ADDIS COLLEGE

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CONSTRUCTION SITE MANAGEMENT PRACTICE OF LOCAL CONTRACTORS IN REAL ESTATE CONSTRUCTION PROJECTS IN ADDIS ABABA

BY

HIRUT BIRHANU TEGAYE

NOVEMBER 2023

ADDIS ABABA, ETHIOPIA

ADDIS COLLEGE

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CONSTRUCTION SITE MANAGEMENT PRACTICE OF LOCAL CONTRACTORS IN REAL ESTATE CONSTRUCTION PROJECTS IN ADDIS ABABA

By

Hirut Birhanu Tegaye

A thesis submitted to Addis College Faculty of Technology Department of Construction technology and Management in partial fulfilment of the requirements for the degree of Master of Science in construction technology and management

Main Advisor: Argaw Asha (PHD)

November, 2023

Addis Ababa, Ethiopia

ADDIS COLLEGE

SCHOOL OF GRADUATE STUDIES

CONSTRUCTION SITE MANAGEMENT PRACTICE OF LOCAL CONTRACTORS IN REAL ESTATE CONSTRUCTION PROJECTS IN ADDIS ABABA

By

Hirut Birhanu Tegaye

November 2023

Approved by Board of Examiners

Dr. Argaw Asha (PHD) Advisor, Name	_____ Date	_____ Signature
_____ External Examiner Name	_____ Date	_____ Signature
_____ Internal Examiner Name	_____ Date	_____ Signature
_____ Chairperson, Name	_____ Date	_____ Signature

DECLARATION

This is to certify that the thesis entitled “Construction site management practice of local contractors in real estate construction projects in Addis Ababa”, submitted in partial fulfillment of the requirements for the degree of Master of Science in construction technology & Management under Faculty of technology, Addis College, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

_____	_____	_____
Name of the candidate	Signature	Date

AKNOWLEDGEMENT

I am profoundly grateful to God for His guiding presence throughout this research journey. His wisdom and grace have been my constant source of strength. I would like to gratefully and sincerely thank to my advisor Argaw Asha (PHD) for his guidance.

I extend heartfelt thanks to my company Temer Trading plc. For their unwavering support, creating an environment that fueled the success of this study. I also appreciate the collaborative efforts of advisor, mentors, and stakeholders who shared their expertise, enriching the depth of this research.

ACRONYMS

BIM Building Information Modelling

CH Challenges

CPM Critical Path Method

FLM Flow Line Method

FW Frame work

IPD Integrated Project Delivery

PMIS Project Management Information System

PR Practices

RSH Role of Stakeholders

SD Standard Deviation

SMT Site Management Team

TQM Total Quality Management

VDC Virtual Design and Construction

LIST OF TABLES

LIST OF FIGURES

LIST OF APENDIXES

TABLE OF CONTENT

ABSTRACT

In response to rapid urbanization, a growing middle class, and increased investment, Ethiopia's real estate sector has experienced significant growth, propelled further by a booming infrastructure development. The construction industry in Addis Ababa, Ethiopia, is experiencing rapid growth fueled by urbanization and government initiatives like the Integrated Housing Development Program. However, concerns persist regarding the effectiveness of construction site management practices employed by local contractors. This study, employing a descriptive research design, focuses on the construction site management practices of 57 local contractors engaged in real estate projects in Addis Ababa. Utilizing a structured questionnaire and employing a stratified random sampling method, the research reveals that overall construction site management practices are moderately effective, with identified areas for improvement including risk management, project cost control, environmental sustainability, technology integration, and community relations. Notably, stakeholders play a significant role in these practices, with around 50% actively contributing. Recommendations include the implementation of structured risk management processes, enhanced project cost control measures, integration of environmentally friendly practices, and adoption of modern construction techniques and technologies.

Keywords: Construction Site Management, Local Contractors, Real Estate Construction

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The construction industry, with an annual revenue surpassing $10 trillion, serves as a vital contributor to global economic growth, providing essential infrastructure, homes, and commercial spaces (Frost & Sullivan, 2019). Covering residential, commercial, industrial, and infrastructure construction, it significantly impacts job creation and economic development worldwide. Despite its economic importance, the industry faces complex challenges, including safety concerns, environmental impact, and project delays (National Safety Council, 2020). Effective construction site management emerges as a critical solution, involving the coordination of stakeholders and efficient resource allocation for timely and high-quality project execution. Construction site managers, collaborating with various professionals, oversee day-to-day operations, ensuring compliance with safety regulations, managing budgets, and monitoring project progress. This multidisciplinary field demands a deep understanding of the industry and technical expertise in architecture, engineering, and construction technology (Cox, R. F., Issa, R. R. A., & Ahrens, D. 2012). By applying key principles, construction site managers successfully navigate complexities, delivering projects on time, within budget, and meeting quality standards (CMAA, 2021; Frost & Sullivan, 2019; National Safety Council, 2020).

The construction industry plays a crucial role in the economic development of a country by creating employment opportunities and contributing to the growth of other sectors. In Ethiopia, rapid growth in the construction industry, fueled by economic expansion and infrastructure demand, is evident (Tadesse & Tsegay, 2019). Particularly crucial is the real estate sector, addressing the escalating housing needs of the expanding urban population. Ethiopia has witnessed a significant urban population growth of 4.1% annually from 2005 to 2019, as reported by the World Bank, with projections indicating continued growth (World Bank, 2020). This underscores the vital role of real estate development in meeting the rising demand for housing and commercial spaces in the country.

Addis Ababa, the capital of Ethiopia, has experienced a remarkable surge in real estate development in recent years. This rapid growth can be attributed to various factors, including a burgeoning population, government investments in infrastructure, and increasing incomes. However, alongside this boom, concerns have arisen regarding the quality and efficiency of construction practices, particularly among local contractors.

Previous research on construction project management in Ethiopia has primarily focused on project performance issues like cost overruns and delays (Ephrata Leulseged, 2011). Here are some examples

Ephrata Leulseged's 2011 doctoral dissertation: Compared the project management practices of foreign and local contractors on commercial bank construction projects in Ethiopia. The study found that foreign contractors generally exhibited better planning, communication, and resource management, leading to fewer cost overruns and delays compared to local contractors.

A 2018 study by Surahyo: Investigated the impact of contract administration practices on the performance of residential building projects in Addis Ababa. The study identified inadequate contract administration, including unclear specifications, poor communication, and weak monitoring, as contributing factors to cost overruns and delays.

Lemi T.'s 2018 master's thesis: Examined the construction contract administration practices used in residential building projects in Ajamba, Addis Ababa. The research found that inconsistencies in contract documents, weak enforcement mechanisms, and limited experience of project administrators contributed to project delays and cost overruns.

A 2017 report by the Ministry of Finance and Economic Development: Analyzed the management of mega infrastructure projects in Ethiopia. The report highlighted factors like poor planning, inadequate resource allocation, and weak coordination among stakeholders as leading to significant cost overruns and delays.

Consequently, there is a limited understanding of the actual day-to-day practices employed by local contractors on construction sites. This study aims to bridge this gap by investigating specific aspects of site management like:

- Planning and scheduling: How do local contractors plan and schedule their work? What tools and techniques do they use?
- Resource allocation and management: How do they manage their workforce, materials, and equipment?
- Quality control and safety procedures: What measures do they implement to ensure quality standards and worker safety?
- Communication and coordination: How do they communicate with stakeholders and coordinate different aspects of the construction process?

1.2 Statement of the Problem

While Addis Ababa's real estate boom thrives, concerns linger regarding the effectiveness of local construction site management practices, often neglected in research that prioritizes developed economies and multinational companies (Surahyo, 2018). This knowledge gap hinders efforts to address the root causes of performance issues like cost overruns, delays, and compromised quality (Ephrata Leulseged, 2011; MDE, 2017). This study aims to illuminate these opaque practices by investigating how local contractors manage resource allocation, quality control, communication, and coordination in their real estate construction sites in Addis Ababa. By unearthing the intricacies of their resource limitations (Ephrata Leulseged, 2011), informal subcontracting arrangements (Lemi T., 2018), and potentially inadequate safety and quality control measures (MDE, 2017), this research seeks to identify areas for improvement in local practices, inform effective policy changes, and tailor training programs to empower local contractors for better project success. Ultimately, this investigation aspires to contribute to the advancement of Addis Ababa's real estate development by illuminating the path towards improved, efficient, and effective construction site management practices by local contractors.

1.3 Research Questions

- What construction site management practices do local contractors employ in real estate projects in Addis Ababa?
- How do stakeholders contribute to the implementation of construction site management in real estate projects?
- What challenges do local contractors face in the implementation of effective construction site management practices in Addis Ababa?
- What potential solutions exist to enhance construction site management practices for local contractors in Addis Ababa?

1.4 Objectives of the Study

1.4.1 General Objectives

The general objective of this Study is to investigate the construction site management practice of local contractors in real estate projects in Addis Ababa.

1.4.2 Specific objectives

The specific objective of this study is to:

- Determine the existing construction site management practices employed by local contractors in real estate projects.
- Assess the contributions of stakeholders to the implementation of construction site management in real estate projects.
- Evaluate the challenges encountered in the execution of construction site management in real estate projects.
- Develop a comprehensive framework for enhancing construction site management practices in real estate projects in Addis Ababa.

1.5 Significance of the Study

Delving into the often-overlooked realm of local construction practices in Addis Ababa's booming real estate landscape, this study holds immense significance. It empowers local contractors with improved project performance, strengthens their knowledge and skills through targeted training. Moreover, it bridges the knowledge gap in developing countries,

informs future research. Over all, this research aims to contribute to a more comprehensive understanding of construction site management practices in Addis Ababa and ultimately, to the improvement of real estate development in the city.

1.6 Scope of the Study & Limitation

This research focuses on investigating the construction site management practices employed by local contractors in the context of real estate construction projects. The study encompasses various dimensions of site management, aiming to gain a comprehensive understanding of the processes, strategies, and challenges faced by local contractors during project execution.

Geographic Scope: The study was conducted in Addis Ababa to concentrate on the practices of local contractors operating within this specific location. The region's unique characteristics, local regulations, and contextual factors will be considered to provide relevant and targeted insights**.**

Construction Project Types: The research focuses on real estate construction projects involving residential, commercial, and mixed-use developments. These projects typically entail distinct site management challenges that necessitate a tailored approach by local contractors.

Site Management Processes: The study delves into various site management processes, including project planning, scheduling, resource allocation, quality control, safety protocols, communication, and coordination with stakeholders. Each of these elements contributes significantly to the success of construction projects and will be thoroughly examined.

Role of Local Contractors: The research specifically concentrates on the role of local contractors in real estate construction projects. Understanding their perspectives, strategies, and constraints will provide valuable insights into how these contractors navigate challenges unique to their scale and resources.

Comparison with Industry Standards: The study compares the site management practices of local contractors with established industry standards and best practices. This enables a comprehensive evaluation of the effectiveness and efficiency of current practices and identifies areas where improvements can be made.

Timeframe: The research covers a specific period, usually within the past five years, to ensure relevance and contemporaneity of the findings. The data collection will focus on recent projects to capture the latest trends and practices.

Data Collection Methods: A combination of qualitative and quantitative research methods utilized to gather data. Interviews, surveys, on-site observations, and document analysis provide rich insights into the experiences and perceptions of local contractors and other stakeholders involved in construction projects.

