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EVALUATING THE IMPACT RELATED TO COMMUNICATION AND COORDINATION CHALLENGES ON PROJECT PERFORMANCE:

A CASE STUDY OF UNIVERSITY CONSTRUCTION PROJECTS IN ETHIOPIA

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OCTOBER/ 2025GC

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A Thesis Submitted to Addis College, School of Graduate Studies in Partial Fulfilment of the Requirements for the Degree of Master of Science in Construction Technology and Management

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CERTIFICATE OF APPROVAL

This is to certify that the thesis prepared by Gardachew Mulat entitled: ‘‘**Evaluating the impact related to communication and coordination challenges on project performance: a case study of university construction projects in Ethiopia’’** and submitted in partial fulfilment of the requirements for the Degree of Masters Science in Construction Technology and Management complies with the regulations of the College and meets the accepted standards with respect to originality and quality.

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DECLARATION

I, by Gardachew Mulat, the under signed, declare that this thesis entitled: ‘‘**Evaluating the impact related to communication and coordination challenges on project performance: a case study of university construction projects in Ethiopia”** is my original work. I have undertaken the research work independently with the guidance and support of the research supervisor. This study has not been submitted for any degree or diploma program in this or any other institutions and that all sources of materials used for the thesis has been duly acknowledged.

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Name of Author	Signature	Date

STATEMENT OF CERTIFICATEION

I hereby certify that the thesis entitled "*Evaluating the impact of related to communication and coordination challenges on project performance: A case study of university construction projects in Ethiopia",* submitted by Mr Gardachew Mulat in partial fulfilment of the requirements for the degree of Master of Science in Construction and Technology Management, under the Postgraduate Studies program at Addis College, is a result of original research conducted under my supervision and guidance.

Having thoroughly reviewed the thesis, I confirm that it is ready for defence and meets the necessary academic standards

_____	_____	_____
Name of Advisor	Signature	Date

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ABSTRACT

The success of university construction projects in Ethiopia largely depends on effective communication and coordination among stakeholders; however, these remain major challenges, often resulting in delays, cost overruns, and poor project outcomes. This study investigates the impact of communication and coordination issues on project performance at Semera University, Mizan-Tepi University, and Addis Ababa Science and Technology University construction projects. A review of existing literature identified 36 critical factors, categorized into five groups: communication, coordination, stakeholder roles, relationships, and external influences. Using a descriptive research design, data were collected from 72 participants including clients, consultants, contractors, and regulatory authorities through questionnaires and interviews. Analysis using the Relative Importance Index (RII) highlighted ten key related to communication related factors coordination, such as delayed decision-making, poor communication systems, inconsistent reporting, unclear objectives, and lack of trust among teams. These issues contribute to poor planning, budget mismanagement, inadequate risk control, lack of coordination, and unclear stakeholder responsibilities, ultimately causing significant delays and cost overruns. The study recommends establishing clear communication protocols, appointing qualified project managers, implementing robust planning and risk management strategies, securing sufficient funding, and fostering transparent stakeholder collaboration to enhance the performance of university construction projects in Ethiopia.

Key words: Construction, Performance, University Projects, Communication, Coordination, Stakeholder

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LIST OF ACRONYMS AND ABBREVIATIONS

PP=project performance

5 C's: coordination, commerce, community, content, and communication

PMI = Project Management Institute

SPSS= Statistical Package for social science

PMBOK= project management body of knowledge

PRINCE= project IN Controlling Environments

OGC= Open Group for Government

LAP= Language Assessment and proficiency

ACTs =Asynchronous Communication Tools

MSEs= Main Source of Finance

ECA= Ethiopia construction Authority

CHAPTER ONE:

1. INTRODUCTION

This chapter discusses the study's background, the problem statement, the research objectives (general and specific), research questions, Significance of the Study, Scope of the study and its limitations and Organization of the paper

1.1. Background of the Study

The construction industry plays a crucial role in economic growth, particularly in developing countries, by providing shelter, infrastructure, and employment (Anaman & Osei-Amponsah, 2007). Researchers, including Khan et al., (2008), highlight its significance as a key driver of national development. Overall, construction and engineering services are essential for a country's economic advancement.

Construction projects are a significant source of employment, and their success hinges on effective communication and coordination of labour, materials, and equipment. Clear communication of performance objectives is essential for completing projects on time, within budget, and to required standards (Crawford, 2016). This is recognized as a critical factor in project success globally, as it influences the quality of information flow between management and workers, fosters relationships, boosts morale, and enhances productivity (Aiyewalehinmi, 2013). Extensive literature highlights that effective communication is closely linked to project outcomes, with poor communication identified as a primary cause of project failure (Pinto & Slevin, 1988a; Varajão et al., 2014). For project managers, strong communication skills are vital for successful project execution and are emphasized in established frameworks like PMBoK and PRINCE (PMI, 2008; OGC, 2005).

Literatures was studied Effective communication is crucial for project success, with Chen & Wu (2010) identifying it as the top factor influencing outcomes, a view supported by Aartsengel & Kurtoglu (2013). Breakdowns in communication and coordination can lead to issues such as cost overruns, poor quality, rework, and delays (Obonadhuze et al., 2021; Hussain et al., 2018; Rahman & Gamil, 2019). Project managers spend 90% of their time interacting with stakeholders, yet barriers can hinder information transfer (Hoezen, 2017). Müller & Turner (2010) emphasize that stakeholder communication is vital for success. The quality of interactions among contractors, clients, and regulatory agencies significantly

impacts construction project outcomes (Jimoh, 2012). Ultimately, successful project completion requires effective communication and coordination among all parties involved Eze et al., (2020), fostering understanding through an interactive information exchange (Wu et al., 2017).

Effective communication and coordination among project parties foster harmony within the team, enabling them to achieve shared goals (Ryan & O'Connor, 2013). To mitigate risks and uncertainties, project teams must communicate effectively to enhance coordination and meet objectives (Hsu et al., 2012). Numerous reports indicate that effective communication and coordination are crucial for project success; improved communication among team members significantly enhances project performance (Pinto & Pinto, 1991). Conversely, poor communication, inadequate coordination, and low involvement are common factors contributing to project failure.

Despite the extensive literature are conducted on impact of communication and coordination on construction projects performance, there is a significant gap in discussions about effective tools for enhancing communication and coordination, as well as their integration into existing workflows. Specific strategies for improving these aspects are limited, and there is little understanding of how stakeholders perceive their effectiveness. In Ethiopia, universities have undertaken numerous construction projects over the past decade, driven by diverse strategic objectives. However, due to time and cost constraints, my study is relevant for the current situations and specific focused on three universities: Semera, Mizan-Tepi, and Addis Ababa Science and Technology. Observations revealed that poor communication and coordination led to substantial time and cost overruns, negatively impacting project performance.

The primary issue in these projects is the adverse effect of inadequate communication and coordination on projects performance. This study aims to identify the challenges posed by these issues in the three universities, analyse their impact on project performance, and recommend improvements to enhance communication and coordination strategies. Unfortunately, universities have not adequately addressed these challenges, resulting in resource constraints, time overruns, and cost overruns. Addressing these issues is crucial for improving project outcomes and aligning construction projects with university strategic objectives. By resolving these challenges, universities can mitigate resource constraints, time delays, and cost overruns, ultimately ensuring successful project execution.

1.2. Statement of the Problem

The construction industry in Ethiopia, especially university projects critical for expanding educational infrastructure, faces major challenges due to poor communication and coordination among stakeholders. These issues lead to delays, cost overruns, and quality problems, negatively impacting project performance. Over 50% of management problems arise from inadequate communication, causing misunderstandings and unclear expectations. In Ethiopian university construction, weak communication channels contribute to delays in decision-making, labor shortages, social instability, adverse weather impacts, and inefficient resource use, all of which hinder timely project completion and affect educational quality and institutional growth.

Despite project managers spending significant time on communication, the lack of effective strategies and platforms continues to worsen these challenges, resulting in failure to meet schedules, budgets, and quality standards. This study aims to assess the impact of poor communication and coordination on Ethiopian university construction projects by identifying key contributing factors and proposing practical solutions to improve practices. Ultimately, it seeks to enhance project outcomes and support the development of the country's higher education infrastructure.

1.3. Objectives of the Study

1.3.1 General Objective

To evaluate the impact of poor communication and coordination on project performance in selected university construction projects in Ethiopia and provide recommendations to improve project performance through effective communication and coordination practices.

1.3.2 Specific Objectives

To identify the primary communication and coordination challenges among stakeholders that affects the performance of construction projects in Semera University, Mizan-Tepi University, and Addis Ababa Science and Technology University

To analyse the impacts of inadequate communication and poor coordination on project performances in selected university construction projects

To develop mitigation measures addressing the impacts of poor communication and coordination on the performance

1.4. Research Questions

What are the key communication and coordination challenges encountered by stakeholders in university construction projects in Ethiopia?

To what extent does ineffective communication and coordination contribute to delays, cost overruns, or quality deficiencies in university construction projects?

What are the primary mitigation mechanisms for addressing the impacts of poor communication and coordination on project performance in Ethiopian university construction projects?

