ADDIS COLLEGE

DEPARTMENT OF PROJECT MANAGEMENT

The Effect of Poor Project Performance on the Quality of Housing Construction Projects: Evidence from selected Housing construction in Addis Ababa

By:

Girmadawit Muchie

Advisor:

Dr. Mekonnen Mengistie

A MASTER THESIS SUBMITTED TO THE DEPARTMENT OF PROJECT MANAGEMENT ADDIS COLLEGE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR MSC DEGREE IN PROJECT MANAGEMENT

July, 2023
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APPROVAL

The undersigned certify that they have read and hereby recommend to Addis College to accept the Thesis submitted by Girmadawit Muchie and entitled as "The Effect of Poor Project Performance on the Quality of Housing Construction Projects: Evidence from selected Housing construction in Addis Ababa " in partial fulfillment of the requirements for the award of a Master's Degree in Project Management

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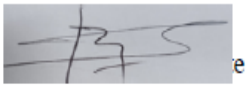
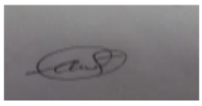
Name of Advisor _____Signature  e 11/08/2023

Name of Internal Examiner Aweke Ashenafi Signature  Date 15/12/2023

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Girmadawit Muchie

The Researcher

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LIST OF ACRONYMS/ABBREVIATIONS

AHP: Analytical Hierarchical Process

BPM: Building Project Management

CPI: Cost Performance Index

CTP: Construction Time Performance

GDP: Growth Domestic Product

GTP: Growth and Transformation Plan

EPS: Environmental Performance Score

KPIs: Key Performance Indicators

MCDA: Multi Criteria Decision Analysis

MOFED: Ministry of Finance and Economic Development

MUDC: Ministry of Urban Development and Construction

PAR: Performance Appraisal and Reporting

PM: Project Management

PMP: Project Management Performance

PPE: Project Performance Evaluation

PPI: Project Performance Indicators

RII: Relative Importance Index

SPI: Schedule Performance Index

SPM: Stakeholder Perspective Measurement

SPSS: Statistical package for social science

ABSTRACT

The objective of this study was to assess the effect of poor project performance on the quality of housing construction projects in Addis Ababa in three selected housing projects currently executing in Addis Ababa using both quantitative and qualitative research approaches. The proposed research design of this study was a cross-sectional study in which both primary and secondary data sources were used during the study using different instruments and methods such as structured and unstructured interviews, systematic visits, and secondary data. The data were analyzed by calculating the Relative Important Index model (RII model), using a weighted average approach to rank the factors based on their importance and frequency, which are derived from the views of the respondents. The most significant quality defects identified by this study were plumping parts, cracked walls and ceilings, interior partitions, and other related finishing works. Even though most of the residents had engaged to repair plumping parts, door handles, and lock keys, the quality defects related to electric utility and electricity installation were low. From these research results, it can be concluded that the major poor project performance on the quality of housing construction projects that most frequently occurs in the study population among stakeholder's managerial factors has been poor relationships and collaboration, a low effective project management system, poor quality procedures and departments, a poor training system, and reduced subcontractor responsibility, and among the technical factors, human error, lack of quality management, low quality drawings and specifications.

Key words: Construction projects, Project Quality, Poor Management, Relative Importance Indicator (RII)

CHAPTER 1

INTRODUCTION

1.1 Background to the study

The construction industry has complexity in its nature because it contains a large number of parties, such as clients, contractors, consultants, stakeholders, shareholders, regulators, and others. The construction industry makes significant contributions to the socio-economic development process of a country. Its importance emanates largely from the direct and indirect impact it has on all economic activities. It contributes to the national output and stimulates the growth of other sectors through a complex system of linkages. (Jha, K., & Lyer, K. 2006)

The construction industry has important contributions to the Ethiopian economy, as demonstrated by its share in the GDP. The sector has registered relatively higher growth as compared to the growth of GDP, and there has been increased investment in the development and expansion of various infrastructure projects like roads, airports, and residential, and non-residential housing units. Maintaining steady cost projections on construction projects had been, until recently, an issue of serious concern both to the client and the project contractors. (MoUDC (2012)

Construction projects often suffer from poor performance in terms of time delays, cost overruns, and quality defects because completion on time, within budget, and with the required quality has been widely recognized as one of the three primary goals of project success. Studies identified time, cost, and quality as major indicators to measure poor project performance. (Meng 2011)

Other contributing factors include lack of attention to the economy, design and material selection, delay in budgetary approval and disbursement of funds, failure to monitor progress on projects, absence of modern management techniques, inappropriate IT systems, weakness in equipment procurement, and ambiguities in relationships among agencies involved in the projects. (Jreisat, L., and Hattar, C. 2016)

Quality defects such as human error, poor workmanship, and contractual relationship respectively, and the relationship between project parties or stakeholders are major causes of poor performance. Many previous researches had been studied the performance of construction projects and the reasons for the industry's poor performance have been

attributed to quality defects. Forsythe, P.J. (2016)

The culture around defects, rework, and quality can determine whether quality issues arise and whether they are dealt with properly as costs increase and building quality failures are frequent. Studies generally analyses how quality failures affect the occupants or how occupants can assist in reducing defects. Most studies on occupier satisfaction in residential construction found that occupiers are more likely to find aesthetic defects post-handover. They will not speak up about potential quality failures during construction due to a lack of awareness of the construction process. As the customer's perspective on quality levels is important, performance should be measured and informed to all stakeholders involved. Forcada, N., Macarulla, M., Gangolells, M., and Casals, M. (2016), Elsherbiny, A. (2021),

Much of literatures have been produced by different scholars in the field of quality performance related to housing construction project. Management commitment to continuous quality improvement, management leadership in promoting high process quality; quality training of all personnel; efficient teamwork to promote quality issues at the corporate level; and effective cooperation between parties taking part in the project are generic factors that affect process of quality (Jha, K. & Iyer, K. 2006, Forsythe, P.J. (2016).

Taking into consideration of this back ground this paper was aimed to assess the effect Poor Project Performance on the Quality of Housing Construction Project evidencing from selected Housing project construction in Addis Ababa where Ethiopia's Federal Housing Corporation (FHC) had building in different housing construction project to be offered to state officials, and for rental houses to employees of businesses.

1.2 Statement of the problem

Ethiopia, as a country, has witnessed a substantial increase in the number of stalled projects due to in appropriate project organization structures and ineffective leadership. There is evidence that the performance of building construction in Ethiopia is poor, as the time, cost, and quality performance of projects are to the extent that over 70% of the projects initiated are likely to escalate with time, with a magnitude of over 50%, and over 50% of the projects are likely to escalate in cost, with a magnitude of over 20%, as per (MOEUDC 2012).

Researchers discovered that despite the high quality of training of consultants in the building industry and the regulation of the industry in major urban areas, construction projects do not always meet their goals. This is manifested by myriad projects that have cost overruns, delayed completion period, and poor quality, resulting in collapsed buildings in various parts of the country, high maintenance costs, dissatisfied clients, and even buildings that are not functional. indicating that the failure of any project is mainly related to problems and failure in performance (Jha, K., & Iyer, K., 2006; Forsythe, P.J., 2016).

Generally, past Ethiopian construction industry experiences show that, medium to large size projects have high failure rate. The consequences can be costly and lengthy, with the worst outcomes often leading to undesirable litigation engagements, according to EEA/EEPRI, 2020.

A number of authors have provided different categorizations of quality problems. However, few comprehensive approaches are made to identify the major sources and factors that affect quality. As per Forsythe, P.J., (2016), Cooper, B., and Brown, M. (2014), and Chong, W.K. and Low, S.P.J. (2005), four main sources of quality defects are identified namely, stakeholder's managerial, technical, environmental, material, equipment, culture and politics. These main sources of quality defects as identified will be used as a framework to identify causes of quality problems in construction projects. Due to its unique characteristics of involving so many actors in construction projects, stakeholder management appears to be one of the most fundamental and important factors of a project, Heravitorbati et al., 2011.

On the other hand, culture and politics have the lowest impact on project quality. (Heravitorbati et al., 2011). There have been a number of recent building quality failures in Ethiopia and internationally that have resulted in professional, government, and academic debate, along with news outlets and the public questioning the quality of new construction. These incidents caused a decline in the public's confidence in construction outputs, particularly their safety and quality outcomes. A boost in quality management and inspections has been demanded by onlookers to ensure future developments are not going to be unsafe to live in and costly to repair.

Although many articles have been written on the topic for a number of years, little seems to have changed in order to significantly improve building quality. Defects in newly completed buildings are becoming a serious phenomenon as lower cost and medium cost houses are being built. A construction defect is lacking and not meeting the required

standard that may reveal itself as a building is constructed or after an element of work is completed, as per Chong, W.K., and Low, S.P.J. (2005); Bubshait, A. (1994); Auchterlounie, T. (2009).

Construction defects affect society or end-users due to the possible danger posed and the direct and indirect cost of repairs imposed. Some of the most common construction defects involve leaking roofs and windows, cracked and heaving concrete, cracks in walls and joints, defective plumbing, and improperly installed electrical equipment. Construction defects typically involve some or all of the following conditions:

A range of sources in the literature discuss shortfalls in specific aspects of housing performance that have the potential to result in houses with low-quality or potentially unsafe living conditions. Overall, it was found that defects and rework are generally not the result of inadequate building code clauses or developed best practices; rather, they are determined by the ability and willingness of industry professionals to communicate, achieve requirements, and manage errors. (Jha, K., & Iyer, K., 2006; Forsythe, P.J., 2016).

In our country, only a few studies have been conducted on the effect of poor project performance on the quality of housing construction.

This study, therefore, was motivated to assess the effect of poor project performance on the quality of housing construction projects: evidence from selected housing project construction in Addis Ababa.

1.3 Objective of the study

1.3.1 General objective

- To investigate the effect of poor project performance on the quality of housing construction projects in Addis Ababa.

1.3.2 Specific Objectives

- To identify the sources and types of quality defects in the quality of the housing construction project in Addis Ababa
- To assess the effect of stakeholder's managerial factors on the quality of a housing construction project in Addis Ababa
- To explore the effect of technical factors on the quality of housing construction projects in Addis Ababa

- To assess the effect of environmental, material, and equipment factors on the quality of the housing construction project in Addis Ababa
- To study the effect of culture and politics on the quality of housing construction projects in Addis Ababa

1.4 Research Questions

i. What are the major sources and types of quality defects in the housing construction project in the study area?
ii. To what extent do the stakeholder's managerial factors affect the quality of the housing construction project in the study area?
iii. To what extent do the technical factors affect the quality of the housing construction project in the study area?
iv. To what extent environmental, material, and equipment factors are affecting the quality of the housing construction project in Addis Ababa?
v. To what extent do culture and politics affect the quality of housing construction in the study population?

1.5 Significance of the study

The study will fulfill an important knowledge gap on the poor project performance that affects the quality of housing projects in the selected construction projects in Ethiopia and in the study area. The findings of this study will also add to the existing body of knowledge and provide the basis for further studies on this matter.

The revelation of the implications would inform policymakers and decision-makers in the country to devise effective ways of addressing the challenges for the stability of the study area. The establishment of the effects will allow the government and other development partners to adopt effective measures with the aim of enhancing the quality of the housing projects.

The study will also have been expected to help decision-makers and interested parties gain in-depth insight into the effect of poor project performance on the quality of housing projects in Ethiopia and in the study population, develop and implement effective strategies to cope with the challenges and problems, and provide ways forward for the construction project stakeholders to improve the quality of project performance in the study population.

1.6 Scope and limitation of the study

The scope was limited to only project managers/owners in the construction industry. The primary focus will be on the effects of poor project performance on the quality of housing projects in Ethiopia, based on related literature and the observed empirical gap in the area. Methodologically, the research was limited only to the use of questionnaires and selected projects, geographically in the area of Addis Ababa City due to its proximity, and more of the construction mega projects are currently found in Addis Ababa City.

1.7 Organization of the study

This study is organized into five chapters. The first chapter is the introduction, which includes the background of the study, statement of the problem, objective of the study, research question, significance of the study, scope of the research, and limitations of the study. The second chapter is about a literature review. The third chapter is the methodology of the research. The fourth chapter results and discussion of the study are followed by the fifth chapter. conclusion and recommendation.

1.8 Operational Definition of Variables

Project: A project is a series of tasks that need to be completed to reach a specific outcome. A project can also be defined as a set of inputs and outputs required to achieve a particular goal. Projects can range from simple to complex and can be managed by one person or a hundred. (Novon 2005)

Owner: A public organization for whom the construction project is being undertaken. (Chan and Kumaraswamy, 2002)

Contractor: A natural or juridical person under contract with an owner to construct the building construction projects. (Pillai et al., 2002)

Consultant: The person or entity appointed by the owner to establish and agree on all budgets and implement and manage the necessary cost control for the project. (Nov. 2005)

Performance: The accomplishment of a given building construction project against contractual cost, time, and quality standards. (Construction Industry Task Force, 1998).

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

The purpose of this chapter is to review the existing literature on the subject matter of the study. It acquaints the reader with the definition of a construction project, an extensive literature review about performance and performance indicators in construction projects, a literature review of the research work that was done by various scholars in the field of performance of construction projects, and presents through a theoretical review, empirical review, conceptual framework work, and analysis of the existing literature relevant to the study, summary, and research gaps.

2.2 Theoretical Review

2.2.1 Construction projects

A construction project is the organized process of constructing, renovating, or refurbishing a building, structure, or infrastructure. Through a project team, the brief and financing are put together to produce a unique design that delivers a single project. Construction is the process of constructing a road, bridge, dam, a private residence, an airport, a commercial building and offices, or the assembling of infrastructure. It is the recruitment and utilization of capital, specialized personnel, materials, and equipment on a specific site in accordance with drawings, specifications, and contract documents prepared to serve the purposes of a client.

By satisfying some of the basic objectives of development, including output generation, employment creation and income generation and re distribution, construction contributes to the economic development of the country and plays a paramount role in satisfying basic physical and social needs, including the production of shelter, infrastructure and consumer goods (Shaban 2008).

As it has been known, projects are risky for three key reasons. The first is that all projects share common characteristics, which unavoidably introduce uncertainty. Some of these common features are that projects are unique, complex, involve assumptions and constraints, are performed by people and involve change from a known present to an unknown future. Secondly, all projects are undertaken to achieve some specific objectives, and the other reason is that all projects are affected by the external environment they exist in. A building construction project, like any other project, also faces different risks throughout the life of the project by reason of the uniqueness of every project, the uncertainties introduced by the project stakeholders, statutory or regulatory protocols, and other intrinsic and extrinsic constraints. Hence, risk can constrain the achievement of key project objectives in terms of time, cost and quality. (Mbugua et al., 1999; Lepartobiko, W. 2012).

2.2.2 Construction industry in Ethiopia

Construction is one of the largest industries that contributes to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005) and is vital for the development and economic growth of that industry, which can be measured by the development of physical infrastructure such as buildings, roads, and bridges. Construction project development involves numerous parties, various processes, different phases and stages of work, and a great deal of input from both the public and private sectors, with the major aim being to bring the project to a successful conclusion (Navon, 2005). The success of a construction project depends on its performance, which is measured based on timely completion within the budget, required quality standards, and the customer's satisfaction (Omran, 2012).