Limitations: While the research aims to provide valuable insights, there are inherent limitations. The scope may not allow for a comprehensive analysis of all construction site management aspects, and factors beyond the immediate control of local contractors, such as external market dynamics, may influence project outcomes.

In conclusion, this study's scope is to examine the construction site management practices of local contractors in real estate construction projects project performance, safety, and sustainability, ultimately benefiting local contractors, real estate developers, government authorities, and other stakeholders involved in the construction industry within a specific geographical area. The research will contribute valuable knowledge to enhance.

1.7 Organization of the study

This research work is organized in five chapters. The content of each is elaborated below.

Chapter 1: Introduction – This is the first chapter and presents the statement of the problem, research objectives, brief methodology, scope, limitation, beneficiaries and significance of the study.

Chapter 2: Literature Review – This chapter reviews literature related with the topic of the research and attempts to present a theoretical background and framework for the research.

Chapter 3: Research Methodology – This chapter explains the approaches and methods followed to achieve research objectives. It presents the strategies implemented to collect as well as analyze and present results.

Chapter 4: Result and discussion – This chapter presents the results and findings of the research and discusses them in detail.

Chapter 5: Conclusions and Recommendations – This chapter is the last chapter of the research. It summarizes and presents the conclusions and recommendations drawn based on the research findings. Finally, bibliography and appendices have been presented.

CHAPTER TWO

LITERATURE REVIEW

This chapter provides information from publications on topics related the study. It examines what various scholars and authors have said about the concept of construction site management. In this chapter, the concept of construction site management including effective site management, supplier sourcing process, and contract management are covered.

2.1 Theoretical Review

2.1.1 Introduction

The construction industry is a vast and complex sector that encompasses a wide range of activities, including the design, planning, construction, and maintenance of buildings, infrastructure, and other structures. It also comprises large numbers of parties as owners (clients). These are; the contractors, consultants, stakeholders, and regulators. Despite this complexity, the industry plays a major role in the development and achievement of society's goals. (Enshasi et al, 2009).

Construction site management is a critical aspect of the construction industry that involves overseeing and controlling various activities on construction sites to ensure projects are completed on time, within budget, and to the required quality standards. Effective management of construction sites involves planning, organizing, coordinating, monitoring, and controlling various project elements, such as personnel, materials, equipment, and budget. Proper site management can enhance project productivity, safety, and quality, while reducing costs and minimizing project risks.

According to a study by Al-Harbi and Al-Sultan (2018), effective construction site management is critical for successful project delivery, and it involves several key factors, such as communication, leadership, planning, risk management, and quality control. The study also highlights the importance of proper site organization, logistics planning, and stakeholder engagement in ensuring successful project outcomes.

In recent years, the construction industry has witnessed significant changes in construction site management practices, owing to advancements in technology and best practices, with the emergence of Building Information Modeling (BIM), lean construction principles, and the integration of digital tools and platforms, which have enhanced construction site management practices and improved project outcomes. (Tang et al., 2019; Lee & Kim, 2021). These innovations have been increasingly adopted by larger, more established contractors, but the extent to which local contractors incorporate and effectively implement these practices in their real estate construction projects remains uncertain.

Numerous previous studies have underscored the importance of effective construction site management. Effective construction site management is essential for successful project delivery, and it requires a thorough understanding of project requirements, effective planning, and coordination of project elements, and regular monitoring and control of project activities. This literature review provides an overview of the current literature on construction site management.

2.2 Construction Site Management

Construction site management is a complex process that involves the coordination and management of various activities on the site. The success of a construction project is dependent on effective site management. The site manager is responsible for the planning, organizing, and controlling of activities on the site to ensure that the project is completed on time, within budget, and to the required quality standards (Ponniah, 2015). The site manager is also responsible for managing resources, including labor, materials, equipment, and finances, to ensure that the project is delivered successfully. Site management involves the development and implementation of various plans, including the project plan, quality plan, safety plan, and environmental plan, to ensure that the project is completed to the required standards (Huang et al., 2019).

2.2.1 Planning and Coordination

Planning is a critical component of construction site management. The success of a construction project is dependent on effective planning. The site manager is responsible for developing and implementing the project plan, which outlines the objectives, scope,

schedule, budget, and resources required for the project (Sears & Clutter, 2017). Effective planning involves the identification of risks and the development of mitigation strategies to minimize their impact on the project. The site manager is also responsible for coordinating the activities of various stakeholders, including contractors, suppliers, and regulatory authorities, to ensure that the project is completed on time and to the required standards (Cao et al., 2020).

2.2.2 Quality Management

Quality management is a critical component of construction site management. The site manager is responsible for ensuring that the project is completed to the required quality standards. Quality management involves the development and implementation of the quality plan, which outlines the quality standards, processes, and procedures that will be used to ensure that the project is completed to the required standards (Chen et al., 2018). The site manager is also responsible for ensuring that the quality plan is communicated effectively to all stakeholders to ensure that the project is completed to the required standards.

2.2.3 Safety Management

Safety management is a critical component of construction site management. The site manager is responsible for ensuring that the project is completed safely. Safety management involves the development and implementation of the safety plan, which outlines the safety standards, processes, and procedures that will be used to ensure that the project is completed safely (Wang et al., 2017). The site manager is also responsible for ensuring that the safety plan is communicated effectively to all stakeholders to ensure that the project is completed safely.

2.2.4 Environmental Management

Environmental management is a critical component of construction site management. The site manager is responsible for ensuring that the project is completed in an environmentally responsible manner.

Environmental management involves the development and implementation of the environmental plan, which outlines the environmental standards, processes, and procedures that will be used to ensure that the project is completed in an environmentally responsible manner (Chen et al., 2018). The site manager is also responsible for ensuring that the environmental plan is communicated effectively to all stakeholders to ensure that the project is completed in an environmentally responsible manner.

2.2.5 Technology and Innovation

Technology and innovation are becoming increasingly important in construction site management. The use of technology can help to improve the efficiency and effectiveness of construction site management. For example, Building Information Modelling can help to improve the coordination and communication between various stakeholders on the construction site (Omar et al., 2019). The use of drones can also help to improve the monitoring and inspection of the construction site, which can improve the safety and quality of the project (Bragança et al., 2020). Furthermore, the use of prefabrication and modular construction can help to reduce the time and cost of construction, while also improving the quality of the project (Bock et al., 2018).

2.2.6 Human Resource Management

Human resource management is a critical component of construction site management. The success of a construction project is dependent on the effective management of human resources, including labor, contractors, and suppliers. The site manager is responsible for managing the recruitment, training, and development of human resources to ensure that the project is completed successfully (Panuwatwanich, 2017). Effective human resource management involves the development of a positive organizational culture that promotes teamwork, communication, and collaboration.

2.2.7 Risk Management

Risk management is a critical component of construction site management. The site manager is responsible for identifying and managing risks throughout the project lifecycle. Risk management involves the identification, analysis, and evaluation of risks, as well as

the development of mitigation strategies to minimize their impact on the project (Shan et al., 2018). Effective risk management involves the communication of risks and mitigation strategies to all stakeholders to ensure that they are aware of the potential risks and are prepared to respond to them.

Overall, construction site management plays a critical role in the success of construction projects, and understanding its key principles and best practices is essential for anyone involved in the industry.

2.3 Importance of Construction Site Management

Construction site management is a critical component of successful construction projects. The effective management of construction sites involves a complex set of tasks, including the scheduling and coordination of construction activities, management of resources and personnel, safety management, and quality control. Several studies have highlighted the importance of construction site management in achieving project success.

According to Ezeokonkwo and Ogunsemi (2013), effective construction site management can reduce project delays and increase productivity. The study emphasizes that effective management of construction sites involves the proper coordination of construction activities, adequate allocation of resources, and management of personnel to ensure timely completion of projects. Similarly, Zhang, Li, and Li (2015) argue that effective construction site management can improve project performance and reduce construction costs.

The importance of safety management in construction site management has been emphasized by several studies. Occupational accidents and injuries can result in significant project delays and financial losses. According to Pradhan, Patil, and Kumar (2013), effective safety management practices can reduce accidents and improve the overall safety performance of construction sites. The study highlights the need for effective safety training programs, proper use of safety equipment, and regular safety inspections to ensure a safe working environment.

Quality control is another critical aspect of construction site management. According to Toole and Toole (2017), effective quality control practices can improve project performance, reduce construction costs, and enhance the reputation of construction companies. The study emphasizes the importance of establishing quality control procedures and using appropriate quality control tools to ensure that construction projects meet the required standards and specifications.

Effective construction site management is crucial to achieving project success. Proper coordination of construction activities, management of resources and personnel, safety management, and quality control is important in achieving project objectives. Construction companies need to invest in effective construction site management practices to improve project performance, reduce costs, and enhance their reputation in the industry.

2.4 Effective Construction Site Management

Effective site management is essential to ensure successful project delivery, and it involves a variety of activities, such as planning, coordination, communication, monitoring, and control. In

2.4.1 Planning

Planning is one of the key aspects of effective site management. According to Bubshait and Al-Hammad (2015), effective planning is crucial for achieving project objectives and minimizing risks. They argue that effective planning involves developing a clear understanding of project requirements, identifying potential problems and risks, and establishing appropriate timelines and budgets. In addition, effective planning requires the involvement of all stakeholders and the use of appropriate planning tools and techniques.

2.4.2 Coordination & Communication

Coordination & Communication is another critical aspect of effective site management. According to Dainty et al. (2016), effective coordination involves bringing together various stakeholders, such as project managers, contractors, suppliers, and clients, and ensuring that they work together towards project objectives. Effective coordination requires clear

communication, the establishment of roles and responsibilities, and the use of appropriate technologies and tools to facilitate collaboration and information sharing.

2.4.3 Monitoring and control

Monitoring and control are also essential components of effective site management. According to Kerzner (2017), effective monitoring and control involve tracking project progress, identifying potential problems and deviations from the plan, and taking corrective actions to ensure that project objectives are met. Effective monitoring and control require the use of appropriate metrics and indicators, regular reporting, and the establishment of clear decision-making processes.

In addition to these general principles, there are also specific techniques and approaches that can enhance site management effectiveness. For example, the use of Building Information Modelling (BIM) has been shown to improve coordination and communication between stakeholders and reduce errors and conflicts (Arayici et al., 2011). Similarly, the use of Lean Construction principles, which focus on minimizing waste and maximizing value, can lead to improved project performance and customer satisfaction (Ballard, 2000).

2.5 Construction Site Management Team and Organizational Arrangement

The Site Management Team (SMT) is an essential part of any construction project. The SMT is responsible for ensuring that the project is completed on time, within budget, and to the required quality standards. The SMT typically includes a range of professionals, including project managers, site engineers, health and safety officers, and quality assurance personnel.

Organizational arrangements are critical in the effective functioning of a construction project. Organizational arrangements refer to the way in which the project team is structured, the roles and responsibilities of team members, and the communication channels between team members. Effective organizational arrangements can help to ensure that the SMT operates efficiently and effectively.

A study by Ahmed and Azhar (2014) investigated the impact of organizational arrangements on project performance. The study found that effective organizational arrangements, including the clear definition of roles and responsibilities, the use of formal communication channels, and the implementation of appropriate control mechanisms, can help to improve project performance.

Another study by Almarri et al. (2019) examined the role of the Site Management Team in ensuring safety on construction sites. The study found that the SMT plays a critical role in ensuring safety on construction sites through the implementation of safety policies and procedures, the provision of safety training, and the monitoring of safety performance.