1.5. Significance of the Study

The Impact of Poor Communication and Coordination on Project Performance in Construction Projects in Ethiopia" lies in its potential to deepen the understanding of how deficiencies in communication and coordination affect construction performance. By identifying specific barriers, the study aims to improve project performance through timely completion, cost efficiency, and enhanced quality. It will raise awareness among stakeholders such as project managers, contractors, university administrators, and consultants about the critical role of effective communication in achieving project success, fostering better collaboration and commitment. Furthermore, it will enrich the existing body of literature on construction management in Ethiopia, emphasizing the importance of communication as a fundamental aspect of project management. Overall, this study is expected to provide valuable insights that can lead to significant advancements in construction project management practices within Ethiopian universities.

1.6. Scope of the study and its limitations:

Over the past decade, the number of construction projects at universities in Ethiopia has significantly increased. However, many of these projects have not been completed within the stipulated contract timelines, cost and met quality standards. This issue can be largely attributed to poor communication and coordination among the various stakeholders involved in these projects, which adversely affects overall project performance.

Spatial Scope

This study was focus specifically on selected universities, namely Mizan-Tepi University, Semera University, and Addis Ababa Science and Technology University, to assess the impact of these poor communication and coordination challenges on project performance. The study is confined to only three universities (Mizan-Tepi University, Semera University, and Addis Ababa Science and Technology University), which may not represent the broader landscape of construction projects across all Ethiopian universities. This limitation is accepted in the study.

Thematic Scope

This research examines into several essential areas, including Stakeholder Relationship Management, Project Team Collaboration, Organizational Culture, and Project Performance, as well as the impact of Feedback Loops and Technological Barriers. It investigates the main obstacles to effective communication and coordination among stakeholders, such as cultural differences, the absence of standardized protocols, technological disparities, and unclear roles and responsibilities. These challenges can result in project delays, cost overruns, decreased quality, and strained relationships among stakeholders. To tackle these problems, university construction projects can develop strategic plans that include implementing communication training programs, utilizing advanced tools like Building Information Modelling (BIM), establishing transparent reporting systems, and promoting openness among stakeholders. By implementing these strategies, stakeholders can strengthen collaboration, enhance project results, and lessen the adverse effects of communication and coordination challenges.

1.7 Organization of the paper

Chapter One: Introduction

Through setting the stage for research, the context in which the study issues is summed up. Chapter one gives a general introduction to the research by covering the background, statement of the problem, objectives of the research, research question, significance of the study, scope and limitations of the study, and key terms used and the organization of the paper.

Chapter Two: Literature Review

The second chapter provides a review of literature related to the Impact of Communication and Coordination Challenges on Project Performance: The review involves an outline of the theoretical framework, empirical studies, and prior research findings that would inform the study. It also identifies literature gaps and thereby situates the current research into the broader academic discourse.

Chapter Three: Research Methodology

Chapter three provides the methodology that was adopted during the study. This focuses on the description of the research design, techniques of data collection and sampling used and method of Analysis.

Chapter Four: Data Analysis and Findings

The fourth chapter is aimed at describing the data analysis findings using tables, and other appropriate data visualization techniques. It, therefore, interprets the data in respect of the study's objectives to answer the research questions and hypotheses identified.

Chapter Five: Summary, Conclusions, and Recommendations

The last chapter summarizes the findings and gives the conclusion based on research done, and goes on to give some recommendations on policy, practice, and future research.

1.8. Ethical considerations

Data collection was conducted with the explicit permission, acceptance, and willingness of construction stakeholders and relevant bodies. The purpose of the study was clearly communicated to all participating individuals to ensure transparency and informed consent. This approach ensured that participants were fully aware of the study's objectives and scope before contributing their data.

To prepare questions for data collection regarding the Evaluate the impact of communication and coordination challenges on project performance in selected in Ethiopia university construction projects.

CHAPTER-TWO

2. REVIEW OF RELATED LITERATURES

2.1. Introduction

This chapter focuses on the theoretical and Empirical review framework supporting this research. It is organized into two main sections: the first addresses communication, while the second examines coordination in relation to project performance.

In the section on communication, various definitions are provided, along with an exploration of its significance in project management. The chapter discusses different types of communication, including the channels, styles, and tools used. It also identifies barriers that can obstruct effective communication and coordination, highlighting their impact on project performance. Furthermore, the study emphasizes the essential role that effective communication and coordination play in achieving project success and outlines the components of a communication plan. Finally, I made a summary and identified the gaps in the literature review in the concluding section of this chapter.

2.2. Theoretical Reviews

Communication is the transfer of information between individuals, involving sending, receiving, and responding to messages. In project management, it serves as both a resource and a tool (Ruuska, 1996). Like personnel, time, finances, and equipment, communication requires careful planning and management. Effective communication is crucial for leveraging other resources; ineffective communication can lead to project challenges. It occurs not only between individuals but also among groups Baguley (1994) making project management a collaborative effort among various stakeholders with specialized expertise. Communication acts as a bridge for interactions ranging from simple exchanges to complex global discussions (Skyttner, 1998). Ultimately, it involves the interpretation of meanings by people, shaped by social norms and behaviours (Gayeski, 1993).

In construction, coordination entails systematically gathering materials and resources to build structures that meet design and quality standards. This includes residential, commercial, educational, healthcare, and sports facilities. Civil construction focuses on infrastructure projects like roads and airports, while industrial construction involves large-scale developments such as pharmaceutical plants. Research indicates that the complexities of the

construction industry often lead to uncertainties and inefficiencies (Dubois & Gadde, 2002). Successful projects require strong coordination among professionals from design to completion, with key roles including project managers and architects. Common delivery methods include design-bid-build, where the architect oversees the project from design to completion, and design and build, where the owner outlines requirements while setting overall goals.

2.2.1 Communication in project performance.

Communication involves at least two individuals exchanging messages, which are sent, received, and responded to. In the context of project performance, communication serves as both a resource and a tool (Ruuska, 1996). As a resource, it is comparable to time, money, and equipment; effective communication requires systematic planning and allocation similar to these other resources. It is also essential for leveraging other resources poor communication often leads to project difficulties. Communication can occur not only between individuals but also among groups or organizations (Baguley, 1994).

Project management is inherently a team effort involving various specialists working together to achieve project goals. Communication bridges gaps that can range from simple exchanges between two people to complex interactions across the globe (Skyttner, 1998). Ultimately, communication is the exchange of information shaped by social norms and behaviours, with individuals interpreting meanings and utilizing information (Gayeski, 1993).Effective communication is a two-way process where messages are sent and feedback is received (Torrington & Hall, 1998). Successful communication requires confirmation that messages have been understood and will be acted upon. Various methods exist for conveying information, including speech, body language, writing, and electronic communication.

Furthermore, communication can be viewed as a professional practice that employs specific rules and tools to enhance information exchange (Dainty et al., 2006). Ruuska (2007) identifies five key important for effective project communication:

It supports the creation of the project's end product and its delivery to customers.
It fosters a positive service profile through mutual profiling.
It serves as an informative tool for all stakeholders about project developments
It is crucial for orienting specialists involved in the project
It fulfilments social interaction needs among team members.

The significance of communication in project performance is often highlighted through the role of project managers. Their communication skills influence stakeholder engagement, expectation management, team dynamics, conflict resolution, and overall project success (Horine, 2005). Despite its importance, communication is frequently taken for granted in project management planning.

However, inadequate communication remains a common area for improvement in project assessments .To be effective, project communication must be systematic, continuous, well-planned, and appropriately informative. A well-structured communication plan can engage team members effectively and enhance overall project performance.

2.2.2. Types of communication in construction industry

According to Gayeski (1993) communication is a professional practice where appropriate rules and tools enhance the utility of information. Communication encompasses different zones of meaning that facilitate interaction between organizations (Heath, 1994). It is the individuals within these organizations who translate meanings and disseminate, comprehend, receive, and utilize information (Gayeski, 1993; Checkland & Holwell, 1998).

Organizations must establish proven business processes to support effective intra-organizational communication structures. Communication among construction alliance parties involves several aspects. First, inter-organizational communication occurs within the alliance team, with representatives from individual organizations facilitating communication. Second, communication channels are created for both close contacts and distant connections. Finally, the choice of channels depends on the volume of information, the urgency of communication, and its overall efficiency and effectiveness. The communication landscape in the construction industry is multifaceted, encompassing various types and strategies essential for successful project execution. Here are key insights from public literature regarding communication types in this sector.

Communication in construction includes several key types: Verbal Communication (face-to-face discussions, phone calls, and meetings) is essential for immediate feedback and task clarification; Written Communication(emails, reports, contracts, and memos) is vital for record-keeping and ensuring all stakeholders have access to the same information; Non-Verbal Communication(body language and cues) significantly impacts interactions and enhances interpersonal relationships; Visual Communication(diagrams, charts, and signage)

conveys information quickly and effectively explains complex ideas; and Digital Communication (project management software, Building Information Modelling (BIM), and mobile apps) transforms communication by facilitating real-time updates, document sharing, and team collaboration. Together, these forms of communication are crucial for successful project execution.

Michael Campbell, PMP (2009), outlines various perspectives on project communication, identifying four key types that project managers should consider:

Project Perspective
Organizational Perspective
Formality Perspective
Channel Perspective

Project Perspectives

Communication can be categorized as internal or external. Internal communication occurs among project team members and is often informal and exploratory, involving discussions to resolve plans or issues. In contrast, external communication involves interactions with stakeholders, such as customers and the media, and is typically more polished before being shared.

