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ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

**PROJECT QUALITY MANAGEMENT PRACTICE (QMP): A
CASE OF FEDERAL HOUSING CORPORATION
CONSTRUCTION PROJECTS**

BY

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A Research Paper Submitted To Addis Ababa University College Of Business And Economics
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Degree Of Master Of Art In Project Management (MAPM)

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STATEMENT OF DECLARATION

I hereby declare that the project work titled “Project quality management practices (QMP) in Ethiopian federal housing corporation construction projects” is a study conducted with my own efforts, and that all sources of materials used in the study have been appropriately accredited. I have developed this research paper entirely on my own, with advice and suggestions from my advisor. This research is provided as a partial fulfilment of a Master of Art degree in Project Management and has not been submitted for any degree at any university or institution.

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STATEMENT OF CERTIFICATION

This is to certify that Moti Duguma has carried out his project work on the topic entitled “Project quality management practices (QMP) in Ethiopian federal housing corporation construction projects”. This work is authentic, and eligible for submission as partial fulfillment for the requirements of the award of Master of Arts in project management.

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APPROVAL SHEET

**“PROJECT QUALITY MANAGEMENT PRACTICE (QMP) IN FEDERAL HOUSING
CORPORATION CONSTRUCTION PROJECTS”**

BY

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List of Acronyms

| | |
|-------|--|
| ISO | International Organization for Standardization |
| PM | Project Management |
| PMBOK | Project Management Body of Knowledge |
| PMI | Project Management Institute |
| QA | Quality Assurance |
| QC | Quality Control |
| QMP | Quality Management Practice |
| QMS | Quality Management System |
| TQM | Total Quality Management |
| FHC | Federal Housing Corporation |
| COPQ | Cost of poor quality |
| EBCS | Ethiopian building codes and standards |

ABSTRACT

The primary goal of this research is to assess the project quality management practices in federal housing corporation construction projects. The research aims to investigate how the concept of quality and quality management is adopted in the FHC's construction projects, to identify the main objectives of using quality management system and the problems encountered in implementing quality management system, to identify the factors that are mostly affecting the quality of building construction during the construction stage and to assess strategies applied to improve the quality management systems of Ethiopian federal housing corporation building construction project. To achieve these objectives, a qualitative research with descriptive research design was used. Data was collected with in the form of questionnaire which included both open and closed ended type questions. A purposive sampling technique was employed to select respondents from federal housing corporation staffs, the contractor and consultant employees. Totally A questionnaire survey of 69 people was conducted with 59 (85.5%) of the project managers, senior site managers/engineer, staffs from human resource, resident engineers, technical team members and office engineers responding. And to analyze these descriptive statistics the Microsoft excel software was used. The research findings show that the corporation is aware with most of the objectives and concepts of quality and quality management system. And it has been shown that the corporation's projects are being affected by Inaccessible materials and equipment, financial issue, Quality control and cost control system and policy used by the corporation itself. In conclusion, successful project management is not only about successfully completing projects with in time, scope and cost but also meeting quality standards is a crucial issue in the successfulness of any construction projects. To do so a proper project quality management system helps to achieve building quality standards (both aesthetic and safety wise), meeting deadlines within budget and customer satisfaction. Finally, the researcher recommended: The hiring of new young professionals from the construction sector to facilitate the implementation of new technological strategies and techniques, investing on local building material and equipment manufacturers will help to decrease the million dollars to be spent for purchasing from abroad, needs to give additional emphasis to meeting project deadlines, project cost budget to save incurred additional cost and time as well to helps the projects from phasing-out, and a revision on the corporation's contract administration and procurement policies, and procedures.

Key words: *Federal housing corporation, quality management system, financial issue, quality control and cost control.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The entirety of a product or service's features and traits that have an impact on its capacity to meet explicit or implicit needs is quality, according to the ISO 9000 standard. According to (Kerzner, 2009) concepts like customer satisfaction, fitness for use, and zero faults are objectives rather than definitions. The majority of corporations see quality more as a process than a finished good. In order to be more precise, it is a process that is constantly being improved, wherein the lessons learnt are applied to improve upcoming goods and services in order to: keep current customers, win back lost customers, and win new ones. (Williams, 2008) states that quality is not only the quality of the finished product but also the approach. This means proper quality control should be applied in the production phase before the products/services are finished and join the market.

Quality is one of the constraints that define project success. Out of several factors a project manager uses for determining a project's viability is quality. The project manager is ultimately in charge of the project's quality management. Management of costs schedules and quality are given equal emphasis. (Kerzner, 2009). According to (Stojetovi et al, 2014), project managers frequently strive to maximize project quality while staying within a specific timeline and budget. According to (Rose, 2014) a project's quality has a significant impact on the quality of the process or product that results from it. A project manager should never, ever compromise quality when implementing a project. He also notes that project managers sometimes do so in order to fulfill other restrictions like time, cost, and scope.

The management of the project and its deliverables are addressed by project quality management. Regardless of the type of the deliverables, it applies to all projects. Specific quality standards and methods are used depending on the project's deliverables PMBOK Guide (PMI, 2017).

A five-element model developed for managing quality on projects, where two elements stand in for what we need to manage the quality of (the product and management processes), two represent how we manage it (through quality assurance and quality control), and the fifth element is the attitudes of the people involved (Turner, 2009).

Quality is one of the most crucial factors in determining if a construction project will be sustainable. The achievement of the goals of the concerned parties (i.e., client, construction consultants, and building contractor satisfaction) can be characterized as project quality and project success (Ashokkumar, 2014). The ISO 9000 definition for quality is the totality of feature and characteristics of a product or service that bears on its ability to satisfy stated or implied needs. To be more specific, it is a continuously improving process where lessons learned are used to enhance future products and services in order to: retain existing customers, win back lost customers, win new customers.

Quality is not only about the quality of the finished product but also the approach. This means proper quality control should be applied in the production phase before the products/services are finished and join the market according to (Williams, 2008).

Quality is one of the factors that can affect the success of a project. The project manager is responsible for ensuring the quality of the project. Quality management is an important part of ensuring that projects stay on schedule and within budget. Often project managers try to achieve the highest possible quality within a given deadline and budget. Project Quality Management is the process of managing the project and the quality of the project's deliverables. The principle is applicable to any project, regardless of its deliverables. Quality measures and techniques are specific to the types of products being produced by the Project Management Institute (PMI) Project Guide. (PMI, 2017).

The construction industry has had a number of quality issues. Construction and other development activities consume a sizeable chunk of the budget each year (Ayalew et al., 2016). The quality of the project's outcomes is not meeting the required standard, which is due to defective construction. As a result, more investment is necessary to correct and maintain building flaws. Throughout the course of a building project, it goes through several stages. The most important stages of conceptual planning, feasibility research, design, procurement, construction, acceptance, operation, and maintenance are involved.

High-quality ought to be identified, from the factor of significance, at the same level as the scheduled time, cost and scope of the project. If the stakeholders are not happy with the given quality of project management or the outputs of the project, the project team should devote scope change, time extensions and extra cost to fulfill the stakeholders' wants and expectations (Rahel, 2017).

Proper Project management desires to balance all the 3 project constraints: time, budget and quality. A project manager is always at ease to manage and manipulate finances and time but quality. poor quality control is the primary cause for the failure of many projects. (Stojcetovic, et al., 2014) states that there are numerous examples in practice that projects had been delivered on time and within budget but did not meet the expectancies of clients

Quality management is crucial for construction firms' survival in today's highly demanding and competitive construction market. quality management have to create an ecosystem in which essential tools, strategies, and techniques can be used effectively, resulting in companies' operational achievement (Besterfield et al., 2014). For construction companies, quality management isn't a stand-alone characteristic; it is entangled with all the firm's operational and managerial operations.

The construction industry is one of the many major industries in which various sub projects are involved in it and the concern of this paper. Thus, not implementing or even low implementation of quality management system in construction projects will make it very difficult to deliver the required product or service within the desired quality. "A sound quality management program with processes in place that monitor the activities to be executed in the project is a good investment. Not only does it contribute to client satisfaction, but it helps organizations use their resources more effectively and efficiently by reducing waste and revisions. Quality management is one area that should not be compromised. The payoff is a higher probability of successfully completing the project and satisfying the client" (Wysocki, 2003). Therefore, construction projects must implement the appropriate quality management system to complete the construction projects in time, within the budget limit and required quality standard so that additional expenses will be minimized and project objectives will be met

1.2 Background of the organization

The Federal Housing Corporation (FHC) is a State-Owned Enterprise recently being re-organized by the Council of Ministers, with a More than 18,450 housing units (Commercial & Residential Apartments, Villas, Hotels) – worth more than ETB 70 billion, (doesn't include the new projects). A significant size of land holdings in the Capital City and Dire Dawa – all of them located in prime areas, well experienced & skilled man power, more than 150 light & heavy vehicles, Workshops for metal and wood works, Garage for vehicles repair and service Fuel Station.

the Corporation's activities are organized under four divisions: -

- Housing Development,
- Housing Administration,
- Construction Inputs Supply and
- Corporate Services Divisions

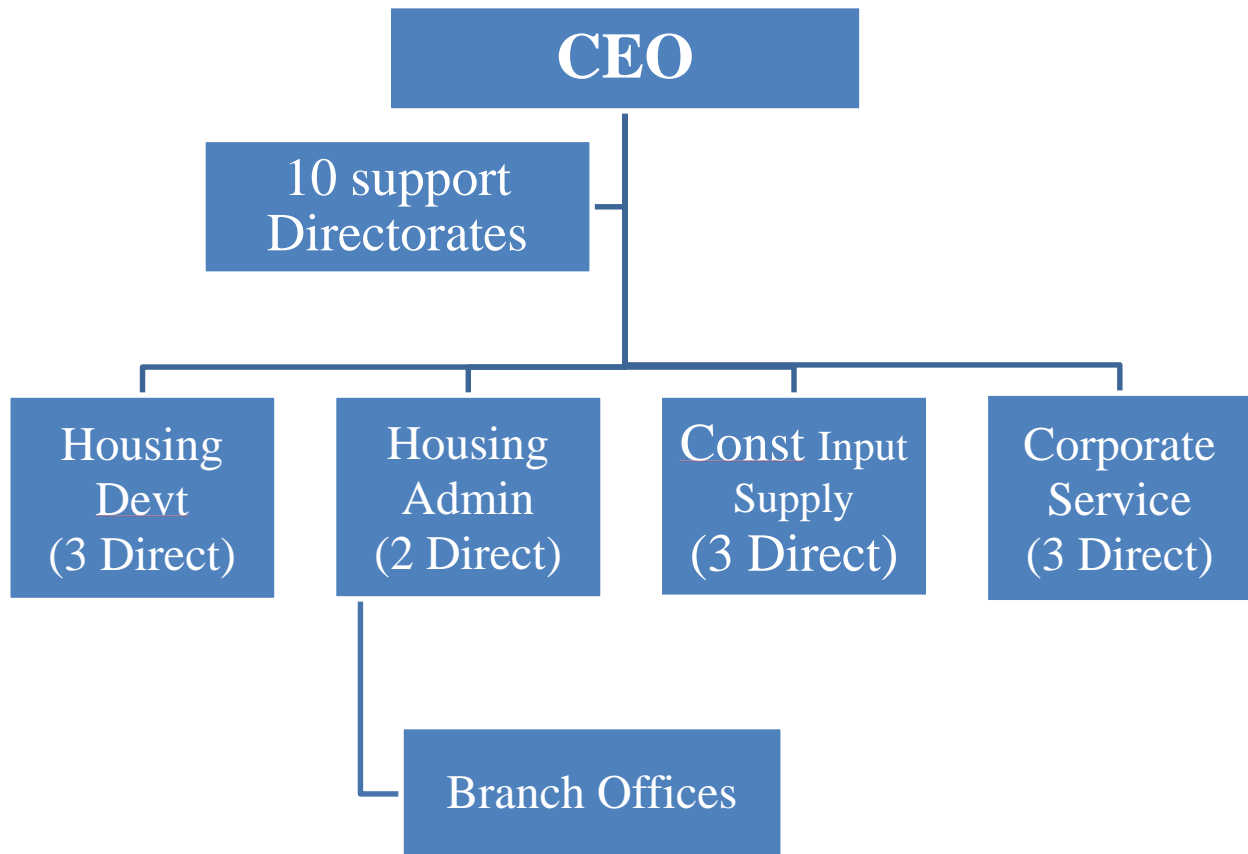


Fig 1.1 Organizational structure of the corporation

Major mandates of FHC:

construct, cause to contract, rent out, sell or buy up on special decision houses that may be used for different services;

- administer and rent out federal government owned houses and possessions;
- carry out necessary maintenance and repair works to preserve and protect government owned houses;

- construct and rent out houses for government officials, employees and public at large; in accordance with government direction and budget out lays;
- make studies and forward proposals to get financial, technological and modern administrative inputs to be competitive and profitable,
- supply construction materials by manufacturing or through procurement so as to be used for house construction, repair and renewal and to be used for other construction works.