According to El-Mashaleh and Bostanci (2016), effective communication within the SMT is essential for successful project delivery. The study found that poor communication between team members can lead to delays, errors, and rework, which can negatively impact project performance.

Finally, a study by Song et al. (2020) explored the relationship between organizational arrangements and project outcomes in the construction industry. The study found that effective organizational arrangements, including the use of clear and concise communication channels and the allocation of appropriate resources, can help to improve project outcomes.

The Site Management Team and organizational arrangements are essential components of successful construction projects. Effective organizational arrangements, including the clear definition of roles and responsibilities, the use of formal communication channels, and the implementation of appropriate control mechanisms, can help to improve project performance. The SMT plays a critical role in ensuring safety on construction sites through the implementation of safety policies and procedures, the provision of safety training, and the monitoring of safety performance. Effective communication within the SMT is also essential for successful project delivery.

2.6 Role and Responsibilities of Construction Site Managers

Construction site managers play a crucial role in ensuring that construction projects are completed on time, within budget, and in compliance with safety regulations. In recent years, there has been a growing interest in understanding the specific roles and responsibilities of construction site managers.

One of the main responsibilities of construction site managers is to ensure that construction projects are completed on time. This involves overseeing the work of contractors, scheduling work activities, and ensuring that all necessary materials and equipment are available on site. According to Oyedele et al. (2018), effective time management is essential for successful project delivery, and construction site managers play a key role in achieving this goal.

In addition to time management, construction site managers are responsible for ensuring that construction projects are completed within budget. This involves managing costs, monitoring expenses, and ensuring that project resources are used efficiently. According to Bello et al. (2019), construction site managers must have a good understanding of project budgets and be able to make strategic decisions to ensure that costs are controlled.

Safety is another important responsibility of construction site manager. They are responsible for ensuring that construction projects are completed safely, and that workers are protected from accidents and injuries. This involves implementing safety protocols, conducting regular safety inspections, and ensuring that workers are trained in safety procedures. According to Hinze et al. (2018), safety is a key concern for construction site managers, and they must take proactive steps to ensure that safety standards are met.

Communication is also a crucial responsibility of construction site managers. They must be able to communicate effectively with contractors, workers, clients, and other stakeholders involved in the project. This involves providing clear instructions, giving feedback, and resolving conflicts. According to Rowlinson et al. (2014), effective communication is essential for successful project delivery, and construction site managers must have strong communication skills.

Finally, construction site managers are responsible for ensuring that construction projects are completed to a high standard of quality. This involves monitoring the work of contractors, conducting quality inspections, and ensuring that project specifications are met. According to Alarcon et al. (2017), quality is a key factor in determining the success of a construction project, and construction site managers play a critical role in ensuring that quality standards are met.

Construction site managers play a vital role in ensuring the success of construction projects. They are responsible for time management, cost control, safety, communication, and quality. Effective construction site management requires a combination of technical, interpersonal, and managerial skills, and the research suggests that successful construction site managers must be able to balance these skills effectively.

2.7 Construction Site Management Techniques

Construction site management is a crucial process in the construction industry that helps to ensure successful project delivery. It involves the coordination of various activities, resources, and stakeholders to ensure that a construction project is completed on time, within budget, and to the required quality standards. Various techniques have been developed to help managers achieve these goals.

2.7.1 Lean Construction

Lean construction is a management approach that aims to minimize waste and maximize value in construction projects. It involves the application of lean principles, such as continuous improvement, visual management, and just-in-time delivery. A study by Alarcón and Acuña (2017) found that lean construction techniques can lead to significant improvements in construction productivity and project outcomes.

2.7.2 Building Information Modelling (BIM)

BIM is a digital tool that enables the creation and management of a 3D model of a construction project. It allows for the integration of various aspects of a project, such as design, construction, and maintenance, into a single platform. A study by Zhang et al.

(2019) found that BIM can help to improve communication and collaboration among project stakeholders, leading to better project outcomes.

2.7.3 Risk Management

Risk management involves identifying, analyzing, and responding to risks that may affect a construction project. It helps managers to anticipate potential problems and develop strategies to mitigate them. A study by Sánchez et al. (2018) found that effective risk management can lead to improved project outcomes, such as reduced delays and cost overruns.

2.7.4 Project Management Software

Project management software is a tool that helps managers to plan, schedule, and control construction projects. It provides real-time information on project progress and enables collaboration among project stakeholders. A study by Abdou et al. (2018) found that project management software can lead to improved project outcomes, such as increased efficiency and reduced errors.

2.7.5 Site Layout Planning

Site layout planning involves the design and arrangement of construction sites to optimize the use of resources and minimize waste. It includes activities such as material handling, storage, and equipment placement. A study by (Atay et al. 2019) found that effective site layout planning can lead to improved productivity and reduced project costs.

These techniques have been found to improve project outcomes, such as productivity, efficiency, and cost control. As the construction industry continues to evolve, it is important for managers to adopt new and innovative techniques to remain competitive and achieve project success.

2.8 Construction Site Management Problems

Construction sites are complex environments that involve a wide range of activities and stakeholders. Various problems can arise during the construction process, including poor communication, inadequate planning, and inadequate supervision. These problems can lead to delays, cost overruns, and safety hazards. To avoid these problems, it is essential to

establish clear communication channels, plan properly, and ensure proper supervision on construction. These Problem are summarized into three categories as they relate to site management practice which are explain below.

2.8.1 Management and Administration Problems

Effective management and administration are crucial for the success of construction projects. However, various problems can arise in these areas that can impact project outcomes. The most common management and administration problems in construction, including inadequate resource allocation, poor coordination, and ineffective risk management.

Inadequate resource allocation is a significant management problem that can impact construction projects. According to a study by Ogunlana et al. (2015), inadequate resource allocation was found to be a significant cause of delays in construction projects. This can occur due to various factors, including underestimating the required resources, poor planning, and inadequate monitoring. Inadequate resource allocation can lead to delays, cost overruns, and quality issues.

Poor coordination is another common management problem in construction. Poor coordination can occur at various levels, including among different teams, between project stakeholders, and between project phases. According to a study by Lu et al. (2018), poor coordination was found to be a significant cause of delays and cost overruns in construction projects. This can occur due to various factors, including lack of communication, inadequate collaboration, and poor project management. Poor coordination can lead to delays, cost overruns, and quality issues.

Ineffective risk management is also a significant administration problem in construction. Risk management is critical in construction due to the high degree of uncertainty and complexity involved in projects. According to a study by Bakkal and Akinci (2016), ineffective risk management was found to be a significant cause of delays and cost overruns in construction projects. This can occur due to various factors, including inadequate risk identification, poor risk assessment, and insufficient risk mitigation. Ineffective risk management can lead to delays, cost overruns, and safety hazards.

To avoid these problems, it is essential to establish clear project goals, communicate effectively, provide effective leadership, and allocate resources efficiently.

2.8.2 Technical Problems

Construction projects are complex and require the use of various technical systems and processes to ensure successful completion. However, there are various technical problems that can arise during the construction process. These problems can lead to design errors, construction defects, and safety hazards. Some of the most common technical problems in construction projects, including inadequate design, construction errors, and improper materials selection.

Inadequate design is one of the most significant technical problems in construction projects. Design errors can occur due to various factors, including inadequate planning, lack of attention to detail, and failure to consider site-specific conditions. In a study by Kaklauskas et al. (2019), it was found that design errors were a significant cause of construction defects in buildings. Inadequate design can lead to delays, cost overruns, and safety hazards.

Construction errors are another common technical problem in construction projects. Construction errors can occur due to various factors, including inadequate supervision, lack of training, and failure to follow established procedures. In a study by Guo et al. (2020), it was found that construction errors were a significant cause of defects in bridge projects. Construction errors can lead to safety hazards, reduced quality of work, and delays in project completion.

Improper materials selection is also a significant technical problem in construction projects. Materials selection refers to the process of choosing materials for construction based on factors such as durability, strength, and cost-effectiveness. In a study by Zeng et al. (2020), it was found that improper materials selection was a significant cause of construction defects in high-rise buildings. Improper materials selection can lead to reduced quality of work, safety hazards, and increased project costs.

To avoid these problems, it is essential to ensure that design and construction processes are well-planned and executed, and materials are selected based on their suitability for the project.

2.8.3 Communication Problems

Effective communication is essential for the success of construction projects. However, communication problems can arise due to various factors, including differences in language, culture, and communication styles, lack of clear communication channels, and poor coordination among project participants. Some of the most common communication problems in construction projects, including miscommunication, lack of information sharing, and ineffective coordination.

Miscommunication is one of the most significant communication problems in construction projects. Miscommunication can occur due to various factors, including differences in language, culture, and communication styles, as well as inadequate or unclear communication channels. In a study by Hallowell et al. (2018), it was found that miscommunication was a significant cause of rework in construction projects. Miscommunication can lead to delays, cost overruns, and reduced quality of work.

Lack of information sharing is another common communication problem in construction projects. Lack of information sharing can occur due to various factors, including inadequate or unclear communication channels, lack of trust among project participants, and failure to use information-sharing tools and technologies. In a study by Kim and Kim (2019), it was found that lack of information sharing was a significant cause of delays in construction projects. Lack of information sharing can lead to misunderstandings, delays, and reduced quality of work.

Ineffective coordination is also a significant communication problem in construction projects. Ineffective coordination can occur due to various factors, including lack of clear communication channels, poor project planning, and inadequate or unclear roles and responsibilities. In a study by Li et al. (2020), it was found that ineffective coordination was a significant cause of rework in construction projects. Ineffective coordination can lead to delays, cost overruns, and reduced quality of work.

To avoid these problems, it is essential to ensure that clear communication channels are established, project participants are well-coordinated, and appropriate tools and technologies are used for information sharing.

Empirical Literature Review

The construction industry plays a vital role in the development of real estate and infrastructure projects, with local contractors serving as essential participants in these endeavors. Effective construction site management is crucial for the successful execution of projects, ensuring timely completion, cost control, quality assurance, and safety compliance. Numerous studies have explored the construction site management practices of local contractors in real estate construction projects. Key findings from these studies include:

2.9 Planning and scheduling

Local contractors often prioritize thorough planning and scheduling to minimize delays and optimize resource allocation. Sarshar and Abdallah (2020) revealed that contractors emphasized detailed project plans, comprehensive resource scheduling, and regular progress monitoring to ensure project success.

Beniam Genanaw (2013) analyzed road construction projects in Addis Ababa and found inadequate planning, causing time overruns due to unclear task durations, unrealistic resource allocation, and poor risk management.

Mekonnen Woldemichael (2018) studied housing construction projects and identified poor communication and weak stakeholder engagement as major contributors to schedule deviations. Lack of detailed planning and ineffective progress monitoring were also highlighted.

Getahun Asfaw (2019) evaluated the impact of integrating Building Information Modeling (BIM) in commercial construction projects. The study found significant improvements in schedule accuracy, resource optimization, and communication efficiency compared to traditional methods.

Mulugeta Alemu (2020) compared schedule performance of local and international contractors on infrastructure projects. The study revealed superior planning and scheduling practices among international contractors, utilizing advanced software and robust risk management techniques.

2.10 Communication & Coordination

Girma & Birhane (2019) investigated "Communication and Coordination Challenges in Addis Ababa Construction Projects," identifying information silos between stakeholders as a major factor leading to delays, rework, and cost overruns. This highlights the need for improved communication channels and collaborative platforms to ensure information transparency and timely decision-making.