Organizational Perspective

From an organizational standpoint, communication can be vertical, horizontal, or diagonal. Vertical communication flows between different levels of hierarchy; for example, a team member updating a project manager represents upward communication, while a project manager sharing goals with the team exemplifies downward communication. Horizontal communication occurs among peers at the same level, while diagonal communication connects different functional areas within the organization, becoming increasingly vital in matrix and project-based structures.

Formality Perspective

Communication can also be classified as formal or informal. Formal communication includes structured formats like reports and presentations that require careful preparation. Informal communication encompasses casual exchanges such as emails and impromptu discussions,

which have gained prominence with the rise of social networking. Successful project managers recognize the importance of both types of communication and ensure that all interactions are purposeful.

Channel Perspective

The communication channel perspectives studied in the literature by Douglas G. Campbell and Melvin E. Murphy, (2017) emphasizes the need to consider the communication channel used to convey messages. This includes choices between verbal or non-verbal, written or oral, and face-to-face or telephone interactions. Factors influencing channel selection include the purpose of communication, audience, and type of information being shared.

Effective communication skills are essential for project managers to succeed. Understanding these different types of communication ensures successful project outcomes.

2.2.3. Channels of Communication

Communication occurs through various channels, styles, and tools. This discussion focuses on the key factors influencing communication in project management. According to Charvat (2002), there are three primary communication channels: upward, downward, and lateral.

Upward Communication

The upward channel involves communicating with senior executives, highlighting issues, risks, and exceptions.

Downward Communication

The downward channel conveys information to the project team, providing direction on pending tasks, schedules, and general briefings. Effective downward communication requires strong delegation skills. This channel also applies to end users, such as sales clerks and conductors, who are impacted by project outputs and changes.

Lateral Communication

The lateral channel targets clients, vendors, and functional managers, focusing on negotiations related to resources, budgets, and timelines. This type of communication demands diplomacy and tact. A communication plan serves as a tool that integrates all three channels into a cohesive strategy (Charvat, 2002).

It is crucial for project managers to identify each communication channel and tailor styles and tools accordingly. Understanding the audience's perspective enhances the effectiveness of project communication. By establishing these channels first, communication becomes more structured and manageable.

2.2.3.1 Styles and tools for the communication channels

Once you identify the communication channel for a project, you can determine the appropriate style and tool for delivering your message (Keyton, 2011). Although you may know your audience, individuals may still differ in how they process information. This variation in message reception is referred to as communication style.

According to Keyton (2011) the communication tool represents the format used to convey the message, such as a meeting or an email. Choosing the right tool is crucial; using an inappropriate medium can send unintended signals. For instance, if a significant message is communicated through an impersonal method, like a note on a bulletin board recipients may perceive it as a sign of neglect or indifference from management. This can lead to decreased motivation and resistance to change in the workplace.

Despite the diversity in how your audience absorbs information and their preferred formats, certain patterns can be identified. Ghattas & McKee (2001) outline five distinct communication styles: readers, listeners, exchangers, manipulators, and viewers. Understanding these styles can help tailor your communication approach effectively.

2.2.4. Communication Strategies

Establishing Clear Channels: It is essential to create a clear chain of command and define communication protocols to minimize misunderstandings.

Leveraging Technology: Tools like BIM and virtual reality are increasingly used to enhance visualization and coordination among stakeholders, allowing for better decision-making during projects.

Encouraging Feedback: Implementing systems that allow for instant feedback can improve engagement and ensure that all voices are heard, which is particularly important in large teams with diverse roles.

2.2.5. Challenges in Communication

The construction industry faces distinct communication challenges due to its fragmented structure and the variety of stakeholders involved.

Effective communication between clients (demand side) and contractors (supply side) is often obstructed by differing priorities and expectations. While proper communication can be challenging, being aware of potential obstacles makes it easier to address them systematically.

Mr.Kailash Awati (2008) identifies three main obstacles to project communication in his article Obstacles to Project Communication political, cultural, linguistic challenges, and Personal Challenges.

Table:-2.1 common challenges

NO.	Common challenges	Characteristics and results
1	Political Challenges	Awati notes that political obstacles arise from vested interests and power dynamics, particularly at higher organizational levels. In large organizations, it is crucial to consider various hierarchical levels and their representatives to ensure messages are conveyed properly. Conflicts can arise when interests clash, making it impossible to satisfy everyone. Awati suggests recognizing key political players early on and working to gain their trust while addressing issues at their source rather than escalating them up the hierarchy. This approach fosters cooperation and minimizes conflicts.
2	Cultural Challenges	Cultural obstacles stem from differences in organizational culture and the diversity of geographically distributed project teams. This study focuses on domestic factors, examining cross-organizational dynamics within the company and among external partners. Awati emphasizes that organizational values can vary significantly, affecting communication styles. For example, some departments may promote open communication, while others adhere to a strict hierarchical structure. Project managers should act as intermediaries to facilitate communication between parties, requiring an understanding of these cultural differences to ensure smooth interactions.
3	Linguistic Challenges	According Mr.Kailash Awati (2008) highlights linguistic obstacles related to specialized terminology used by different departments. Terminology can vary widely between areas like Marketing and IT. Terms used in documents shared across the organization should have consistent meanings or be clearly defined in context. New terms may emerge throughout a project; these should be well-defined and properly integrated into the organization's vocabulary.
4	Personal Challenges	In addition to the aforementioned aspects, personal communication challenges also play a significant role.

		Past experiences, assumptions, and expectations influence how individuals perceive messages (Horine, 2005). Each person's learning styles, cultural background, values, and emotional state affect how they interpret messages. Project communicators must be aware of these personal factors and manage them effectively to ensure clear and impactful communication.

2.3. Coordination theory in project performance

Coordination is a fundamental issue in organization theory, particularly significant in e-commerce, where it is recognized as one of the 5 C's: coordination, commerce, community, content, and communication (Afuah & Tucci, 2001). Malone & Crowston (1994) were pioneers in proposing an interdisciplinary approach to coordination, noting its relevance in fields such as computer science.

Understanding Coordination- is driven by the existence of dependencies between activities or entities. Without interdependence, there would be no need for coordination (Malone & Crowston, 1994). Galbraith (1994) suggests that reducing interdependence can lessen the need for coordination, but this can only be achieved to a limited extent. Interdependencies are inherent in human interactions and can be explained through various lenses:

Division of Labour;-Economists argue that dividing labour enhances efficiency through specialization but also increases the need for coordination (Douma & Schreuder, 1992).

Social Orientation:- Collaborative practices contribute to life's meaningfulness beyond mere efficiency.

Bounded Rationality:- Simon's theory posits that complex organizations cannot be effectively managed from a single perspective, necessitating decentralized control (Simon, 1976; Hayek, 1945).

Definitions of Coordination Different scholars have defined coordination in various ways:

Chandler (1962) Coordination involves structuring and facilitating transactions among interdependent components.

Thompson (1967) it consists of protocols and decision-making mechanisms designed to achieve concerted actions among interdependent units.

Lawrence & Lorsch (1969) Coordination describes integrative devices for connecting differentiated sub-units.

NSF (1989) it refers to the joint efforts of independent actors toward mutually defined goals.

Koningsveld & Mertens (1992) Coordination involves timely alignment of actions and decisions among individual actors to achieve organizational aims.

Malone & Crowston (1994) it is the act of managing interdependencies between activities aimed at achieving a goal.

The Purpose of Coordination

Given the unavoidable nature of dependencies, coordination seeks to manage these relationships so that activities contribute to a cohesive whole. This does not necessarily require cooperation among actors; competitive dynamics can also form a purposeful framework. Successful coordination is often characterized by the satisfaction of those involved. However, Malone & Crowston (1994) note that effective coordination is often unnoticed until it fails.

Types of Dependencies

Malone & Crowston (1994) identify several key types of dependencies that require coordination:

Shared resources
Task assignments
Producer-consumer relationships
Transfer processes
Design considerations for manufacturability and usability
Task/subtask dependencies
Simultaneity constraints

In summary, coordination is essential for managing interdependencies within organizations. It aims to integrate activities into a purposeful whole while acknowledging that dependencies are an inherent aspect of organizational life. By understanding and addressing these dependencies effectively, organizations can enhance their operational efficiency and achieve their goals more project performance.

2.3.1 Managing dependencies

According to Malone & Crowston (1994), coordination is the act of managing interdependencies between activities performed to achieve a goal. What seems to be underestimated in this definition and in their broad overview is that coordination is not only "making things fit". The problem of coordination is aggravated by several factors, such as the information asymmetry that usually exists between the actors. This problem has been studied

extensively in the agency theory literature (Eisenhard, 1989), if I hire an agent to do a certain job, how can I make sure that he also will perform his job in the best way (best for me), given the reasonable assumption that he will optimize his efforts so as to maximize his own utility. What is the optimal reward structure? If we take into account that

People behave opportunistically, and any realistic approach should take that into account, then coordination is more than "making things fit". Central in (Mintzberg, 1989) organizational pentagon model are the conflicting forces of cooperation and competition. From that perspective, coordination means coping with these forces: how to counteract the "pulling apart" force of competition and the dysfunctional influence of politics?