Although the industry plays an important role in country development, there are several problems while trying to improve its performance. This is due to the nature of the work, such as high fragmentation, instability, low productivity, poor quality control, and a lack of standards.

The construction industry, which is the core of the nation's economy in Ethiopia, is currently facing many problems, and the unorganized and fragmented nature of the industry is likely to exacerbate this effect. The construction industry has important contributions to the Ethiopian economy, as demonstrated by its share in the GDP, which contributes about 19.5 percent (MRE 2020). The sector has registered remarkable growth;

over the last 11 years, there has been increased investment in the development and expansion of various infrastructure projects (MoUDC 2012).

The industry comprises organizations and persons who include companies, firms, and individuals working as consultants, main contractors, and sub-contractors, material and component producers, plant and equipment suppliers, builders and merchants and has a close relationship with clients and financiers. The Ethiopian government is involved in the construction industry as a purchaser (client), financier, regulator, and operator. In combination the construction and real estate sectors contributed about 20.37% to Ethiopia's GDP in 2019 and now there are 159 grade 0ne major construction projects currently underway in Ethiopia as of 2019 and a further 85 set to go ahead within the next five years (Deloitte 2020).

In Ethiopia, the construction industry has been a huge investment sector for the last many years; on average, 58–60% of the capital budget is spent on this industry. It contributes to employment and income creation for the population. It also contributes to government revenue through the generation of corporate profit tax and employee's income tax, which in turn go to finance public services such as schools and health institutions, among others. (EEA 2006)

2.2.3 Theory of Performance

As it has been widely known to perform, it produces valuable results. A performer can be an individual or a group of people engaging in a collaborative effort. The Theory of Performance develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements. Developing a performance is a journey, and the level of performance describes the location in the journey. The current level of performance depends holistically on six components that include context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. For effective performance improvements, three axioms are proposed that involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice. Performance advancing through levels is used to characterize the effectiveness of performance. Performing at a higher level produces results that increase quality, capability, capacity, knowledge, skills, identity, and motivation (Don, 2010).

2.2.4 Construction project and performance

Construction projects success depends mainly on success of performance that unequivocally mentioned the ultimate goal for every project. Many previous researches had been studied on performance of construction projects reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system (Dissanayaka and Kumaraswamy 1999). financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting (Thomas (2002). Construction time is also increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. (Chan and Kumaraswamy 2002).

2.2.5 Construction project performance measurement models

Two models developed for measuring construction project performance are integrated performance index (Pillai et al., 2002) and key performance indicator (Construction Industry Task Force, 1998). Integrated Performance Index was developed initially for performance measurement of R&D projects, based on their real-life experiences of working on the management system for the integrated guided missile development program of India. The model identified three project phases and dealt with performance elements such as performance indicators or key factors associated with each phase; the stakeholders; and the performance measurements. The three project phases identified are the project selection phase, the project execution phase and the implementation phase.

The usefulness of the integrated performance index is that it can be applied at all the phases of the project life cycle to rank the project for selection, to compare project performance under the execution phase and to act as an input for the management of future projects. One problem of the model is lack of clarity in the way the mathematical formulae is used to integrate the identified key factors into an integrated performance index. Given this shortcoming, this model is not well received by practitioners. Key Performance Indicators (KPIs) is the UK construction industry's response to Egan’s report (Construction Industry Task Force, 1998) to measure project performances, based on ten identified parameters.

These consist of seven project performance indicators; construction cost, construction time, cost predictability (design and construction), time predictability (design and construction), defects, client satisfaction with the product and client satisfaction with the service; and three company performance indicators namely; safety, profitability and productivity. The strength of this model is that the overall concepts are easily understood and easily implemented by clients, designers, consultants, contractors, sub-contractors and suppliers. One problem with the model is that the KPIs are not compartmentalized along project phases.

2.2.6 Performance Measurement Theory

Scholars have identified a distinction between performance indicators, performance measures and performance measurement. Performance indicators specify the measurable evidence necessary to prove that a planned effort has achieved the desired result. In other words, when indicators can be measured with some degree of precision and without ambiguity, they are called measures. However, when it is not possible to obtain a precise measurement, it is usual to refer to performance indicators. Performance measures are the numerical or quantitative indicators (Sinclair and Zairi, 1995, Mbugua et al.,1999).

On the other hand, performance measurement is a systematic way of evaluating the inputs and outputs in manufacturing operations or construction activity and acts as a tool for continuous improvements (Sinclair and Zairi, 1995; Mbugua et al., 1999). In response to calls for continuous improvement in performance, many performance measurements have emerged in management literature such as the financial measures (Kangari et al., 1992), client satisfaction measures (Walker, 1984), employee measures (Abdel-Razek, 1997), project performance measures (Belassi et al., 1996) and industry measures (Egan, 1998). Rene cordero (1990) classifies performance measurement based on the method of measurement and area of measurement.

The methods of measurement of performance can be in terms of the technical performance, the commercial performance and the overall performance. The areas of measurement are at the planning & design level, the marketing level and manufacturing level etc., and for the overall performance are at the level of a firm or strategic business unit.

2.2.7 Measurement of Project Performance

The purpose of performance measurement is to help organizations understand how decision-making processes or practices led to success or failure in the past and how that understanding can lead to future improvements.

Performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. (Tangent 2004) Performance measurement systems are imminent in the construction firms. and one of the primary tools used by the manufacturing sector for business process re-engineering in order to monitor the outcomes and effectiveness of implementation. (Lehtonen 2001, Karim and Marosszeky 1999),

Performance measurement as a comparison between the desired and the actual performances and it is needed not only to control current projects but also to update the historic database. Such updates enable better planning of future projects in terms of costs, schedules and labor allocation. The purposes of key performance indicators are to enable a comparison between different projects and enterprises to identify the existence of particular patterns. They used different representation values to evaluate time and cost performance such as project characteristics, procurement system, project team performance, client representation's characteristics, contractor characteristics, design team characteristics, external condition. Samson and Lema (2002) further remarked that characteristics of emerging performance measurement indicators need analysis of both the organization and environment such as: nature of work, global competition, quality awards, organizational role, external demands and power of IT.

The indicators should be able to identify causes of problems, address all possible performance drivers, and identify potential opportunities for improvement. Cheung et al (2004) in other study publicized that seven main key indicators for performance which are: time, cost, quality, client satisfaction, client changes, business performance, and safety and health. As Pheng and Chuan (2006) indicated that project performance can be determined by two common sets of indicators. The first set is related to the owner, users, stakeholders and the general public which are the groups of people who will look at project performance from the macro view point and the second are the developer, a non-operator, and the contractor which are the groups of people who will look at project performance from the micro viewpoint.

Ugwu and Haupt (2007) developed and validated Key performance indicators for sustainability appraisal using South Africa as a case study using four main levels in a questionnaire to identify the relative importance of Key performance indicators such as economy, environment, society, resource utilization, health and safety and project management and administration whereas Luu et al (2007) provided nine Key performance indicators which can be applied to measure project management performance and evaluate potential contractors as well as their capacity by requesting these indices.

2.2.8 Problem of Performance in Construction Industry

The failure of any construction project is mainly related to the problems and failure in performance. though there are many reasons and factors which attribute to such problems. Long et al, (2004) classified into three layers namely problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants, and problems caused by contractor incompetence/inadequacies and he further remarked that performance problems arise in large construction projects such as incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Other study conducted by Okuwoga (1998) identified that the performance problem is related to poor budgetary and time control.

In other hand unrealistic target setting (i.e., planning) and causes originating from the actual construction (in many cases, the causes for deviation originate from sources) the main performance problem. Navon (2005)

2.2.8.1 Quality

The word quality has many meanings: a degree of excellence; conformance with requirements; fitness for use; delighting customers; freedom from defects, imperfections or contaminations (Hoyle, 2006). Although PMBOK 5th edition define quality in project term as "Quality is a performance or a result which is maintaining and fulfill all the requirement sets in the objectives of the product or deliverables of the project". Chan and Chan (2004) confer that in the construction industry, quality is defined as a totality of features required by a product or service to satisfy a given need- "fitness for purpose". However, the way in which quality is determined is by the extent to which a product or service successfully serves the purpose of the user during

usage (not just at the point of sale). Price and delivery are both transient features, whereas the impact of quality is sustained long after the attraction or the pain of price and delivery has subsided (Hoyle, 2006). Nowadays, quality is the guarantee of the product that convinces the customer or the end-user to purchase or use.

The concept of managing construction projects is deeply embedded in the traditional building procurement system. Ireland (1983) argues that time; cost and quality are the principal feasible objectives of the client in any construction project. Although it is claimed that time, cost and quality are incorporated in the management of construction projects; research has shown that in fact a time-cost bias exists. Specifically, quality is the most significance thing in construction projects that have been perceived as impactful in order to meet client satisfaction.

To the client, quality may be defined as one of the components that contributes to "value for money" (Flanagan and Tate, 1997). Vincent and Joel (1995) define total quality management as: "…the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services. The goal is customer satisfaction." Furthermore, in order to achieve successful project quality management three separate drivers to quality management must be managed, namely:

- Integration of the project team so as to have a single objective and a common culture
- A customer focus for the team thereby facilitating the provision of products and services that will meet the client's needs
- A process of continuous improvement in the management of the construction project. When these three components are successfully integrated, the project will begin to realize significant, measurable and observable improvements in the attainment of the clients‟ objectives.

'Quality' has a wide range of definitions, varying amongst different consumers and authors. For the purpose of this research, the following definitions and terms will be used to discuss quality and barriers to quality. The definition of quality from BRANZ Study Report SR380 (Page & Gordon, 2017, p. 1) will be used as a basis for searching and evaluating the relevance of potential sources of information.

In general, quality in buildings may include:

- compliance with building regulations and standards
- suitability for its intended use

- sustainability in construction and use
- adaptability
- being aesthetically pleasing
- avoiding defined defects in performance, durability, functionality and safety.

A range of different terms, such as ‘defects’, are used within literature to refer to shortfalls in quality. The following terms were found to be the most significant keywords used within the literature and will be referenced within this report. ‘Rework’ is defined as the “unnecessary effort of redoing a process or activity that is incorrectly implemented the first time” (Love & Edwards, 2004b, p. 207). It is referred to commonly within studies discussing errors and defects that are discovered and remedied during the construction phase of building projects.

A ‘handover defect’ or ‘snag’ refers to a defect that is absorbed during the construction phase and found at the completion of the project when the building is ready for occupation (Sommerville & McCosh, 2006). The terms ‘handover defect’ and ‘post-handover defect’ are most commonly used by Spanish authors to describe defects found at or shortly after project completion. ‘Snags and the process of ‘snagging’ are common terms in the UK. Outside of these sources, the term ‘defect’ is most commonly used, including within the New Zealand Building Act 2004, to describe any shortfall in quality after the construction phase has ended. Within the literature, ‘latent defects’ typically refer to defects that become apparent during the occupancy phase of a building’s life, affecting the building in the long term.

Project quality Management

Project quality management is the process and activities of performing organization that determine quality policies, objectives and responsibilities so that the project will satisfy its customer demand and the project objective by itself. (PMBOK fourth edition).

Project quality management is a process that contains the following

1. Plan quality management
2. Perform quality assurance
3. Perform quality control

These project quality management practices are interacted with each other and as well as interacted with other project management body of knowledge areas especially with project time management, project cost management, project risk management and project

integration management. Each process at least occurs once in every project and the project phases.

Project quality management addresses the management of the project and project deliverables. It is applied in all types of projects that differentiated based on their products or deliverables.

In any case failure to meet quality requirement always has serious negative consequence for all of the project stakeholders. This means when we take the case to Research organizations, if the research firm face or fail to meet the required project quality the company may lose clients trust, this also caused company's reputation in question. For example, the following points could be major sources for quality problems.

- Meeting customer requirements by overworking the project team may result an increase in employee attritions, errors and rework the project that may leads to extra project cost.
- Meeting project schedule objectives by rushing planned quality management may result in undetected errors.

Project quality management implemented in different conditions and process. Among the methods of project quality management, total quality management, six sigmas, failure mode and effect analysis, design review, voice of the customer, cost of quality and continuous improvement are the main implemented in different projects.

Project quality management as a discipline recognizes the importance of responding customer satisfaction, prevention over inspection, continuous improvement and management responsibilities are the most crucial in managing project quality.

As stated on the above project quality management has three main processes, plan quality management, perform quality assurance and perform quality control (PMBOK fourth edition). Then we will see the process in short as follows.

A. Plan quality management

It is the process of identifying quality requirements and standards for the proposed projects. And it is also documenting how the project will demonstrate compliances. In short it is proposing, identifying, measuring and documenting quality requirement or standards for the project. In research, every project has its own objectives that needs specified and documented quality standards based on its requirement. Also it should be performed parallel with other project planning process. The planning process has consisted of different processes as an input, tools and techniques and output

B. Perform quality assurance

It is the process of auditing quality requirements and the result from quality control measurements to ensure appropriate quality standards during the project is conducted. It is although an execution process that uses data created during performs quality control.

Perform quality assurance also can provide a continuous improvement in the quality performance of the project, it also being a means of an iterative improving of all quality processes. This could help the project to save cost and time as well as allocating the effectively and efficiently.

This process also has its own processes of input, tools and techniques and output.

i. Perform quality control

It is the process of monitoring, controlling and recording the result of executing the quality activities to assess performance of the project and provide recommendations for necessary changes. This process is performed throughout the project. This process often performed in an organization is by quality control department or quality control team. Their major responsibilities are identifying quality problems in the project and recommend and take actions to eliminate the quality problems occurred in the project. Most of the time the quality control team need to have statistical quality control knowledge especially sampling and probability knowledge.

This process also has its own processes of input, tools and techniques and output. Most of the processes in the tools and techniques are cause and effect approach (project management institute 2013).

ii. Quality Management System

If properly implemented, formal quality management systems provide a vehicle for achieving quality (i.e., conformance to established requirements). Quality system is the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management (Battikha, 2002). In other words, Quality management systems refers to the set of quality activities involved in producing a product, process, or service, and encompasses prevention and appraisal (Burati, 1992). It is a management discipline concerned with preventing problems from occurring by creating the attitudes and controls that make prevention possible (Battikha, 2002). Quality activities include the determination of the quality policy, objectives, and responsibilities and implementing them through quality planning, quality control, quality assurance, and quality improvement, within the quality system (ASQC, 1997 in Battikha, 2002). these views expressed by, is that, a quality management system is a management technique used to communicate to employees what is required to produce the desired quality of products

and services and to influence employee actions to complete tasks according to the quality specifications. In like manner, they also explained quality management system as a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance. These activities interact and are affected by being in the system, so the isolation and study of each one in detail will not necessarily lead to an understanding of the system as a whole.

The main thrust of a QMS is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. The paper continued to say that a fully documented QMS will ensure that two important requirements are met:

- The customers‟ requirements – confidence in the ability of the organization to deliver the desired product and service consistently meeting their needs and expectations.
- The organization's requirements – both internally and externally, and at an optimum cost with efficient use of the available resources – materials, human, technology and information.

iii. Purpose of Quality Management in Building Construction

"The U.S. Army Corps of Engineers, (2004) states that Construction Quality Management "CQM" is the performance of tasks, which ensures that building construction, should performed according to plans and specifications, on time, within a defined budget, and a safe work environment.