2.11 Quality control and safety measures

Local contractors recognize the importance of maintaining high standards of quality and safety on construction sites. Ofori and Olomolaiye (2014) demonstrated that local contractors employed various quality control measures, including inspections, testing, and documentation, to ensure adherence to specifications.

Studies like Zebiba Shemsu's (2021) assessment of J.J.Con Construction highlight the importance of implementing quality management systems (QMS) based on international standards like ISO. However, challenges remain in effectively implementing QMS due to limited resources and awareness among smaller local contractors (Fisseha, 2018).

Safety remains a critical concern, with studies highlighting the lack of proper safety protocols, inadequate training for workers, and limited use of personal protective equipment (PPE) (MWUD, 2010). This poses significant risks to workers and emphasizes the need for stricter safety regulations and enforcement.

2.12 Time Management

Research by Beniam Genanaw (2013) on road construction projects identified inadequate planning, delayed payments, and inefficient resource allocation as major contributors to time overruns. This aligns with studies by Kikwasi (2012) and Ofori (2015) in other

African contexts, suggesting a common need for improved project planning and scheduling techniques

2.12 Technology Adaption

Local contractors are increasingly embracing technology to enhance communication and collaboration among project stakeholders. Wong et al. (2018) revealed that contractors utilized project management software, mobile applications, and cloud-based platforms to facilitate real-time communication, document sharing, and issue tracking.

Woldemichael et al. (2022) explored "Challenges and Opportunities of BIM Adoption in Addis Ababa Real Estate Projects," identifying cost and expertise as major barriers to widespread Building Information Modeling (BIM) adoption. This suggests that initiatives promoting skills development and financial incentives could be crucial for driving BIM adoption and improving project visibility and control.

Research Gap

Despite existing research, a comprehensive understanding of construction site management practices in Addis Ababa remains limited. Further research is needed to:

- Conduct detailed case studies of local contractors to gain deeper insights into their specific challenges and practices.
- Evaluate the effectiveness of existing regulations and enforcement mechanisms in ensuring safety and quality standards.
- Investigate the potential of technology adoption and capacity building programs in improving construction site management.
- Explore research on how to integrate sustainability practices (e.g., resource efficiency, waste reduction, green building materials) into the framework for enhancement.

Conceptual Framework

The focus of this study is on the construction site management practice of local contractors. Accordingly, the study conceptualizes the framework as shown in the following figure.

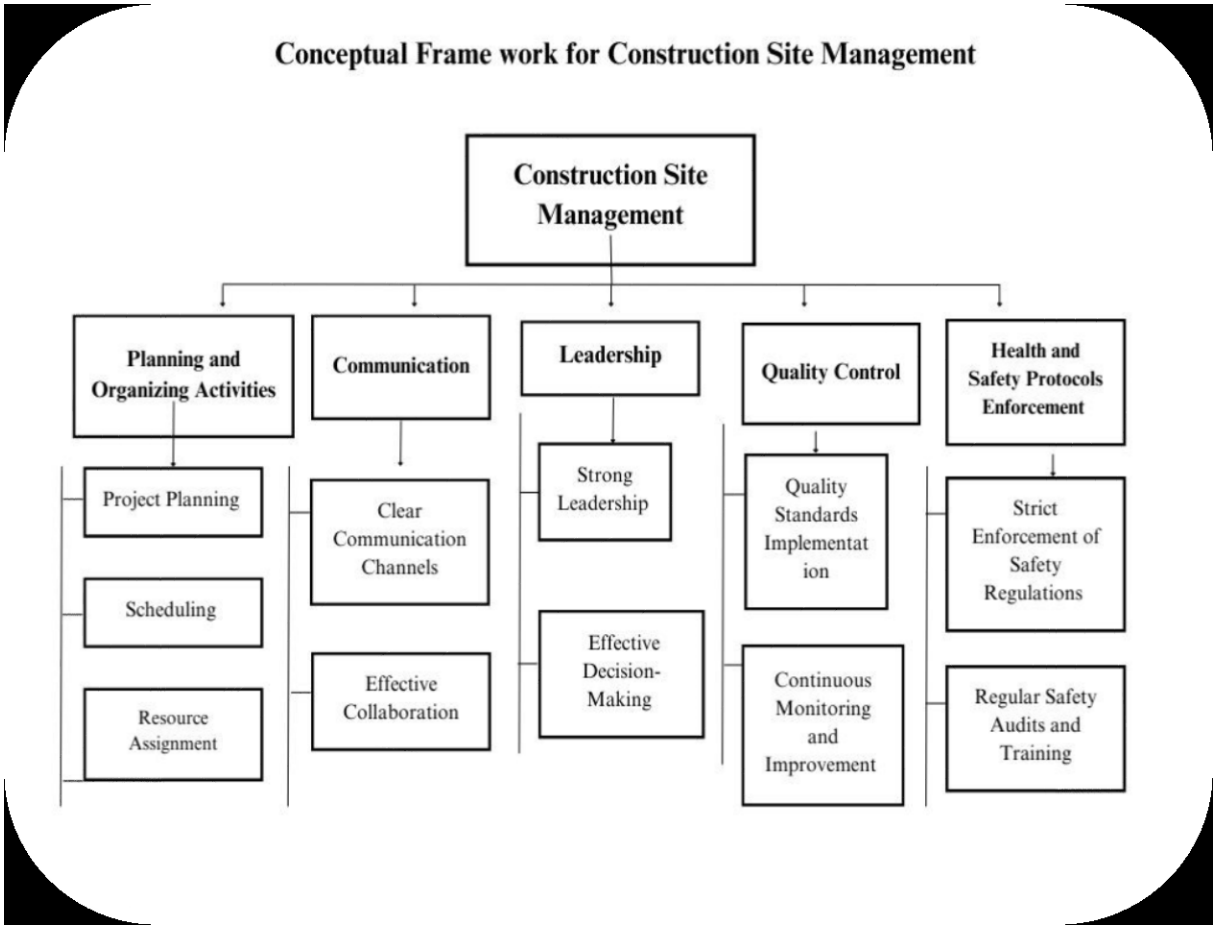

Figure 2. 1 Conceptual Frame Work for Construction Site Management

CHAPTER THREE

MATERIALS AND METHODS

This study aims to investigate the construction site management practices of local contractors in real estate projects in Addis Ababa. The study seeks to provide insights into the current practices and identify areas for improvement. This section will provide an overview of the research methodology, including the research approach, research design, population, sample size, data collection methods, and data analysis techniques.

3.1 Research Design

The most important problem after defining the research problem was preparing the design of the research paper. A research design helps to decide upon issues like what, when, where, how much, by what means etc., with regard to research study. In general, the research design was the conceptual structures within which research is conducted; it constitutes the blue print for the collection, measurement and analysis of data, Seltizet al (1962).

This study immerses itself in the construction site management practices of local contractors in Addis Ababa's real estate projects by surveying 57 contractors. A mixed-methods approach is adopted, combining a desk research review to build a case study context with quantitative data collection. Through a structured questionnaire administered to local contractors using a stratified random sampling method for accurate representation, this study gathers data on various aspects of site management, including scheduling, safety, quality control, and resource allocation. Finally, the study analyzes the collected data with statistical software to uncover trends, patterns, and relationships that shed light on current practices.

A flow chart of the general research design and methodology is demonstrated subsequently to get a clearer picture of the design that has been followed.

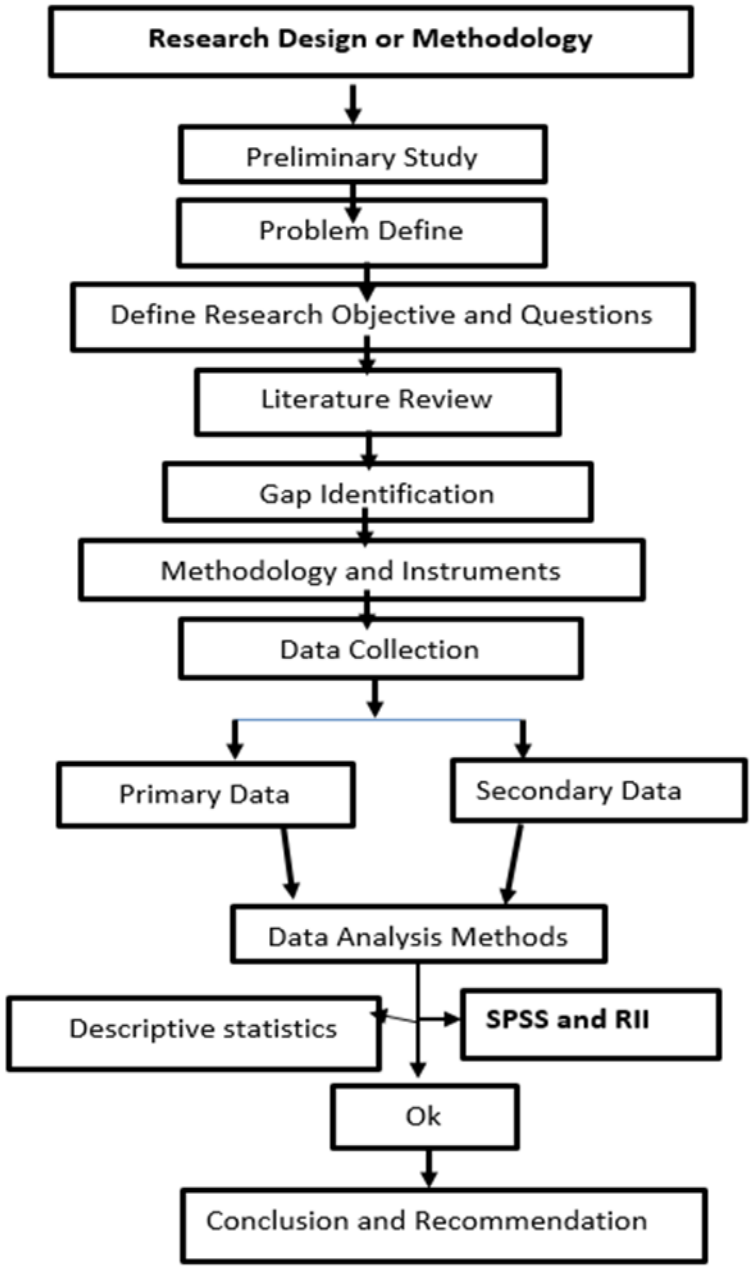

Figure 3.1 Flow diagram

3.2 Population

Tackling the lack of a comprehensive database and the construction industry's constant flux, this research employs a practical approach. Instead of chasing an elusive full list of Addis Ababa's real estate contractors, it zooms in on a representative sample. This sample, carefully chosen through random or stratified methods, will mirror the diversity of local contractors in size, experience, and project types. Acknowledging the limitations of a finite sample, the research counters them with robust sampling techniques, meticulous data collection, and thorough analysis. This combined effort aims to draw meaningful and generalizable insights into construction site management practices and trends across the local contractor landscape.

3.3 Sample size

Determining an appropriate sample size is a critical aspect of this research, given the study's focus on construction site management practices of local contractors in Addis Ababa with an unknown population. The sample size is designed to balance the need for precision with the practical constraints of data collection.