A second problem that seems to be overlooked by Malone and Crowston is the indeterminacy of communication. Coordination is usually achieved with some kind of communication or information exchange. However, as Taylor (Taylor, 1993) notes, every communicative exchange is generative of indeterminacy. This is because communication involves the wording of intentions that must be interpreted by the receiver. This indeterminacy is related to what Weick (1969) has called the equivocality ("ambiguity", "confusion", "conflict", "lack of shared understanding") that organizations have to face.

To deal with coordination problems micro-economic theory proposes the use of market transactions to reduce coordination costs. When all the necessary information is available to both parties, price is a sufficient coordination mechanism to coordinate the transaction. But in reality people are only rational within bounds (March & Simon, 1958). To overcome the costs of coordination due to information problems, we can turn to the use of organizations ("hierarchy"). Organization theorists such as March and Simon (ibid) and Mintzberg (ibid) have devised a number of coordination mechanisms within organizations.

2.3.2..Coordination mechanism Definition

Mutual adjustment;- Achieves coordination by the simple process of informal communication

Direct supervision;- Achieves coordination by having one person issue orders or instructions to several others whose work interrelates

Standardization of plan;- Achieves coordination through the establishment of schedules by which the activities in organizations are performed.

Standardization of work processes;- Achieves coordination by specifying the work processes of people carrying out interrelated tasks

Standardization of output;- Achieves coordination by specifying the results of the work

Standardization of skills and knowledge;- Achieves coordination of work by virtue of the related training the workers have received

Standardization of norms;- Achieves coordination by controlling the norms infusing the tasks, usually for the entire organization, so that everyone functions according to the same set of beliefs.

These coordination mechanisms are traditionally divided into three groups: standardization (in its various forms), hierarchy or direct supervision (typically supplementary to the standard procedures, to solve infrequent situations for which standardized programs have no solution), and mutual adjustment, which again supplements standardization and the hierarchy. It is interesting to see that standardization typically means control of the agent behaviour and minimization of communication. In this way, the equivocality associated with communication can be reduced, but the other side of the coin is of course that the organization risks rigidity, lack of contact with the enacted environment and stereotyped thinking (Taylor, 1993:141).

2.3.3 Mutual adjustment

Mutual adjustment is usually associated with "horizontal coordination" and "lateral relationships" and is said to be realized by "simple, informal" communication processes However, (Peterson, 2002) argues that mutual adjustment is not simple, nor is it developed automatically. Under conditions of uncertainty and equivocality, organizations must purposefully design lateral coordination. Mutual adjustment is also described as integration (Lawrence & Lorch, 1967). Three levels of integration can be distinguished:

Structural integration;- (e.g. a liaison role, but also job rotation or email infrastructure)
Process integration;- (e.g., one decision process is performed after the other)
Collaborative integration;- (socialization, joint decision-making, shared understanding)

According to Galbraith (1994), these levels depict a cumulative hierarchy, in which process integration builds on structural connections, and collaboration builds on process integration. Structural integration reduces uncertainty, process integration reduces equivocality, and collaborative integration creates mutual understanding.

Collaborative integration comes the closest to what LAP theory calls communicative action aimed at shared understanding. On the account so far the following definition can be given Gray (1991), Collaborative integration is the voluntary participation in the process of joint decision making among interdependent parties, involving joint ownership of decisions and collective responsibility for the outcomes" According to Gray and others, collaborative integration is characterized by its participative and shared nature. This is also the basis for the collective responsibility for the outcomes. This definition stresses that the parties are interdependent. They want to reduce uncertainty and equivocality to make better decisions. Joint ownership means that the different stakeholders are sharing a "mutual commitment" amongst one another. As the term ownership can be replaced by the term partnership, this mutual commitment is also a long-term commitment. During participation, influence is exercised and shared among the stakeholders regardless of their formal position or hierarchical structure. The essential element here is building a basis of "shared understanding" and or "mutual commitment". Peterson (ibid) notes that this shared understanding is inherently dynamic and is structured more as webs of meaning, than as linear ordered graphs. Note that the term has many different synonyms like for example "shared mental models", "shared thought worlds", "shared frames", "shared knowledge" and "collective minds". It is important to realize that at this point of collaborative integration; the limitations of coordination theory become apparent. Crowston & Kammerer (1998) phrase it as follows in their study on software development:

In general Coordination is a process aimed at managing dependencies. Within a traditional organization, the hierarchy is the backbone of coordination, but additional coordination mechanisms are standardization of work practices and mutual adjustment. Mutual adjustment, also called horizontal integration, involves structural arrangements and process integration, but in the end it is based on mutual understanding. So we can conclude that when communicative action is aimed at mutual understanding, it is an integration mechanism indeed, and thus also a coordination mechanism. So it makes sense to assess the value of the communication processes from a coordination perspective

2.4. Key challenges to Effective Communication and coordination in project performance

This section outlines key barriers to coordination and communication in construction projects, building on established concepts and principles. According to Hassoin (2009),

coordination is an abstract concept that is challenging to measure quantitatively; it relies on various factors, including specific barriers. This framework aims to provide a comprehensive understanding of these barriers, which can serve as performance indicators for future studies. The paper categorizes the key barriers into five groups for clarity: the nature of construction, traditional contractual arrangements, construction participants, organizational characteristics, and management approaches. That is

Nature of Construction

Nature of construction has been widely criticised by many researchers' including Latham (1994) and Egan (1998). Based on the nature of construction, complex and intangible project activity, uniqueness and lack of repetition, temporary construction project and labour intensity are observed as the barriers have led to high level of coordination failures.

Traditional Contractual Arrangement

In general, design-bid-build is recognized as traditional contracting system and it is the most common form in delivering the construction project (Greco, 2006; Gehrig, 2009). Design-bid-build is characterized by fragmentation, uneven risk allocation, lowest-bid-price and multi-layer of subcontracting that discourages coordination in aproject. These key barriers under traditional contractual arrangement.

Construction Participants

The myriad of activities in construction constrains the large number of participants to carry out a task (Hanrot, 2003). They are multi-disciplinary and each has the character of interdependent roles in construction project, thereby rendering it difficult for them in coordination. Unfavourably, adversarial relationships and uncommon objectives among participant aggravate the problems of coordination. Thus, these three key barriers of faultless coordination under construction participants.

Characteristic of Organization

According to Stephen & Christopher (2007), the behaviour of the people involved and structure of their organizations are fundamentally important in ensuring the coordination during the construction process. Nevertheless, organisational design in construction

characterized by being temporary and project-based has frustrated the coordination among them for this gap project is not completed on contract time.

Construction Management Approach

The management approach significantly influences the success of construction projects. However, traditional management systems have often been informal, complicating communication and coordination among participants. Saram et al. (2009) highlight that construction management typically relies on informal methods, while Crichton (1966) notes that this informal style stems from direct oversight rather than structured documentation. As a result, processes are not formally recorded in handbooks or reports, leading to a lack of established methods for gathering, processing, and sharing crucial information (Saram, 2002). This absence of documentation makes it challenging for participants to communicate effectively, increasing the likelihood of conflicts and disputes.

2.5. The relationship between communication and coordination

The interplay between communication and coordination is evident in their collective impact on project outcomes. Effective communication enhances coordination by ensuring that all team members are aware of their roles and responsibilities, as well as the overall project timeline. Conversely, strong coordination mechanisms can improve communication flow by establishing clear protocols for information sharing among stakeholders. Relational coordination theory explains how effective communication and strong relationships enhance the coordination of complex tasks. It emphasizes that strong relationships marked by shared knowledge, mutual respect, and common goals facilitate .Frequent and accurate communication, which in turn strengthens these relationships over time (Gittell, 2000; Gittell, 2002). This interplay between relationship quality and communication quality is crucial for successful collaboration and leads to better sharing of information and resources, ultimately enhancing intellectual capital (Collins & Clark, 2003; Gibson et al., 2011).

Due to improve of digital technology and remote work, maintaining effective communication becomes challenging. Proximity traditionally enhances visibility and informal interactions, which are vital for relational coordination (Allen, 1984; Okhuysen & Bechky, 2009). In remote settings, interactions often become limited to scheduled meetings, reducing spontaneous discussions that foster effective communication (Wang et al., 2020).To address these challenges, companies implement Asynchronous Communication Tools (ACTs)that

facilitate both synchronous- is communication tools enable real-time, simultaneous interaction among participants. They are best suited for urgent discussions, immediate feedback, and problem-solving that requires people to be engaged simultaneously. Examples of synchronous tools in construction include phone calls, video conferencing software (like Zoom, Microsoft Teams, Google Meet), and live chat apps. These tools help with immediate decision-making, crisis management, and real-time collaboration among stakeholders and Asynchronous communication tools, on the other hand, do not require participants to be engaged at the same time. Messages, documents, or updates can be sent and reviewed at each person's convenience, allowing thoughtful and detailed responses. Asynchronous tools in construction include emails, project management platforms, issue tracking software, shared documents, and collaboration workspaces (like Google Workspace, Slack, Trello, and Active Collab). These tools support coordination across different time zones, reduce disruption to focused work, and improve documentation, tracking of tasks and exchanges information (Greer & Payne, 2014).