For a construction project, quality begins with requirements carefully developed, reviewed for adherence to existing guidance and ultimately reflected in criteria and design documents which accurately address these needs. Therefore, the designer establishes the quality standards and the contractor in building to the quality standards in the plans and specifications, controls the quality of the work. The purpose of CQM is the Government's efforts, separate from, but in coordination and cooperation with the contractor, assure that the quality set by the plans and specifications is achieved. CQM is the combined effort of the contractor and the Government. The contractor has primary responsibility for producing construction through compliance with plans, specifications, and accepted standards of the industry" (Hiwot 2012).

2.2.9 Poor construction Performance, Causes and Effects

Construction projects often suffer from poor performance in terms of time delays, cost overruns and quality defects because completion on time, within budget and with the required quality has been widely recognized as the three primary goals of project success. Meng (2011) identified time, cost and quality as major indicators to measure poor project performance. Rwelamina & Savile (1994) further divided the methods of measurement into two: traditional project performance, which measures cost, quality and time; and non-traditional performance that measures health and safety, environment, management, worker skills, industrial relations and facilities.

There are a number of factors which affect the performance of a project. Ofori (1994) identifies the reasons contributing to poor project performance as delay in obtaining statutory approval and clearance, inadequate expertise in project appraisal, planning and budgeting, and assessment of technology. Other contributing factors include lack of attention to the economy, design and material selection, delay in budgetary approval and disbursement of funds, failure to monitor progress on projects, absence of modern management techniques, inappropriate IT systems, weakness in equipment procurement, and ambiguities in relationships among agencies involved in the projects.

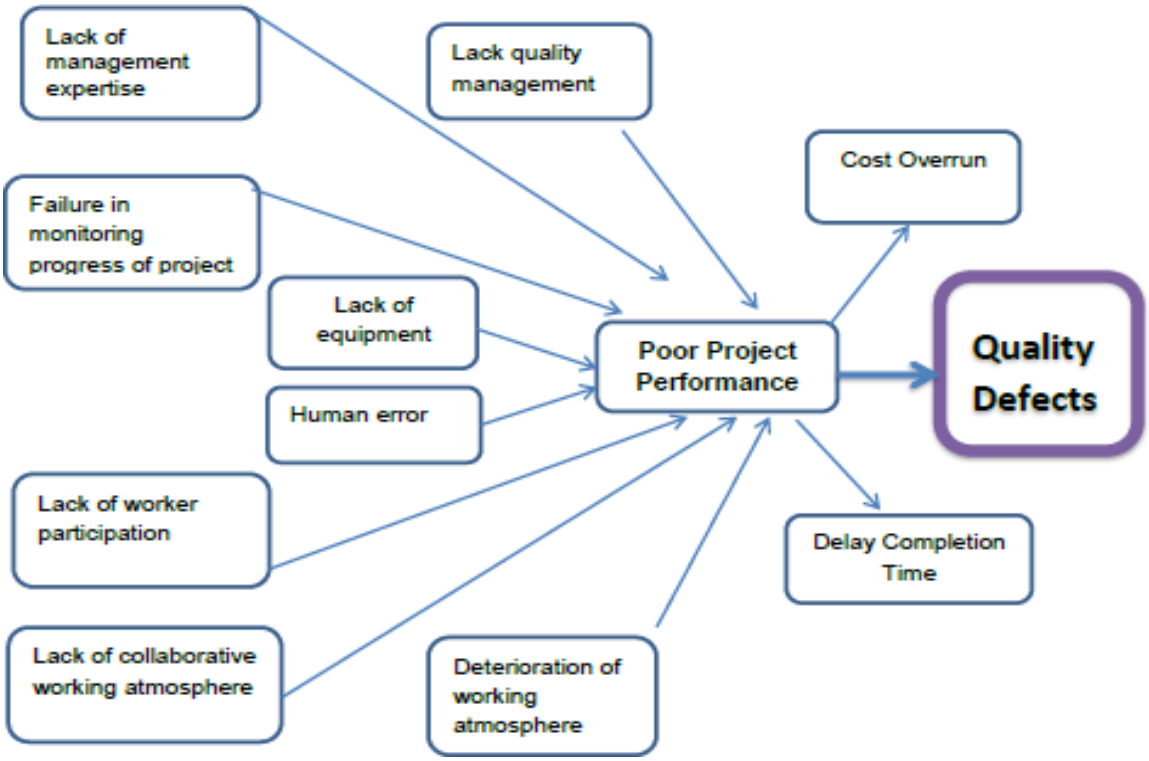
So far, different causes are identified as causes of poor performance in construction. Rwelamina & Savile (1994) identified a lack of management expertise and worker participation, and Tam & Harris (1996) added equipment and quality management of the team as a major cause. Atkinson (1999), Love & Li (2000), and Odeh & Battaineh (2002) further identify major causes of quality defects as human error, poor workmanship and contractual relationship respectively. Underlining on the effect of relationship management on project performance in construction, Meng (2011) identified deterioration of the relationship between project parties or stakeholders as a major cause of poor performance.

Since construction is undertaken as teamwork, it has incorporated actors with different role and responsibilities thus, collaborative working atmosphere is required. Partnering is widely recognized as a collaborative supply chain relationship where, supply chain relationship refers to the linkage in the network of an organization (Christopher 1992). Supply chain in construction is more complex than manufacturing supply chain because it involves a larger number of key participants, such as project client, consultants, main contractor, specialist contractors, and various suppliers (Meng 2011).

Meng (2011) identified three types of relationships in construction supply chain: traditionally adversarial (TAR), short-term collaboration (STC) and long-term collaboration (LTC). TAR focuses on win-lose, suspicious, withhold and manipulate information, ineffective problem solving and unfair risk allocation (Larson 1997), according to Thomas & Thomas (2005) these leads to selfish objective, lack of trust, poor communication problem escalation and lack of continuous improvement. Thus, for successful application of supply chain management, major shift from TAR to collaborative relationship is required (Egan 2002). The second and the third type of relationships are a form of partnering in which STC is project partnering focused on a single project and LTC is strategic partnering focused on multiple projects (Meng 2011).

Based on the analysis of both the traditional and the collaborative approaches within existing literature, Meng (2011) identified ten key indicators that describe supply chain relationship of a construction.

Performance measurement and Continuous improvement are also among the ten indicators of supply chain relationship. Based on the literature review made in this section, the identified causes and effects that lead to poor performance of a project summarized in the diagram below.



(Source: Author 2012, adapted from the literature)

Figure 2-1: Causes and Effects of Poor Project Performance on the Quality of Housing Construction Projects

2.3 Empirical Review

2.3.1 Quality practices in building projects

Although a significant amount of quality practices has been introduced within the industry, attainment of reasonable levels of quality in construction projects continues to be an on-going problem" (Heravitorbati et al. 2011, pp. 265).

Some researchers like Arditi & Gunaydin (1997) use the term quality instead of project performance to indicate the effect. Quality project refers to a project, which is completed on time within budget and meets its functional requirement (Arditi & Gunaydin 1997).

Vincent & Joel (1995) define quality as the integration of all functions and processes to achieve continuous improvement of the quality of goods and services to meet customer satisfaction. According to Arditi & Gunaydin (1997), quality is meeting the requirements of the stakeholders: designer, contractor and regulatory agencies as well as the owner. To ensure project quality implementation of a Total Quality Management System (TQMS) is necessary. TQMS is an effort that involves every organization in the industry to improve performance and focus on process improvement, customer and supplier involvement, teamwork, education and training to achieve customer satisfaction defect free work (Meng 2011). The system is also defined as being prescribed quality objective of the company (Oztas et al. 2005).

There are two widely used terms in TQMS namely Quality Assurance (QA) that covers activities necessary to provide quality in project work and Quality Control (QC) that is set of procedure to meet QA. The activities in QA involve establishing project related policy, system necessary to produce quality, standards, training and guidelines whereas the procedures in QC involve planning, coordinating, developing, checking, reviewing and scheduling of work (Arditi & Gunaydin 1997). The training in QA includes instruction in the basic TQM cause and effect analysis, team problem solving, interpersonal communication and interaction and cost of quality measurement (Arditi & Gunaydin 1997).

Arditi & Gunaydin (1997) also identify the importance of teamwork in the implementation of TQMS. The team, which is responsible for establishing joint goals, plans, and controls should include all members of the parties involved in the project. The

teamwork provides a mechanism for listening to and communicating with the owner, thus useful for measuring the level of customer satisfaction.

As the customer's perspective of quality levels is important (Deming 1986), performance should be measured and informed to all stakeholders involved (Thomas & Thomas 2005). The next subsections then address stakeholder involvement, performance measurement and customer satisfaction.

2.3.2 Stakeholder involvement

A building project involves several factors such as the client, designers, contractors, project managers and users and each of them have their own role, requirement and objective (Wang & Huang 2006). All of the stakeholders set demands on organization, coordination and communication. If the mentioned stakeholders do not function well, there are often problems like higher costs, delays, low quality and poor function of the final product. The main actors, which carry out a construction project, are engineers, architects and contractors. The process becomes complicated when investors, subcontractors, suppliers of equipment and materials, potential users of facilities, and Government agencies that regulate nearly every step of the process are involved (Moavenzadeh 1987).

Key stakeholders are usually considered responsible for many of the current quality problems or defects that occur in construction building projects. Jha & Lyer (2006) identify that one of the most important factors, which has an indisputable effect on project quality is efficient communication between parties involved in construction projects. Arditi & Gunaydin (1998) also affirm that high quality projects mainly depend on the relationship among the parties involved. Thus, Heravitorbati et al (2011) concluded that stakeholder incorporation within quality management planning and proceeding would facilitate greatly in solving large numbers of quality problems in building projects.

Therefore, effective relationship among stakeholders and involving stakeholders in planning and practice has immense help in solving quality failure issues (Wang & Huang 2006 and Heravitorbati et al. 2011). Bubshait (1994) provides a clear interaction between project quality and stakeholder involvement as shown in Figure 4 below.

*(*Source: Heravitorbati et al. 2011)

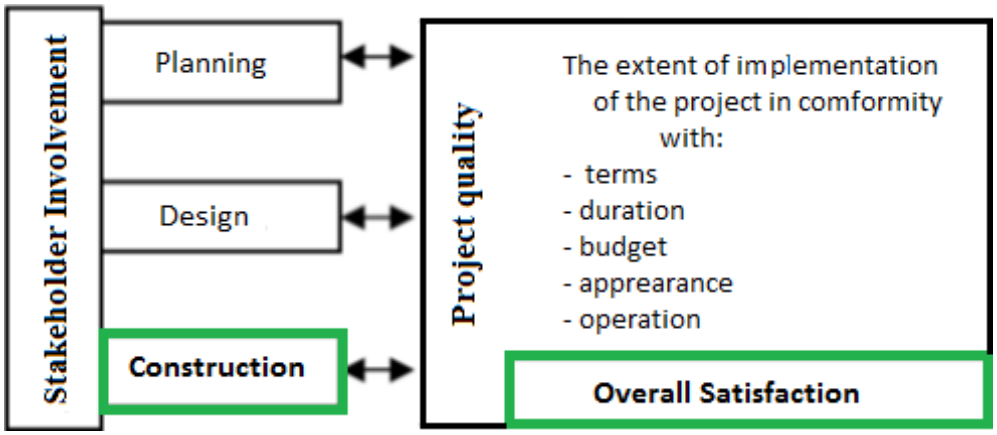


Figure 2-2: Relationship between stakeholder involvement and project quality

2.3.3 Measure Project Performance

It is important to measure project performance in the agreed areas, at the agreed intervals, and to give feedback to the project team (CIB 1997). Performance should be measured on a regular basis throughout the project, which helps the team to review progress and identify opportunities for further improvement (Thomas & Thomas 2005). Benchmarking allows a project team to learn from best practice by comparing its own performance with others (Kelly et al. 2002). Without clear measurement of performance against benchmarks, it is difficult for any teams to determine how well they have done and what improvement they need to make (Cain 2004).

Measuring quality enable managers to know how close they are to their target and how to make the right decisions for improving work process (Oztas et al. 2005). Continual measuring of project performance for further improvement also helps in meeting customer expectation on the project outcome. Deming (1986) also affirms that the customer's perspective of quality levels is critically important. Hence it is important for the project team to understand what customer satisfaction means.

2.3.4 Customer Satisfaction

Successful companies need to meet their customer expectations through superior implementation of their quality policies; however, currently many customers are still not satisfied with the quality of constructed projects (Seaver 2001). Customer satisfaction model (Cook et al 2000) consists of five satisfaction quality dimensions: safety, project management (ability to plan schedules, manage and execute), contractor/customer relationship, cost, and prepared/skilled workforce. Clients have a substantial role to play

in setting demanding and insisting upon improvements. Ultimately, they have the most to gain from ensuring the implementation of the best practice, (Latham 1994).

2.3.5 Defects in building construction

Defects in newly completed buildings are becoming a serious phenomenon as lower cost and medium cost house are being built (Alsadey, Omran & Pakir 2010). Construction defect according to Alsadey, Omran & Pakir (2010) is lacking and not meeting the required standard that may reveal as a building is constructed or after an element of work is completed. Construction defects usually include any deficiency in the performing of the design, planning, supervision, inspection, construction or observation of construction to any new home or building. The defects usually are start to appear after 2 years of occupancy (Chong & Low 2006).

Construction defect affects society or end-users due to possible danger posed and direct and indirect cost of repairs imposed. Some of the most common construction defects involve leaking roofs and windows, cracked and heaving concrete, cracks in walls and joints, defective plumbing and improperly installed electrical equipment. Construction defects typically involve some or all of the following conditions (Chew, Wong & Kang 1998; Alsadey, Omran & Pakir 2010, and Chong & Low 2006)

Table 2-1: Causes and symptoms of common defects in building services

Service building installation	**Symptom and possible causes**
Water supply	- Insufficient water pressure or flows due to blockage or leakage of the components of the supply system such as pipes or valves - Stoppage of supply due to pump failure, breakage of supply pipe - Water seepage due to defective pipes (pipe joints) or valves - Sudden rise in consumption due to leakage in the system after water meters - Noisy water pumps, noisy water inlets due to defective water pumps, undue water pressure

Electric supply	- Stoppage of supply / system breakdown due to failure of fuse or circuit breaker - Sudden or frequent fuse or circuit breaker cut off leading to stoppage due to earth leakage - Heating of switches and wires due to overloading - Sudden or frequent stoppage and larger power consumption due to uneven distribution of phases - Electric sparks or shocks, electrocution due to inadequate earth bonding

(Source: adapted from Chew, Wong & Kang 1998; Alsadey, Omran & Pakir 2010 and Chong & Low 2006)

There have been a number of recent building quality failures in Ethiopia and internationally that have resulted in professional, government and academic debate, along with news outlets and the public questioning the quality of new construction. These incidents incurred a decline in the public's confidence towards construction outputs, particularly its safety and quality outcomes.

A boost in quality management and inspections has been demanded by onlookers to ensure future developments are not going to be unsafe to live in and costly to repair (Gorrey et al., 2020). Although many articles have been written on the topic for a number of years, little seems to have changed in order to significantly improve building quality.