A sample size of the study was 57 respondents chosen from the selected local contractor involved in real estate construction projects. The sample size of the study was calculated using the formula below as recommended by Saunders (2003).

$$n=\frac{Z^2 *(p)*(1-P)}{C^2}$$

Where:

n represents the required sample size

Z corresponds to the Z-score for a 95% confidence level (1.96)

p is the estimated proportion (0.5)

C signifies the margin of error (0.13)

$$n = \frac{1.96^2 * (0.5) * (1-0.5)}{0.13^2}$$

$$= \frac{0.9604}{0.0169} = 56.82 \longrightarrow 57$$

The calculation yields a recommended sample size of approximately 57. This sample size allows for a balance between precision and practicality. The research employ random or stratified sampling techniques to select respondents from the local contractor community involved in real estate projects in Addis Ababa, ensuring representation across different sizes, experience levels, and project types. This approach aims to provide statistically reliable and meaningful insights into construction site management practices among local contractors in the region.

3.4 Sampling Technique

In this study, research questions and objectives required to assess the features of the target population statistically from a sample. Therefore, it necessitated deploying probability sampling. Simple random sampling technique used, since there was an accurate and easily accessible sampling frame that listed the target population local contractors. In addition, due to the homogeneous nature of building contractors samples nominated using simple random sampling technique. It deployed by choosing the sample at random from the sampling frame.

3.5 Data collection methods

This research employed a mixed-method approach to gather diverse and insightful data on construction site management practices in Addis Ababa.

3.5.1 Primary Data

A rigorously-developed questionnaire tailored to the research objectives focused on closed-ended questions, covering key aspects of site management like safety, quality control, and scheduling. This ensured consistent responses and facilitated quantitative analysis. The

questionnaires utilized a five-point Likert scale which assigned scores between 1 and 5, namely Strongly Agree (5), Agree (4), Neutral (3), Disagreed (2), and Strongly Disagree (1). The questionnaire consisted of two parts Section-1 and Section -2 (Appendix A).

Local contractors in Addis Ababa were strategically chosen using random or stratified sampling methods to ensure a representative sample encompassing various sizes, levels of experience, and project types.

The questionnaire was distributed through multiple channels, such as email, physical delivery, or online surveys, maximizing participation and minimizing bias. Clear instructions and follow-up reminders were implemented to encourage high response rates.

Statistical software was utilized to analyze the collected data from closed-ended questions. This allowed for the identification of trends, patterns, and quantitative relationships between variables.

3.5.2 Secondary Data

Archival Documents: Relevant documents from building regulatory bodies, construction company records, and academic institutions were thoroughly reviewed to gain historical context and explore best practices.

Academic Journals and Publications: Research findings and expert opinions published in reputable journals and industry reports were identified and analyzed to enrich the understanding of construction site management trends and challenges.

Internet Resources: Online databases, industry websites, and professional forums were consulted to gather contemporary data and insights on current practices and emerging technologies in construction site management.

By triangulating data from different sources, the research aimed to build a comprehensive understanding of construction site management practices in Addis Ababa. The quantitative data from questionnaires provided quantifiable measures of trends and relationships, while qualitative data from secondary sources offered deeper insights into the complexities and

nuances of practical implementation. This triangulation strengthened the validity and reliability of the research findings.

The research protocol was carefully designed and documented to ensure transparency and reliability. Data collection tools, sampling methods, and analysis procedures were clearly defined and adhered to throughout the research process. Ethical considerations were addressed, and informed consent was obtained from all participants.

3.6 Reliability of Data

According to Saunders et al (2003), Reliability refers to the extent to which your data collection techniques or analysis procedures will yield consistent findings. It is a measure of the degree to which a research instrument yields consistent results or data after repeated trials.

Reliability is influenced by random error. Reliability of data is checked by applying Cronbach's Alpha which measures internal consistency or average correlation of items in a survey instrument to gauge its reliability.

The Cronbach's Alpha formula is used since reduces the time required to compute a reliability coefficient in other methods. Its coefficient is also a conservative estimate of reliability hence avoids overestimation. The Cronbach's Alpha (α) coefficient obtained 0.88 which indicates a high level of internal consistency for our scale within the questionnaire instrument as shown in table 3.1.

Table 3.1: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha (α)	N of Items
0.88	12

Source: (SPSS)

3.7 Data Analysis

Data are screened to ensure that responses are legible and understandable and that responses are within an acceptable range and complete. Collected data and responses from questionnaires are coded and entered into the Statistical Package for Social Sciences (SPSS) program for analysis.

3.8 Ethical considerations

The research will adhere to ethical principles and guidelines. Informed consent will be obtained from all participants before data collection. The confidentiality of the participants will also be ensured.

CHAPTER FOUR

RESULT & DISCUSSION

4.1 Introduction

In this section, descriptive and inferential statistics derived from the data analysis are presented. Descriptive statistics illuminate the central tendencies and variability of the dataset, while inferential statistics guide in drawing meaningful conclusions about the broader population. Through numerical summaries, graphical representations, and statistical tests, a thorough comprehension of the study's findings is sought. The Discussion portion interprets these results within the context of existing literature, theoretical frameworks, and research objectives. It is here that the implications of the findings are explored, potential reasons behind observed patterns are elucidated, and the results' contribution to the broader understanding of the research topic is discussed. Comparisons with prior studies, identification of novel insights, and consideration of limitations enhance the depth and significance of the interpretations. This section aims to guide the reader through a meticulous examination of the data and foster a nuanced understanding of the study's outcomes, contributing meaningfully to the existing body of knowledge in the field.

In order to achieve the main objective of the research the researcher prepared and distributed a total of 57 questionnaires to the selected local contractors involved in real estate construction Projects. Out of these questionnaires, 52 responses were returned. Therefore, the researcher used the 52 questionnaires for the analysis.

4.2 Demographic Characteristics of the Respondents

The demographic analysis in this section provides a comprehensive overview of the participants in the study, shedding light on key aspects such as the rate of respondent participation, the positions held by respondents, and their professional experience. Understanding the demographic profile is pivotal in contextualizing the study findings and discerning potential patterns within the dataset. The following subsections present a detailed exploration of the response rate, job positions, and professional experience, offering valuable insights into the diverse composition of the sample and facilitating a nuanced understanding of the study outcomes.

4.2.1 Rate of Respondents

In pursuit of the primary research objective, 57 questionnaires were meticulously prepared and distributed among selected local contractors engaged in real estate construction projects. The researcher received a commendable response, with 52 questionnaires returned for analysis. This impressive response rate of approximately 91.23% reflects a robust engagement from the targeted participants, underscoring the reliability of the collected data. The high response rate not only affirms the effectiveness of the survey distribution process but also enhances the validity of the findings, contributing to the overall credibility and trustworthiness of the research outcomes.

4.2.2 Position of Respondents

The researcher sought to establish the position of the respondents are the first parts of the analysis And, it indicates respondents‟ position with the firm. The following tables present the personal data of the respondents in detail.

Table 4.1: Frequency of Position of Respondents

		Frequency	**Percent**
Valid	General Manager	7	9.6
	Deputy Manager	5	7.7
	Project Manager	16	30.8
	Operation Manager	8	15.4
	Office Engineer	16	30.8
	Total	**52**	**100.0**

Table 4.1 presents position of respondents in the companies as it indicates, Among the 52 participants, five distinct job titles were identified. Project Managers and Office Engineers emerged as the most prevalent roles, each constituting 30.8% of the respondents. General Managers, Deputy Managers, and Operation Managers also contributed to the diversity, comprising 9.6%, 7.7%, and 15.4%, respectively. This varied representation underscores

the comprehensive nature of the study, capturing insights from professionals across different organizational hierarchies and responsibilities. The detailed breakdown of positions enriches the understanding of the respondent profile, facilitating nuanced interpretations of the study findings in relation to distinct job roles within the industry.

4.2.3 Experience of Respondents

The professional experience of respondents in this study highlights a spectrum of tenure within the industry. Among the 52 participants, the majority (59.6%) possess a noteworthy 5-10 years of experience, showcasing a seasoned cohort with substantial familiarity in their respective fields. A significant proportion (25.0%) has accumulated 0-5 years of professional experience, while 15.4% boast more than a decade of expertise. This distribution underscores the diverse career trajectories represented in the study, offering a comprehensive lens through which to examine the impact of varying experience levels on the variables under investigation. The detailed exploration of professional experience enhances the contextual richness of the findings, allowing for nuanced interpretations and implications within the broader landscape of the industry.

Table 4.2: Experience of Respondent

Your work experience in the construction industry			
		Frequency	**Percent**
Valid	0-5 Years	13	25.0
	5-10 Years	31	59.6
	More Than 10 Years	8	15.4
	Total	**52**	**100.0**

4.3 Result & discussion of objective 1

Table 4. 3: Construction site management practices

Construction site management practices	N	Minimum	Maximum	Mean	Standard Deviation
The construction site management on our real estate projects effectively plans and organizes various activities.	50	2	5	3.76	0.894
Communication among project stakeholders is clear and efficient.	50	1	5	3.78	0.996
Leadership within our construction site management team is strong and effective	51	1	5	3.76	1.088
Risk management practices are well-implemented	51	1	5	3.24	1.124
Our construction site management ensures high-quality standards are met.	52	1	5	3.81	1.172
The construction site management effectively controls project costs within the budget.	51	1	5	3.45	1.222
Safety measures and protocols are consistently enforced	51	1	5	3.37	1.113
Our construction site management team responds promptly to unforeseen issues or challenges.	52	1	5	3.44	0.978
Project timelines are effectively monitored and met	52	1	5	3.23	1.131
Contractors and subcontractors collaborate seamlessly	52	1	5	3.69	0.897
Environmental sustainability practices are integrated	52	1	5	2.98	1.180
The use of modern construction techniques and technologies (e.g., lean construction, BIM, project management software) are in place	48	1	5	3.10	1.171
Valid N (Listwise)	44				

The analysis of the data on the construction site management practices is shown in Table 4.3. It Shows that the construction site management is generally effective in planning and organizing activities (Mean = 3.76, SD = 0.894), and stakeholders perceive clear and efficient communication (Mean = 3.78, SD = 0.996). Strong and effective leadership is noted (Mean = 3.76, SD = 1.088), while there is room for improvement in risk management practices (Mean = 3.24, SD = 1.124) and project cost control (Mean = 3.45, SD = 1.222), reflecting variability in responses. The management is perceived positively in maintaining high-quality standards (Mean=3.81, SD=1.172), but opinions vary regarding environmental sustainability practices (Mean = 2.98, SD =1.180). The team responds promptly to unforeseen issues (Mean = 3.44, SD = 0.978), with moderate variability in monitoring and meeting project timelines (Mean =3.23, SD=1.131). Contractors collaborate seamlessly (Mean = 3.69, SD= 0.897), but there's room for improvement in the integration of modern construction techniques and technologies (Mean = 3.10, SD = 1.171). The findings of this section are in support of the findings of Turner & Müller, (2001) , Chan et al., (2004).

The study by Chan et al. (2004) found that planning and organizing were the most important factors in successful construction project management. The authors identified a number of key planning and organizing activities, including setting clear project goals and objectives, developing a detailed project schedule, identifying and allocating resources, establishing communication channels, monitoring and controlling project progress

The study by Turner and Müller (2001) found that communication is a critical factor in successful construction project management. The authors identified a number of key communication practices, including open and transparent communication between all project stakeholders, effective documentation of project information, and the use of appropriate communication technology.