Asynchronous Communication Tools (ACTs) can enhance communication by helping employees manage information flows more effectively. Many employees report improved communication quality due to more focused social interactions (Leonardi et al., 2010). Modern ACTs that support real-time communication boost performance during collaborative processes [Dennis et al., 2008] and enable sharing through various channels (Malhotra & Majchrzak, 2004, 2012).However, studies highlight that ACTs cannot fully replace spontaneous, informal interactions, which are important for successful relational coordination (Golden et al., 2008; Wang et al., 2020). The lack of these informal exchanges in remote teams can lead to increased conflicts (Hinds & Mortensen, 2005) and make it harder to assess colleagues' skills and knowledge (van der Lippe & Lippényi, 2020). Additionally, research shows that employees may use synchronous ACT features to create distance and limit interactions, counteracting their intended purpose (Leonardi et al., 2010). Overall, effective communication and coordination are crucial for project success, influenced by factors like clarity, stakeholder engagement, and decision-making processes. Effective coordination enhances communication efficiency among stakeholders, particularly in cross-functional teams where diverse expertise must be synchronized. Effective communication and coordination are critical components that significantly influence project outcomes. Their relationship can be studied in different through several key dimensions, including clarity, stakeholder engagement, and decision-making processes.

2.6. The perceptions of project managers and stakeholders

2.6.1. Involved Stakeholders in Construction

The stakeholders in a construction project can be large, but also quite small, depending on the size of the project. Involved stakeholders can be the owners and users of facilities, project managers, facilities managers, designers, shareholders, legal authorities, employees, subcontractors, suppliers, process and service providers, competitors, banks, insurance companies, media, community representatives, neighbours, public sector , government establishments, visitors, customers, regional development agencies, the natural environment, the press, pressure groups, civic institutions, etc. (Newcombe, 2003).

In the construction industry, stakeholders can be categorized into four primary groups: clients (both private and public sectors), government entities (local and national), suppliers, contractors, and subcontractors, as well as others impacted by the built environment (Dainty et al., 2006). Effective communication and coordination among all team members are crucial responsibilities of the project manager. While not all stakeholders need to communicate directly with one another, it is the project manager's duty to ensure that everyone has access to accurate information and that coordination is maintained. This is essential for achieving the project's goals. Therefore, strong communication and coordination among stakeholders are vital for the successful completion of construction projects.

2.6.2. Involved project manager in Construction

The project manager is one of the key individuals in the successful delivery of a project; failure in project management will most likely lead to project failure. The project manager’s role is to try and balance their decisions in such a way as to fulfil the needs of all parties involved (Dainty et al., 2006).

The formal definition of project manager’s responsibilities can be defined as:

The planning, monitoring and control of all aspects of a project and the motivation of all those involved to achieve the project objectives on time and to cost, quality and performance (Fewings, 2013).

The project manager must be adept at managing the interests of multiple stakeholders throughout the entire project management process (Chinyio & Olomolaiye, 2010).

Although, the definition of a powerful actor is seen as one with the ability to solve complex problems and manage risk for the client (Winch, 2010).

The main goal for the project manager is to make the client happy, to become a powerful actor. To satisfy the client it is important to understand the needs and to do so, communication and coordination is the key. As a project manager it is important to adapt different both communication and coordination strategies to different stakeholders. According to Weiss (2003), strategies and tactics developed to cope with stakeholders include:

Determine whether to accommodate, negotiate, manipulate, resist, avoid or wait, and see with specific stakeholders' combination of strategies

The project manager serves as the team leader and acts on behalf of the client, ensuring efficient collaboration among project members (Fewings, 2013).Typically hired by the client, the project manager functions as an intermediary between the client and contractors, facilitating communication and coordination with suppliers. The primary objective of construction project management is to meet the client's requirements regarding functionality and budget (Koutsogiannis, 2017). Therefore, maintaining open lines of communication with the client is crucial. The project manager must keep the client informed about project progress and ensure alignment with their vision, necessitating on going communication through meetings, phone calls, and emails.

In construction management, common communication methods include emails, phone calls, and meetings. Technological advancements have enhanced communication capabilities, allowing for real-time interactions. However, face-to-face meetings remain the most effective way to engage with stakeholders (Chinyio & Olomolaiye, 2010). A project manager's daily responsibilities involve various communication activities such as conversing with colleagues, networking, gathering information, and directing team members (Dainty et al., 2006). Significant time is spent on documentation and administrative tasks. The project manager must plan, organize, and supervise the construction process while also developing staff throughout different phases. While competent project consultants are vital for success, their effectiveness can vary in practice. Ultimately, the project manager's skills and approach significantly influence how other consultants operate and can determine a project's overall success (Chinyio & Olomolaiye, 2010).

2.7. Empirical Literature

The project may be taken as successful if it is completed within a planned or specified budget, with a specified time frame, and full fill the required quality or the required client specification (Chan W.M., 2002). According to Gebrehiwot (2017), also shares the same idea. If one of these requirements is not satisfied the project will not be considered as successful.

Mahamid (2016) studied the performance of construction projects in Saudi Arabia to determine the contributors to poor performance and their severity according to public owners, contractors, and consultants using a questionnaire survey. The results of this study show that owners rank 'poor communication between project participants' as the top major factor affecting the performance of construction projects, followed by 'poor labour productivity' and 'poor planning and scheduling', respectively. But contractors indicate that the most critical factors are payments delay, escalation of material prices, and poor labour productivity, respectively. Besides, consultants also mention the top three affecting factors that are poor planning, and scheduling, poor site management, payment delay, poor coordination and communication between parties respectively.

Aziz & Abdel-Hakim (2016), believe that the top factors affecting the scheduling of the road project in Egypt as follows:

➢ the financial ability of the owner (in road projects the Egyptian government is the owner of the project), any delays in progress payment to the contractor leads to project suspension which results in serious delays in project delivery.

On-time, delivering the material and equipment required to commence the work.

Strong site management and supervision of the contractor.

Level of the coordination between different parties of the construction process.

Change orders made by the owner.

Government regulation and bureaucracy in obtaining permit and payment progress.

Quality of material and equipment used in the project.

Lack of experience of consultants in dealing with extraordinary situations and weather conditions.

Naveen Kumar (2016) determines the following causes of cost overrun in India construction project. These are delay in preliminary handing over of the project, wrong or inappropriate choice of site, inadequate project preparation, increment of material prices, resource constraint, unpredictable weather conditions, fluctuations in the cost of materials, equipment allocation problems, and lack of cost reports and design changes. Patil & Pankaj (2016) also add the following cause of cost overrun in India construction project. These are high transportation cost, change in material specification, escalation of material price and frequent break down of construction plants and equipment.

According to Wambui et al. (2015), the following factors are the main factors that should be considered in urban road construction projects in Nairobi, which include: Project management experience, project information technology used to control the progress of the project, which includes the database and software used by the management team, availability of funds for the project, quality of equipment used in road construction projects, and availability of skilled labors. Tejale et al. (2015) studied the causes of cost overrun in India construction project and list as follows: Material shortage, shortage of labor, unavailability of competent staff, late delivery of material and equipment, low productivity level of labor and quality of equipment and raw material. Subramani et al. (2014) also add these two causes of cost overrun those are slow decision making and poor design or delay in design. Culfik et al. (2014) did a research on the delay of the construction project of turkey. The data were collected from all client, contractor, and consultant. The finding of this research shows that the following listed are causes of delay of construction project in turkey. These are suspension of the project by owner, delays in contractor's progress payment by owner, unrealistic project duration, slowness of the owner decision-making process, inadequate early planning of the project, financing by contractor during construction, shortage of labor, slow delivery of materials, obtaining permits from municipality and design changes by the owner or his agent during construction.

Ravisankar et al. (2014) did a research on the main causes of schedule delays in a construction project in India. A detailed questionnaire was prepared and distributed between contractors to collect the required data. The data analysis shows that the main reasons for delays are change orders made by the owners of the project, bad weather conditions such as

floods and earthquakes, unforeseen problems during construction, shortage of skilled labourers which increase the reworking items due to errors, high changes in materials and equipment prices, ineffective site management and supervision, high idle times for equipment maintenance, delays in paying the contractors, inaccurate time estimation and wrong selection of equipment.

According to Saraf (2013), the following listed factors are important causes of cost overrun in the construction industry of India. These are improper planning, improper designing, site management decision making, construction methods, shortage of labor and technical personnel, construction mistakes and defective work, quality and shortage of materials and labor productivity.

Wong & Vimonsatit (2012) believe that the schedule of construction projects in Australia is affected by many factors. These are:

Availability of local skilled engineers: Rather than relying on foreigners the government focus on training and improving local site engineers that solve the problem for a short period of time.

Financial resources of owners and contractors: The failure of the owners to pay the contractors for each progress in construction process prevent the contractors to continue working in the project and cause serious delays in the schedule and consequently cost overrun. Therefore, it is necessary for the contractors to have reliable financial resources to support themselves in case of any delay from the owners.

Availability of skilled workers: this could be solved by providing training, good wage rates, incentives and bonuses to continue working effectively in the construction industry

The accurate anticipation of project completion: estimating a realistic deadline to complete the project is the most important aspect of scheduling to prevent paying any liquidated damages. This necessitates including the risk and uncertainty in scheduling to prevent any critical conditions during construction.

Well planned site investigation: will enable the contractors to put a better schedule and control any unforeseen ground problems.