Currently the corporation has resumed the construction of new houses in 2018 in Addis Ababa after nearly three decades. Following the mandate revision, just in 3 years, the Corporation started construction projects in 10 sites – currently their execution status is at different levels. Out of the 10 sites, except Gerji site, 9 sites projects are financed by the FHC's own income sources,

The construction methodology employed were both conventional and technology (aluminum formwork) based, first cycle of the first phase of house development project (HDP) started in five sites, from which the construction in four sites have reached final stage within the expected time, quality and budget. The one site that the corporation is spending multi billions for constructing it is a 2B + G+21 mixed use building currently being built at somale tera, Addis Ababa. Which has a capacity of holding 112 families, out of which 56 houses with two bedrooms and the rest 56 with three bedrooms, not including the commercial rooms.

1.3 Statement of problem

In Ethiopia, there's poor quality management practice and it's one of the areas that need greater attention. Through analyses of the EQA self-assessment report and evaluation, generally, quality control practice in Ethiopia was discovered to be low in all the principles which includes strategy, policy, resource management, leadership, customer satisfaction, business performance and effect on society (Birhanu & Daniel, 2013). Since service is tough to control and measure so is its quality. (Birhanu & Daniel, 2013) additionally their research states that quality management practice in service provider industries is weaker whilst it's compared to manufacturing industries.

Considerable amounts of time, cash, and sources are squandered due to ineffective or insufficient quality management system on construction projects. according to (Abdul-Rahman, 1995) non-conformance to stated criteria can also be used to discern poor quality resulting from inadequate construction quality management. Non-conformance in construction takes place whilst the very last end result of a project and its components differs from the specifications. Quality management isn't an event in fact it's a process, a consistently high-quality service or product cannot be produced

by using a detective system. Quality management is a repetitive cycle of measuring quality, updating quality until a better level of quality is achieved. Non-conformance also can increase due to a project's time and cost being mismanaged.

Conformity, based on ISO 9000:2015 as cited on (Bielefeld et al., 2020), is the "fulfillment of a condition." A project's requirement is a necessity, expectation, or obligation, and to conform means to meet or satisfy with them. client needs, product specifications, quality management prerequisites, management requirements, manufacturing requirements, compliance duties, legislative necessities, and regulatory requirements are just a few examples of requirements.

The Construction industry has been substantially chastised in recent years for its performance and productivity in comparison to other industries. After 2007 it appears that the construction sector is undergoing a duration of extensive introspection, that's compounded through improved technological and societal change. The pace of construction is converting due to these advances (Ayalew, T., Dakhli, Z. and Lafhaj, Z., 2016).

Now collapse of a building is vital concern in Ethiopia. Building collapses in Ethiopia have been increasingly frightening in recent years. The fall of a five-story building in Addis Ababa, according to (Zerihun, 2016), was not unusual in Ethiopia. Other collapses have occurred in Ethiopia in recent years, including a three-story structure in Gondar, a three-story tower in Hawassa, and a four-story tower in Wolayta. He also indicated that active engagement of all stakeholders, such as the customer, contractor, consultant, financiers, and others, is one of the most significant aspects for good quality in the building sector. The aforementioned study and reports highlight the importance of quality in a building structure. In light of this, the purpose of this research is to determine the impact of quality on performance measurement and, where acceptable, offer suggestions.

As long as the project output is what the federal housing corporation demands the projects are tolerated in some degree of quality. According to the preliminary assessment, and in addition to what we the professionals in the construction sector witness there is a gap in project quality management concept and their implementation both in private construction companies and federal housing corporation construction projects (the corporation's annual report).

This study tries to be a breakthrough for the corporation in the terms of quality management because no other studies have been done on the context after FHC has been re-organized by the council of ministers recently, by being dormant for more than three decades. (according to a report by corporation). The main issues with project quality management practice in the Federal Housing

Corporation, as determined by the researcher's assessment and findings from various organizational project documents, are: poor quality management guidelines, policies, processes, tools and techniques and standards; a problem with experts about quality; a lack of top management commitment; employee turnover; a lack of expert consultants and contractors; and a communication gap between top managers.

Therefore, based on what has been done in different contexts, Ethiopia and practical problems observed in the construction projects in Ethiopia indicated in the literature, this study aims to assess project quality management practices, quality awareness/culture together with the strategies employed to improve the awareness of quality, and quality management implementation problems with special focus on building construction project by the corporation.

Thus, the researcher derived and motivated to fill this research gap by studying the project quality management culture in federal housing corporation construction project, focusing on the staffs located at somale tera mixed use building, since it is currently being built with the collaboration of the Chinese communication construction company (CCCC) as a contractor and Acute engineering as a consultant. This research will differ from other previous ones by the extra mile it goes to try and discover present day problems associated with construction quality management and put possible recommendations for the organization.

1.4 Research Questions

The following are main research questions this research is going to address.

- ✓ How the concept of quality, customer quality management system and the overall quality management system are adopted in the building construction projects?
- ✓ What problems encounter in implementing quality management system?
- ✓ What are the factors that are mostly affecting the quality of building construction during the construction stage?
- ✓ What strategies are being applied to improve Ethiopian federal housing building construction project quality management systems?

1.5 Research objectives

1.5.1 General Objective

The general objective of this study will be assessing quality management practice (QMP) in federal housing corporation construction projects.

1.5.2 Specific Objective

The specific objective of this study will be the following:

- ✓ To investigate how the concept of quality, customer quality management system and the overall quality management system are adopted in the building construction projects.
- ✓ To identify the main objectives of using quality management system and problems encountered in implementing quality management system.
- ✓ To identify the factors that are mostly affecting the quality of building construction during the construction stage.
- ✓ To assess strategies applied to improve the quality management systems of Ethiopian federal housing corporation building construction project.

1.6 Significance of the study

Nowadays, driving a construction project into quality while keeping costs low and completing it on time is more important. This is because quality is essential to meet the project needs of the owners, contractors, and other parties involved more satisfactorily. Furthermore, low quality may result in extra expenditures to the firm, such as failure and appraisal (Mallawaarachchi and Senaratne, 2015). According to (Han et al., 2012), project performance is determined by time, cost, and quality. The quality dimension is explored as the least explicit element of project performance among these three widely acknowledged limitations. Thus, this study is extremely important for federal housing construction project.

For a starter, this study promotes quality awareness and implementation in the building industry. Second, it enables construction companies to concentrate on critical elements that may influence quality and quality management issue, helping them to strengthen their quality management system.

The study provides a different viewpoint on the quality management systems of federal housing corporation's building projects from a research and academic standpoint. A comparison analysis also aids in the association of the present quality management system with various phases of construction.

The findings can potentially serve as a springboard for subsequent research. By simply shifting the concept of this study from building to other construction modalities such as road, irrigation, and bridge, an analogous study can be undertaken.

1.7 Scope of the study

Geographically the study will be conducted in Addis Ababa. The specific place where this study will be held is at federal housing projects in Addis Ababa, which is specifically found in Somali Tera, in the year of 2022 GC. The study will apply a qualitative research method with descriptive research design. The topic area of this study is assessing the practice of quality management practices in federal housing construction project. The research and the researcher of this study will be limited only on assessing the practice of quality management in federal housing project in Addis Ababa, which is specifically found in Somali Tera.

The respondents of this study will be Employers of federal housing projects in Addis Ababa, which is specifically found at Somali Tera mixed use building site, the consultants and personnel from the contractor that are working during the study time of this research.

1.8 Organization of the Study

The study is divided into five sections. The first chapter will contain background of the study, statement of the problem, the research questions, objectives of the research, scope of the study. The second chapter will contain theoretical and empirical literatures as well as the study's conceptual framework. The third chapter covers research design and methodology, data sources, target population, sampling methods. The fourth chapter will contain data analysis and interpretation of major findings, and at last the fifth chapter will contain summary, conclusion and recommendation.

1.9 Limitation of the study

Since project management as a subject is still in its development, various methodologies, theories, practices, and systems need to be put into effect. Despite the fact that the field has produced a large number of publications, further books, papers, and theoretical analyses for each project knowledge area and project process group are still expected. Therefore, one of the constraints and the main issue was the lack of easily accessible reference materials in the field of study. Second limitation was due to tight work schedule and an availability of some of the respondents (government officials) punctual collection of data was difficult. Thirdly the researcher focuses to study the quality management practices in somali tera Lot 9 mixed use building project only from the client's perspective, the contractor's and consultant's perspective on this study will not be discussed.

CHAPTER TWO

LITREATURE REVIEW

2.1 Introduction

This chapter discusses different literature published by scholars in the area of construction management and quality management practices in construction. It puts into perspective different findings and conclusions of various articles. Recent articles and publications have been considered to reflect the central idea of this paper. It has two sections theoretical and Empirical. Theoretical review tries to explain that theoretical knowledge and the empirical literature review explains the area from actual research papers.

2.2 Theoretical review

2.2.1 Quality

Quality has evolved from just meeting customer needs to a scenario in which a product or service may be delivered at a minimal price while preserving its trustworthiness and consistency (Besterfield et al., 2014). Quality in the construction firm is determined by (Farooqui and Ahmed, 2009) as the ability to meet client expectations, the ability to continue projects on budget and on time, the reduction of defects and reworks, and project adherence to ISO 9000 quality standards. The ISO 9000 meaning of quality is indeed the sum of a product's or service's features and qualities that affect its ability to meet requirements.

Presently, total quality management has been used to handle client needs (TQM). total quality control (TQM) is an ever-evolving idea. Total quality management is a constantly evolving approach for integrating a numerous organizational constitutes into design, development, and production operations in order to provide economical services or products which might be fully proper to the end users.

TQM is client-centered and results in higher levels of authentic client satisfaction. Clients these days are very demanding: better overall performance standards, fast product development, increasing technological levels, materials, smaller contractor earnings margins, and decreased non-conformance (Shankar, 2010).