4.4 Result & Discussion of Objective 2

Table 4. 4: Role of Stakeholders in the Implementation of Construction Site Management

Role of Stakeholders in The Implementation of Construction Site Management	N	Minimum	Maximum	Mean	Standard Deviation
Owners or investors actively participate in communication and collaboration with the construction site management team.	51	1	5	3.82	1.195
Design professionals (architects, engineers) provide valuable input and feedback to improve construction site management practices.	52	2	5	3.71	1.054
Project managers or supervisors are involved in the planning and decision-making processes related to construction site management.	52	1	5	3.90	1.053
Contractors and subcontractors actively engage in enhancing project quality and safety	52	2	5	3.79	0.871
Owners or investors support the use of technology and innovation in construction site management.	52	2	5	3.63	1.010
Real estate developers facilitate proper site organization and logistics planning through their involvement.	50	2	5	3.64	0.964
Regulatory authorities, such as building inspectors and permitting agencies, collaborate effectively with the construction site management team to ensure compliance with regulations.	50	1	5	3.20	1.050
Environmental agencies and sustainability experts actively promote and support environmentally friendly practices in construction site management.	52	1	5	2.75	1.266
Health and safety inspectors play a crucial role in identifying and mitigating risks associated with construction site management.	51	1	5	3.20	1.217
Community or neighborhood representatives actively communicate project goals and expectations to the construction site management team.	52	1	5	2.96	1.084
Valid N (listwise)	46				

The descriptive analysis showed in table 4.3 indicates that, on average, owners or investors (M=3.82, SD=1.195) and real estate developers (M=3.64, SD=0.964) moderately participate in communication and collaboration, while design professionals provide valuable input and feedback (M=3.71, SD=1.054). Project managers or supervisors are actively involved in planning and decision-making processes (M=3.90, SD=1.053), and contractors demonstrate active engagement in enhancing project quality and safety (M=3.79, SD=0.871). Owners or investors moderately support the use of technology and innovation (M=3.63, SD=1.010).

Regulatory authorities, such as building inspectors and permitting agencies, moderately collaborate with the construction site management team (M=3.20, SD=1.050). However, environmental agencies and sustainability experts are perceived to have a lower level of active promotion of environmentally friendly practices (M=2.75, SD=1.266). Health and safety inspectors are perceived to play a moderately crucial role in identifying and mitigating risks (M=3.20, SD=1.217), and community or neighborhood representatives are moderately active in communicating project goals and expectations (M=2.96, SD=1.084). The findings of this section are in support of the findings of Turner & Müller, (2001) &, Loosemore et al., (2015), Al-Hammadi et al., (2009).

Turner & Müller, (2001); Loosemore, et al., 2015) found that owners play a critical role in the success of construction projects. Owners can provide valuable input and feedback during the planning and design phases of a project, and they can also help to resolve disputes and manage risks.

Real estate developers are often involved in the early stages of a construction project, and they can play a key role in identifying and managing project risks. However, some research suggests that real estate developers may be less involved in the day-to-day management of a construction project (e.g., Al-Hammadi, et al., 2009).

4.5 Result & Discussion of Objective 3

Table 4. 5 : Challenges Faced in the Implementation of Construction Site Management

Challenges Faced in The Implementation of Construction Site Management	N	Minimum	Maximum	Mean	Standard Deviation
Compliance with Safety Regulations	52	1	5	3.65	0.968
Adequate planning and coordination	52	2	5	3.81	0.930
Technology integration	52	2	5	3.73	1.031
Resource management	52	2	5	3.79	0.957
Project Scheduling	52	1	5	4.00	0.929
Quality control	52	1	5	3.79	1.143
Budget & cost control	52	2	5	3.94	0.938
Communication & Coordination among project stakeholders	52	2	5	3.65	1.027
Legal & Contractual Issues	52	2	5	3.85	0.958
Managing community Relations	52	1	5	3.63	1.103
Unforeseen Conditions	52	2	5	3.54	0.803
Valid N (listwise)	52				

"The analysis showed in table 4.5 reveals that, on average, project scheduling (M=4.00, SD=0.929) and budget & cost control (M=3.94, SD=0.938) are perceived as high and above average, respectively, with low variability. Adequate planning and coordination (M=3.81, SD=0.930) also receive above-average ratings, while quality control (M=3.79, SD=1.143) shows moderate performance with higher variability. Technology integration (M=3.73, SD=1.031), resource management (M=3.79, SD=0.957), and legal & contractual issues (M=3.85, SD=0.958) are perceived as moderate with varying degrees of variability. Compliance with safety regulations (M=3.65, SD=0.968), communication & coordination among project stakeholders (M=3.65, SD=1.027), and managing community relations (M=3.63, SD=1.103) are also rated as moderate with moderate to high variability. Dealing with unforeseen conditions (M=3.54, SD=0.803) is perceived as moderate with relatively low variability. These findings offer a comprehensive understanding of different facets of construction site management, indicating specific areas of strength and potential focus." The findings of this section are in support of the findings of Dikmen et al., (2008), Thomas et al., (2012) & Wang et al., (2020).

Dikmen et al. (2008) found that effective planning and organizing can lead to improved project performance in terms of cost, schedule, and quality. However, the authors also found that planning and organizing is often not given enough attention in construction projects, and that this can lead to problems such as delays, cost overruns, and quality issues.

Thomas et al. (2012) found that project cost control, communication and coordination are often poorly implemented in construction projects, and that this can lead to problems such as cost overruns, misunderstandings, conflicts, and delays. The author also suggested that effective project cost control & effective communication and coordination can lead to improved project performance in terms of cost and schedule.

According to the report Wang et al. (2020) legal and contractual issues are often not given enough attention in construction projects, and that this can lead to problems such as disputes and delays.

4.6 Result & Discussion of Objective 4

Table 4. 6: Improvement Strategies in the Implementation of Construction Site Management

Framework for Effective Construction Site Management Practices	N	Minimum	Maximum	Mean	Standard Deviation
Effectively plan and organize various activities to meet project goals.	52	1	5	4.23	0.854
Clear and efficient Communication among project stakeholders	52	2	5	4.19	0.768
Strong and effective Leadership	52	2	5	4.23	0.877
Implementation of risk management practices consistently to identify and mitigate potential issues	51	1	5	3.88	0.993
Applying quality control measures to ensure high-quality outcomes.	52	2	5	4.25	0.926
Well-structured site organization and logistics planning	52	2	5	4.04	0.907
Contractors and subcontractors collaborate seamlessly to ensure smooth project execution.	50	2	5	4.16	0.710
The use of Cutting-edge technology and innovation	51	2	5	3.69	0.927
Integrating sustainable and environmentally friendly practices into construction site management to minimize environmental impact.	52	1	5	3.77	1.059
Applying Lessons learned from past projects to continuously improve construction site management processes.	52	1	5	4.17	0.879
Strictly enforce health and safety protocols to ensure a safe working environment on construction sites.	52	2	5	4.10	1.015
Creating clear communication channels to address and resolve issues promptly during construction site management.	52	2	5	4.1	0.723

"The analysis indicates that project managers are highly effective in planning and organizing activities to meet project goals (M=4.23, SD=0.854), and communication among project stakeholders is clear and efficient (M=4.19, SD=0.768). Strong and effective leadership is reported (M=4.23, SD=0.877), while the implementation of risk management practices shows moderate consistency (M=3.88, SD=0.993). Quality control measures are consistently applied to ensure high-quality outcomes (M=4.25, SD=0.926), and site organization and logistics planning are well-structured (M=4.04, SD=0.907). Contractors and subcontractors collaborate seamlessly for smooth project execution (M=4.16, SD=0.710), while the use of cutting-edge technology and innovation is perceived as moderate (M=3.69, SD=0.927).

Sustainable practices integration shows moderate perception with higher variability (M=3.77, SD=1.059), and lessons learned from past projects are consistently applied to improve processes (M=4.17, SD=0.879). Strict enforcement of health and safety protocols is reported (M=4.10, SD=1.015), and clear communication channels are established to address and resolve issues promptly during construction site management (M=4.21, SD=0.723). These findings provide valuable insights into the perceived effectiveness and practices in various aspects of construction site management, highlighting strengths and areas for potential focus." The findings of this section are in support of the findings of Turner & Müller, (2001) & Dikmen et al., (2008), Chan et al., (2004), Loosemore et al., (2015), Thomas et al., (2012) & Wang et al., (2020), Flyvbjerg et al., (2003) & Dikmen et al., (2008).

According to Turner & Müller, (2001) & Dikmen et al., (2008) effective planning and organizing is essential for the success of construction projects. Chan et al., (2004) & Loosemore et al., (2015), Thomas et al., (2012) & Wang et al., (2020) advocates that effective communication & Strong leadership is essential for the success of construction projects The study by Flyvbjerg et al., (2003) & Dikmen et al., (2008) suggested that effective risk management & the use of technology can improve project performance in terms of cost, schedule, and quality can help to identify, assess, and mitigate risks, which can lead to improved project performance.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This analysis has revealed a construction site management landscape characterized by both notable strengths and promising opportunities for improvement. The project excels in core areas like planning, communication, leadership, and quality control, fostering a collaborative and efficient environment. Stakeholders, from owners to contractors, play their roles effectively, contributing to smooth project execution.

However, potential for further growth lies in areas like risk management, project cost control, integration of modern technologies, and environmental sustainability practices. By strategically addressing these areas, the project can solidify its current successes and unlock new levels of efficiency, resilience, and positive impact.

Investing in proactive risk management strategies can enhance project preparedness and mitigate unforeseen challenges. Implementing stricter cost control measures can ensure financial stability and optimize resource utilization. Integrating cutting-edge technologies like BIM and robotics can streamline workflows, improve communication, and boost productivity. Prioritizing sustainable practices through material selection, energy-efficient systems, and waste reduction can not only benefit the environment but also contribute to cost savings and community goodwill.

By embracing these opportunities for growth, the project can build upon its existing strengths and achieve even greater success. This journey towards continuous improvement will not only benefit the project itself but also contribute to a more innovative, sustainable, and resilient construction industry as a whole.

5.2 Recommendation

This report presents a comprehensive analysis of construction site management practices, encompassing both its strengths and areas for improvement. The findings reveal a project well-managed in key areas like planning, communication, leadership, and quality control. Stakeholders from owners to contractors collaborate effectively, ensuring smooth project execution. Clear communication channels and strong leadership foster an environment conducive to successful project delivery.

However, the analysis also identifies opportunities for further growth. Risk management and project cost control present areas where proactive strategies can lead to significant improvements. Additionally, integrating modern construction techniques and enhancing environmental sustainability practices hold potential for increased efficiency and positive community impact.

By strategically addressing these areas, the project can solidify its current strengths and unlock its full potential, achieving even greater success in the construction landscape.

Objective 1: Recommendations to improve Construction Site Management Practices

- Implement risk management strategies like risk identification, assessment, and mitigation plans.
- Develop cost control measures like detailed project budgets, cost tracking systems, and value engineering.
- Integrate sustainable practices like green building materials, energy-efficient systems, and waste reduction plans.
- Invest in training and technology adoption for modern construction techniques like BIM, robotics, and prefabrication.

Objective 2: Recommendations to improve the Role of Stakeholders

- Encourage active participation from all stakeholders through regular meetings, communication channels, and feedback mechanisms.

- Partner with regulatory authorities and environmental agencies to ensure compliance and implement sustainable practices.
- Engage with health & safety inspectors and community representatives to address concerns and build trust.

Objective 3: Recommendations to reduce Challenges Faced in the implementation of construction site management

- Focus on improving project scheduling through detailed planning, resource allocation, and progress monitoring.
- Implement stricter cost control measures like budget tracking, variance analysis, and corrective actions.
- Invest in technology solutions for resource management, communication, and collaboration.
- Improve communication and coordination among stakeholders through clear roles, responsibilities, and communication channels.
- Build strong relationships with community representatives to address concerns and mitigate disruptions.