Accurate definition and organization of the construction process to reduce change orders, which result in a reliable schedule.

Strong communication system among different parties participated in the project will support quick decision-making and adjust the schedule quickly without any delay.

Mahamid et al. (2012) studied the time performance of road construction projects in the West Bank in Palestine to determine the causes of delay and their severity according to contractors and consultants through a questionnaire survey. The result of this study indicates that there are 52 causes of delay in road construction projects in Palestine. But the major and significant causes of delays are political situation, segmentation of the West Bank and limited movement between areas, award project to the lowest bid price, progress payment delay by owner and shortage of equipment, the Poor communication by owner with other, by the contractors with other and by consultant with other parties. The finding also shows that:

Approximately 75% of the participating contractors shown that the average delay for the projects they have experienced is between 10 and 30% of the original project duration.

Approximately 20% of the contractors shown a 30–50% delay compared with the origin specified duration.

Approximately 70% of the participating consultants shown that the average delay for the projects they have experienced is between 10 and 30% of the original project duration.

Approximately 25% of the consultants shown a 30–50% delay compared with the original specified duration.

A total of 5% of the consultants shown a 50–100% delay.

Neither consultants nor contractors shown any time delay greater than 100% of the original contract duration.

According to Sunday et al. (2012), the following listed factors are causes of cost overrun in Nigeria construction project. These are inflation increase in material cost, inaccurate material estimation, underestimating of project costs, and increase in project scope among others. Chitkara (2011) states the following important cause of cost overrun in India. These are poor planning for implementation, inadequate project formulation, lack of proper contract planning and management, lack of project management during execution.

According Ameh et al. (2010)), state the following causes of cost overrun in Nigeria construction project. These are lack of experience of contractors, cost of material, fluctuation in the price of material, frequent design changes, economic stability, high-interest rates charged by banks on loan, mode of financing, bonds, and payments, and fraudulent practices and kickbacks.

According to Ali & Kamaruzzaman (2010), studied factors that contribute to cost overrun and potential measures to mitigate the problem with the focus given to construction projects within Klang Valley, Malaysia. Their finding indicates that inaccurate or poor estimation of original cost was the most serious factor that contributes to cost overrun and the factor affect most was a mistake in design. They recommend that the most important method to manage construction costs is proper project costing and financing. On the other hand, the least important method was establishing a system in design. Ochieng & Price (2010), studied managing cross-cultural communication in the multi-cultural project team in Kenya and the United Kingdom. The results indicate that communications within multicultural project environments can be effective when project managers explain an awareness of cultural variation. This finding shows that one of the important components of building multicultural project teams in the creation and development of effective cross-cultural collectivism, trust, communication, and empathy in leadership.

Assaf & Al-Hejji (2006) studied the cause of delays in large construction projects in Saudi Arabia. A data was gathered from the contractor, client, and consultant on-time performance of different types of construction project that are located in Saudi Arabia to identify the cause of delay. According to this finding, there are seventy-three causes of delay in which the most common cause of delay is a change order. The result also shows that 76% of the contractor and 56% of the consultant indicate that the average time overrun is between 10% and 30% of the original duration. Poor communication/coordination between the consultant and other parties, between the contractor and other parties between the client and other parties, are some of the seventy-three cause of delay of construction project in Saudi Arabia.

The following review is the related literature which is done in our country.

Garomsa et al. (2019) did the study to assess the applicability of value engineering concepts and the current management practice of Ethiopian building construction projects. In this study, the understanding of Ethiopian building construction project experts on value

engineering principles was studied and the current management practice was evaluated. The finding of this study shows major challenges in the project area were: delay in progress payment by owner, poor site management, weak follow up by consultant, and delay in material delivery from contractor side.

Nearly all experts in the project do not know the principle of value engineering and have no willingness to apply the principle. The evaluation made using value engineering principles indicates the current management practice was more conventional and the industry is still experiencing a delay of projects, cost overrun and poor quality while there is opportunity to reduce such problems.

Desalegn et al. (2017) studied major success factors on building construction projects management system in Addis Ababa, Ethiopia. According to this study, the main significant success factors from 68 identified major management success factors are project delivery system, decision-making effectiveness, timely decision by owner/owner's representative, contractor's cash flow, and leadership skills of project manager and adequacy of the fund.

Koshe (2016) did research on Investigating Causes of Construction Delay in Ethiopian Construction Industries. The first 88 important factors that cause delay in Ethiopian construction industries were identified, and then the most common and important causes of construction delay were assessed by using both the data collected in a survey of construction managers, resident engineers, contractors, and clients, and interviews with senior expert. According to this finding, he main important factors that cause construction delays in Ethiopia are: Difficulties in financing project by a contractor, escalation of the materials price, infective project planning, scheduling or resource management, delay in progress payments for completed works, poor communication and coordinate with other parties, fluctuating labor availability season to season /Seasonal labor availability.

Sinesillase et al. (2016) studied the critical factors of scheduling public construction projects in Ethiopia and listed as follows:

➢ Project manager's knowledge and experience: a clear understanding of project scope, well-planning and organizing of project execution at site facilities monitoring, controlling the project progress easily, and anticipating any sudden problems before their occurring.

Coordination and communication between project parties enhance completing the project within the estimated time.

Regular monitoring and feedback between site engineers and project managers improve project progress.

Defining the responsibility of each party involved in the construction process prevents any conflict in the future.

Clear plans and specifications help reducing change orders during construction and maintenance of the prepared schedule without any delay.

A good prediction of weather conditions helps to organize the work at the site without any delay and improve resource management.

According to Tebeje (2016), did study to access the level of techniques and software packages used for project time control; to identify factors affecting delay in Ethiopian construction projects and to recommend possible mitigation measures. The study revealed a low-level application of techniques and software packages for project planning and time control. It also identified the top five delay factors. Lack of effective communication is one of the factors of construction delay in Ethiopian.

2.7.1. Related to improper communication and coordination Cause of Delays in Public Construction Projects in different country

There are many factors that contributed to causes of delays in construction projects range from factors inherent in the communication technology and its management, to those resulting from the physical, social, and financial, environment. A study conducted by Symon (2016) on construction projects found in Kenya found out contract administration, finances, design change, variation and lack of communication technology were the major causes of delays in the completion of large construction projects that affects project performance in country. Fugar and Agyakwah (2010) conformed that project financing, economic, natural material supplies and poor communication are the major causes of project delays and affects project performance in Ghana. Another study carried out by Akinsiku and Akinsurile (2012) in Nigeria indicate that some of the factors that influence project delays include poor contractual management, slow or delayed approval processes by project stakeholders change in laws and regulations, poor communications and contractual problems among others.

In Ethiopia context some researches undertaken on this issue. For example a study by (Armide, 2018) on 20/80 condominium housing projects in Addis Ababa categorized causes of delay in to three groups such as client related causes includes problem in selection of competent consultants and reliable contractors, absence of good methods and systems in purchasing and finance, slow speed in decision making, poor planning and controlling, lack of leadership skills of project manager, poor coordination and communication with stakeholders, and lack of sense of ownership. The current employment crisis is the result of the cumulative inability to achieve an effective connection between employer expectations and perceptions from the graduates (Ahmed and Tessma, 2020). On the other hand,(Armide, 2018) identified consultant related causes as lack of knowledge and experience, poor management, and difficulty in controlling contractors, a slow response regarding testing and inspection, lack of commitment to confirm construction work according to specification and design.

The third category related to the contractor's weakness like lack of experience and technical profession, poor planning and scheduling, Insufficient coordination and communication, lack of leadership quality, less commitment, wastage of resources around the project sites, construction mistakes and defective works. Furthermore, a study on rail and road construction projects of Ethiopia by Yenealem (2018) found out the major causes of delay as incomplete study prior to project approval, poor project management and coordination, right of way issues, inaccurate forecasting of schedule, overconfidence and interest of project stakeholders. According to Ferejo et al., (2022) individuals and their relatives are the main source of finance for the majority of MSEs for two major reasons. These and other few researches done in Ethiopian context in different region indicate the cause of delay in one geographic area is not necessary the same in another area thus, causes are not inclusive and wholes tic.

Gebrehiwet & Luo (2017) identified the primary causes of delays in construction projects in Ethiopia. Their study revealed that corruption ranks as the leading cause of these delays. Additionally, they found several other contributing factors, including the unavailability of services or utilities at project sites, inflation, low-quality materials, delays in design and the provision of design documents, slow material supply, late contract agreements, delays in receiving completed project work, poor site management and performance, late budget releases, and ineffective project preparation and scheduling.

In Ethiopia, Sinesilassie et al. (2017) found that conflicts among project participants, the project manager's ignorance, lack of knowledge and poor human resource management hindering the schedule performance of public projects. Taye (2016), Mengesha (2004) argued that public infrastructure projects in Ethiopia experienced a high schedule overrun. This is mainly due to poor planning, failure to update schedules in time, inadequate contract management, inadequate on-site supervision, inflation prices for construction materials, change orders, delayed payments, quality defects, cost overruns, capacity issues, weak organization and failure to coordinate. According to Ayalew et al. (2016), the level of construction project management practice in Ethiopia in terms of adapting general project management procedures, project management functions, tools and techniques is thought to be unsatisfactory.