Is the literature itself narrowed or sporadic, or are the data inconclusive? Furthermore, the literature scan indicates that there is not a recent systematic review on the topic, analyzing the themes and gaps contributing towards building and construction quality issues and providing conceptual classification and association of the themes. This can be evidenced with the analysis of the similar review studies. Neale and Gurmu (2021) completed a systematic literature review on building production pressures with a focus on safety. Their review found that tight schedules, ineffective management and rework caused pressure. In their paper, they discussed the consequences of this pressure and proposed mitigation strategies against it (Neale and Gurmu, 2021). Jraisat et al. (2016) developed a study on identifying the factors affecting building quality through the integration of literature, interviews and questionnaires to determine the most important factors (Jraisat et al., 2016).

Agreed that there is little published on defect guidelines and recommended that this gap be filled. They found that design factors, lack of reference data, water, dampness and fire caused the most defects in their study (Talib and Sulieman, 2020).

This review study, therefore, aims to provide an analytical scan of the current literature and determine the themes and gaps to develop real improvements in construction quality and raise the awareness of building practitioners, construction quality researchers and policymakers. To do this, the literature was extensively sourced online from the previous 20 years with a focus on building and construction quality. For the purpose of the clarity of the terminologies used in this study, the following definitions can be presented: (1) Rework: Building scope that needs to be repeated to achieve compliance or quality standards. (2) Defect: Building scope that does not meet the compliance regulation or quality standards. (3) Variations: Additions, subtractions or revisions to current scope to reflect client changes or to meet compliance or quality standards. These include design changes with or without cost and time implications.

A range of sources in the literature discuss shortfalls in specific aspects of housing performance that have the potential to result in houses with low-quality or potentially unsafe living conditions. Overall, it was found that defects and rework are generally not the result of inadequate Building Code clauses or developed best practices. Rather, they are determined by the ability and willingness of industry professionals to communicate, achieve requirements and manage errors. The definition of quality was found to be a subjective issue when it comes to achieving consumer satisfaction. This would require the development of consumer-focused criteria if the industry wishes to work towards achieving not only compliance but also the quality expectations of their clients. Most importantly, defects and errors are reported as an unavoidable part of the building process. Therefore, measures to raise quality focus on the reduction and better management of common issues through improved methods for detecting, recording, communicating and managing errors. This would allow them to be resolved more efficiently and provide useful data for learning and informing continuous improvement strategies.

Safety issues (found in 10 papers of the 97) are often found to be a consequence of poor quality. For example, it has been found that rectifying defects was the catalyst to safety incidents being four times as likely to occur as compared with normal construction operations (Love et al., 2019). Similarly, Wanberg et al. (2013) found that injury rates were positively correlated with defects. This means that where there are more defects,

there are more injuries (Sadeghi et al., 2020). Both studies recognized that the rework resulted in extra pressures, corners cut and the processes being undertaken were more likely to be unsafe ones, such as demolition. Wanberg et al. (2013) also suggest that to mitigate this correlation, firms and individuals should consider aiming to reduce defects at the outset or encourage leadership at all levels, pre-plan and ensure people are held accountable for their actions. Safety is often overlooked in the literature in line with building defects issues, with few discussing its importance and fewer giving defined recommendations.

Occupier satisfaction in total, 11 articles discussed how building defects were associated with occupancy, such as (Forsythe, 2007) and (Palaneeswaran et al., 2006). Seven of these were related to residential construction, such as (Ng et al., 2011) and (Auchterlounie, 2009), while four had a mix of all construction types, such as (Karim et al., 2005) and (Alencastro et al., 2018). In terms of their methodology, five used questionnaires, such as (Fauzi et al., 2012); three gained data from firms who collect information about the industry; two used literature reviews and two used case studies. These articles generally analyzed how quality failures affect the occupants or how occupants can assist in reducing defects. Most studies on occupier satisfaction in residential construction found that occupiers are more likely to find aesthetic defects post-handover. They will not speak up about potential quality failures during construction due to a lack of awareness of the construction process (Milion et al., 2017); (Forsythe, 2016) and (Sommerville, 2007).

There was a general consensus across the literature that due to the owners' lack of knowledge, structural defects went unnoticed until too late to remediate effectively. Forsythe (2007) provided a framework using a literature review and previous research into marketing theory to develop a model for occupier satisfaction. The article identified different stages of expectations and how the builder should use the research to seek adequate feedback to alleviate longer term dissatisfaction.

Cost and its association with building quality has been found as one of the most significant areas of research with 28 studies investigating this area. As it can be expected, costs increase where building quality failures are frequent. The most recent Australian pieces of information are from the study of (Love et al., 2018) and the Queensland Building and Construction Commission's (QBCC) 2016–17 Annual Report (Queensland-Building-and Construction-Commission, 2017). Cost issues are simultaneously a cause and consequence of defects. Cost pressures during the design and construction stages

increase building quality IJBPA failures (Aljassmi et al., 2016); (Mills et al., 2009) and (Peter and Love, 2007). Love et al. (2014c) found that the mean design error cost is 14.2% of the contract value of residential buildings.

For civil engineering projects and fit-outs, these cost increases are 23.44 and 22.5%, respectively. For projects over $100M (AUD), the mean was 26.18%. Lopez and Love (2011) found that direct and indirect design error costs were 6.9 and 7.4% of the project's contract value, respectively. Similarly, Love (2002) found that direct costs accounted for 6.4% contract value increases and indirect costs account for 5.6%. Direct costs are those that can be attributed predominantly to the defects. Indirect costs are those where the defect has an effect but is not absolutely the cause. For example, rework costs would be directly attributed to poor quality, but first aid and administration costs for an incident occurring during the rework would be an indirect cost (Akbari et al., 2020).

Time Poor quality negatively affects the construction schedule. A total of 11 articles contained the theme of time and scheduling. The two most recent Australian articles that mention time issues are (Arashpour et al., 2014) and (Boyd et al., 2013). It was found in the study by Arashpour et al. (2014) that where defects are rectified quickly, the schedule is less likely to overrun. Time pressures are both a cause and consequence of poor quality (Golizadeh et al., 2017). Short project schedules cause defects, errors and omissions in the design and construction phases. Poor quality then causes scheduling issues on the back end of the program. Love (2002) found that the initial schedule was increased by 20.7% due to rework. Hwang et al. (2014) discovered that construction projects averaged a 3.3-week delay.

A study into dependent activities and their outcomes by Dehghan and Ruwnapura (2014) found that where dependent activities are overlapped in the schedule, the schedule is more likely to finish later than keeping activities concurrent. This creates a loop of shortening sequence > schedule increase > shortening sequence > schedule increase. Therefore, where the schedule is shortened and the dependent activities are overlapped, there is more likely to be rework, and so a new loop is formed as shown in Figure 5. Poor scheduling includes overlapping dependent activities or can be an unreasonably shortened schedule fashioned to win a tender. Therefore, suitable timing should be built into any project schedule. This is not surprising; however, the addition of other pressures, such as cost minimization, causes conflict in decision-making. Licensing in total, 11 articles were focused on the licensing requirements for trades and the ISO 9000 or other quality management systems (QMS). Examples include (Alwi et al., 2002) and Poor Scheduling

Defects Rework Schedule Increase Figure 5. The rework and scheduling loop Building and construction quality (Cooper and Brown, 2014). These were found where the articles mentioned how quality relates to licensing schemes or QMS. Poor licensing and QMS are often cited as being a cause of poor quality.

The two most recent Australian articles analyzing licensing and QMS are (Cooper and Brown, 2014) and (Shergold and Weir, 2018). Shergold and Weir's report recommends a consistent licensing scheme across Australia with provisions that only registered practitioners can complete specific works and that builders, site or project managers, building surveyors, building inspectors, architects, engineers, designers/draftspersons, plumbers, fire safety practitioners and their subsequent sub-categories shall be registered. In Spain, Forcada et al., (2016) found that the lack of licensing and registration was one of the major problems that contributed to defects in residential construction. After studying waterproofing and concreting defects in Australia, it was recommended by Dhakal (2016) that annual training courses become mandatory as part of the renewed licensing and that the licensing regime becomes stricter.

In 2005, 80% of Australian construction companies were certified under the ISO 9000 (a family of QMS), 10% had non-certified systems and the other 10% had non-documented systems in Australia, according to Karim et al. (2005). This high certification rate is due to the government requirement to tender for work. Ng et al. (2011) discovered that occupier satisfaction in Chinese residential construction was positively affected after the implementation of the ISO 9000, so the QMS was deemed successful. Although many articles recommend improving licensing, there are no clear implementable actions by the licensors that can be taken to successfully improve this area (Hosseini et al., 2019).

Two articles relating to licensing included comprehensive frameworks. Pheng and Wee (2001) discussed the ISO 9000 by examining each clause of the standard. The article also explored the "project system" and how each area of a project can reduce defects. The second article, from Pheng and Teo (2004), identified the problems with total quality management (TQM) and provided a feedback framework based on these problems.

Three articles mentioned culture and its effects on quality, largely discussing the negative effects because of the poor-quality culture in a firm or the industry as a whole. The culture around defects, rework and quality can determine whether quality issues arise and whether they are dealt with properly. All three of these articles were Australian, being (Saha and Hardie, 2005; Love et al., 2014a, 2015). Culture and learning are intertwined and often cited as recommendations for improvements in the industry. Love et al. (2015)

suggests methods for improving culture and learning as follows: (1) Active reflection on mistakes, (2) Encouragement to share lessons learnt, (3) Creating a no-blame culture, (4) Coaching leaders to assist others with learning and (5) Involving all parties in the quality improvement process. They found that where the learning is focused not solely on the individuals but the firms as a whole, the process is more successful.

Ten articles discussed enterprise training and certificate schemes for building quality through individual or organizational practices. All suggested these schemes are an option for improving quality. Titov et al. (2015) found that increased learning practices were directly IJBPA linked to decreased rework. Figure 6 is a framework synthesized from (Love et al., 2013, 2015). This diagram implements the ideas from both of the cited studies. The information encapsulated by the oval is related to the different learning strategies for people, the organization and the project. This section also shows how these different areas are interlinked, and how information can be shared between them.

2.4 Research Gap

Much of literatures have been produced by different scholars in the field of quality performance related to housing construction project. Enshassi et al. (2009) in his thesis on factors affecting the performance of construction projects in the Gaza Strip, found out that the most important factors agreed by the owners, consultants and contractors were average delay because of closure and materials shortage, availability of resources as planned through project duration, leadership skills for project manager, escalation of material prices, availability of personals with high experience and qualification and quality of equipment and raw materials in project. Bui et al., (2010) in their study carried out in Vietnam on factors affecting construction project outcomes discovered that major enablers that lead to project success are foreign experts' involvement in the project, government officials inspecting the project and very close supervision when new construction techniques are employed.

Management commitment to continuous quality improvement, management leadership in promoting high process quality; quality training of all personnel; efficient teamwork to promote quality issues at the corporate level; and effective cooperation between parties taking part in the project are generic factors that affect process of quality, Arditi & Gunaydin 1998). Through case studies Pheng and Chuan (2006) has shown that total quality management a successful management philosophy in the manufacturing and service industry could be replicated in the construction industry with similar benefits. in

terms of reduction in quality costs, and better employee job satisfaction. A contractor's quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems were lack of documentation of a quality system for the majority of the contractors. (Iyer and Jha 2005)

In our country, only a few studies have been conducted on the effect of poor project performance on the quality of housing construction (Hiwot B., 2012; Abrham H., 2017). All the empirical reviews showed that there is a lack of empirical studies in methodology, performance measurement framework, and modelling systems in order to measure the performance of construction organizations and projects in the construction industries, and both were studied in condominium housing projects. To the best of the researcher's knowledge, there are not many comprehensive studies yet produced by the various researchers who have accommodated all these variables and investigated the relationship of all these factors with the impact of quality of housing construction performance in the construction industries in Ethiopia.

Previous studies were made and concentrated on the project management practices, knowledge area and other related factors. All the studies reviewed ultimately concentrate on the professionals and the studies were made based on the specific area and project covered on the capacity and training and specific concern to risk management related to performance such as, construction management, information technology, factors affecting performance of managers, measurement of project performance, key performance indicator and benchmarking. This study will fill the knowledge gap to the organization to move towards and achieving best practice and to overcome quality performance problem in Housing project in Ethiopia**.**

Therefore, this study will fulfill by including a comprehensive approach that are made the major source and factors that affect quality based on extensive review Heravitorbati et al. (2011) identified four main sources of quality defects namely, stakeholders managerial, technical, environmental, material and equipment culture and politics.

2.5 Conceptual framework

A number of authors have provided different categorizations of quality problems. However, few comprehensive approaches are made to identify the major sources and factors that affect quality (Heravitorbati et al., 2011). Based on an extensive review, Heravitorbati et al. (2011) identified four main sources of quality defects: stakeholders, managerial, technical, environmental, material and equipment culture, and politics. These

main sources of quality defects, as identified by Heravitorbati et al. (2011), can be used as a framework to identify the causes of quality problems in construction projects. In addition, this extensive review encompasses all the identified causes of defects identified and discussed in previous sections of this literature review.

The figure below summarizes the conceptual frame work for proposed by Heravitorbati et al., (2011).

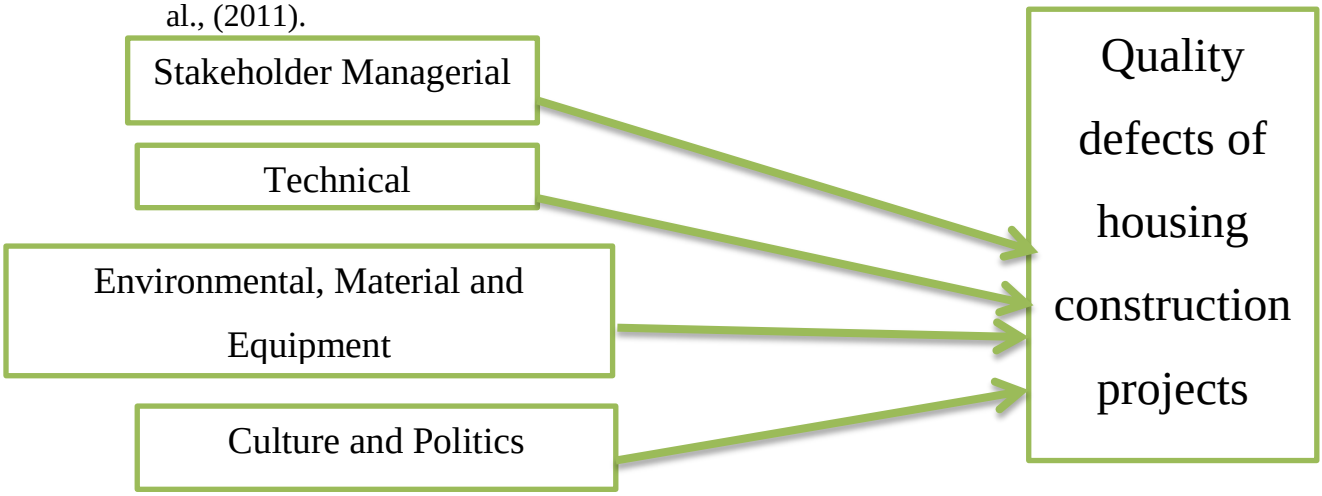


Figure 2-3: Conceptual framework of the study (Source: adapted from Heravitorbati and et al. 2011)

Chapter Three

RESEARCH METHODOLOGY

This chapter presents the research design, the target population, the sample size, the sampling technique, data collection instruments, data analyzing statistical tools and techniques, data interpretation mechanisms, and ethical considerations.