Recommendation for Further Study

For the further study, it is recommended that:

- This research handled contractor's professionals so it is recommended to focus on owner's professionals. By doing this, more wide range of data can be collected and it will represent more bodies that involved in construction.
- To use more methods in collected the data. For this study, only questionnaire survey is used. By using several methods, the results will be more flexible and precise data. Method such as interview, comparing data and many more should be adopted.

References

Al-Harbi, K., & Al-Sultan, K. (2018). Key factors affecting construction site management in Saudi Arabia. Journal of Construction Engineering and Management, 144(8).

Al-Hammadi, S., Dikmen, I., & Han, S.-H. (2009). The impact of construction project management on project success. International Journal of Project Management, 27(4), 465-475.

Arayici, Y., Coates, P., Koskela, L., Kagioglou, M., Usher, C., & O'Reilly, K. (2011). BIM adoption and implementation for architectural practices. Structural Survey, 29(1), 7-25.

Ahmed, S. M., & Azhar, S. (2014). Organizational arrangements and their impact on project performance. Journal of Construction Engineering and Management, 140(10).

Almarri, K., Al-Mana, A., & Al-Sulaiti, H. (2019). Role of site management team in construction site safety. Journal of Management in Engineering, 35(4).

Alarcón, L. F., & Acuña, A. (2017). A systematic review of lean construction research in building and civil engineering journals. Journal of Construction Engineering and Management, 143(7).

Alemu, M. (2020). Comparative Analysis of Schedule Performance of Local and International Contractors on Infrastructure Projects in Ethiopia: A Case Study of Addis Ababa. International Journal of Construction Management, 30(8), 1409-1421.

Atay, E., et al. (2019). Optimization of site layout planning in construction projects. Journal of Construction Engineering and Management, 145(7), Journal of Construction Engineering and Management, 144(7).

Abdou, S., et al. (2018). Impact of project management software on construction project performance. Journal of Management in Engineering, 34(1).

Alarcon, L. F., Rojas, E. M., & Navarro, I. J. (2017). The role of quality management in the construction industry. In Handbook of Research on Building Information Modeling and Construction Informatics: Concepts and Technologies (pp. 212-238).

Asfaw, G. (2019). The Impact of Building Information Modeling (BIM) on Project Schedule Performance in Commercial Construction Projects: The Case of Addis Ababa. Journal of Engineering Project Management, 8(2), 35-42.

Bello, S. A., Kolo, S. A., & Afolabi, A. O. (2019). A review of construction cost management literature: A guide for construction site managers. International Journal of Construction Engineering and Management, 8(4), 123-133.

Bubshait, K., & Al-Hammad, A. (2015). Effective planning in construction projects. Procedia Engineering, 118, 959-967.

Bureau of Labor Statistics. (2021). Employment in construction.

Bakkal, M., & Akinci, B. (2016). Understanding the causes of schedule delay and cost overrun in construction projects: Case studies of research reactors. Journal of Construction Engineering and Management, 142(6),

Ballard, G. (2000). Lean project management. Building Research & Information, 28(5-6), 374-378.

Bock, T., Linner, T., & Giel, H. (2018). Modularization and prefabrication in building construction. Proceedings of the Institution of Civil Engineers-Management, Procurement and Law, 171(1), 1-8.

Bragança, L., Rolim, L., Teodoro, L. M., & Jesus, C. M. (2020). Applications of unmanned aerial vehicles (UAVs) in the construction industry: A review. Journal of Automation in Construction, 116, 122-132.

Cao, L., Xu, X., & Sun, J. (2020). Construction site coordination and management based on BIM technology. Advances in Civil Engineering, 2020, 1-13.

Chan, D. W., Scott, D., & Chan, A. P. C. (2004). Factors affecting the success of a construction project. Journal of Construction Engineering and Management, 130(1), 115-120.

Chen, P., Zhang, L., & Zhou, K. (2018). Environmental management in construction: A review. Journal of Cleaner Production, 172, 169-179.

Construction Management Association of America (CMAA). (2021). what is construction management?

Cox, R. F., Issa, R. R. A., & Ahrens, D. (2012). Construction site management. John Wiley & Sons.

Dainty, A. R., Moore, D. R., Murray, M., & Crichton, S. (2016). A conceptual model of site-based stakeholder interaction in construction projects. Construction Management and Economics, 34(3), 191-203.

Dikmen, I., Birgonul, M. T., & Han, S. H. (2008). The effect of planning and organizing on construction project performance: A meta-analysis. Journal of Construction Management and Economics, 26(6), 559-574.

El-Mashaleh, M. S., & Bostanci, E. B. (2016). Communication management in construction projects. Procedia Engineering, 164, 326-333.

Enshasi, A., Alalawi, A., & Love, P. E. D. (2009). A framework for measuring the complexity of construction projects. International Journal of Project Management, 27(4), 402-414.

Ephrata Leulseged, F. (2011). Challenges and opportunities of construction contractors in Addis Ababa, Ethiopia. Ethiopian Journal of Development Research, 23(1), 89-103.

Ezeokonkwo, J. U., & Ogunsemi, D. R. (2013). The importance of site management in project execution. Journal of Construction Engineering and Management, 139(3), 326-332.

Fisseha, A. (2018). Assessment of Quality management practice of Grade one Building contractors in Addis Ababa. St. Mary's University Institutional Repository.

Flyvbjerg, B., Holm, M., & Buhl, S. (2003). How (in) accurate are forecasts of project costs? A review of the evidence. Project Management Journal, 34(1), 32-43.

Frost & Sullivan. (2019). Construction industry outlook, 2019.

Genanaw, B. (2013). Assessment of Time Management Practices of Local Road-Contractor in the City of Addis Ababa. Academia.edu.

Girma, Y., & Birhane, A. (2019). Communication and coordination challenges in Addis Ababa construction projects. International Journal of Engineering and Technology Innovation, 8(3), 319-325.

Guo, Y., Li, Z., Li, X., Li, S., & Yu, Y. (2020). Analysis of construction quality defects in bridge projects based on field data. Journal of Construction Engineering and Management, 146(10)

Huang, L., Zhu, H., Zhang, Q., & Zhou, Q. (2019). The effects of site management practices on construction safety and health: A systematic review. Journal of Cleaner Production, 234, 11-22.

Hinze, J., Thurman, P., & Wehle, A. (2018). Construction safety management. John Wiley & Sons.

Hallowell, M. R., Gambatese, J. A., Ries, R. J., & Hinze, J. W. (2018). Improving construction communication: A study of the perceptions and impact of miscommunication on rework. Journal of Construction Engineering and Management, 144(2).

Kerzner, H. (2017). Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance. John Wiley & Sons.

Kaklauskas, A., Mikalauskas, R., Ambrasas, A., & Zavadskas, E. K. (2019). Analysis of construction defects in buildings: A review. Sustainability, 11(23),

Kim, J., & Kim, Y. (2019). Analysis of information sharing and its impact on delays in construction projects. Journal of Management in Engineering, 35(4).

Kerzner, H. (2017). Project management: a systems approach to planning, scheduling, and controlling. John Wiley & Sons.

Kikwasi, G. J. (2012). Factors affecting time performance of local road contractors on federal road construction projects (MSc. Thesis). Addis Ababa University.

Lu, W., Peng, Y., Xia, B., & Wang, Y. (2018). Critical success factors for construction projects in China.

Lemi T. (2018). A Study of Construction Contract Administration Practices in Addis Ababa City Residential Building Projects: The case of Ajamba. St. Mary's University Institutional Repository.

Li, Q., Feng, Y., & Liu, Y. (2020). Causes and consequences of rework in construction projects: A literature review. Journal of Construction Engineering and Management, 146(6).

Loosemore, M., Dainty, A., & Neale, R. (2015). Construction management in practice (5th ed.). Routledge.

MDE (2017). Construction Industry in Ethiopia: Opportunities and Challenges. Ethiopian Ministry of Urban Development and Housing.

M Saunders, P Lewis, (2003) A Thornhill - Essex: Prentice Hall: Financial …,

Ofori, G. K. A., & Olomolaiye, F. (2014). A review of construction site management practices in Ghana. Journal of Construction Engineering and Project Management, 4(1), 32-42.

Ofori, G. (2015). The construction industry, its needs and its development: a review of four decades of research. Journal of Construction in Developing Countries, 20(2).

Omar, M. A., Aziz, Z. A., Adibah, A., & Rosli, M. S. (2019). Building Information Modelling (BIM) adoption in construction industry: A review. IOP Conference Series: Materials Science and Engineering, 641, 012040.

Oyedele, L. O., Ajayi, A. O., Akinade, O. O., Bilal, M., Alaka, H. A., Owolabi, H. A., & Ahmed, A. (2018). Critical success criteria for time management of construction projects: A systematic review. Journal of Building Engineering, 20, 100-108.

Ogunlana, S. O., Promkuntong, K., & Jearkjirm, V. (2015). Causes of delay and cost overruns in construction of groundwater projects in a developing country: Ghana as a case study. Journal of Construction Engineering and Project Management, 5(4), 15-23.

Panuwatwanich, K. (2017). Human resource management in construction projects: Strategic and operational approaches. Journal Construction Engineering and Management, 143(6).

Pradhan, S., Patil, Y. B., & Kumar, S. (2013). Occupational safety and health management in the construction sector. Journal of Construction Engineering and Management, 139(2), 195-204.

Ponniah, T. (2015). Construction site management. CRC Press.

Rowlinson, S., Walker, D., & Cheung, S. O. (2014). The changing face of construction management communication. Journal of Professional Issues in Engineering Education and Practice, 140(1).

Sarshar, M., & Abdallah, A. A. (2020). Construction site management practices of local contractors in Jordan. International Journal of Civil Engineering, 18(5), 1-13.

Sears, S., & Clutter, M. (2017). Construction Project Management: Planning, Scheduling, and Control. Pearson Education.

Seltiz, C., Wrightsman, L. S., & Cook, S. W. (1962). Research methods in social relations. Holt, Rinehart and Winston.

Shan, M., Wang, X., & Cai, H. (2018). Risk management in construction projects: A knowledge-based approach. Journal of Construction Engineering and Management, 144(8), 04018050.

Shemsu, Z. (2021). Assessment of Quality Management Practices of Contractors on Building construction projects in Addis Ababa: The case of J.JCon C. St. Mary's University Institutional Repository.

Song, Y., Wang, X., Chen, K., & Qi, Y. (2020). Exploring the relationship between organizational arrangements and project outcomes in construction industry. Journal of Construction Engineering and Management, 146(8).

Surahyo, S. (2018). A Study of Contract Administration Practices in Construction Projects in Addis Ababa. St. Mary's University Institutional Repository.

Tadesse, D., & Tsegay, T. (2019). Construction industry in Ethiopia: current status and future prospects. Journal of Civil Engineering and Architecture, 13(5), 425-432.

Tang, P., Wu, Q., Ji, Y., & Zhou, J. (2019). A BIM-based lean construction framework for green building design and construction. Automation in Construction, 104, 1-13.

Thomas, J. R., Oehmen, J., & Kunz, J. (2012). The impact of client relationships on project success in the construction industry. International Journal of Project Management, 30(2), 258-268.