From the literature review above, I understand that the causes of delays can be classified into client-related, contractor-related, consultant-related, and external factors. Although many researchers have explored the causes of delays in public projects, they frequently neglect or little to consider the substantial impact that poor communication and coordination among project stakeholders can have on overall project performance. This oversight has been recognized by researchers as an area that requires further investigation.

2.8. Overview of the Literature and Identified Gaps

The effectiveness of communication and coordination is crucial for determining project success. Effective communication serves as the foundation of successful project management, aligning stakeholder objectives and keeping all parties informed and engaged throughout the project lifecycle. Research shows that clear, consistent, and timely communication significantly enhances project performance by reducing misunderstandings, minimizing delays, and controlling costs. Coordination, closely linked to communication, further enhances these benefits by synchronizing tasks and fostering collaboration among team members. Strong communication practices lead to improved coordination, resulting in greater efficiency and productivity. Projects with high levels of communication and coordination are more likely to meet their time, cost, and quality targets.

Addressing barriers to effective communication such as language differences and information delays can further enhance project outcomes. Implementing structured communication strategies and utilizing digital tools can streamline information flow and mitigate risks associated with poor communication. In summary, prioritizing effective communication and

coordination is essential for achieving positive project results. By fostering a culture of transparency and collaboration, project managers can significantly increase the likelihood of success, leading to improved stakeholder satisfaction and long-term sustainability. Assessments of poor performance are common in the construction industry, where coordination is often seen as a key solution. However, this sector still operates at an early stage regarding effective coordination practices.

The study builds on a comprehensive literature review that examines theoretical and Empirical frameworks specific barriers to coordination in construction projects. The findings highlight the need to address these barriers to improve overall performance since effective coordination is a prerequisite for success. Identifying these barriers allows future construction participants to develop strategies to overcome them, ultimately enhancing project performance. In the long term, this focus on coordination may raise awareness among industry participants about its importance and encourage innovative management practices. Further research should analyse how coordination impacts project success by incorporating it into critical success factors. Recognizing the perceptions of project managers and stakeholders regarding communication and coordination is vital for achieving project goals. Effective communication fosters collaboration, clarity, and mutual understanding among all parties involved. Stakeholders emphasize the need for transparency and timely information sharing to meet expectations and address concerns. Their active involvement in the communication process allows project managers to align objectives with stakeholder interests, driving overall project success. The interplay between communication and coordination is critical; coordinated efforts supported by robust communication channels lead to efficient workflows and timely decision-making essential for navigating complex projects in dynamic environments. Project managers and stakeholders can enhance collaboration, resulting in improved outcomes and greater satisfaction for everyone involved. Ultimately, recognizing these perceptions will empower teams not only to meet but also to exceed their project goals.

From this summary, several gaps in the research have been identified regarding how poor communication and coordination impact project performance in university construction projects concerning budget adherence, quality, and timelines. The researchers did not provide enough quantitative data supporting claims about the effects of communication on success or explore how barriers manifest in practice. A deeper analysis of specific challenges faced by

teams would provide a more comprehensive view. Additionally, there is a lack of specific strategies for improving communication and coordination as well as discussions on how different stakeholders perceive their effectiveness. There are also gaps regarding technology utilization; while digital tools are mentioned as beneficial for improving communication, there is little discussion on which tools are most effective or how they can be integrated into existing workflows. Therefore, our research will focus on the impact of poor communication and coordination on project parties to project performance in selected university construction projects in Ethiopia. The main objectives are: (1) to identify key communication and coordination barriers among stakeholders that affect construction performance; (2) to analyse the impacts communication and coordination effectiveness with project outcomes; (3) To develop mitigation measures for the impacts of poor communication and coordination on project performance in Ethiopian university construction projects.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Study area description

Ethiopia is situated in the Horn of Africa and encompasses an area of approximately 1.13 million square kilometres. The country's topography is characterized by rugged landscapes, with elevations ranging from 125 meters below sea level to 4,620 meters above sea level. A notable feature of Ethiopia's geography is its elevated central plateau, which varies in altitude between 2,000 and 3,000 meters above sea level between 2,000 and 3,000 meters above sea level.

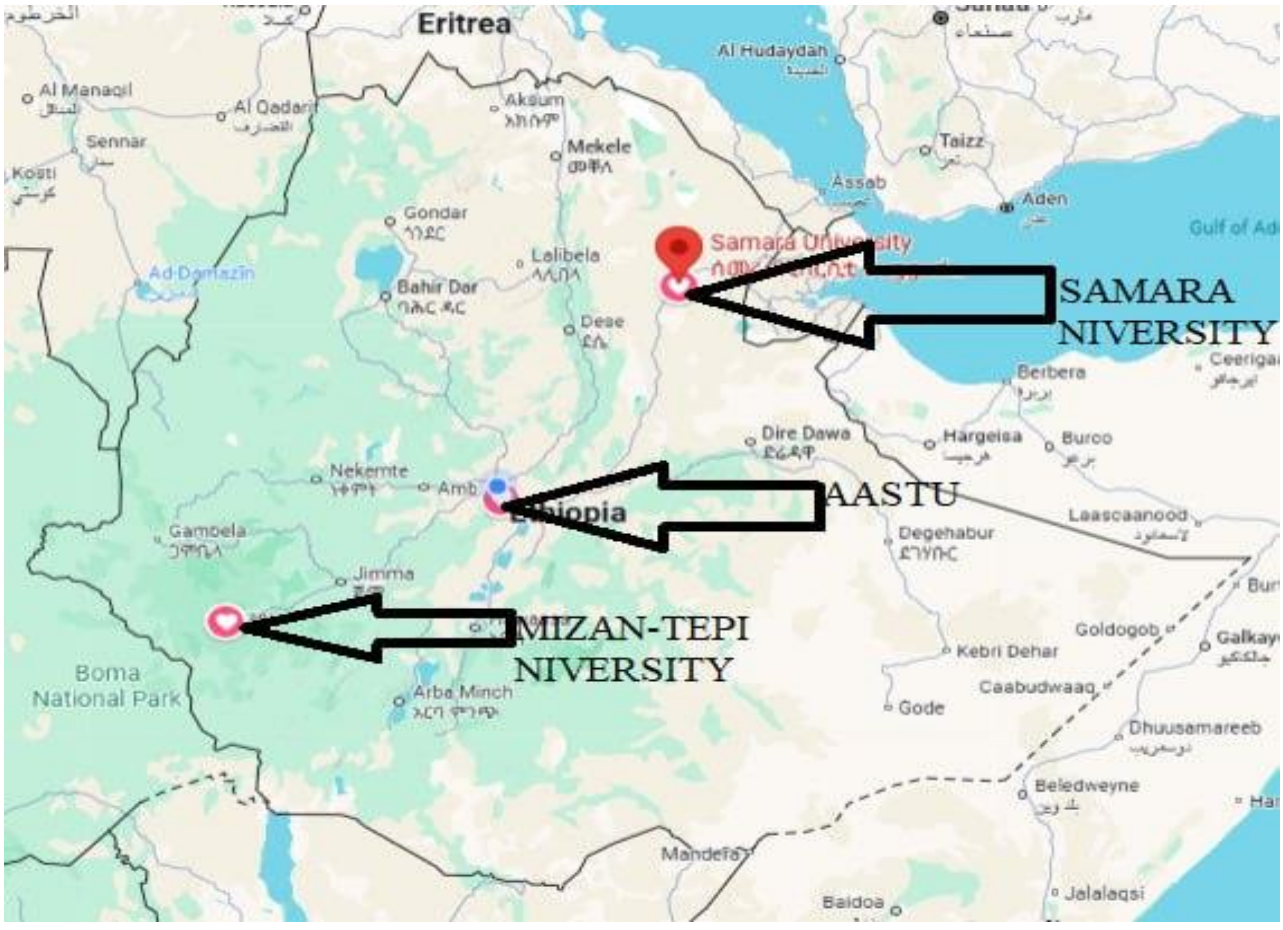


Figure-1: location map study https://www.google.com/maps

3.2. Study approach and research design

The methodology of this study primarily depends on survey questionnaire responses collected from clients, contractors, consultants, and regulatory public organizations involved in selected Ethiopian university construction projects, specifically at Samara University, Mizan-Tepi University, and Addis Ababa Science and Technology University. The questionnaire was developed by reviewing and understanding relevant literature in the field of construction communication and coordination. To facilitate effective data collection from primary sources, a thorough literature review was conducted initially to identify the various causes of communication and coordination issues in the construction industry from an international perspective.

The research focuses on a comprehensive analysis of the impact of poor communication and coordination on project performance in university construction projects, including both initiated and on-going projects between February 2014 and March 2025 GC.

The survey instrument was designed by synthesizing findings from relevant literature on construction communication and coordination. Conducting an extensive literature review beforehand was essential to identify the key factors affecting communication and coordination within the construction industry globally.

This study employed a descriptive research design because the nature of the project characteristics made this approach more suitable than other research methods. The descriptive design allows for a clearer understanding of the issue by analysing relevant sources and focusing on critical aspects. Its ability to efficiently collect comprehensive, naturalistic, and multifaceted data makes it particularly appropriate for examining university construction projects in Ethiopia, where practical constraints and the need for foundational knowledge are significant. Other research designs that require experimental manipulation or emphasize cause-and-effect relationships may not be feasible or appropriate in this context. The study integrates both quantitative and qualitative approaches, using structured systems and tools to convert observable phenomena into numerical data. Additionally, a survey methodology was employed to gather information through questionnaires that included demographic variables such as qualifications, age, gender, and experience.