2.2.2 project Quality Management

project management is a subject which is involved on maximizing project quality within its described budget and agenda. Project management is the application of knowledge, skills, tools, and techniques to project activities to fulfill the project requirements. (PMI, 2017) additionally states that project management allows corporations to execute tasks efficiently and effectively.

Wysocki states that: A sound quality management programs with processes in place that monitor the work in a project is a good investment. It is not only contributing to customer satisfaction but also it helps organizations use their resources more effectively and efficiently by reducing waste and rework. He further described “Quality management is one area that should not be compromised. The payoff is a higher probability of successfully completing the project and satisfying the customer” (Wysocki, 2014).

Therefore, so as to correctly manage and attain maximum quality in a firm, the most essential stakeholders (the employees) must be kept satisfied, as they're key to the business's success. The revolutionized present day quality management tactics consist of quality control and assurance. (Romero et al., 2019) defined quality management as having cornerstones: quality planning, process monitoring, quality enhancement, and quality assurance.

Quality control is a distinct entity which should not be forgotten throughout the implementation of a project; it deals with the management of ventures of every type and the way to meet the deliverables assigned to them (PMP, 2017). It is the practice of a project's planning, management, and control of quality. This basically means that project quality control is essential for the successful completion of any construction project. To effectively adopt optimal quality management methods, it is necessary to first determine the current level of quality with in company; this is necessary before any strategy can be established and implemented. (Burke, 2013) emphasized the significance of quality management in attaining project goals, stating that businesses must adjust their quality management way to fulfill project tasks in a timely manner. Quality control in building projects can be accomplished in a variety of ways. Some quality management strategies have indeed been popular for centuries; nonetheless, certain practices are required to solve the industry's current dilemma.

Customers' demands, according to (Kerzner, 2017), motivate the need to enhance quality. The requirement to execute projects on time, reduced rates of faults in projects, and reduced contractor profit margins are only a few of the basic consumer demands. He described how quality has evolved over time from being the duty of a few workers in an organization to becoming the duty of everybody. In today's world, businesses are beginning to make quality a shared responsibility among all employees in order to ensure that quality is ingrained in the company culture.

Total quality management is strategy that exemplifies the client perspective of quality (TQM). TQM is described by (Ishanka and Gooneratne, 2018) as the application of some measures in a venture to eliminate costs which does not add value to the project while also enhancing productivity. TQM is also defined by (Oyebamiji, 2019) as a phenomena in which firms seek continual improvement by changing their organizational structure to meet consumer expectations. This method to quality management has been there for decades, and some firms have attempted to use it because of the long-term benefits it provides.

Quality Management Plan is considered to be constructed in principle according with "International Organization for Standardization" ISO 9000-series as well as the "Plan, Do, Check, Act" PDCA-cycle by (Kaufmann and Wiltschko, 2006). It also included the following illustrations of the two primary structures mentioned above:

2.2.2.1 ISO 9001 Standards

ISO is a global federation of international standards bodies (Taril, et al., 2012). Such a non-governmental organization brings together standards bodies including over 160 countries to encourage and manage global standards for technology, scientific test methods, workplace circumstances, societal problems, and others (Taril, et al., 2012). ISO 9001 is a standard that sets the requirements for an effective system and was developed by ISO. It is a universal standard that institutions use to illustrate their ability to successfully offer products and services that satisfy clients and regulatory requirements (Heras-Saizarbitoria & Boiral, 2013).

The construction sector needs ISO 9001 standards for a range of factors, including standardizing services and product quality, lowering constructor costs, and ensuring continuous improvement. These advantages can be backed up by ISO 9001, which has special requirements for the building industry.

The elements are as follows: Planning – The ISO 9001 aspect of planning is organized in such a way that it supports more detailed strategic planning for construction projects. It focuses more on how risks and opportunities can be handled in building projects because then pre-determined goals can be reached (Heras-Saizarbitoria & Boiral, 2013).

It can assist in this by managing contractor performance and ensuring that the supply chain fulfills the price target. It can assist with it via contractor performance management and ensuring that the supply chain satisfies both pricing and quality objectives at the same time. A construction company can benefit financially, in terms of quality, and in terms of time by doing so. Performance evaluation – this element is critical because it directs a construction company to analyze its overall performance while also allowing for continuous improvement via previously mentioned attributes of better planning, processes, and performance (Heras-Saizarbitoria & Boiral, 2013).

The process approach is a component that allows a construction company to bring together all of the components of a complex project, such as budget and timeline.

The process approach might be beneficial in assisting a building company in staying within such parameters. Leadership – This component would be important because it gives clear guidance to achieve effective communication on objectives and shared goals, as well as how to set up a great culture within construction projects, resulting in the achievement of both financial and time targets, which are critical in the construction industry. Customer orientation, leadership, employee engagement, process approach, improvement, evidence-based judgment, and client relations are the seven key principles of ISO 9001.

2.2.2.2 PDCA-cycle

The PDCA cycle is a critical excellent management philosophy. Walter Shewhart first proposed the PDCA cycle at some point of the Nineteen Thirties, and W. Edward Deming sooner or later embraced it. The method is an iterative which includes 4 key method that offers a preferred approach for reinforcing a workflow (Kaufmann and Wiltschko, 2006).

Plan: planning is step one in the section. Managers need to compare the existing procedure and create plans in response to any troubles observed. They have to record all gift methods, collect information, and detect troubles. These records should then be analyzed and used to create an incentive program as well as particular overall performance signs.

Do: this is the plan's implementation and its miles the subsequent step inside the cycle (do). Managers should document those changes achieved and collect facts for the evaluation at some point of the challenge execution.

Check: The 1/3 stage is to double-check the statistics accrued in the previous section. The records are analyzed and evaluated to see if the plan is assembly the goals set out within the making plans phase.

Act: The very last phase of the cycle is to take action based totally on the consequences of the previous three stages. The quality approach to do this is to share the results with other employees after which apply the new technique if it proves to be successful. it is important to understand that this is a cycle, and the subsequent degree is to plan again. We have to keep evaluating the system, plan, and doing it all another time after we've got taken action.



Figure 2.1 Japanese PDCA Cycle Source (Moen and Norman, 2006)

2.2.2.3 Quality Management Systems

Proper quality standards provide a mechanism for attaining quality if they are executed in conformance with specifications (i.e., conformance to installed requirements). A quality system, according to the American National Standards Institute, is "the organizational structure, duties, techniques, approaches, and resources for executing satisfactory management" (Battikha, 2002). Quality management systems, alternatively, supply a selection of quality elements performed in creating a product, process, or service, and encompass prevention and assessment (Burati et al., 1992). Inside the quality system, quality activities consist of deciding the quality plan, goals, and duties placing them into motion via planning phase, quality control, quality assurance, and process optimization (Battikha, 2002).

Current quality management systems strive to reduce variation and offer outputs that match set criteria in order to achieve ISO compatibility. Modern quality management systems recognize the importance of customer satisfaction, prevention over inspection, continuous improvement, management responsibility and cost of quality. Customer satisfaction is a critical factor in these strategies. Customer requirements are fulfilled by understanding, analyzing, specifying, and monitoring requirements. This necessitates a combination of requirement compliance and usability. Inspection comes second to prevention. Quality must be planned, created, and built further into project management and results, not inspected into them. The cost of preventing errors is typically substantially lower than the cost of rectifying errors that are discovered during inspection or during use. Continuous improvement is a must.

2.2.2.4 Project Quality Management Processes

Project Quality Management includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements in order to meet stakeholders' objectives.

Project Quality Management also supports continuous process improvement activities as undertaken on behalf of the performing organization. The Project Quality Management processes are: Plan quality management, manage quality and control quality

plan quality management

Plan Quality Management is the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will demonstrate compliance with quality requirements and/or standards.

The key benefit of this process is that it provides guidance and direction on how quality will be managed and verified throughout the project. (PMI, 2017)

The purpose of the QMP is to describe how quality will be managed throughout the lifecycle of the project. Quality management planning determines quality policies and procedures relevant to the project for both project deliverables and project processes, defines who is responsible for what, and documents compliance.

According to the ISO the following issues must be ensured in a good quality management plan:

- Minimize cost
- Improve efficiency
- Satisfying customer needs and expectation
- Reduce cost of re-work

Steps to follow in managing quality:

- Initiate the project.
- Identify the clients/customers.
- identify the needs of the customers
- Study and arrange customer needs.
- develop the product needed
- Improve the product features so as to meet the product range as well as customer needs.
- Identify process and goals
- Establish a process able to produce the product.
- Optimize the process features and goals.
- Verify that the process can produce the product under operating conditions.
- Identify control needs.

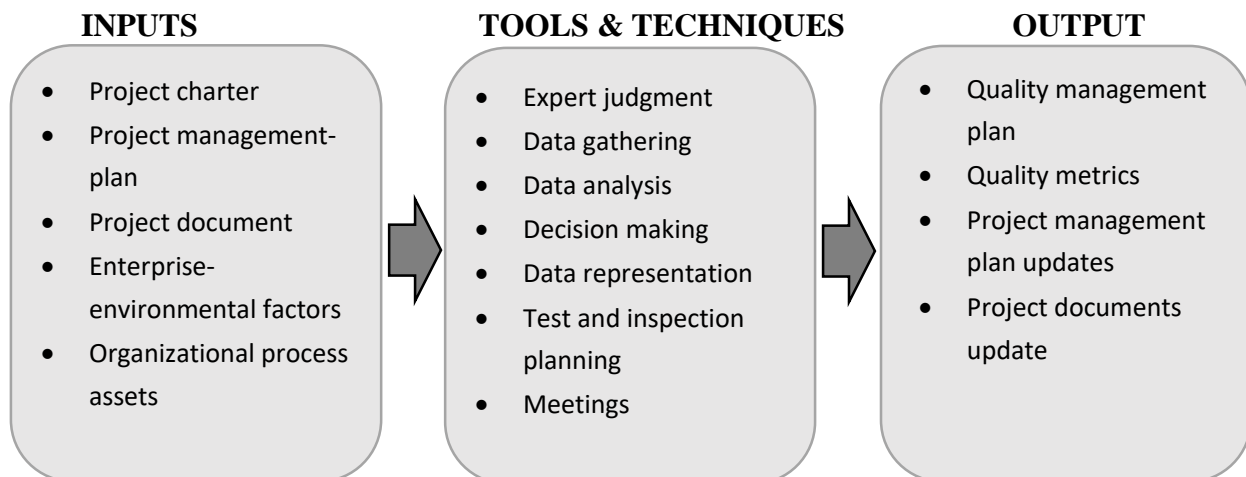


Figure 2.2 layout of planning quality management

Manage quality

The process of translating the quality management plan into executable quality activities that incorporate the organization's quality policies into the project. (PMI, 2017)

A quality management principle is a comprehensive and fundamental rule / belief, for leading and operating an organization, aimed at continually improving performance over the long term by focusing on customers while addressing the needs of all other stakeholders". (ISO 9000)

These principles are mainly composed of eight major ones:

- **Customer focus:** Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

The key steps in applying a Customer Focus are based on (quality management systems, 2014):

- ✓ Ensure a balanced approach among customers and other stakeholders needs and expectations.
- ✓ Understand your customers' needs and expectations for products, delivery, price, dependability
- ✓ Communicate these needs and expectations throughout the organization.
- ✓ Measure customer satisfaction and act on results.
- ✓ Manage customer relationships.
- **Leadership:** Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

The key steps in applying the Leadership principle are:

- ✓ Understand and respond to changes in the external environment
- ✓ Consider the needs of all stakeholders including customers, owners, people, suppliers, local communities and society at large
- ✓ Build trust and eliminate fear
- ✓ Be proactive and lead by example.