3.1 Research Setting

Housing in Ethiopia has been improving over the past decades. About 70% of housing units require total replacement, whereas 30% are in fair condition. 20–27% have adequate sanitation, and 19.4% live in rural areas at the national level. However, there are still slum areas, particularly in Addis Ababa, where 80% of areas experienced sanitation problems and health and safety risks (Ethiopia-Habitat for humanity, 2022). The Human Rights Measurement Initiative finds that Ethiopia is fulfilling 18.9% of what it should be fulfilling for the right to housing based on its level of income **(**World Bank, 2015).

The overall objectives of the government on the housing program consist of: implementing a new resource-efficient housing policy based on modest standards, self-help, and individual initiative, thus easing the burden on public finances; and strengthening the financial and professional capabilities of the Housing and Savings Bank, which would play a central role in the implementation of housing policy. low- and middle-income housing projects in Addis Ababa.

Improve health and environmental conditions through upgraded services and sanitation, which should ultimately improve productivity within affected populations. Reform policies and practices regarding maintenance of urban infrastructure and housing with a view to ultimately reducing rent subsidies and improving the efficiency of public resource utilization and strengthen two other key urban institutions dealing with land: the Ministry of Urban Development and Housing and the Addis Ababa Central Association.

With its all-due efforts, there have been a number of recent building quality failures in Ethiopia and internationally that have resulted in professional, government, and academic debate, along with news outlets and the public questioning the quality of new construction. These incidents incurred a decline in the public's confidence in construction outputs, particularly their safety and quality outcomes. Hence, it is crucial to investigate the factors affecting quality performance in the housing project in Ethiopia. This study, therefore, is aimed at investigating the effect of poor quality on the performance of construction projects in selected construction projects in Addis Ababa.

3.2 Description of the Study Area

The study was conducted on three selected housing project projects currently executing in Addis Ababa. The study was conducted on three selected housing projects currently executing in Addis Ababa, namely Mekanisa sites. Bole site and Gerji sites that were

owned by FHC. These sites were selected based on recently transferred houses and their availability on site, the availability of consultants and project managers and their offices on the project site, the review of report documents, and complaints raised by the beneficiaries regarding project quality performance.

3.3 Research approach

The study used both quantitative and qualitative research approaches. The combination of these two approaches will provide to get in depth data for the study mixed methods" refers to an emergent methodology of research that advances the systematic integration. "Mixing," of quantitative and qualitative data within a single investigation or sustained program of inquiry and produces a richer and more comprehensive understanding of a research area.

3.4 Research Design

The proposed research design in this study was a cross-sectional study. By definition, cross-sectional studies are research that analyses variables in different contexts over the same period of time (Collis & Hussey, 2021). To elaborate, this study will examine the effect of poor project performance on the quality of housing construction projects and how varying factors affect project quality performance.

3.5 Population and Sample

Among the housing projects sites the target population as a source of information for this research will three projects selected purposely from three sub city namely Mekanisa site , Bole site and Gerji site that were owned by FHC that were selected based on that recently transferred houses and on site, availability of consultants and project managers and their offices on the project site, and review of report documents, and complaint raised by the beneficiaries regarding to project quality performance.

The primary use of a method applied for data collection was convenience sampling. As the name suggests, convenience sampling relies on the factor of being convenient and had the advantages being inexpensive, the survey reaches more individuals, and data gathering can be obtained over a short period of time.

Following the convenience sampling technique, a project for the study was selected. Project selection was based on the following criteria: a finished project handed over to the occupants and the other an on-going project. This helped to take the research samples from one project. Accordingly, occupants who lives in the finished houses

and contractors and MSEs who participated in the finished project and now working on the on-going projects will be selected as primary respondents. HDPO officials and the consultants who are currently working on the projects were also be selected as the set of respondents that were also part of the previous project.

The population was then being consists of contractors who engage in construction work, the consultants who are responsible for supervision of the whole of the work, HDPO officials who are responsible for training and capacity building and the occupants who are living in the constructed houses.

Drawing a sample from the occupants is not being an easy task because of its big size of population. As mentioned, the survey's sample size must be large enough to provide statistical accuracy and be generalizable for the population in question. The thesis adopts a cross-sectional study due to time constraints and limited resources. The particular method favors a large sample size collected once in a short period of time (Collis & Hussey, 2021, p.57).

The targeted sample size to represent the population is a minimum of 100 occupants and 90 consists of contractors who engage in construction work, the consultants who are responsible for supervision of the whole of the work, HDPO officials who are responsible for training and capacity building and the occupants who are living in the constructed houses. For the chosen statistical method, more than 30 responses should suffice. (L. Muthén & B. Muthén, 2009).

3.6 Data source and types

Both primary and secondary data source were used during the study. Primary data source was information source that were gathered from the study population through questionnaire and interview. On the other hand, secondary data sources were from already availed or from source that has been collected for another purpose.

3.7 Data Collection Procedures

Both quantitative and qualitative data will be collected using different instruments and methods such as structured and unstructured interview, systematic visiting, and other secondary data such as official records that will be obtained from the annual and quarterly reports. Besides, as reference material project directives were used in order to collect data and pertinent information for the study. The primary data collection method was unstructured interview with key informants through close ended questionnaires to

mangers and respective. Questionnaires were prepared in English, and necessarily translated into Amharic for the purpose of clarity and to facilitate the data collecting process.

In addition to this method, systematic visiting and observation were used in order to gather additional information, for crosschecking the opinions given by the respondents. The study was also employed the use of secondary data and review of various documents, journals, bulletins, proclamations, reports and other sources relevant to the research problem, Questionnaires were first administered to few respondents from the study population as pre-test and appropriate adjustments was made.

The closed ended questions were also used to collect the respondents background information covering demographic variables (e.g., age, sex, position and educational background,), institutional and other variables that selected factors that affects the housing construction quality performance on housing projects in in Addis Ababa. Sources of the secondary data were official records that will be obtained from the annual and quarterly reports of the respective hotels.

3.8 Data Analysis

Data gathered through questionnaire from the respondents, records of the institution concerning its operation and additional responses from experiences of the researcher during the data collection were used for the analysis.

The analysis part was combined based on all groups of respondents in order to obtain significant results. The data were analyzed by calculating the Relative Important Index model (RII model) using a weighted average approach to rank the factors based on their importance and frequency which is derived from the views of the respondents.

The analysis was used the RII method to determine the relative importance of the various factors of affecting housing construction projects.

RIIs for each factor is calculated as shown below:

$$\mathbf{RII} = \sum \mathbf{W} / \mathbf{A} \times \mathbf{N}$$

Where: RII = relative importance index, W = weighting given to each factor by respondents (ranging from 1 to 5), A = highest weight (i.e., 5 in this case); and N = total number of respondents.

The RII values have a range of 0 to 1 (0 not inclusive); the higher the RII is the more important factors indicators affecting the performance of construction projects. The RII will be ranked, and the results will be arranged in table and chart form along with

percentage in a descriptive way by using simple static tools. First, respondents on general profile, next other study variables were discussed. To simplify the data analysis, after the collection of both primary and secondary data information on the project and staffs, tabulation of qualitative data was performed. Quantitative data were analyzed using the statistical package for social science (SPSS). The reliability and consistency of the data were analyzed by means of the Cronbach's Alpha (a) analysis.

3.9 Reliability and Validity of the Instrument

The key informant interview guidance and pre testing of the questionnaires were conducted to warrant data reliability and validity. The researcher used checklist of questions when making personal interviews with respondents so as to achieve data consistency and completeness.

The internal consistency of the data is the reliability that. Cronbach's α, a value of +.70 or greater were considered as good internal consistency. In the same way, the Validity of the research was considered as the variable are measured as intended the scores from a measure. Content validity in this case were usually assessed by carefully checking the measurement method against the conceptual definition of the construct.

3.10 Ethical Considerations

The researcher was considered voluntary participation, confidentiality, anonymity by announcing the objective of the study is for Master study programs and taking part in the research was only on a voluntary basis refusal or abstaining from were permitted. Confidentiality of the information given by the respondents were given that the data used only for the intended purposes and result and findings were given latter after accomplishment of the study.

Chapter Four

RESULT AND DISCUSSIONS

4.1 Introduction

This chapter presented data presentation, analysis and discussion part of the study that analyzes the extent of poor project performance on the quality of housing construction

project in Addis Ababa that were selected from the study population found in Addis Ababa. The data collected were used for data the analysis using SPSS 26.

4.2 Response Rate

From the total of ninety responders, seventy-five respondents were responded accurately and timely. This made the response rate 83.3%. According to Baruch & Holtom (2008), the average level of response rate is 52.7 percent is acceptable for survey (Baruch & Holtom 2008).

4.3 Descriptive analysis

For the purpose of the study, a total of 90 questionnaires were distributed to the study population and 75 questionnaires were collected timely and accurately.
The demographics of the respondents are presented below

4.3.1 Gender of the respondents

The study intended to establish the gender of the respondents. The results of the study showed that among the reached-out respondents, 46 were male, making a total of 61.3%, while 29 were female, at a rate of 48.3%. This has the implication of male dominance in the construction sector. The researchers believe that the research did not come across the effect of sex on the level of response.

Table 4-1: Gender of the respondents

	Sex	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	46	61.3	61.3	61.3
	Female	29	38.7	38.7	100
	Total	75	100.0	100.0	

Source: SPSS output 2023

4.3.2 Age range of the respondents

The study sought to establish the age range of the respondents. The researchers believe that age has its own effect on the response because of their maturity and work experience level. From table 4-2 below, the study found out that the majority of the respondents were at the age of between 26 to 35 years as shown by 49.3 % (37). Additionally, some respondents were at the age of above 36 to 45 years as shown by 42.5 % (32), while the

Table 4-3: Level of Education Attended

	Educational level	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	14	18.7	18.7	18.7
	BA/BSC	43	57.3	57.3	76.0
	MA	18	24.0	24.0	100.0
	Total	75	100.0	100.0	

rest of the respondents were at the age of above 45 years were about 8% respectively. This was a clear indication that the organization has the majority of the respondents being in the youthful age, and who may lead to a high performance in terms of employee output, and the overall organizational performance, therefore it is an added advantage to the company.

Table 4-2:Age range of the respondents

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26-30	13	17.3	17.3	17.3
	31-35	24	32.0	32.0	49.3
	36-40	20	26.7	26.7	76.0
	41-45	12	16.0	16.0	92.0
	46-50	3	4.0	4.0	96.0
	above 51	3	4.0	4.0	100.0
	Total	75	100.0	100.0	

Source: SPSS 2023

4.3.3 Level of Education

The study sought to establish the highest level of education of the selected respondents. Table 4.4 below showed that a greater part of the participants at a frequency of 57.3 % had the B/A degree as the highest academic qualification as shown in table below. Additionally, the second most respondents were with MA/MSC degree as shown by 24%, followed by those with diploma level at a frequency of 18.7% This has the implication that the majority of the respondents, having a college level qualification was well versed with knowledge and could easily understand the meaning and importance of the question raised. The findings of the study were mentioned in table 4-3 below in detail.

Source: SPSS 2023

4.3.4 Designation / Position

The study sought to establish the designation of the respondents. The findings of the study were presented in table 4.5 below; Table 4-4 shows that the majority of the

respondents who were able to respond to the questionnaires were owner at a frequency of 37% and a rate of 49.3 %, followed by project manager 23(30.7%) and site and office engineer at a rate of 20 %,

Table 4-4: Position of the respondents

Variables		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owner	37	49.3	49.3	49.3
	Project Manager	23	30.7	30.7	80.0
	site engineer	9	12.0	12.0	92.0
	Office engineer	6	8.0	8.0	100.0
	Total	75	100.0	100.0	

Source: SPSS 2023

4.3.5 Experience

The study sought to establish the duration which the respondents had worked in their respective organization. The results of the study were presented in table 4-5 below. From table 4.6 below, the majority of the respondents had an experience less than 5 years in their respective organizations as shown by 21.3% (16). Additionally, 31 respondents had worked for 6-10 years as shown by 41.3%, followed by 28.7 % of the respondents who had worked for 11-15 years. in their organizations. This clearly indicated that the organizations had managed to retain its competitive talents experts for an average of 5 years, which means that they have advanced knowledge on the housing construction industries in the organization for the time they have been there, and they would be in a position to give advice regarding the best rewards method for the organization in the future.

Table 4-5: How long have you been working for the project?

	Work experience	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	16	21.3	21.3	21.3
	6-10	31	41.3	41.3	62.7
	11-15	21	28.0	28.0	90.7
	above 16	7	9.3	9.3	100.0
	Total	75	100.0	100.0	

Source: SPSS OUTPUT 2023

4.3.6 Number of projects executed

The study sought to establish the duration which the respondent's number of projected executed in their respective organization. The results of the study were presented in table 4-6 below. From table 4-6 below, the majority of the respondents had executed a 2 to 5 projects as shown by 45.3%. This clearly indicated that the organizations had managed good number of projects with its competitive talents experts for an average of three project during the study period, which means that they have advanced knowledge on the housing construction industries in the organization for the time they have been there, and they would be in a position to give response regarding the question raised for the study.

Table 4-6: number of projected executed

	Project number	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 2	11	14.7	14.7	14.7
	2 t0 5	34	45.3	45.3	60.0
	5 to 10	30	40.0	40.0	100.0
	Total	75	100.0	100.0	

Source: SPSS OUTPUT 2023

4.4 Reliability test

For this study, the Cronbach's Alpha values were tested from the variables described in the framework, and presented in table 4-7 below. The overall internal consistency of 33 items were tested and the result showed the high Alpha value (α=0.922). Thus, it concluded that the questionnaire was reliable and consistent, because the Alpha value greater than 0.70.

Table 4-7: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
0.922	33

Source: SPSS OUTPUT 2023

4.4.1 Reliability Analysis

To measure the consistency of the questionnaire particularly the Likert-type scale the reliability analysis is essential in reflecting the overall reliability of constructs that it is measuring. To carry out the reliability analysis, Cronbach's Alpha (α) is the most common measure of scale reliability and a value greater than 0.700 is very acceptable (Cohen et al, 2010) and according to Cronbach's (1951), a reliability value (α) greater than 0.600 is also acceptable. The questionnaire item was analyzed by SPSS and the following result was obtained.

Initially, the overall internal consistency of 33 items were tested and the result showed the high Alpha value (α= 0.922). Thus, it concluded that the questionnaire was reliable and consistent, because the Alpha value greater than 0.70**.**

Table 4-8: Reliability Statistics

Sr No	Study Variables	Cronbach's Alpha coefficient	Number of items
1	Stakeholder managerial factor	.897	12
2	Technical factor	.787	9
3	Environmental, Material and Equipment factor	.663	6
4	culture and politics factor	.825	6
5	Over all reliability	0.922	33

Source: SPSSOUTPUT 2023

4.5 Occurrence of construction Performance Problem

The descriptive statistics including the mean and standard deviation along with their ranks on the occurrence of performance problem are presented in the following table. A mean score of 0-1.5 means that the respondents never with the measurement variable presented in this study, between 1.50 to 2.50 means they are Sometimes, 2.50 to 3.50 means the respondents were usually, for a mean score of 3.50-4.50 respondents have frequently and for a mean over 4.50, respondents have most frequently by the statement

Table 4-9: Descriptive Statistics of Occurrence of poor-quality Performance Problem

	N	Mean	Std. Deviation	RII	Rank
Quality defects from stakeholder' managerial	75	3.39	1.184	0.677	4

Quality defects from technical factors	75	3.84	1.128	0.768	2
Quality defects from Environmental, material and equipment	75	3.49	1.018	0.698	3
Quality defects from Culture and politics	75	4.61	.804	0.922	1

Source: Compiled by the researcher 2023

Under the occurrence of the problem, there were four statements in a Likert scale which focused mainly on the existence of quality performance problem in housing construction projects in the study area and how frequently it occurs. Table 4-9 shows the means score based on the response of the participants regarding the occurrence. As it has been above Quality defects from Culture and politics is a them problem occur in the housing construction projects a scored a mean value 4.61 indicating that most of the respondents tend to agree with the existence of the problem while poor quality performance problem frequently occur in in the study population , with the mean score of.3.84 of Quality defects from technical factors is the second followed by Quality defects from Environmental, material and equipment with 3.49 mean score and Quality defects from stakeholder' managerial, 3.39 of mean score and standard deviation of 1.184.