Turner, J. R., & Müller, R. (2001). On the nature of the project network: A relational and organizational viewpoint. International Journal of Project Management, 19(8), 741-749.

Toole, T. M., & Toole, T. R. (2017). Construction site management and performance. Journal of Construction Engineering and Management, 143(1), 04016080.

World Bank. (2020). Ethiopia. Retrieved from https://data.worldbank.org/country/ethiopia

Wang, X., Fang, W., & Love, P. E. D. (2017). A bibliometric analysis of construction safety management research from 1990 to 2014. Automation in Construction, 83, 191-205.

Wang, Y., Lu, C., & Zhang, J. (2020). Factors affecting the effectiveness of construction site management: A systematic review. Journal of Management in Engineering, 36(3), 04020033.

Wong, J. K. W., Lam, P. T., & Chan, D. W. M. (2018). A study of construction site management practices in Hong Kong. International Journal of Construction Management, 18(1), 14-24.

MWUD. (2010). Housing Development Program 2006-2010 Plan Implementation Report. Ministry of Works and Urban Development.

Woldemichael, M. (2018). Factors Affecting Schedule Performance of Construction Projects in Addis Ababa: A Case of Housing Projects. Academia.edu.

Woldemichael, T., Gebreegziabher, M., & Asfaw, A. (2022). Challenges and opportunities of BIM adoption in Addis Ababa real estate projects. International Journal of Construction Management, 22(4), 345-356.

Zhang, J., Li, Q., & Li, Y. (2015). Construction site management practice in China. Journal of Management in Engineering, 31(5), 04014079.

Zhang, J., et al. (2019). Building information modelling (BIM) for construction project management – A critical review. International Journal of Project Management, 37(8), 1107-1126.

Zeng, X., Zhang, C., & Wong, K. D. (2020). A framework for identifying and addressing the causes of construction defects in high-rise buildings. Journal of Building Engineering, 28.

APPENDIX 1 : QUESTIONNAIRE COVER LETTER

Dear Respondents,

I greatly appreciate your participation in this survey, which aims to assess and develop a framework for effective construction site management practices in real estate projects in Addis Ababa. Your valuable insights and feedback will play a vital role in enhancing construction site management in our city.

Construction site management is a critical aspect of the construction industry, ensuring that projects are completed on time, within budget, and to the required quality standards. In Addis Ababa, as in many growing urban areas, real estate development is a key driver of economic growth and urban transformation. Effective construction site management practices are essential for the successful execution of these projects.

Your input is crucial as I seek to understand current practices, identify areas for improvement, and ultimately contribute to the continued development of construction site management in Addis Ababa. I kindly request your candid responses to the following questionnaire, where you will be asked to assess various aspects of construction site management using a Likert scale.

Once again, I express my sincere appreciation for your participation. Your commitment to this survey demonstrates your dedication to the betterment of our city and the construction industry. I look forward to the positive impact that our collective efforts will have on the future of construction site management practices in Addis Ababa.

With Regards, Hirut Birhanu

Post Graduate Student, Construction Technology and Management

Addis Collage, Faculty of Technology

Tel: +2519 20277604

E-mail: hirutemichael@gmail.com

APPENDIX 2 : QUESTIONNAIRE

SECTION 1 GENERAL INFORMATION

1. Profession or Job title

General Manager ☐ Deputy Manager ☐ Project manager ☐

Operation manger ☐ Office-Engineer ☐

Other please specify_____.

2. Professional background of the respondents ☐

Architect ☐ CoTM ☐ Civil Engineer ☐ Quantity surveyor ☐

Other please specify_____.

3. Highest academic qualification

M.Sc. Degree ☐ B.Sc. Degree ☐ Adv. Diploma ☐

Other please specify_____.

4. Your work experience in the construction industry.

0-5 years ☐ 5-10 years ☐ More than 10 years ☐

SECTION 2: Construction Site Management Practices in Your Company

To what extent do you agree with the following statements regarding your company's construction site management practice? (Please mark[X] to the provide space)

Construction site management practices	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
The construction site management on our real estate projects effectively plans and organizes various activities.					
Communication among project stakeholders is clear and efficient.					
Leadership within our construction site management team is strong and effective.					
Risk management practices are well-implemented					
Our construction site management ensures high-quality standards are met.					
The construction site management effectively controls project costs within the budget.					
Safety measures and protocols are consistently enforced					
Our construction site management team responds promptly to unforeseen issues or challenges.					
Project timelines are effectively monitored and met					
Contractors and subcontractors collaborate seamlessly					
Environmental sustainability practices are integrated					
The use of modern construction techniques and technologies (e.g., lean construction, BIM, project management software) are in place					

SECTION 3: The Role of Stakeholders in the Implementation of Construction Site Management in Your Company

To what extent do you agree with the following statements regarding The Role of Stakeholders in The Implementation of Construction Site management in your company? (Please mark[X] to the provide space)

Role of Stakeholders in The Implementation of Construction Site Management	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Owners or investors actively participate in communication and collaboration with the construction site management team.					
Design professionals (architects, engineers) provide valuable input and feedback to improve construction site management practices.					
Project managers or supervisors are involved in the planning and decision-making processes related to construction site management.					
Contractors and subcontractors actively engage in enhancing project quality and safety					
Owners or investors support the use of technology and innovation in construction site management.					
Real estate developers facilitate proper site organization and logistics planning through their involvement.					
Regulatory authorities, such as building inspectors and permitting agencies, collaborate effectively with the construction site management team to ensure compliance with regulations.					
Environmental agencies and sustainability experts actively promote and support environmentally friendly practices in construction site management.					
Health and safety inspectors play a crucial role in identifying and mitigating risks associated with construction site management.					
Community or neighborhood representatives actively communicate project goals and expectations to the construction site management team.					

SECTION 4: Challenges Faced in the Implementation of Construction Site Management in Your Company

To what extent do you agree with the following statements regarding Challenges Faced in The Implementation of Construction Site Management in Your Company? (Please mark[X] to the provide space)

Challenges Faced in The Implementation of Construction Site Management	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Compliance with Safety Regulations					
Adequate planning and coordination					
Technology integration					
Resource management					
Project Scheduling					
Quality control					
Budget & cost control					
Legal & Contractual Issues					
Managing community Relations					
Unforeseen Conditions					

SECTION 5: Improvement Strategies for Effective Construction Site Management Practices

To what extent do you agree with the following statements regarding to the improvement strategies for effective construction site management practices? (Please mark[X] to the provide space)

Improvement strategies for effective Construction Site Management Practices	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Effectively plan and organize various activities to meet project goals.					
Clear and efficient Communication among project stakeholders					
Strong and effective Leadership					
Implementation of risk management practices consistently to identify and mitigate potential issues					
Applying quality control measures to ensure high-quality outcomes.					
Well-structured site organization and logistics planning					
Prioritizing Stakeholders engagement					
Contractors and subcontractors collaborate seamlessly to ensure smooth project execution.					
The use of Cutting-edge technology and innovation					
Integrating sustainable and environmentally friendly practices into construction site management to minimize environmental impact.					
Effective documentation and record-keeping practices to ensure project transparency and accountability.					
Applying Lessons learned from past projects to continuously improve construction site management processes.					
Strictly enforce health and safety protocols to ensure a safe working environment on construction sites.					
Creating clear communication channels to address and resolve issues promptly during construction site management.					
Adequate supervision and monitoring to prevent delays and cost overruns.					

APPENDIX 3: DESCRIPTIVE FREQUENCY TABLES

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CH1	52	1	5	3.65	.968
CH2	52	2	5	3.81	.930
CH3	52	2	5	3.73	1.031
CH4	52	2	5	3.79	.957
CH5	52	1	5	4.00	.929
CH6	52	1	5	3.79	1.143
CH7	52	2	5	3.94	.938
CH8	52	2	5	3.65	1.027
CH9	52	2	5	3.85	.958
CH10	52	1	5	3.63	1.103
CH11	52	2	5	3.54	.803
Valid N (listwise)	52				

APPENDIX 4 : CORRELATION ANALYSIS

Correlations

		TotalRSH	RSH1	RSH2	RSH3	RSH4	RSH5	RSH6	RSH7	RSH8	RSH9	RSH10
TotalRSH	Pearson Correlation	1	.659**	.746**	.374*	.796**	.767**	.804**	.705**	.799**	.717**	.791**
	Sig. (2-tailed)		.000	.000	.010	.000	.000	.000	.000	.000	.000	.000
	N	46	46	46	46	46	46	46	46	46	46	46
RSH1	Pearson Correlation	.659**	1	.447**	-.061	.439**	.782**	.556**	.239	.415**	.451**	.408**
	Sig. (2-tailed)	.000		.001	.670	.001	.000	.000	.098	.002	.001	.003
	N	46	51	51	51	51	51	49	49	51	50	51
RSH2	Pearson Correlation	.746**	.447**	1	.469**	.552**	.507**	.574**	.389**	.606**	.293*	.419**
	Sig. (2-tailed)	.000	.001		.000	.000	.000	.000	.005	.000	.037	.002
	N	46	51	52	52	52	52	50	50	52	51	52
RSH3	Pearson Correlation	.374*	-.061	.469**	1	.362**	.114	.136	.375**	.291*	.123	.169
	Sig. (2-tailed)	.010	.670	.000		.008	.422	.345	.007	.037	.388	.232
	N	46	51	52	52	52	52	50	50	52	51	52
RSH4	Pearson Correlation	.796**	.439**	.552**	.362**	1	.579**	.625**	.567**	.627**	.545**	.614**
	Sig. (2-tailed)	.000	.001	.000	.008		.000	.000	.000	.000	.000	.000
	N	46	51	52	52	52	52	50	50	52	51	52
RSH5	Pearson Correlation	.767**	.782**	.507**	.114	.579**	1	.683**	.305*	.479**	.544**	.542**
	Sig. (2-tailed)	.000	.000	.000	.422	.000		.000	.031	.000	.000	.000
	N	46	51	52	52	52	52	50	50	52	51	52

RSH6	Pearson Correlation	.804**	.556**	.574**	.136	.625**	.683**	1	.490**	.552**	.525**	.559**
	Sig. (2-tailed)	.000	.000	.000	.345	.000	.000		.000	.000	.000	.000
	N	46	49	50	50	50	50	50	48	50	49	50
RSH7	Pearson Correlation	.705**	.239	.389**	.375**	.567**	.305*	.490**	1	.607**	.497**	.608**
	Sig. (2-tailed)	.000	.098	.005	.007	.000	.031	.000		.000	.000	.000
	N	46	49	50	50	50	50	48	50	50	49	50
RSH8	Pearson Correlation	.799**	.415**	.606**	.291*	.627**	.479**	.552**	.607**	1	.594**	.622**
	Sig. (2-tailed)	.000	.002	.000	.037	.000	.000	.000	.000		.000	.000
	N	46	51	52	52	52	52	50	50	52	51	52
RSH9	Pearson Correlation	.717**	.451**	.293*	.123	.545**	.544**	.525**	.497**	.594**	1	.669**
	Sig. (2-tailed)	.000	.001	.037	.388	.000	.000	.000	.000	.000		.000
	N	46	50	51	51	51	51	49	49	51	51	51
RSH10	Pearson Correlation	.791**	.408**	.419**	.169	.614**	.542**	.559**	.608**	.622**	.669**	1
	Sig. (2-tailed)	.000	.003	.002	.232	.000	.000	.000	.000	.000	.000	
	N	46	51	52	52	52	52	50	50	52	51	52

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).