- ✓ Promote open and honest communication.
- ✓ Educate, train and coach people.
- ✓ Establish shared values and ethical role models at all levels of the organization.
- **Involvement of people:** since People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

The key steps in applying the Involvement of People principle are:

- ✓ Actively seek opportunities to make improvements and enhance competencies, knowledge and experience.
- ✓ Accept ownership and responsibility to solve problems.
- ✓ Focus on the creation of value for customers.
- ✓ Freely share knowledge & experience in teams.
- ✓ Improve the way of representing the organization to customers, local communities and society at large.
- **Process approach:** A desired result is achieved more efficiently when activities and related resources are managed as a process.

The key steps in applying the process approach:

- ✓ Define the process to achieve the desired result.
- ✓ Identify and measure the inputs and outputs of the process.
- ✓ Identify the interfaces of the process with the functions of the organization.
- ✓ Evaluate possible risks, consequences and impacts of processes on customers, suppliers and other stake holders of the process
- ✓ Establish clear responsibility, authority, and accountability for managing the process.
- ✓ Identify internal and external customers, suppliers and other stake holders of the process.

- **System Approach to Management:** Identifying, understanding and managing a system of interrelated processes for a given objective improve the organization's effectiveness and efficiency. Using a systems approach to management involves identifying all of an organization's processes as well as their interdependence and managing the processes as a complete system.

Key steps in applying the System Approach to Management are:

- ✓ Define the system by identifying or developing the processes that affect a given objective
 - ✓ Structure the system to achieve the objective in the most efficient way
 - ✓ Understand the interdependencies among the processes of the system.
 - ✓ Continually improve the system through measurement and evaluation
- **Continual Improvement:** Continual improvement of the organization's overall performance should be a permanent objective of the organization.

Key steps in applying the Continual Improvement principle are:

- ✓ Make continual improvement of products, processes and systems an objective for every individual in the organization.
 - ✓ Apply the basic improvement concepts of incremental improvement and breakthrough improvement.
 - ✓ Use periodic assessments against established criteria of excellence to identify areas for potential improvement.
 - ✓ Continually improve the efficiency and effectiveness of all processes.
- **Factual Approach to Decision Making:** The factual approach to decision making principle simply states that "Effective decisions are based on the analysis of data and information."

The key steps in applying the Factual Approach to Decision Making are:

- ✓ Take measurements and collect data and information relevant to the objective.
 - ✓ Ensure that the data and information are sufficiently accurate, reliable and accessible.
 - ✓ Analyze the data and information using valid methods.
 - ✓ Understand the value of appropriate statistical techniques, and
 - ✓ Make decisions and take action based on the results of logical analysis balanced with experience and intuition.
- **Mutually beneficial supplier relationship:** interdependency and relation of an organization and its suppliers enhances their ability to create value

The key steps in applying the mutually beneficial supplier relationship are:

- ✓ The first one is its ability to create both parties
- ✓ Cost optimization and resources.

Control quality

The process of monitoring and recording the results of executing the quality management activities to assess performance and ensure the project outputs are complete, correct, and meet customer expectations.

Quality control, as described by (Harris and McCaffer., 2002) is a collection of actions or processes whose objective is to guarantee that all quality criteria are satisfied. Processes are monitored and performance issues are resolved in order to reach this goal. According to the ISO definition, quality also governs the operational processes and activities utilized to meet quality criteria. This definition might indicate that any action aimed at quality improvement, control, management, or assurance is a quality control activity.

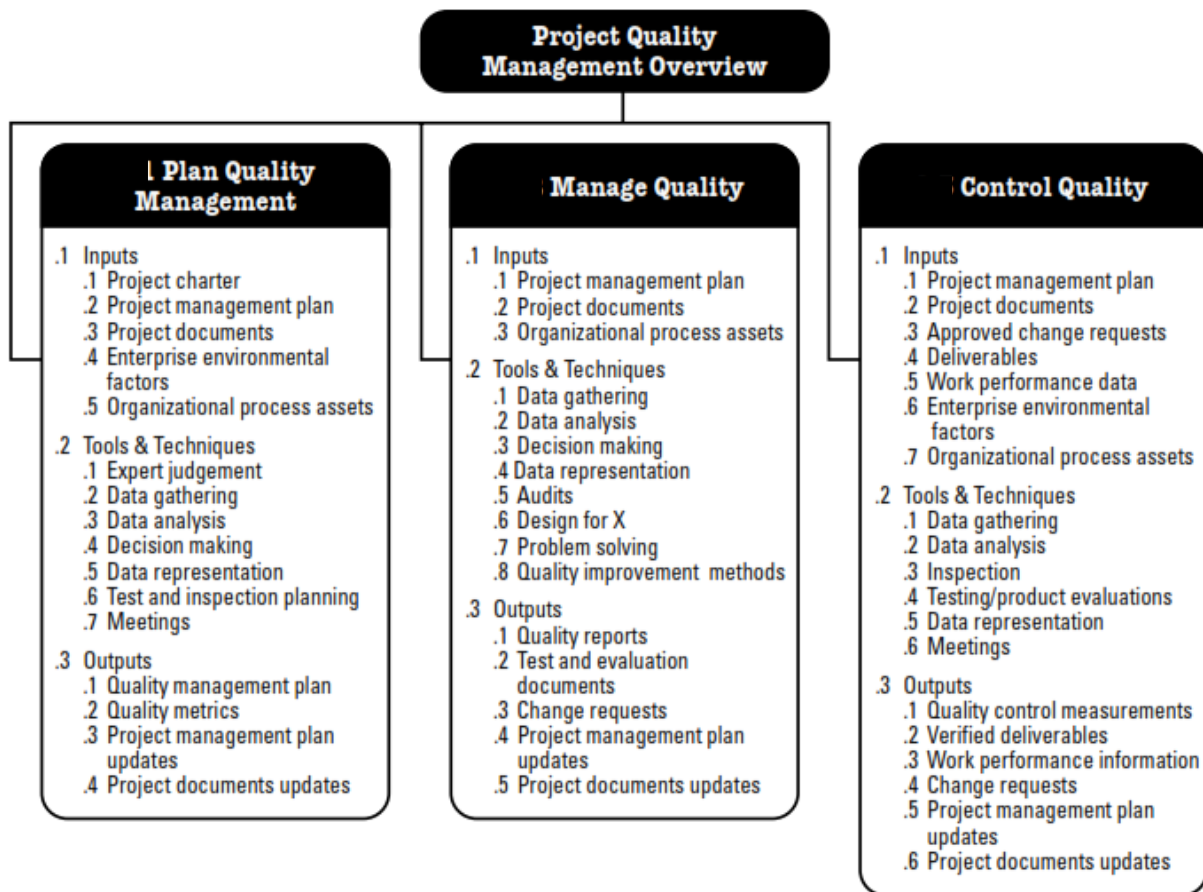


Figure 2.3 Project quality management overview

2.2.2.5 Challenges in Quality Management Practice in Construction

By finding and removing the variables that contribute to poor project achievement, quality may be ensured (Lepartobiko, 2012). The project manager's expertise and managerial support were shown to play a major role in improving the quality of a construction project's performance; however, lack of contractor experience ranked first among the quality-related reasons for project failure. In the framework of projects, good quality has been defined as meeting the customer's requirements, specifications, solving problems, fitting the purpose, and satisfying the customer, so the community serviced by the project. The majority of academics agree that different internal and external things influence project quality in the construction industry.

Based on the nature of the project, quality is one of the most important considerations in project management, particularly in developing nations like Ethiopia. Leadership issues, an absence of policy and strategy, unsustainable resource management, ineffective process

management, a reduced customer emphasis, and poor business achievement, according to (Birhanu, 2014), are the underlying causes of quality control problems that leads too Ethiopia's poor quality management issue.

2.3 Empirical Review

In the Malaysian construction sector, a research project by (Chin-Keng, 2011) analyzes quality management techniques, management commitment and quality effective implementation challenges in building projects. The study's findings suggest that highest managers of construction organizations should be more involved in quality management, that human and financial resources should be better allocated to troubles of quality assurance implementation, because there are issues with quality management implementation that need to be addressed.

According to a study conducted by (Ofori, 2013) to identify and evaluate the quality of project management strategies and also key performance indicators for projects in Ghana, top management support, effective communication, clarification of project purpose and goals, and stakeholder engagement are all crucial elements which contribute to quality project completion.

According to the research conducted by (Toor & Dhir, 2011)) the goal of giving customers, construction managers, designers, and contractors the information they need to effectively manage the quality of buildings project by defining and ranking the factor that affect process quality of construction projects. Design, lack of communication, adherence to guidelines and regulations, choice of developer, collaboration of stakeholders, management capability, choice of consultant, top management commitment, workforce, implementation, fabric, machinery, money troubles, health and reliability systems, and legal documentation are all factors that affect quality, according to the study.

By putting a focus on quality at every level of the business, which can assist solve complicated problems and signify excellence, quality awareness is a means to support quality activities. Organizations now place a high priority on quality due to a variety of issues as well as the growing importance of the quality system. Irrespective of how they operate, quality awareness is a problem that affects all industries who are trying to deal with the quality concerns. (Hussain, Abba, and Merviel, 2006)

Due to their lack of advancement and strength, Ethiopian industries are less exposed to a highly competitive market and don't use the most up-to-date quality control methods, which would allow them to learn more about the systems that can be used to enhance quality and operational performance (Berhe & Gidey, 2016). In a study by (Berhe and Gidey,2016), out of 44 businesses from diverse industries the majority of quality departments in the industry sectors do not properly understand quality control tools. 62% of their respondents admitted that they received no training on quality control tools. This is primarily a result of upper management's lack of awareness and motivation. The following items have been chosen from the literature to study the quality: implementation and awareness in the workplaces.

1. Availability of Quality planning, control and assurance methodology in the company
2. Trainings given to improve their Attitude towards customer quality management system
3. Application of new technological strategies and techniques to develop culture of quality management practice
4. Implementation of continues follow up strategies in the project site by the concerned bodies.
5. Experience sharing from other projects.

Factors Affecting the Quality of Construction Projects

Poor management techniques at each level of the project have a significant impact on the project's quality. Construction project quality is correlated with effective quality management throughout the whole project life cycle (Ashokkumar, 2014). According to a study by (Ayalew, Dakhli, and Lafhaj, 2016), Ethiopian construction project managers did a poor job of adapting general project management practices, project management functions, tools, and methodologies. Additionally, it was discovered that very little was being done in terms of safety, risk, and time management. Projects also revealed schedule delay and budget overruns.

In addition, other factors including risk, quality, resource use, and safety diverges up to 40% from the specifications set forth at the start of the projects. By supporting this, (Shahraki, et al, 2018) argues that, unfortunately, given the importance of the building

construction sector, the poor work performance of engineers results in poor quality of urban developments.

The following components have been used in this analysis based on a thorough literature review on the factors of poor-quality construction.