From the result shown on table above, the major poor project performance on quality problems of occurrence which have been occurs on the projects performance were Quality defects from Culture and politics followed by technical factors and Quality defects from stakeholder' managerial and from Environmental, material and equipment with a RII of 0.922, 0.768, 0.698 and 0.677 by ranks respectively.

4.6 Factors affecting the Quality Performance of housing Construction Projects in the study population

4.6.1 Stakeholders managerial factor

Under Stakeholders managerial factor causing performance problem, table 4-10 shows the means score based on the response of the participants concerning the Stakeholders managerial factor leading to poor project quality performance are presented. Factors among Stakeholders managerial as shown in table 4-10 Poor relationship and collaborating is the largest factor with the mean score of 3.84 and Standard deviation of

1.128, followed by low effective project management system with the mean score 3.59 and standard deviation of 1.242, Poor quality procedure and department with the mean score 3.53 and standard deviation of 1.245, poor training system with the mean score 3.52 and standard deviation of 1.143, Reduced subcontractor responsibility with the mean score of 3.51 and standard deviation of 1.201.

Moreover most of the respondents lean towards agreeing that Lack of contractor supervision with the mean score of 3.39 and standard deviation of 1.184, Poor communication with the mean score 3.49 and standard deviation of 1.018, Inappropriate method of contractor selecting with the mean score 3.45 and standard deviation of 1.255, Lack of management talent and commitment with the mean score 3.15 and standard deviation of 1.135, Lack of quality policy with the mean score 3.29 and 1.148, Lack of process improvement with the mean score 3.19 and standard deviation of 1.159, Poor communication with the mean score 3.49 and standard deviation of 1.018, Reduced subcontractor responsibility with the mean score 3.51 and 1.201, Inappropriate method of contractor selecting with the mean score of 3.45 and 1.255, Poor quality procedure and department with the mean score 3.53 and standard deviation of 1.245, Poor training system with the mean score of 3.52and standard deviation of 1.143, Lack of process improvement with the mean score of 3.19 and standard deviation of 1.15, Lack of management talent and commitment with the mean score of 3.15 and standard deviation of 1.135, Lack of quality policy with the mean score of 3.29 and standard deviation of 1.148, Low effective project management system with the mean score of 3.59 and standard deviation of 1.242, and Bureaucracy Supplier impact was the lowest mean score of 3.05 and standard deviation of 1.384.

Table: 4-10 below also showed the factors Related to poor quality project performance in the study population by relative importance index and ranking. As shown in table 4-10, the major top five stakeholders managerial factors affecting the poor performance of housing construction projects quality in Addis Ababa were Poor relationship and collaborating (RII 0.768), Low effective project management system (RII 0.717), Poor quality procedure and department (RII 0.706) and Poor training system (RII 0.704) and Reduced subcontractor responsibility (RII 0.701)

Table 4-10: Descriptive Statistics of cost Factors Related to stakeholder managerial in the study population

Sr No	**Stakeholder managerial**	**Mean**	**STD DEV**	**RII**	**Ranks**
1	Lack of contractor supervision	3.39	1.184	0.6773	8
2	Poor relationship and collaborating	3.84	1.128	0.768	1
3	Poor communication	3.49	1.018	0.698	6
4	Reduced subcontractor responsibility	3.51	1.201	0.701	5
5	Inappropriate method of contractor selecting	3.45	1.255	0.690	7
6	Poor quality procedure and department	3.53	1.245	0.706	3
7	Poor training system	3.52	1.143	0.704	4
8	Lack of process improvement	3.19	1.159	0.637	11
9	Lack of management talent and commitment	3.15	1.135	0.629	10
10	Lack of quality policy	3.29	1.148	0.658	9
11	Low effective project management system	3.59	1.242	0.717	2
12	Bureaucracy Supplier impact	3.05	1.384	0.610	12
Aggregate		3.56	1.184	1.184	

Source: SPSS output 2023

4.6.2 Technical factors

Under technical factors causing quality performance problem, table 4-11 shows the means score based on the response of the participants concerning the technical factors leading to the problem of poor-quality project performance are presented. Nine factors were identified from the literature reviewed that affects the poor housing project performance of quality. Human error with the mean score of 4.31 and standard deviation of .615 which implies most of the respondents lean towards agreeing that humans error are more likely to be caused by the change or increase poor quality project performance lead to quality defects followed by Difficult application of quality system with the mean score 4.25 and standard deviation of .917, Lack quality management with the mean score 4-11 and standard deviation of 1.047, Low quality drawing and specification with the mean score 3.99, and standard deviation of .979, Difficult data collection system with the mean score 3.93and standard deviation of .963, Design complexity with the mean score of 3.83 and standard deviation of ,.978, Poor performance of quality tools with the mean score 3.67 and standard deviation of 1.044, Poor Workmanship with the mean score 3.61 and standard deviation of 1.126 and Lack of technical talent with the mean score 3.55 and standard deviation of 1.166

Table: 4-11 below Factors Related to project performance in the study population by relative importance index and ranking. As shown in table 4.9, the major top five technical factors affecting the performance of construction projects in Addis Ababa.to these respondents were Human Error (RII 0.861), followed by lack quality management (RII 0.821), Low quality drawing and specification (RII 0.797), Difficult data collection

system (RII 0.786) and Design complexity (RII 0.765).

Table 4-11: Descriptive Statistics of Technical factors Related to poor project performance in the quality on the study population

Sr No	Technical factors	Mean	STD DEV	RII	Ranks
1	Low quality drawing and specification	3.99	.979	0.797	3
2	Design complexity	3.83	.978	0.765	5
3	Difficult data collection system	3.93	.963	0.7866	4
4	Poor performance of quality tools	3.67	1.044	0.733	6
5	Lack quality management	4.11	1.047	0.821	2
6	Difficult application of quality system	4.25	.917	0.658	9
7	Lack of technical talent	3.55	1.166	0.709	8
8	Poor Workmanship	3.61	1.126	0.722	7
9	Human Error	4.31	.615	0.861	1
Aggregate					

Source: Compiled by the researcher 2023

4.6.3 Environmental, Material and Equipment factor

From the literatures reviews there were six factors that affect the quality performance of housing construction projects. Table 4-12 and shows the mean results of participants and combined RII and rank of factors affecting Environmental, Material and Equipment factor on poor quality performance in the study population respectively.

As shown in table 4-12 below Project Environment with the mean score of 4.28 and standard deviation of .798 is the major factor implying that most of the respondents lean towards agreeing that Project Environment are more likely to be caused by the change or poor project quality lead to poor project performance problem in the study population followed by Nature uniqueness with the mean score of 4.24 and standard deviation of .867 , Material/Equipment specification with the mean score of 4.13 and standard deviation of .759, Project size and complexity with the mean score of 4.01 and standard deviation of .830, with the lower mean score of Poor quality and unavailability of resource which was with the mean score of 3.57 and standard deviation of .932 and Equipment idleness and inefficiency 3.37 and standard deviation of 1.171 respectively.

Table: 4.12 below also showed the environment, Material and equipment factors related to poor project performance in the quality problem in the study population by relative importance index and ranking. As shown in table 4.9, the major top five Environmental, Material and Equipment factors affecting the performance of construction projects in Addis Ababa were Project Environment (R II 0.856), Nature uniqueness (R II 0.848),

Material/Equipment specification (R II 0.826), Project size and complexity (R II 0.802) Poor quality and unavailability of resource (R II 0.714).

Table 4-12: Descriptive Statistics of quality factors Related to project performance in the study population

Sr No	Environmental, Material and Equipment factor	Mean	STD DEV	RII	Ranks
1	Nature uniqueness	4.24	.867	0.848	2
2	Project size and complexity	4.01	.830	0.802	4
3	Material/Equipment specification	4.13	.759	0.826	3
4	Project Environment	4.28	.798	0.856	1
5	Poor quality and unavailability of resource	3.57	.932	0.714	5
6	Equipment idleness and inefficiency	3.37	1.171	0.674	6
Aggregate		3.48	1.222		

Source: Compiled by the researcher 2023

4.6.4 Culture and Politics factor

From the literatures reviews there were six Culture and Politics factor that affect to the poor performance of housing construction projects a to the quality defects. Table 4-13 shows the results of respondents and combined RII and rank of factors affecting quality performance respectively.

As shown in table 4-13 below Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture) with the high mean score value of 4.47 and standard deviation of .857 which implies most of the respondents lean towards agreeing that Lack of collaborative working atmosphere are more likely to be caused by the Culture and Politics factor that lead to poor project performance problem on quality defects followed by Lack of motivation with mean score value of 4.25 and standard deviation of 1.187, Corruption with mean score value of 4.17, and standard deviation of.934, Lack of being customer oriented and focused 3.20 and standard deviation of 1.325 and Emphasis on production and projectduration which was with mean score value of 3.97 and standard deviation of 1.197 and Incompatible tendering procedures with mean score value of 3.08 and standard deviation of 1.333 mean and standard deviation respectively.

Table: 4-13 below also showed Culture and Politics factors related to poor project performance that led to quality defects in the study population by relative importance

index and ranking. As shown in table 4-13, the major top five culture and poetics factors affecting the poor performance on quality defects of housing construction projects in Addis Ababa.to these respondents were Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture (RII 0.909) followed by lack of motivation (RII 0.850), corruption (RII0.840), Emphasis on production and project duration (RII 0.794) and Lack of being customer oriented and focused (RII 0.640).

Table 4-13:Descriptive Statistics of Culture and Politics factor related to poor project performance in the study population

Sr No	**Culture and Politics factor**	Mean	STD DEV	RII	Ranks
1	Lack of motivation	4.25	1.187	0.850	2
2	Incompatible tendering procedures	3.08	1.333	0.616	6
3	Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture)	4.47	.857	0.909	1
4	Corruption	4.17	.934	0.840	3
5	Lack of being customer oriented andfocused	3.20	1.325	0.640	5
6	Emphasis on production and projectduration	3.97	1.197	0.794	4
Aggregate		3.58			

Source: Compiled by the researcher 2023

4.7 Respondents from House occupants on Quality defects

Drawing a sample from the occupants was not an easy task because of its big size of population. Yet, a large size sampling approximately 100 respondents are selected to ensure representativeness of the sample. Purposive sampling was employed to select respondent from the whole population for in-depth interviews and questionnaire.

4.7.1 Distribution of sex and age of the respondents from the House Occupants

For the purpose of the study, a total of 100 questionnaires were interviewed to the occupants and 80 questionnaires were collected timely and accurately.

The demographics of the respondents are presented below

4.7.2 Gender of the respondents

The study intended to establish the gender of the respondents. the results of the study showed that among the reached-out respondents, 30 were male making total of 37.5 %,

while 50 were female at a rate of 62.5%. This has the implication female respondent's dominancy during the study as most of female occupants were in home.

Table 4-14: Gender of the respondents of the house occupants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	30	37.5	37.5	37.5
	Female	50	62.5	62.5	100
	Total	80	100.0	100.0	

Source: SPSS output 2023

4.7.3 Age range of the respondents

The study sought to establish the age range of the respondents. From table 4-15 below, the study found out that the majority of the respondents were at the age of between 26 to 35 years as shown by 22.5% of the respondents. Additionally, some respondents 45.5 % were at the age of above 36 to 45 years as shown. while the rest of the respondents were at the age of above 45 years and 32.5% were 36 to 45 years. Respectively. This was a clear indication that the majority of the respondents being in the 36 to 45 years.

Table 4-15: Age range of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26-30	-	-	-	-
	31-35	18	22,5	22.5	22.5
	36-40	12	15	15	37.5
	41-45	24	30	30	67.5
	46-50	16	20	20	87.5
	above 51	10	12,5	12,5	100.0
	Total	80	100.0	100.0	

Source: SPSS output 2023

4.7.4 Type of house, Age of the house since they received and Floor number

Table 4-16 shows that respondent distribution based on their house type, age of the house since they received and Floor number. 15.3% of the respondents were live in studio type of house, 36.7% of the respondents are lives in one bed room type of houses. 32.7% of respondents are lives in two bed room types of houses and the rest 15.3% of the respondents are lives in three bed room types of houses.

Table 4-16 also shows that respondent distribution based on house floor number. 15% of the respondents were lives in the house found on ground floor. 30% of respondents were lives in the house found on 1st floor. 20% of the respondents were lives in the house found on 2nd floor. 35 % of the respondents were lives in the house were found on 3rd floor Most of the respondents participated in this study are lives in the house were found on 2nd and 3rd floor. Similarly, As shown in table below 31.3 percent of the house had an Age of less than 2 years and the rest 68.7percent of the hose had More than 5 years at the time of the study.

Table 4-16: Distribution of the response by Type of house, Age of the house since they received and Floor number in the study population

NO	Description	Frequency	Percent
1	**Type of house**		
	Studio	10	12.5
	one bed room	15	18.7
	two bed room	30	37.5
	three bed room	25	31.3
	Total	80	100
2	**Age of the house since they received**		
	Less than 2 years	55	31.3
	2 to 5 years	25	68.7
	More than 5 years	80	100
	Total		
3	**Floor number**		
2	Ground	12	15
	1st floor	24	30
	2nd floor	16	20
	3rd floor	28	35
	4th floor	-	-
	Total	80	100

Source: Compiled by the researcher 2023

4.8 General Quality problems

4.8.1 The general quality problem in the study population

As shown Table in table 4-17 the first question for survey of the house occupants was “have you observed any quality problem over/in the house?” As shown in table below 5.4 92% of the respondents agreed that the houses, they are living on have a quality defect while only 8 % of the respondents say the houses, they are lives in have no quality problems. for the question raised What quality problems have you observed when you

receive the house from Government? “Most of the respondents participated in this study had found the horse had quality defects in their house when they were received the houses from government. 50% of the respondents found that their broken glass of window and door, also broken handle of window and doors. This shows half of the houses have this kind of quality defects when the government transfers the houses. This shows that definitely there is poor finishing work.

The other quality problem variable presented to the respondents was the condition well opening and closing of doors and windows. Regarding to this 80.2% of the respondents was agreed that doors and windows have a problem of easily to be open and close. This shows that finishing works regarding to fitting doors and windows are poor. According to respondents from the consultant this kind of quality problem is caused because of poor workmanship. However, the rest 19.8% of the respondent did not face any quality problem related to doors and windows.