- ✓ Lack of professional project managers and experienced site employees.
- ✓ Lack of trainings
- ✓ lack of equipment and defective materials
- ✓ Absence of on-site quality tracking
- ✓ Harsh management control and administration system
- ✓ Non-conformance to specifications and drawings
- ✓ Quality control and cost control system and policy used by the corporation
- ✓ Financial issue

Quality improvement

Due to a failure to prevent defects and wastage during construction work, the construction sector is faced with the critical issue of cost of poor quality (COPQ). Poor quality costs the construction industry up to 40% of its income and goes unaccounted for. (Mashwama, Aigbovboa, & Thwala, 2017). According to a study by (Mashwama, Aigbovboa, and Thwala, 2017), the project managers' position in building projects is still not well understood, which could be problematic if it is not discovered and acknowledged. Additionally, it comes to the conclusion that there are other success criteria, such as the implementation of a quality management system, that can actually assist to eliminate poor quality in most construction projects.

The following items have been acknowledged as quality improvement approaches in accordance with the causes of poor quality and the costs associated with not meeting quality standards.

1. Continuous trainings on waste and quality management
2. Assigning qualified staff
3. Adopting quality reports and records
4. Respecting code of working ethics (EBCS)
5. Conformance to standards and specifications

Principles of Quality Management

Companies can utilize a variety of quality-related criteria awards to implement their quality management system. Building construction companies can enhance their quality management system by adopting either of the Malcolm Baldrige Criteria, Ethiopian Quality Award, European Quality Criteria, or Australian Quality Criteria.

Numerous scholars have examined the quality management systems of various sectors using the ISO 9001 standards. (Demissie et al., 2016) used gap analysis to evaluate and identify potential areas for improvement for Ethiopian garment businesses. Similar findings were made by (Ochieng, Muturi, and Njihia, 2015) who discovered that ISO 9001 certification had an impact on the return on net assets of the organizations in East African nations, which in turn influences their performance.

In addition, a survey-based study on the performance of construction projects from 336 respondents found a significant difference at the 5% confidence level that ISO 9000 certified organizations have higher levels of performance in their project environments than those that are not certified, (Din, Abd-Hamid, and Bryde, 2011)

To investigate the quality management system of the building construction enterprises, the quality management principles as per ISO 9001:2015 were employed. The ISO has a number of quality management system standards that are based on ISO 9001 and tailored to particular businesses and sectors. The sole family member standard that can be certified to is ISO 9001:2015, which outlines the requirements for a quality management system. Utilizing ISO 9001:2015 makes it possible to guarantee that clients receive reliable, high-quality goods and services, which has numerous positive effects for businesses. The foundation for the ISO 9001:2015 and ISO 9000:2015 standards is seven quality management principles. which are, the customer focus, leadership, employee engagement, process approach, improvement, evidence-based decision making, and relationship management have been utilized to examine the quality management procedures of the respective construction organizations.

2.4 Conceptual Framework

On this part of the study the researcher developed a conceptual frame work based on the theoretical and empirical reviews done above that helps to understand how the study going to assess the quality management practices in federal housing corporation construction projects

| Customer quality management | Strategies applied | Elements of quality |
|---|--|---|
| <ul style="list-style-type: none"> • Awareness and Trainings given • Experience sharing | <ul style="list-style-type: none"> • New Technological techniques • Preparation of quality reports • Hiring of new professional employees | <ul style="list-style-type: none"> • Project cost budget • Project time/deadline • Health and safety standard • client's Expectation • Quality standards |

Independent variables



| Factors affecting quality of building construction |
|--|
| <ul style="list-style-type: none"> • Project's complexity and type • Material issue • Design issue • Contract issue • Man power issue • Subcontractor issue • Equipment issue • Financial issue • Cooperation experience and understanding of site personnel • Quality control and cost control system and policy used by the corporation • Lack of professional project managers • Harsh management control and administration system |

Successful quality management with in the required design specification, desired customer and other stakeholder satisfaction.

Dependent variable

Figure 2.4 Conceptual Frame Work Source (Author 2022)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

According to (Kothari, 2004:8), research methodology may be defined as a technique that indicates how research is done systematically; and it is the general principle that guides one's research practice (Dawson, 2002:14). It includes research processes, tools and procedures or steps to be taken in accomplishing the research. Thus, this chapter presents the research methodology that comprises, based on the above conceptualization, the research approach and design, the research instruments and type of data collection techniques which the researcher has used. The chapter also describes how the data have been organized, summarized, analyzed and interpreted by using appropriate statistical methods based on the type of data. This chapter will also come out with the discussion on the validity and reliability of the research and the ethical considerations involved in pursuing the same.

3.2 Method of the Study

Research design is the overall plan for collecting data in order to answer the research question and also the specific data analysis techniques or methods that the researcher intends to use. According to (Crosswell, 2005) and (Clark, 2011), a descriptive study is a type of study that tries to explain and interpret what is now available in the form of circumstances, practice, method, patterns, effects and so on. As a result, to measure the qualities mentioned in the study objectives, a descriptive survey method will be adopted in this study. Its purpose is to describe important characteristics of the phenomena under consideration (Sekaran, 2003).

The research approach employed for this study will be a qualitative research design.

3.3. Research Approach

The types of Approaches used in this study will be a descriptive research. Because, Descriptive research is defined as a research method that describes the characteristics of the population or phenomenon studied. The descriptive research method primarily focuses on describing the nature of a demographic segment, without focusing on "why" a particular phenomenon occurs. Or it is research method that describes the characteristics of the population or phenomenon studied. This methodology focuses more on the "what" of the research subject than the "why" of the research subject.

The descriptive research method primarily focuses on describing the nature of a demographic segment, without focusing on “why” a particular phenomenon occurs. In other words, it “describes” the subject of the research, without covering “why” it happens. Descriptive research approach has great contribution to answer most of research questions designed by WH equation.

3.4. Research Design

According to (Creswell, 2009) research design is plan and the procedure for research that span the decisions from broad assumptions to detailed methods of data collection and analysis. The research design embodies a descriptive research approach. The rationale for the choice of descriptive survey method is the fact that the descriptive studies are used in order to describe and interpret the trend of events that exists in an organization (Best and Kahn, 2003). But also, it will follow a qualitative type of research to explain the findings in the study. Moreover, it will help the researcher to avoid limitations of information and this research designs helps to the overall strategy that the researcher has choose to integrate the study in coherent and logical way.

3.5. Population, sampling design and techniques for the study

The Population of this study will be all employees of FHC at LOT 9 mixed use building located at Somali tera, Addis Ababa Ethiopia together with staffs from the contractor and consultant of that project. By referring (Orodho, 2003), and (Dola, 2015) survey design is a technique of collecting population’s attitude opinions or views by using interview or questionnaire by studying a sample of that population. Again (Dola, 2015) stated that sampling is the means of selecting a studying population. Sampling is the process of selecting sample from the studying population and the selected samples should be representative of the total population as much as possible.

The study is conducted between employees, project managers, technical team members, engineers and subordinates. The reason why these groups are selected is due to the thought that these groups are close to the decision making and are more responsible in achieving organizational goals and objectives.

3.5.1. Sampling Design

Taking sample from a population is a normal process that enables to save time and money. Sampling techniques provide a range of methods to reduce the amount of data needed for a study by considering only data from a sub-group rather than all possible elements (Saunders et al, 2009).

According to (Saunders et al., 2009) there exists two types of sampling: probability, where the chances of each case being selected from the population is known and is usually equal for all cases. Random sampling is the technique that gives equal chance to the population to be included in the sample. To select the respondents for the questionnaire a purposive sampling technique was employed. This sampling method is chosen for it allows the researcher to focus on a limited number of informants that are specifically associated with the corporation's quality management department.

3.5.2. Sample size determination

Sample size is actually the total number of units which are to be selected for the analysis in the study. All employees of FHC at LOT 9 mixed use building located at Somali tera, Addis Ababa Ethiopia together with staffs from the contractor and consultant of that project and staffs from head office associated with the project design and follow up of the above-mentioned construction project will be taken and used as sample for this study. Therefore, 48 participants from FHC (both from site and head office) and 21 participants from the contractor and consultant side, totally 69 participants will be the sample size of this study.

3.6. Data Sources and Data collection techniques

In order to gather appropriate data for this study, both primary and secondary data sources will be considered. Primary data is the information that is collected from the source directly and the data is original data. Secondary data is information that is collected and organized by someone. Secondary data helps the researcher to get supportive information on the selected topic (Kothari, 2004). In this study primary data is collected mainly by using questionnaire that is distributed to the respondents and secondary data will be gathered from the sectors yearly work accomplishment reports and by reviewing literatures related to the selected topic.

3.7. Method of data Analysis

As a qualitative design which uses, questionnaires (both closed and open ended) and a secondary data source. Then utilizes a content analysis to analyze the data collected from each respondent by identifying the ideas, definitions of quality, priorities given to factors affecting building construction quality, strategies applied and techniques of quality management practices implemented in the organization. It is conducted by rating them on five-point scale, (1), strongly disagree/ very low (2), disagree/low important (3), neutral/medium Important (4), agree/ high

important (5) strongly agree/ very high important. In order to rank these findings a Relative Important index (RII) is used. The formula for the calculation of RII used is shown in [Eq.3.1]

Relative importance index (RII)= $\frac{5n_5+4n_4+3n_3+2n_2+1n_1}{A*N}$ Eq.3.1

$$A*N$$

Where, n_5, n_4, n_3, n_2, n_1 indicate the number of respondents for strongly disagree, disagree, neutral, agree, and strongly agree respectively.

A= highest weight which is 5

N= Total number of respondents= 59

3.8. Research Validity and Research Reliability

Validity determines whether the research tools truly measure what they are intended to measure (Golafshani, 2003). This study will encompass all workers working in federal housing corporation construction projects in Addis Ababa located around Somali Tera. Validity refers to the extent of accuracy of the results of the study. Validity of the results can either be internal or external. Internal validity refers to the analysis of the accuracy of the results obtained. External validity refers to the analysis of the findings with regards to whether they can be generalized. In order to increase reliability and validity by decreasing biases from a different point in the research process, the researcher uses the following approaches or techniques: 1. Prolonged involvement: since the researcher has been involved in the participants' environment which is the project site itself, as being one of the personnel from the contractor side helps to increase the level of trust. 2. Triangulation of data (by comparing data from the respondents to the previous and existing knowledge of the researcher).

3.9. Ethical Consideration

The study will conduct by considering ethical responsibility, these includes providing the necessary Information to the respondents, the purpose of the study and the use of the information as well. Every person involved in the study will entitled to the right of privacy and dignity of treatment. Informant will be hold in strict confidentiality by the researcher. The ethical Considerations of fairness, openness, disclosure of methods, and respect of the individuals to

participate voluntarily in the research will be secured. Also, the researcher had an authorization from the management of the target organization the federal housing corporation (FHC). before carrying out the research.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The respondents participated in this survey questionnaires are personnel from federal housing corporation specifically staffs from house development sector, from human resources department, and also key persons both from the contractor and consultant side whom at the time of this research period were involved in the construction of the federal housing corporation's LOT 9 mixed use building found at somale tera Addis Ababa, Ethiopia.

The federal housing corporation especially house development sector consists of 43 personnel whom were selected as whole for the questionnaire. From the human resource department consisting of 25 individuals 5 personnel from managerial level were purposely selected depending on their role in quality management system of the corporation. The other group of this respondents are from the contractor and consultant side whom were working in the construction of one of the organizations mixed use 3B + G+21 building project located at somale tera at the time of this research period, they are composed of project managers, senior site engineers, office engineers, resident engineers and technical staffs with a total person of 21.

4.2 Discussion and analysis of data

4.2.1 Rate of response and respondents' profile

As described above this questionnaire was distributed for a total of 69 personnel directly related to the construction projects of the organization. Out of which 59 responses were collected and analyzed using the Microsoft Excel software package. Then the information is ranked in different position by using relative important index.

Table 4.1 Questionnaires response rate

| From | Questionnaires distributed | Questionnaires retrieved | Rate of responses |
|-------------------------------|----------------------------|--------------------------|-------------------|
| FHC | 48 | 42 | 87.5 |
| The Contractor and consultant | 21 | 17 | 80.95 |
| Total | 69 | 59 | 85.5 |

As shown in the table 4.2 below we can see the gender components of the respondents

Table 4.2 Gender

| Gender | Frequency (n) | Percentage (%) |
|--------|---------------|----------------|
| Male | 49 | 83.1 |
| Female | 10 | 16.9 |
| Total | 59 | 100 |

As the table above indicates 49(83.1 %) of respondents were males, and the 10 (16.9 %) of the respondents were females. This indicates that majority of respondents that were addressed in this study are males.

Table 4.3 Respondents' Age

| Age | Frequency (n) | Percentage (%) |
|----------|---------------|----------------|
| 18-25 | 2 | 3.4 |
| 26-35 | 10 | 16.9 |
| 36-40 | 26 | 44.1 |
| Above 40 | 21 | 35.6 |
| Total | 59 | 100 |

Data source: researcher's own questionnaire 2022

Table 4.3 describes that 2(3.4) percent of respondents were age between 18-25, 10(16.9) percent of respondents are 26-35, 26(44.1) percent of respondents were 36-40, and the rest 21 (35.6) percent of respondents are above 40 years of age. This indicates that large numbers of respondents were between working age of 36-40.

Table 4.4 Educational Background

| Qualification | Frequency (n) | Percentage (%) |
|------------------------------|---------------|----------------|
| Diploma or certificate level | 0 | 0 |
| Degree level | 26 | 44.1 |
| Post graduate level | 33 | 55.9 |
| Total | 59 | 100 |

Data source: researcher's own questionnaire 2022

Table 4.4 shows that majority of the respondents have an educational background of a bachelor's degree which is 26 (44.1%) and the rest 33 (55.9%) personnel have a post graduate degree.

Table 4.5 experience

| Interval in years | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| 1-2 | 2 | 3.39 |
| 3-5 | 6 | 10.17 |
| 6-8 | 22 | 37.29 |
| Above 8 | 29 | 49.15 |
| Total | 59 | 100 |

Data source: researcher's own questionnaire 2022

The personnel years of experience as summarized in the above table 4.5 shows 48.3 % of the staffs have more than 8 years of experience in the industry. The staffs with experience between 6-8 years are 37.9%, 3-5 years are 10.3 % and 1-2 years are 3.4%. with the majority of the respondents having experiences of more than 8 years, it helps the researcher to gather data from well understood and highly experienced respondents.

Table - 4.6 Working Position

| Position | Frequency (n) | Percentage (%) |
|---------------------------|---------------|----------------|
| Project manager | 3 | 5.1 |
| Senior site engineers | 10 | 16.9 |
| Human resource management | 5 | 8.5 |
| Office engineer | 14 | 23.7 |
| Technical team | 19 | 32.2 |
| Resident engineer | 8 | 13.6 |
| Total | 59 | 100 |

Data source: researcher's own questionnaire 2022

Table 4.6 shows that large number of active participants in this study are technical team member, whom are involved in the day-to-day activities of the construction projects

4.2.2 Descriptive Statistics on factors of Quality management practice (QMP) in federal housing corporation construction projects

Descriptive analysis is used to obtain existing facts regarding the customer's level of agreement on the Quality management practice (QMP) in federal housing corporation construction projects, namely, Customer Quality Management System, Factors that affect quality of building construction, Strategies Applied. This section presents the respondents' perception on the independent variable. The respondents were asked to indicate the extent to which they agreed and disagreed to statements relating to the variables under study on a five-point Likert scale (1=Strongly Disagree to 5= strongly agree).

It is taken to identify the differences among the variables and the square root of standard deviation shows the variance. The standard deviation is therefore a measure of how well the mean represents the data. Whereas, small standard deviation means (relative to the value of the mean itself) indicates that the data points are close to the mean. In another case, larger standard deviation (relative to the mean) indicates that the data points are distant from the mean (i.e. the mean is not an accurate representative of the data) (Andy, 2010). Similarly, high standard deviation means that the data are wide spread, which means that respondents give variety of opinion and the low deviation means that respondents express close opinion.

Range for interpreting five-point Likert scale data

Range Interpretation based on (Ugade and Shende, 2012)

- ✓ 1.49 or less Strongly disagree
- ✓ 1.50-2.49 Disagree
- ✓ 2.50-3.49 Neutral
- ✓ 3.50-4.49 Agree
- ✓ 4.5 or greater Strongly agree

Part 1 Close Ended Questions

4.2.3. Descriptive Statistics on Customer Quality Management System

A Series of four questions were presented to respondents to rate their level of agreement with each statement. The questions are designed to examine the level of Customer Quality Management

System in federal housing corporation construction projects. The below table displays the respondent's level of agreement against their Customer Quality Management System.

Table 4.7 **Factors affecting Customer Quality Management System**

| Factors | Scale | | | | | N | Mean | Standard deviation |
|--|-------|---|----|-----|----|----|-------|--------------------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Our project site gives great concern to customer quality management system. | 0 | 1 | 8 | 23 | 27 | 59 | 4.288 | 0.766 |
| Site managers in our project site take trainings to improve their Attitude towards customer quality management system. | 0 | 2 | 18 | 24 | 15 | 59 | 3.88 | 0.832 |
| Subordinates as well as project site managers and administrators have enough awareness about customer quality management system. | 0 | 1 | 20 | 26 | 11 | 59 | 3.745 | 0.759 |
| Our project site shares experience from other project site about customer Quality Management System. | 0 | 2 | 17 | 34 | 6 | 59 | 3.745 | 0.684 |
| Total | 0 | 6 | 63 | 107 | 59 | | 3.915 | 0.76 |

- Note: the ranking numbers used shows the degree effect which those factors have on customer quality management system. (1) very low (2) low (3) medium (4) high (5) very high

Data source: researcher's own questionnaire 2022

In relation to the above table result, the Respondents' level of agreement of Customer Quality Management System was perceived to have a mean of **3.915** and SD= **0.760** on a 5-point scale (taking the average of the mean for each response given for the four questionnaires under customer quality management system). This shows that the respondents agreed about the Customer Quality Management System. Since, the obtained result of mean **3.915** is supported by (Upgade and Shende, 2012) i.e., value 3.50-4.49, implies that the responses of the respondents are agreed on the

corporation implementing customer quality management system. In this case, low standard deviation indicates that the data points are not distant from the mean (i.e., the mean is an accurate representative of the data). Hence, low standard deviation indicated that the responses are not scattered. Therefore, the respondents' customer Quality Management System deviation is below 1. Thus, it is possible to conclude that the respondent's perception is homogeneous.

4.2.4 Descriptive Statistics on Factors that affect quality of building construction

A Series of five questions were presented to respondents to rate their level of agreement with each statement. The questions are designed to examine the level of Factors that affect quality of building construction. The below table displays the respondent's level of agreement against factors that affect quality of building construction.

Table 4.8 **Factors that affect quality of building construction** (Management and employees perspective)

| Factors | Level of Intensity | | | | | N | Mean | S.D. | RII |
|---|--------------------|----|----|----|---|----|-------|-------|------|
| | 1 | 2 | 3 | 4 | 5 | | | | |
| Lack of professional project managers is factors that are now affecting our project site quality management practice. | 15 | 35 | 7 | 2 | 0 | 59 | 1.93 | 0.716 | 0.39 |
| Lacks of experienced employees are affecting our project site to build to enhance quality management practice. | 14 | 32 | 12 | 1 | 0 | 59 | 2 | 0.719 | 0.4 |
| Inaccessible materials are factors affecting our project site quality management practice. | 1 | 7 | 25 | 21 | 5 | 59 | 3.37 | 0.869 | 0.67 |
| Harsh management control and administration system affects our quality project performance. | 0 | 7 | 28 | 17 | 7 | 59 | 3.406 | 0.853 | 0.48 |
| Security factors are affecting our project site from constructing quality construction and from | 7 | 12 | 31 | 7 | 2 | 59 | 2.75 | 0.930 | 0.55 |

| | | | | | | | | | |
|---|----|-----|----|----|---|--|------|-------|--|
| developing quality management practice. | | | | | | | | | |
| Total | 44 | 114 | 92 | 38 | 7 | | 2.49 | 0.817 | |

- Note: the ranking numbers used shows the degree effect which those factors have on quality of building construction. (1) very low (2) low (3) medium (4) high (5) very high

Data source: researcher's own questionnaire 2022

Lack of professional project managers, lack of experienced employees and Harsh management control and administration system are not affecting the project site quality management practices which we can see from the analysis with a mean of 1.932, 2 and 2.406 respectively on a five-point scale, which falls under disagree according to (Ugade and Shende, 2012). The rest two factors that are categorized under this part of the questionnaire are the current security factor and Inaccessible materials which both of them got a response mean of 2.746 and 3.373 respectively and a relative important index RII OF 0.55 and 0.67 which makes them a neutral but relatively a higher factor in affecting quality of building construction when compared to the other three factors under this section. When we see the overall deviation of responses for each factor, they have scored a deviation in the range between 0.716 - 0.930, which is below 1. Thus, it is possible to conclude that the respondent's perception is homogeneous.

Additionally, there are others factors that are affecting building construction which the respondents mentioned in the open-ended question's part.

4.2.4 Descriptive Statistics on Strategies Applied

Series of six questions were presented to respondents to rate their level of agreement with each statement. The questions are designed to examine the level of Strategies Applied. The table displays the respondent's level of agreement against their level of strategies applied.

Table 4.9 **Strategies Applied**

| Strategies | Level of intensity | | | | | N | Mean | S.D. | RII |
|--|--------------------|---|----|----|---|----|-------|------|------|
| | 1 | 2 | 3 | 4 | 5 | | | | |
| Continuous training strategies are applied in our site to ensure and maximize quality management practice. | 1 | 3 | 13 | 35 | 7 | 59 | 3.746 | 0.8 | 0.75 |

| | | | | | | | | | |
|---|---|----|----|-----|----|----|-------|-------|------|
| Experience sharing strategies are one types of strategies performed in our project site to improve our project culture of quality management practice. | 0 | 1 | 10 | 38 | 10 | 59 | 3.966 | 0.642 | 0.79 |
| To develop culture of quality management, practice our project site applies new technological strategies and techniques | 0 | 2 | 26 | 26 | 5 | 59 | 3.576 | 0.699 | 0.72 |
| There is a continues follow up strategies in our project site by the concerning bodies. | 0 | 0 | 4 | 40 | 15 | 59 | 4.186 | 0.540 | 0.84 |
| Our project continuously prepares quality reports | 0 | 0 | 7 | 38 | 14 | 59 | 4.119 | 0.589 | 0.82 |
| Top managers test and evaluate those quality reports and documents | 0 | 1 | 16 | 29 | 13 | 59 | 3.915 | 0.749 | 0.78 |
| Due to our project site strategies, professional employees were hired to improve our site quality management practice and building quality construction | 3 | 14 | 34 | 8 | 0 | 59 | 2.79 | 0.738 | 0.76 |
| Total | 1 | 10 | 90 | 240 | 72 | | 3.901 | 0.68 | |

- Note: the ranking numbers used shows the degree of impact the strategies applied have on the quality management of the corporation. (1) very low (2) low (3) medium (4) high (5) very high

Data source: researcher's own questionnaire 2022

Based on the above result, it is shown that the average response of respondents to the degree of consistency of different Strategies Applied to strengthen the corporation's quality management practices has a mean **3.90**, SD = **0.68** (taking the average for all seven types of strategies mentioned in the questionnaire. It can be seen that that the respondents are mostly agreed about the Strategies Applied. Since, the obtained result of mean (**3.90**) is supported by (Upgade and Shende, 2012) i.e., value 3.50-4.49. In this case, the RII shows that among the seven strategies continuously preparing audit reports (RII=0.82), and follow up strategies from top management (RII=0.84) are the highly implemented strategies to strengthen the corporation's quality management practice. low standard deviation indicates that the data points are not distant from the mean. Therefore, the Strategies Applied deviation is below 1. Thus, it is possible to conclude that the respondent's perception is homogeneous.