The other quality problem presented as a question to the respondents was whether they observe or not quality problem related to incomplete kitchen and toilet materials. 66.4% of the respondent reply that they face this problem. They found their house with in complete kitchen and toilet materials. The rest 33.6% of respondents reply that they did not face this kind of quality problem. In this section respondents also asked about quality problem related to whether they observed cracked walls, floors and poor ceiling of concrete. In this regard 57.1% of the respondents were replied that they had faced this quality problem when they receive the house from government. And most of them are engaged to reconstruct the interior wall part of the house. This also shows there was poor finishing work in the project. The rest 42.9% of respondents were replied they did not face this kind of quality problem when they receive the house.

Although respondents were asked whether they faced quality problem or not related to leaking of water inside shower and kitchen. 68.1% of respondents were replied that they had faced this problem when they receive and since they are starting to live in the house.

According to the respondents from the consultant this kind of quality problem is very critical in most projects’ sites of the AAHDP. Most of the housing construction project had this kind of quality defects which is leads the houses sustainability under question. The rest 31.9% of respondents replied they did not face this kind of quality defects.

The other quality defects asked to the respondent was quality problem related to deflection of roof. Most of the respondents were responded they did not face this kind of quality problem. This counts to 86.3% of the respondents. The rest 13.7% of the

respondents replied that they had faced this kind of problem when they receive the house. As it has been shown on table 5.4, the most difficulties which faced house occupants when they are trying to fix finishing work after they received the houses. Accordingly, most of the quality defects of the houses are emerged due to poor finishing works. Here According to the data presented on the above table 82.4% of respondents replied that they had faced irregularity of wall level while they are conducted finishing work after they received the houses. The rest 17.6% of respondents replied that they did not face this kind of quality problem while they are conducting finishing works. Based on the data from researcher's observation most of the houses which are transferred to owners but no resident yet, this condition had occurred significantly. The walls are not level, and had cracked.

In another condition 50% of respondents replied that they had face irregularity of floor level when they received the house. This is also huge number to justify there is quality problem related to constructing floor levels. 77.4% of the respondents are replied that they had faced irregularity of ceiling level while they conducting finishing work after they received the houses. The rest 22.6% of respondents replied that they did not face this kind of quality problem while they are conducting finishing work. Moreover, 82.4% of the respondents were replied that they had faced difficulties of fixing, properly closing and opening of inside doors and windows while they are conducting finishing works. The rest 17.6% of respondents replied that they did not faced this kind of quality problem while they are conducting finishing works.

In general, the respondents were rating the quality of building in terms of its housing construction was poor which was expressed by 69 percent of the house occupants and the level of satisfaction was dissatisfied which was mentioned by the 64 percent of the house occupants.

Table 4-17: Quality problems observed and level of satisfaction by the study population

Sr No	Description	Yes response	
		Frequency	Percent
1	**Have you observed any project quality problems in the house?**	73	92
2	**What quality problems have you observed when you receive the house from Government?**		
	Broken door or window handle and broken glasses	40	50

	Doors and windows not close and not open properly	16	19.8
	Incomplete kitchen and toilet materials	27	33.6
	Cracked wall, floors and Poor concrete ceiling	34	42.9
	Leaking of water plumping, shower, kitchen and toilet sink	59	74.2
	Deflection of roof	69	86.3
	Leaking of kitchen and toilet hand wash sink	28	35.8
	Poor electric line installation	61	75.9
	Poor water line installation	26	31.9
3	**What was the most difficult part when you executing finishing work?**		
	Irregularity of wall level	14	17.6
	Irregularity of floor level	40	50
	Irregularity of ceiling level	18	22.6
	difficulty to fix inside and main door and windows	14	17.6
4	**Over all how do you rate the quality of building in terms of its construction?**		
	Very poor	10	13
	Poor	55	69
	Fair	8	10
	Good	7	8
	Very Good	-	-
5	**What is your level of satisfaction?**		
	Very dissatisfied	20	26
	Dissatisfied	51	64
	Satisfied	8	10
	Very satisfied		-

4.9 Quality defects on Water and electric utility problems

As shown below in table 5.5 60.9% of respondents are repair their houses door lock keys or door handles because it was malfunctioned, 43.9% of the respondents were engaged to repair their houses window's glass because of breakage when they received the houses and also because of security issue and not satisfied with glasses which they believed that the glass could not have the capacity to prevent robbers, 35% of the respondents are engaged to repair toilet doors and 29.1% of respondents are engaged to repair their house toilet seats because of malfunctioning and poor quality. 39,1 of the respondents engage to repair their house hand wash basin because of malfunctioning.

Most of the respondents were engaged to repair plumping parts because of leaking water and improper functioning. 62% of the respondents were engaged to repair plumping parts. and also engage to repair kitchen sink because of poor quality and malfunctioning. This shows that kitchen sinks are good quality materials.

Question provided to respondents regarding to water utility problem. to assess whether residents faced water utility problem or not **35.6%** of the respondents replied that they faced any water supply problem because of water pipe leakages and 24% were reported that they faced electricity utility problem due to installation of electric works in the project.

Similarly, for the question raised whether occupants are engaged or not to repair materials in order to fix quality problems related to overall construction and design of the house 17 % of respondents are replied that they had always engaged to repair construction problem. 12.6% of the respondents had replied that they were often engaged to repair construction problem. 17.6% of the respondents replied that they were sometimes engaged to repair construction problems.54.4% of replied that they rarely engaged to repair construction problems. The rest 5% of respondents replied that they did not engaged to repair any construction problem.

Table 4-18: Quality defects and Water and electric utility problems during the study period

Sr No	**Description**	**Yes response**	
		Frequency	**percent**
1	**Which of the following house building equipment you are forced to repair or replace because of improper function or defected?**		
	Door handles and lock keys	48	60.9
	Door‟s or window‟s glasses	35	43.9
	Toilet door	5	6
	Toilet seat	23	29.1
	Hand wash basin	2	2.1
	Plumping parts	49	62
	Kitchen sink	31	39.1
2	**What problems related to water seepage you observed in the house?**		
	Leaking through doors	55	68.7
	Leaking through windows	31	38.4
	Leaking through roof	36	45
	Leaking inside the kitchen	19	23
	Leakage inside bathroom	47	58.8
3	**Do you face water supply problem because of blockage or leakage of pipes?**		
	Always	6	7.6
	sometimes	2	2.2
	Often	50	62.6
	Rarely	13	16.1
	Never	9	11.5
4	**Have you ever detect the following**		

	electricity problem in the house?		
	Sudden or frequent fuse circuit breaker	32	40
	Heating of switch or wires	28	35
	Electric shock	31	38.7
4	**Overall how often do you required to perform repair due to construction problems in your house?**		
	Always	15	2.7
	sometimes	10	12.6
	Often	14	17.6
	Rarely	10	12.6
	Never	44	54.4

4.10 Responses from unstructured interview from Key Informants

Unstructured interview, also called non-directive interview, were conducted through questions that are not predetermined but used questions that came which come to the researcher mind on the spot to the key informants and selected respondents. According to the respondent's response different reasons may lead to a poor project performance on quality defects, such as an unclear characterization of the objectives, an insufficient project schedule, many changes, inadequate control, ineffective communication, and unclear role of the stakeholders and no top management support.

These reasons according the respondents were all related to the organizational system and associated with organizational culture, project management culture and the project manager. As it has been explained to one of respondents working as project consultant in the study that a project manager's performance could be affected by organizational culture and project management culture within the organization. So, changes in any aspects of the organizational system will have an effect on the performance of the project manager and the project outcome as well indicating that as of many attributes that affect the performance and outcome of projects have been mainly directed to the project manager's characteristics such as a project manager's skills, competencies, leadership, and motivation influence project success.

The second one was the organizational factors that organizational cultural variables that influence project success such as organizational strategy, structure, system, culture types, and behavioral patterns. And the third one was project management culture that project management culture is important to project success which include values, norms and leadership.

Further responses for the questions raised to the respondents on the factors affecting poor performance of the projects Escalation of material prices other than cement, reinforcement and fuel, problem in estimated cost, too much number of test orders for and shortage of materials, design and technical matters, and project overtime cost and material and equipment cost and problem in estimated cost were the major mentioned concerning Cost factor. Moreover design change, Project complexity , Late decision on approval of material , time needed to rectify defects - major materials supply shortage , Work suspension and time needed to import materials that are not locally available - delay related to sub-contract works , too much variation orders from the owner and delay in payments from the owner to the contractor were among time factors mentioned commonly from the respondents besides unavailability of quality materials , conformity to the specification , unavailability of quality materials and competent workers were among quality factors that affect performance while training and lack of appropriate leadership style also commented regarding the leadership issues . In general, the respondent's response was at large similar from the study findings of this study.

For the question raised to the respondents "What would you recommend towards the effective housing projects construction performance in the construction industries" The respondents recommended that a new contract awarding approach by giving less weight to prices and more weight to the capabilities and past performance of contractors should be adopted and It is necessary to establish proper construction industry regulations and appropriate mechanism for proper contractors' enforcement and owners are recommended to facilitate payment to contractors in order to overcome delay, disputes and claims. More importantly, project participants should actively have their input in the process of decision-making; and continuous coordination and relationship between project participants are required through the project life cycle in order to solve problems and develop project performance.

Chapter Five

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This part of the study presented the major findings, conclusion and recommendation of the study. Therefore, the summary of findings, conclusion, and recommendations are based on the objectives of this study as well as the recommendations of the researcher.

5.2 Major findings

The objective of this study was to investigate the effect of poor project performance on the quality of housing construction projects in Addis Ababa in order to assist owners, consultants, and contractors to overcome quality housing project performance problems and improve the quality of their housing construction projects.

Data were collected through the use of structured questionnaires that were distributed to 90 selected respondents and 100 occupants in the study population. Only 75 and 80 percent responded accurately and timely. The response rates were 83.3% and 80%, respectively. According to Baruch & Holtom (2008), an average response rate of 52.7 percent is acceptable for the survey.

The age category of respondents shows that most respondents are between the categories of 25 and 35. As the respondent age category has its own influence on the view they have regarding the practice, the wider and more diversified the age group, the wider and more diversified are the views of the respondents on the issue under consideration.

As to the educational background of the respondents', the majority of the respondents had BA or BSC degrees, followed by MA degrees. The fact that the majority of respondents have BA or BSC degrees would help respondents understand and fill out the questionnaires correctly so that the findings would be viable.

As to the service year category, the majority of the respondents were over 10 years experienced. The overall internal consistency of 33-item questionnaires was tested, and the result showed a high alpha value ($\alpha = 0.922$). Thus, it concluded that the questionnaire was reliable and consistent because the alpha value was greater than 0.70.

All the variables listed on the questionnaires were categorized by the factors that affect poor project performance and quality in the study population.

Generally, quality defects from culture and politics are a problem that occurs in housing construction projects. They scored a mean value of 4.61 with a mean score of 3.84. Quality defects from technical factors are the second, followed by quality defects from environmental, material, and equipment with a 3.49 mean score, and quality defects from stakeholder's management with a 3.39 mean score. Which was interpreted as this variable having above-average mean poor quality project performance in the study population

The major top five stakeholder's managerial factors affecting the poor performance of housing construction projects quality in Addis Ababa were poor relationships and collaboration (RII 0.768), a low effective project management system (RII 0.717), poor quality procedures and departments (RII 0.706), a poor training system (RII 0.704), and reduced subcontractor responsibility (RII 0.701).

The top five technical factors affecting the performance of construction projects in Addis Ababa to these respondents were human error (RII 0.861), followed by lack of quality management (RII 0.821), low quality drawing and specification (RII 0.797), difficult data collection system (RII 0.786), and design complexity (RII 0.765).

The major quality problems that occurred in the housing construction projects in the study population were exhibited as project quality defects: leaking roofs and windows, cracked and heaving concrete, cracks in walls and joints, defective plumbing, and improperly installed electrical equipment.

Similarly Based on the results of the study, the most significant quality defects identified were plumping parts, cracked walls and ceilings, interior partitions, and other related finishing works. Even though most of the residents had engaged to repair plumping parts and door handles and lock keys, the quality defects related to electric utility and electricity installation were low.

5.3 Conclusions

The Ethiopian construction industry, like that in most developing countries, faces challenges that hinder its development, such as delay in construction industry development (CID) policy implementation and corruption, weak capacity of contractors and consultants, lack of collaboration and professionalism, and lack of benchmarking CID practice from the role of the government, resource-related variables, the nature of the industry, and the industry's vision for its own development, respectively.

Many research studies have been conducted to evaluate and improve the poor quality of housing construction performance in the construction industry. Traditionally, the industry evaluates its performance using four such factors: stakeholder's managerial factors, technical factors, environmental, material, and equipment factors, and culture and political factors. That was the purpose of this study: to study the extent of poor project performance on the quality of housing construction projects in Addis Ababa.

In general, many quality problems occurred in the housing construction projects in the study population that exhibited a project quality defect, including leaking roofs and windows, cracked and heaving concrete, cracks in walls and joints, defective plumbing, and improperly installed electrical equipment. Based on the results of the study, the most significant quality defects identified were plumping parts, cracked walls and ceilings, interior partitions, and other related finishing works. Even though most of the residents had engaged to repair plumping parts and door handles and lock keys, the quality defects related to electric utility and electricity installation were low.

From these research results, one can conclude that the major poor project performance on the quality of housing construction projects that most frequently occurs in the study population among stakeholder's managerial factors has been poor relationships and collaboration (RII 0.768), a low effective project management system (RII 0.717), poor quality procedures and departments (RII 0.706), a poor training system (RII 0.704), and reduced subcontractor responsibility (RII 0.701).

The most common factors affecting poor project performance on the quality of housing construction projects among the technical factors are human error (RII 0.861), followed by lack of quality management (RII 0.821), low quality drawing and specification (RII 0.797), difficult data collection system (RII 0.786), and design complexity (RII 0.765).

Among environmental, material, and equipment factors that affected the extent of poor project performance on the quality of housing construction projects were project environment (R II 0.856), nature uniqueness (R II 0.848), material and equipment specification (R II 0.826), project size and complexity (R II 0.802), and poor quality and unavailability of resources (R II 0.714). Moreover, culture and politics factored into the major top factors of poor project performance on the quality of housing construction projects: lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture) (RII 0.909), followed by lack of motivation (RII 0.850), corruption (RII 0.840), emphasis on production and project duration (RII 0.794), and lack of being customer-oriented and focused (RII 0.640).

In general, the study concludes that the technical factors, culture, and political factors reflected by poor performance of quality tools, lack of quality management, human error, as well as a lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture), and corruption, respectively, were the major performance problems that affected the quality of housing construction projects in the study population.

5.4 Recommendations

Based on the findings the study, the researcher would recommend that:

- Housing Construction projects should have been counselled to minimize waste rates through project implementation to improve quality. They should be more interested in conformance to project specifications to overcome disputes, time, and cost performance problems.
- Quality materials should be of greater interest for housing construction projects in order to improve quality performance. This can be done by applying quality training and meetings that are necessary for performing an improvement.
- Housing construction projects should have been encouraged to be more interested in sequencing work according to schedule. and cost engineers in their projects to successfully control costs and improve the performance of construction**.**
- Construction projects are recommended to have proper planning and a good site management system for the different activities of the project so as to avoid any mistakes that may lead to rework of activities, resulting in time and cost performance problems.
- Construction projects should use qualified and experienced staff, use good-quality materials and equipment, and ensure that the project conforms to the specification.
- Construction projects should have recommended minimizing design change as much as possible in order to avoid any factors affecting quality performance.
- Communication and coordination between the stakeholder groups also have to be improved to minimize quality performance problems.
- The government should create a climate of economic stability that is sufficient to inspire investors, especially in the production of construction materials to be produced from local materials and the production of enough quantity and quality of construction materials in the local market. This will help to reduce excessive

price fluctuations associated with imported construction materials, which in turn affect project quality.

- The government should provide capacity building for professionals and firms in the construction sector so as to develop the performance of the professionals. In addition, the government has to encourage intellectuals to do research regarding factors affecting the quality of construction projects.
- The government should create opportunities for local contractors and consultants to work with international contractors and consultants to share experiences and adopt new technologies for quality performance**.**
- Leaving the finishing work to the final consumer, reducing its equivalent costs, and conducting a consumer survey regarding finishing work and material selection before conducting and performing the work

5.5 Future Research Area

As it has been known traditionally, the industry evaluates its performance using three key indicators: time, cost, and quality. However, the traditional indicators can no longer be an effective measurement of project success. In real practice, many factors, apart from those three key factors, affect construction performance, both directly and indirectly. Include safety and health aspects for better construction performance; others claim financial aspects for the profitability and survivability of a construction company; environmental aspects for better quality construction performance; and the importance of client/customer satisfaction and stakeholder management is crucial to improving the performance of the construction industry.

Further study is therefore recommended in assessing the constraints of HDPO in administering and managing the project and the constraints of the consultants during the works and material inspection. There is a need to carry out further studies to find out how the defects observed during the handover of the houses pass final inspections by HDPO and the consultants.

More importantly, further study is also recommended to identify the types of quality defects that are related to structural defects as well as the life span of the building. The construction materials used in the project need to be assessed, and a study should be made on the quality of the material provided or to find out whether the materials meet the specifications in the building codes of the country.

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APPENDIX: QUESTIONNAIRE

Addis College, Department of Project Management

MSc in Project Management

HOUSE OCCUPANT QUESTIONNAIRE

Data Collection Form	
	Collected By

This questionnaire is prepared for the study entitled "Assessing Poor Project Performance on the Quality of Housing Construction Project: Evidence from selected Housing project construction in Addis Ababa ". All the information you provide is totally sought for academic purposes and shall be kept strictly confidential. Your answers will be combined anonymously with other participants. Please kindly give your genuine response and share your experiences regarding the information requested on the following information.

Thank you in advance for your cooperation

Girmadawit Muchie

The Researcher

Section One: General Information

I. Demographic section.

1. Sex of respondent?
   Male
   Female
2. Age of respondent?
   a. 18-23 b. 24-29 c. 30-35 d. 36-40 e. above 41

3.Number of family member lives together ……

4. Type of house?
   a. Studio b. one bed room c. two bed room d. three bed room
5. House area in meter square ……...
6. Age of the house since they received……..
7. Floor number
   i. ground b. 1st floor c. 2nd floor d. 3rd floor e. 4th floor

Section Two: Main questions

A. General problems.

2.1 Have you observed any project quality problems in the house?

ii. Yes

iii. No, if no please skip to question 5.

2.2 What quality problems have you observed when you receive the house fromGovernment? (Multiple responses are possible), please use "√" for your response.

QUALITY PROBLEMS	YES	NO
Broken door or window handle and broken glasses		
Doors and windows not close and not open properly		
Incomplete kitchen and toilet materials		

Cracked wall, floors and Poor concrete ceiling		
Leaking of water plumping, shower, kitchen and toilet sink		
Deflection of roof		
Leaking of kitchen and toilet hand wash sink		
Poor electric line installation		
Poor water line installation		

2.3 What was the most difficult part when you executing finishing work?

(Multiple responsesare possible) please use "√" for your response.

QUALITY PROBLEMS	**YES**	**NO**
Irregularity of wall level		
Irregularity of floor level		
Irregularity of ceiling level		
difficulty to fix inside and main door and windows		

2.3 Over all how do you rate the quality of building in terms of its construction?

a. Very poor b. poor c. fair d. good e. very good

2.4 What is your level of satisfaction?

a. Very dissatisfied b. dissatisfied c. middle d. satisfied e. very satisfied

2.5 Which of the following house building equipment you are forced to repair or replacebecause of improper function or defected?

Quality defects	***Yes***	***No***
Door handles and lock keys		
Door‟s or window‟s glasses		
Toilet door		
Toilet seat		

Hand wash basin		
Plumping parts		
Kitchen sink		
If any other please specify		

B. Water and electric utility problems

2.6 What problems related to water seepage you observed in the house?

Problems	**Yes**	**No**
Leaking through doors		
Leaking through windows		
Leaking through roof		
Leaking inside the kitchen		
Leakage inside bathroom		
If any other please specify		

2.7 Do you face water supply problem because of blockage or leakage of pipes?

a. Always b. often c. sometimes d. rarely e. never

2.8 Have you ever detect the following electricity problem in the house?

Problems	**Yes**	**No**
Sudden or frequent fuse circuit breaker		
Heating of switch or wires		
Electric shock		

2.9 Overall how often do you required to perform repair due to construction problems in yourhouse?

a. Always b. often c. sometimes d. rarely e. never

Addis College, Department of Project Management

MSc in Project Management

STAKEHOLDRE QUESTIONNAIRE

Data Collection Form	
	Collected By

This questionnaire is prepared for the study entitled "*The Effect of Poor Project Performance on the Quality of Housing Construction Project in Addis Ababa".* All the information you provide is totally sought for academic purposes and shall be kept strictly confidential. Your answers will be combined anonymously with other participants. Please kindly give your genuine response and share your experiences regarding the information requested on the following information.

Thank you in advance for your cooperation

Girmadawit Muchie

The Researcher

Part One: General Information

1. Age (Years)

○ < 18 ○ ○ 18 – 30 ○ 31 – 45 ○ 46 and above

2. Gender

○ Male ○ Female

3. Educational Qualification

○ 12 and below ○ TVET ○ Diploma

○ Bachelor ○ Masters ○ PhD and above

4. Which organization do you represent?

○ Client [Owner] ○ Contractor ○ Others (specify)

5. Respondent Designation in the organization

○ Owner ○ Project Manager ○ Site Engineer

○ Office Engineer ○ Others (Specify)

6. Years of Work Experience

○ 0 to 5 years ○ 6 to 10 years ○ 11 to 15 years ○ Above 15 years 4)

7. Number of executed projects in the organization

○ 1 to 2 ○ 3 to 5 ○ More than 5

Part Two : Performance Related Problems in Building Construction Projects

Below are mentioned numbers of quality defected and related factors in housing construction projects. From your experience, please express your opinion on rate of occurrences in housing construction projects based on the representative numbers listed below. (Please tick the appropriate box). 1= Never, 2= Sometimes, 3= Usually, 4= Frequently and 5= Most Frequently

Sr No	Statement	Rate of occurrences				
		1	2	3	4	5
1	Quality defects from stakeholder' managerial					
2	Quality defects from technical factors					
3	Quality defects from Environmental, material and equipment					
4	Quality defects from Culture and politics					
5	Other factors					

Part Three: Factors Affecting the poor project Performance of Quality of housing Construction Projects

Below are numbers of factors affecting the poor performance of construction projects on quality. From your experience, please express your opinion on the importance of the following as factors affecting the poor performance of construction projects on quality based on the associated numbers given here. (Please tick the appropriate box). 1=Very Low Important, 2= Low Important, 3= Medium Important, 4=High Important, 5=Very High Important

Sr No	Statement	Rate of occurrences				
		Very Low Important	Low Important	Medium Important	High Important	Very High Important
		1	2	3	4	5
Stakeholders managerial factor						
1	Lack of contractor supervision					
2	Poor relationship and collaborating					
3	Poor communication					
4	Reduced subcontractor responsibility					
5	Inappropriate method of contractor selecting					
6	Poor quality procedure and department					
7	Poor training system					
8	Lack of process improvement					
9	Lack of management talent and commitment					
10	Lack of quality policy					
11	Low effective project management system					
12	Bureaucracy Supplier impact					

Sr No	Statement	Rate of occurrences				
		Very Low Important	Low Important	Medium Important	High Important	Very High Important

		1	2	3	4	5
Technical factor						
1	Low quality drawing and specification					
2	Design complexity					
3	Difficult data collection system					
4	Poor performance of quality tools					
5	Lack quality management					
6	Difficult application of quality system					
7	Lack of technical talent					
8	Poor Workmanship					
9	Human Error					

Sr No	**Statement**	**Rate of occurrences**				
		Very Low Important	**Low Important**	**Medium Important**	**High Important**	**Very High Important**
		1	**2**	**3**	**4**	**5**
Environmental, Material and Equipment factor						
1	Nature uniqueness					
2	Project size and complexity					
3	Material/Equipment specification					
4	Project Environment					
5	Poor quality and unavailability of resource					
6	Equipment idleness and inefficiency					

Sr No	**Statement**	**Rate of occurrences**				
		Very Low Important	**Low Important**	**Medium Important**	**High Important**	**Very High Important**
		1	**2**	**3**	**4**	**5**
Culture and Politics factor						
1	Lack of motivation					
2	Incompatible tendering procedures					
3	Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture)					
4	Corruption					

5	Lack of being customer oriented andfocused					
6	Emphasis on production and projectduration					

Part Four : Miscellaneous Question

1. **How do you evaluate the housing quality of this project in terms of the following points?**

   _____
   _____
   _____
   _____

2. **Would you please explain how you inspect and measure housing quality?**

_____
_____

3. **How do you evaluate your project quality management system as a consultant in order tomaintain project quality?**

   _____
   _____
   ____

4. **As a consultant what are the major project quality problems in this project?**

_____
_____
_____

5. **What are the major causes for project quality problems in this project?**

_____
_____

_____

6. How do you explain the impact of project time and cost on project quality?

_____

_____

_____-

7. How do you explain house occupant complain regarding to housing project quality?

_____

_____

_____

8. As a consultant\ Contractor, how do you evaluate your project monitoring and controlling practice inorder to bring quality project?

_____

_____

_____

9. What do you suggest for further intervention to keep quality in housing construction project?

_____

_____

_____

Annex 3 Calculated RII taken from SPSS

Calculated RII taken from SPSS : Occurrence of poor project performance on quality											
Sr No	**Occurrences**	**VLI**	**LI**	**MI**	**HI**	**VHI**	**Total**	**Total**	**Ax N**	**RII**	**RANK**
		1x n_1	**2x n_2**	**3 x n_3**	**4 x n_4**	**5x n_5**		**(N)**		**Total / A x N**	
1	Stakeholder managerial factor	5	28	51	100	70	254	75	375	0.677333333	4
2	Technical factor	3	14	45	96	130	288	75	375	0.768	2
3	Environmental, Material and Equipment factor	2	28	39	148	45	262	75	375	0.698666667	3
4	culture and politics factor	1	4	9	52	280	346	75	375	0.922666667	1
Aggregate (A)											

Calculated RII taken from SPSS: Stakeholder managerial factor											
Sr No	**statement**	**VLI**	**LI**	**MI**	**HI**	**VHI**	**Total**	**Total**	**Ax N**	**RII**	**RANK**
		1x n_1	**2x n_2**	**3 x n_3**	**4 x n_4**	**5x n_5**		**(N)**		**Total / A x N**	
1	Lack of contractor supervision	5	28	51	100	70	254	75	375	0.67733333	8
2	Poor relationship and collaborating	3	14	45	96	130	288	75	375	0.768	1
3	Poor communication	2	28	39	148	45	262	75	375	0.69866667	6
4	Reduced subcontractor responsibility	6	20	45	112	80	263	75	375	0.70133333	5
5	Inappropriate method of contractor selecting	7	28	18	136	70	259	75	375	0.69066667	7
6	Poor quality procedure and department	7	20	33	120	85	265	75	375	0.70666667	3
7	Poor training system	4	24	45	116	75	264	75	375	0.704	4
8	Lack of process improvement	5	38	54	92	50	239	75	375	0.63733333	11
9	Lack of management talent and commitment	7	32	51	116	30	236	75	375	0.62933333	10
10	Lack of quality policy	6	26	57	108	50	247	75	375	0.65866667	9
11	Low effective project management system	8	12	39	120	90	269	75	375	0.71733333	2
12	Beurocracey supplier impact	13	34	33	84	65	229	75	375	0.61066667	12
Aggregate (A)											
Calculated RII taken from Technical factors											
Sr No	**statements**	**VLI**	**LI**	**MI**	**HI**	**VHI**	**Total**	**Total**	**Ax N**	**RII**	**RANK**
		1x n_1	**2x n_2**	**3 x n_3**	**4 x n_4**	**5x n_5**		**(N)**		**Total / A x N**	
1	Low quality drawing and specification	3	8	18	160	110	299	75	375	0.797333333	3
2	Design complexity	2	16	21	168	80	287	75	375	0.765333333	5
3	Difficult data collection system	3	4	39	144	105	295	75	375	0.786666667	4
4	Poor performance of quality tools	3	20	27	160	65	275	75	375	0.733333333	6

5	Lack quality management	5	2	12	144	145	308	75	375	0.821333333	2
6	Difficult application of quality system	3	12	96	136	0	247	75	375	0.658666667	9
7	Lack of technical talent	6	18	36	136	70	266	75	375	0.709333333	8
8	Poor Workmanship	6	12	39	144	70	271	75	375	0.722666667	7
9	Human Error	0	2	9	172	140	323	75	375	0.861333333	1
Aggregate (B)											

Calculated RII taken from Environment , Material and Equipment factors

Sr No	**statements**	**VLI**	**LI**	**MI**	**HI**	**VHI**	**Total**	**Total**	**Ax N**	**RII**	**RANK**
		1x n_1	**2x n_2**	**3 x n_3**	**4 x n_4**	**5x n_5**		**(N)**		**Total / A x N**	
1	Nature uniqueness	1	8	9	140	160	318	75	375	0.848	2
2	Project size and complexity	0	8	39	144	110	301	75	375	0.802666667	4
3	Material/Equipment specification	1	2	24	168	115	310	75	375	0.826666667	3
4	Project Environment	1	2	21	132	165	321	75	375	0.856	1
5	Poor quality and unavailability of resource	1	22	48	152	45	268	75	375	0.714666667	5
6	Equipment idleness and inefficiency	5	28	51	104	65	253	75	375	0.674666667	6
Aggregate (C)											

Calculated RII taken from Culture and politics factors

Sr No	**statements**	**VLI**	**LI**	**MI**	**HI**	**VHI**	**Total**	**Total**	**Ax N**	**RII**	**RANK**
		1x n_1	**2x n_2**	**3 x n_3**	**4 x n_4**	**5x n_5**		**(N)**		**Total / A x N**	
1	Lack of motivation	5	8	9	72	225	319	75	375	0.850666667	2
2	Incompatible tendering procedures	12	26	63	60	70	231	75	375	0.616	6
3	Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture)	1	4	24	72	240	341	75	375	0.909333333	1
4	Corruption	1	8	21	120	165	315	75	375	0.84	3
5	Lack of being customer oriented and focused	11	28	39	92	70	240	75	375	0.64	5

6	Emphasis on production and project duration	5	12	18	108	155	298	75	375	0.794666667	4
	Aggregate (D)										

Source: compiled by the Researcher 2023