4.10 priorities given to elements of quality

| Variables | Priority level | | | N | RII | Rank |
|------------------------------------|----------------|-----|-----|-----|------|------|
| | 1 | 2 | 3 | | | |
| Meeting Quality Standards | 0 | 5 | 54 | 172 | 0.97 | 1 |
| Satisfying Client's expectation | 0 | 18 | 41 | 159 | 0.9 | 3 |
| Meeting Project Time / Deadline | 1 | 31 | 27 | 144 | 0.81 | 5 |
| Meeting Project Cost Budget | 3 | 26 | 30 | 145 | 0.82 | 4 |
| Meeting Health and Safety Standard | 1 | 2 | 56 | 173 | 0.97 | 1 |
| Total | 5 | 164 | 621 | 790 | | |

Note: the ranking numbers used shows the priority level the respondents gave for mentioned elements of quality. (1) low (2) medium (3) high

Table 4.10. Priorities given to elements of quality

Data source: researcher's own questionnaire 2022

The results obtained from the respondents on this part shows that the highly prioritized factor /element of quality are meeting quality standards and meeting health and safety standard which is a mandatory factor expected from any governmental or private contractors, which is also clearly indicated in Ethiopian building codes and standards (EBCS). Simultaneously the respondents prioritized meeting quality standards, which this rank shows that the concerned staffs at FHC have a better understanding and awareness on how meeting qualities play a vital role in constructing a long lasting, durable and safe buildings, which is a crucial factor that the researcher found in literature review as a problem (collapse of buildings due to lack of meeting quality standards) in Ethiopian construction industry. These two are followed by satisfying clients' expectation, meeting project cost budget and meeting project time /deadline (3rd 4th 5th respectively). The last two priorities prove us that government owned constructions (since FHC is one of it) as we generally know that they are over budget and mostly do not meet their scheduled timeline due to many different reasons.

4.11 Definitions given to quality

| Definition | Frequency (N) | Percent % | Rank |
|-----------------------------------|---------------|-----------|------|
| Aesthetic/ Good appearance | 53 | 89.83 | 2 |
| High price/expensiveness | 5 | 8.47 | 5 |
| Increased profit | 34 | 57.62 | 4 |
| Meeting specification requirement | 58 | 98.30 | 1 |
| Customer satisfaction | 51 | 86.44 | 3 |
| Others | 4 | 6.78 | 6 |

Table 4.11 definitions given to quality

Data source: researcher's own questionnaire 2022

The mostly given definition for quality by the respondents is meeting specification requirement with 98.3% which by itself connected to the other variables, in a way that meeting these specifications will lead to customer satisfaction, good appearance and cost reduction since it reduces maintenance and rework costs. The least given definition in this section is high price / expensiveness, because high price/expensiveness contradicts with the mission and mandates of the corporation as described on the literature review. Also from the response gained in the open ended part the researcher was able to collect 26 respondents, majority of them stated that quality in construction means that a project is completed within the defined guidelines set out in the Scope of Work which in general means meeting the design and specification requirements provided on their contract agreement, they also responded quality in building project can be expressed as meeting client need, safety and strength, taking continues sample test for the materials used, built and delivered as per the scheduled time on the contract, by implementing a pre-approved work procedure, using skilled man power and quality material properly.

4.12 Does your company implement quality management system?

| Does your company implement quality management system? | Frequency (N) | Rank |
|--|---------------|------|
| No such thing | 1 | 3 |
| it is under consideration | 1 | 3 |
| Has been implemented recently | 16 | 2 |

| | | |
|--|----|---|
| Has been part of the corporation for some time now | 41 | 1 |
|--|----|---|

Table 4.12 implementation of quality management system

We can conclude from the above table is that the corporation has been implementing quality management system for long time according to the respondents. According to the literature review there are different kinds of quality management systems that a project can use, for this study purpose the researcher included ISO 9001, total quality management and quality control / quality assurance.

4.13 Which type of quality management system does the corporation use?

Table 4.13 type of quality management system used

| Type of quality management system | Frequency (N) | Rank |
|------------------------------------|---------------|------|
| Total Quality Management | 21 | 3 |
| ISO 9001 | 28 | 2 |
| Quality Control /Quality assurance | 55 | 1 |
| Others | 0 | 4 |

The main and frequently used quality management system in the corporation is quality control/quality assurance (QC/QS), followed by ISO 9001 and total quality management the best way to use all this three-quality management system in a corporation is to implement them separately in different department of the corporation. As we can in the background of the organization the corporation's activities are organized under four divisions: - Housing development, housing administration, construction inputs supply and corporate service division. We can conclude from the above response on the type of quality management system, is that these different departments use those systems ranked from one up to three on the above table. The highly ranked quality management system which is quality control/assurance as expressed in the literature helps in analyzing if the housing development department's project deliverables comply with the mandatory standards given for building constructions and identifying ways to eliminate the root causes that are a major obstacle to fulfill quality standards provided by Ethiopian building code and standards (EBCS).

The ISO 9001 quality management system which is secondly ranked by the respondents which is the latest system known plays a major in testing the input materials and finishing products used during the construction phase which results in higher productivity of the corporation.

The thirdly ranked system is Total quality management system which helps them in achieving customer satisfaction since the corporation's main goal is providing commercial, residential apartments, villas as well as hotels for government officials, employees and the public at large.

From the open ended question part asking to discuss the type of QMS the corporation uses and how the organization manage quality, the researcher was able to collect 26 responses for this question which shows that the detailed steps taken on how the corporation manages quality. The responses are summarized into:- making decision according to the work guidelines and test results, by preparing documentation of test results, design and specification requirements are the governing factors in a construction project so supervise works accordingly, following up the day to day activity in each stage of the construction, continuous assessment and evaluation of work progress, providing active decision to modifications and encountered problems, making sure works executed comply with all applicable codes and regulations, having good communication, proper supervision and increasing the skill and knowledge of project team members.

4.14 what do you think is the major objectives of quality management system?

Table 4.14 objective quality management system

| Objectives | Frequency (N) | Rank |
|---|---------------|------|
| cost reduction | 35 | 3 |
| Initiation of employees to be part of the corporation's quality building effort | 33 | 4 |
| Compliance with design, safety and environmental requirements | 55 | 1 |
| High productivity | 41 | 2 |
| Others | 1 | 5 |

Among many objectives of employing a quality management system mentioned in the literature review for construction company, four main objectives are selected for this part of the questionnaire. The respondents at the corporation shown in the above table agreed on compliance

with design, safety and environmental requirements being their major objective to employ a quality management system. We can understand and agree on this specific objective is because building construction projects must comply with the design provided and safety since it involves many people's life during its construction and service period. Secondly, being highly productive is the other objective that follows, as a corporation which serves the public sector at large being productive for the firm is needed to accomplish the corporation's mission.

4.15 Factors affecting quality of building construction. (General)

| Factors affecting quality of building construction | Degree of severity | | | | | N | RII | Rank |
|--|--------------------|-----|---------|-----|-----|----|-------|------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Project's complexity and type | 7 | 9 | 10 | 3 | 30 | 59 | 0.735 | 7 |
| Material issue | 0 | 0 | 17 | 28 | 14 | 59 | 0.789 | 5 |
| Design issue | 0 | 16 | 8 | 25 | 10 | 59 | 0.698 | 8 |
| Contract issue | 1 | 5 | 9 | 23 | 21 | 59 | 0.797 | 4 |
| Man power issue | 0 | 13 | 24 | 14 | 8 | 59 | 0.658 | 9 |
| Subcontractor issue | 2 | 4 | 30 | 16 | 7 | 59 | 0.674 | 9 |
| Equipment issue | 0 | 3 | 7 | 35 | 14 | 59 | 0.803 | 3 |
| Cooperation experience and understanding of site personnel | 3 | 7 | 3 | 24 | 22 | 59 | 0.786 | 6 |
| Quality control and cost control system and policy used by the corporation | 4 | 3 | 6 | 20 | 26 | 59 | 0.807 | 2 |
| Financial issue | 0 | 0 | 5 | 12 | 42 | 59 | 0.925 | 1 |
| Total | 17 | 120 | 35 7 | 800 | 965 | | | |

- Note: the ranking numbers used shows the degree of severity that those factors have on quality of building construction. (1) very low (2) low (3) medium (4) high (5) very high

Table 4.15 degree of priority for factors affecting quality of building construction

All the factors used in this part of the questionnaire that affect quality of a construction process are the components of construction inputs and processes. These factors are ranked depending on the level of effect they have on the quality of building constructions. As we can see in table above factors ranked 1 up to 7 have a close level of intensity in affecting the quality of building

construction in FHC. But financial issues which is ranked number one reflects that the current 10 mega projects launched by the corporation to build commercial and residential buildings are being affected by the inflation and shortage of foreign currency, since most construction materials used in those projects are imported from abroad. This fluctuation in foreign currency impacts the overall budget assigned to those projects and That is why it is ranked number one relatively to the other factors. Following Quality control and cost control system and policy used by the corporation, Equipment issue, Contract issue, material issue, Cooperation experience and understanding of site personnel, Cooperation experience and understanding of site personnel are ranked 2nd – 7th respectively.

The list ranked factors are found to be man power and sub-contractor issue, this can be understood, in highly populated country like Ethiopia whom most of the population is from young and active age group, man power can be found and utilized abundantly. Also, the emphasis that the Ethiopian government has been giving lately for the engineering and construction sector by funding billions to educate and organize the construction companies with in different levels of (from level 1-9) makes it easy to employ potential contractors to work with as sub-contractor.

If there is additional factor not included in this part of the questionnaire respondents were given the chance to add other factors in the open ended part and the researcher was able to get 23 responses and they are summarized as the following: - making sure each and every material used during construction fulfills the governing standard of the EBCS. For example, if the Materials whether the type of the aggregate or the cement grade used for concrete is not up to standards it lowers the concrete strength which might lead up to collapse of the structure. Market price of materials and Availability of equipment on the market. For Example, if the required Materials or equipment are not available on the market, the contractor could be forced to use the available substitute material or equipment which might compromise the quality of the overall project. The performance of the consulting engineers, financial capacity of the contractors. Not having a fruitful communication between the big three stakeholders in the project (the client, contractor and consultant). Another factor given is that continuously modifications of designs this could cause the project to be behind schedule as well as to be over the budget.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

This study assessed project quality management practices in building construction projects at FHC with the general objective of assessing the corporation's quality management practices and identifying the major challenges faced in implementing a quality management system at Federal housing corporation. As part of the discussion on the literature review and the discussion of the major findings of the study, a successful project management is not only about successfully completing projects with in time, scope and cost but also meeting quality standards is a crucial issue in the successfulness of any construction projects. To do so a proper project quality management system helps to achieve building quality standards (both aesthetic and safety wise), meeting deadlines within minimum cost and customer satisfaction.

5.2 CONCLUSION

The following conclusion is made depending on the specific objectives of his research.

- 1. To investigate how the concept of quality, customer quality management system and the overall quality management system are adopted in the building construction projects.*

The corporation's top managerial and subordinate staffs involved in building construction projects are relatively aware of the concept of quality management system. Since Modern quality management systems recognize the importance of customer satisfaction, management responsibility and cost of quality. To refer the number from the analysis the corporation's understanding and implementation of customer quality management system has a total mean of 3.915 which shows that by implementing the four sub techniques mentioned on table 4.7 the corporation is in a good track in practicing customer quality management system. In which Meeting quality, health and safety standards the corporation has been giving a great concern, but it is shown that it lacks effort in meeting project deadlines, meeting project cost budget.

- 2. What are the main objectives of using quality management system and the problems encountered in implementing quality management system?*

This study shows us that the corporation is well understood and has been implementing different quality management system for some time now, mainly quality control/ quality assurance and ISO 9001 systems. This QMS helped the corporation to have a good Compliance with design, safety and environmental requirements needed in construction projects, high productivity and cost reduction. Which in turn the data shows that the implemented QMS is playing a major role in increasing the personnel's understanding and perception they give to the element of quality, in meeting quality standards and satisfying client's expectation. The problems factors encountered while applying QMS are more or less neutral but relatively Harsh management control and administration system is affecting the corporation's project quality performance.

3. Identifying the factors that are mostly affecting the quality of building construction during the construction phase

As described in the literature review part of the study The Construction industry has been substantially chastised in recent years for its performance and productivity in comparison to other industries in Ethiopia. This issue has also been affecting the federal housing corporation's construction projects. According to the study the researcher examined ten important factors together with other factors left for the respondents to mention in the open ended part of the questionnaire, it is identified that Inaccessible materials and equipment, financial issue, Quality control and cost control system and policy used by the corporation are the major factors affecting quality of building construction in the construction phase. These factors are deeply associate with the current economic crisis the country is facing, with the shortage of foreign currency coupled with the increased inflation rate make them a critical condition.

4. Assessing strategies applied to improve Ethiopian federal housing building construction project quality management systems.

This study shows that the corporation has been giving continuous training strategies and experience sharing for its staff at different levels to improve the culture of quality management practice of the corporation. As part of managing quality of the project it is shown that the corporation prepares performance reports which in turn will be tested and evaluated by top managers. The corporation has a low rate of implementing new technological strategies and techniques to improve the QMP. the project site strategies do not promote the employment of professional personnel to the needed level to improve the site's quality management practice and building quality construction.

5.3 RECOMMENDATION

- In relation with the corporation's implementation of new technological strategies and techniques to improve quality management practice.

Every construction business aspires to achieve better performance outcomes, thus it is advised that FHC personnel who benefit from those gains should spend more time and energy on fostering the proper quality awareness within their authority. These concerns are at the core of staff members' dedication to the project and their drive to meet project goals. Some of the practical strategies that can be used in this regard include hiring new professional staffs, offering ongoing training on those new technologies, offering a vision that all employees can identify with, continuously monitoring performance and providing feedback, and setting up reward structures that are appropriate for team achievements.

- In order to minimize shortage of unavailable construction materials and equipment, the corporation as being one of biggest government's developmental organization investing on local building material and equipment manufacturers will help to decrease the million dollars to be spent for purchasing from abroad. Also it is recommended that the procurement unit needs to build strong relationships with key suppliers to benefit from good quality and on-time supply of materials because the delays are also influenced by late provision or an availability of the materials. Thus, the corporation's construction input supply directorate needs to plan and manage construction equipment and materials required for each project. This department should employ enough number of qualified engineers. Therefore, the concerned department should be able to:

- Gather information about the efficiency of the equipment and the availability of input materials at the project level and its current status.
- Site engineers should receive awareness training on equipment planning and management guidelines and how to manage equipment at the project level.
- Create a scheduled preventive maintenance strategy to reduce extended equipment downtime.
- The equipment management guidelines must be updated by the corporation to reflect the current workload and working conditions.
- Create optimization techniques to utilize the equipment and material resources that are available effectively and efficiently.

- The corporation still needs to give additional emphasis to meeting project deadlines, project cost budget. To do so since project planning is the first crucial step in the project's life cycle The study suggests that project plans to be created by experienced project managers and discussed by all parties before the final draft is finished and put into implementation. This will reduce the number of change orders during the construction phase, which typically leads to high cost overruns. In addition, next to project planning, monitoring and controlling the project are key factors in determining the performance of any project, it should be more inclusive to involve all the stakeholders especially the project manager who is the main actor and accountable for the success and failure of the project. The study also recommends in this stage that the project manager engages the stakeholders more so as to harmonize its goals and objectives with the desires of the stakeholders and hence reduce conflict levels thereby increasing project's outcome satisfaction. In doing so the corporation can save incurred additional cost and time to be spent for rework and solving conflicting ideas between stakeholders. These will lead the project to success in meeting project deadlines and cost budgets.

- Additionally, the researcher observed the corporation's issues related with financial and project cost budget are also coming from overpriced material and payments to works to be executed by the contractor. Thus, the researcher recommends a revision on the corporation's contract administration and procurement policies, and procedures, together with regular monitoring from top managers on how funds intended for running construction projects are used by site personnel. Additionally, the financing authority should make sure that all budgetary allocations are fully utilized and that the funds reserved for the execution of building construction projects are used effectively, also making sure that the funds are made available in a timely manner so that the projects are able to be completed within time and higher quality. Adding more, financial management training is crucial for enhancing the success of the corporation's projects. Along with hiring skilled candidates, another strategy to guarantee the competency of finance managers is to regularly schedule financial management training for project managers and finance officers. The trainings must to be given by qualified training partners who are experienced about public sector finance management problems.

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APPENDIX A: Questionnaire



Dear respondents!

This Questionnaire is Designed and prepared by the student researcher at Addis Ababa University, doing research paper in partial fulfillment of requirements of Master of Arts in Project Management. With this questionnaire the student researcher intends to assess quality management practice (QMP) in federal housing corporation construction projects, located at Somali Tera.

You are kindly requested to complete this questionnaire in each question you are requested to give genuine response and fill in the blank space or to put mark \surd on your possible answer to the corresponding question.

Thanking you for the cooperation. Your response will be treated confidentially and only be used for academic purpose.

- I. Please indicate the extent to which you agree with each of the following choices

Part one: Closed Ended questions

1. Age

18 – 25

26 – 35

36 – 40

Above 40

2. Sex

Female

Male

4. Experience

1 - 2 years

3 – 5 years

6– 8 years

>8 years

5. Position

Senior Site Manager

Project manager

Human resource Management

Technical team

office Engineer

Resident Engineer

6. Educational Qualification

Certificate level

Diploma level

Degree level

Post graduate level

Kindly indicate the extent do you agree or disagree with the following statements regarding transformational leadership in your organization. Rate your response on scale of five units where by:

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

A. Customer Quality Management System

| Scale | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| Our project site gives great concern to customer quality management system. | | | | | |
| Site managers in our project site take trainings to improve their Attitude towards customer quality management system. | | | | | |
| Subordinates as well as project site managers and administrators have enough awareness about customer quality management system. | | | | | |
| Our project site shares experience from other project site about customer Quality Management System. | | | | | |

B. Factors that affect quality of building construction (Management and employees perspective)

| Scale | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Lack of professional project managers is factors that are now affecting our project site quality management practice. | | | | | |
| Lack of experienced employees are affecting our project site to build to enhance quality management practice. | | | | | |
| Inaccessible materials are factors affecting our project site quality management practice. | | | | | |
| Harsh management control and administration system affects our quality project performance. | | | | | |

| | | | | | |
|---|--|--|--|--|--|
| Security factors are affecting our project site from constructing quality construction and from developing quality management practice. | | | | | |
|---|--|--|--|--|--|

C. Strategies Applied

| Scale | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| Continuous training strategies are applied in our site to ensure and maximize quality management practice. | | | | | |
| Experience sharing strategies are one types of strategies performed in our project site to improve our project culture of quality management practice. | | | | | |
| To develop culture of quality management practice our project site applies new technological strategies and techniques. | | | | | |
| There is a continues follow up strategies in our project site by the concerning bodies. | | | | | |
| Our project continuously prepare quality reports | | | | | |
| Top managers test and evaluate those quality reports and documents | | | | | |
| Due to our project site strategies, professional employees were hired to improve our site quality management practice and building quality construction. | | | | | |

D. Priorities given to elements of quality

For the following part of the questionnaire respondents are asked to rank based on the level of priority from low (1), medium (2) and high (3) for the given elements of quality.

| Factors | Level of priority | | |
|---------------------------------|-------------------|---|---|
| | 1 | 2 | 3 |
| Meeting Quality Standards | | | |
| Satisfying Client's expectation | | | |

| | | | |
|------------------------------------|--|--|--|
| Meeting Project Time / Deadline | | | |
| Meeting Project Cost Budget | | | |
| Meeting Health and Safety Standard | | | |

E. How do you define quality?

For the following part mark (√) on one or more than one definition you give for quality.

| Definition | mark (√) |
|-----------------------------------|----------|
| Aesthetic/ Good appearance | |
| High price/expensiveness | |
| Increased profit | |
| Meeting specification requirement | |
| Customer satisfaction | |

F. Does your company implement Quality management system?

Put mark (√) on your corresponding answer.

No such thing it is under consideration

Has been implemented recently has been part of the corporation for some time now

G. If your answer is yes in the previous question, which type of the quality management system is the corporation using?

| Type of quality management system | mark (√) |
|------------------------------------|----------|
| Total Quality Management | |
| ISO 9001 | |
| Quality Control /Quality assurance | |
| Others | |

H. What do you think is the major objectives of quality management system?

| Objectives | mark (√) |
|----------------|----------|
| Cost reduction | |

| | |
|---|--|
| Initiation of employees to be part of the corporation's quality building effort | |
| Compliance with design, safety and environmental requirements. | |
| High productivity | |
| Others | |

- I. For this part of the questionnaire rank the following main factors that affect building construction quality on their degree of severity. Where (1) very low, (2) low, (3) medium (4) high, (5) very high.

| No. | Factors affecting quality of building construction (General) | Degree of severity | | | | |
|-----|--|--------------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. | Project's complexity and type | | | | | |
| 2. | Material issue | | | | | |
| 3. | Design issue | | | | | |
| 4. | Contract issue | | | | | |
| 5. | Man power issue | | | | | |
| 6. | Subcontractor issue | | | | | |
| 7. | Equipment issue | | | | | |
| 8. | Cooperation experience and understanding of site personnel | | | | | |
| 9. | Quality control and cost control system and policy used by the corporation | | | | | |
| 10. | Financial issue | | | | | |

Part two: Open ended question

1) From your experience, how could quality be expressed in building project?

2) How does your organization manage quality? Or is there any quality management program your organization implements?

3) What are the factors that you think will affect the quality of construction projects during Construction phase? Please explain with example.

Thank you!