1.3. Source of data

The study collected all the necessary data from both primary and secondary sources. Additionally, documentation was used to triangulate the findings, ensuring their reliability and validity. Primary data were obtained through questionnaires distributed to selected participants, including contractors, clients, consultants, and key government officials from various offices. Secondary data comprised information that supported the overall evaluation of communication and coordination in the performance of construction projects. Relevant documents highlighting the causes, effects, and consequences of poor communication and coordination among stakeholders served as key sources of secondary data related to project performance in construction projects.

1.4. Number of projects and sample size

The target population for the study consists of selected experts involved in specific university construction projects, as well as representatives from governmental construction regulatory authorities. The study aims to conduct research on university construction projects by engaging with each focal person through phone communication. These focal persons will inform the organizations listed above to facilitate the collection of in-depth information from each participating expert. Following this process, questionnaires will be distributed through face to face delivery and Telegram. The sample collected from three universities and the supervision teams of the construction regulatory authority comprises a **total number of projects are 92.**

1.4.1. Sample size determination

The study employed purposive sampling, a method that relies on specific criteria Ames, et al. (2019). This approach was chosen to select respondents based on the researcher's judgment. Purposive sampling is commonly used when researchers want to focus on a particular group of informants who can provide detailed insights into the topic. These individuals are strategically selected to offer in-depth information, which can lead to a more comprehensive understanding and detailed descriptions of the issue Berger (2000).

According to Glenn (1992) there are several approaches used in determining the sample size. These include using a census for small populations, imitating a sample size of similar studies, using published tables, and lastly applying formulas to calculate a sample size. For this study

the first and the latter were applied. The study assumed a margin of error of 5% according to Creswell (2009) which determines the sample size as shown below.

The sample size was determined using the formula by Taro Yamane (1967) is good my research.

$$\mathbf{n} = \frac{\boldsymbol{N}}{\mathbf{1}+\boldsymbol{N}(\boldsymbol{e})^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textit{Eq (3.1)}$$

Where, n is the sample size, $\boldsymbol{N}$ is total population which in this research=92, e is margin of error= ± 0.05

1.4.2. Stratified sub group sample size determination

Stratified sub group sample size = (Total sample size/Entire population) * population of groups

Table 3.1 Sample size distribution.

no.	**Name of sample collected university and anization**	**Required sample collected**
1	Addis Ababa science and technology university	30
2	Semera university	19
3	Mizan-tepi university	14
4	Ethiopia construction Authority	12
	Total sample size	75

3.5 Data collection methods

The data collection for this study involved both quantitative and qualitative methods, utilizing questionnaires and interviews. The research aimed to assess the impact of communication and coordination challenges on the performance of selected university construction projects. The questionnaire, which included both closed-ended and open-ended questions, was distributed face-to-face and via Telegram to respondents involved in various university projects, selected using judgment sampling (also known as purposive sampling). The Likert scale was employed as the measurement tool (Taherdoost, 2019), adopting a 5-point scale ranging from 5 (strongly agree) to 1 (strongly disagree). Before collecting data from the

actual sample, the questionnaire was pretested on a small group of non-sampled respondents, and necessary adjustments were made based on the feedback received. The structured questionnaire was organized into five sections to effectively address the research objectives.

3.5.1 Questionnaire design and contents

First part of a questioner was gathering information about the background of the respondents.

The second part of the questionnaire was designed to collect information regarding respondents' perceptions of the factors of poor communication and coordination on project performance.

The third part Impacts of poor communication and coordination on project performance.

The fourth part of the questionnaire developing improving mechanisms of poor communication and coordination among stakeholders in specific university construction projects.

The fifth part of the questionnaire open ended on poor communication and coordination among stakeholders on the performance of specific university construction projects.

A questionnaire is a type of survey where respondents write answers to questions posed by the researcher on a question form. Properly designed questionnaires can be used as an effective and affordable tool for gathering large amounts of data within a relatively short period (Hague 1993). Constructing meaningful and interpretable questions is a complex process and requires careful word selection to ensure that the questions are asked in such a way that they are fully understood by the respondents. The research design is basically descriptive type of research which involves gathering of survey data and case study of limited projects.

There are two types of research strategies namely quantitative research and qualitative research (Naoum, 2007). Quantitative approaches seek to gather factual data and to study relationships between facts and how such facts and relationships accord with theories and the findings of any research executed previously (Fellows and Liu as cited in Al-Najjar, J., 2008).

3.6 Case study

In addition to conducting a questionnaire survey in university construction projects, this research employed a case study approach on three randomly selected projects to comprehensively evaluate the impact of communication and coordination challenges on project performance. Specifically, this study examined university construction projects in Ethiopia. The case study methodology is particularly suitable when a holistic and in-depth investigation is required (Feagin et al, .1991). Case studies involve a detailed contextual analysis of a limited number of events or conditions and their interrelationships. A crucial aspect of case studies is the unit of analysis, which typically involves a system of action rather than individual or group dynamics. Case studies are often selective, focusing on key issues that are essential for understanding the system under examination.

For the case study, data such as progress reports from on-going projects were collected. Based on the current progress and condition of project performance, factors contributing to poor performance were analysed in accordance with the set questionnaires.

Yin (1994) identified six primary sources of evidence for case study research. The use of each of these might require different skills from the researcher. Not all sources are essential in every case study, but the importance of multiple sources of data to the reliability of the study is well established (Stake, 1995; Yin, 1994). The six sources identified by Yin (1994) are:

contract documentation,
interviews,
direct observation,
participant observation, and
Monthly reports.

For the purpose of the case study in this study, the following documents were collected for analysis:

- All contract documents of the selected projects,
- Progress report to know actual completion date or current completed percentage with to date elapsed time,

- Problems recorded in the project (or with interviewing the representative of the three parties),
- Claim and correspondence letters including any justification with them,

3.7. Data processing and analysis

The responses to the questionnaire was based on Liker's scale of five ordinal measures which was from 1 to 5 arranged in ascending order according to the degree of contribution to each question, The approach adapted for this thesis was to undertake research through survey of questionnaire having descriptive output. The contribution of each of the factors Impacts poor communication and coordination challenge to overall university construction project performance was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII). This index was computed using equation (3.2).Adopted by Kumaraswany and Chan (1997, 1998), Assaf, et al. (1995) and Iyer & Jha (2005).

$$\mathbf{R}=\frac{\sum \mathbf{w}}{\mathbf{A}\times\mathbf{N}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2$$

Where w is the total weight given to each factor by the respondents, which ranges from 1 to 5 and is calculated by an addition of the various weightings given to a factor by the entire respondent; A is the highest ranking available (i.e. 5 in this case) and N is the total number of respondents that have answered the question.

The analysis was aided by the use of Statistic Package for Social Science (SPSS) where the scores assigned to each factor by the respondents were entered and consequently the responses from the questionnaires were subjected to statistical analysis for further insight.

3.8. Reliability and validity of the data

3.8.1. Validity of the data

The validity of the data pertains to whether the findings accuracy reflects what they relevance to represent. To minimize any lack of validity in this study, measures were taken to exclude irrelevant data and ensure that sufficient relevant data were collected for analysis. In this study data validity is checked by construct validity type by using version 26 -SPSS software, the convergent validity is checked by person correlation moment and it is below the results of cronbach's alpha and the results of discriminant validity is below 0.70 which means it is

acceptable. This approach helped maintain the integrity and reliability of the research outcomes.

3.8.2. Reliability of data

A study was done to evaluate the reliability of the questionnaire. The reliability of the tool shows that the research results are consistent and can be replicated in a similar study. The Cronbach's coefficient, a measure of reliability, was used to calculate the reliability of the questionnaire. A coefficient of 0.7 or higher indicates a reliable tool. Using SPSS version 26.0, the Cronbach's coefficient alpha was determined for the factors poor communication and coordination in Ethiopia university construction projects to project performance, as shown in Table 3.2, and found to be 0.742. These values being above 0.7, the questionnaire is considered reliable.

Table-3.2:-Total factors Reliability taste result

Reliability Statistics	
Cronbach's Alpha	**N of Items**
0.742	42

Table -3.3: data reliability test standards by using Cronbach‘s Alpha

NO.	**Cronbach‘s Alpha**	**Internal consistency**
1	0.91-1	Excellent
2	0.81-0.9	Good
3	**0.71-0.8**	**Acceptable**
4	0.61-0.7	Questionable
5	0.51-0.6	Poor
6	0-0.5	Unacceptable

3.8.4. Person correlation analysis

The study was analysed according to the required standards by each survey respondent as outlined below:

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

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

A Pearson product- moment correlation was conducted to examine the relationship between ten top variables.

Correlation analysis indicates both direction and strength of the relationship between two variables.

Understanding Correlation Coefficients

Direction of the Relationship:

1. Positive Correlation: A positive coefficient indicates that as one variable increases, the other variable also tends to increase. For example, height and shoe size often have a positive correlation.

2. Negative Correlation: A negative coefficient indicates that as one variable increases, the other variable tends to decrease. For instance, the prices of a product and its sales quantity typically have a negative correlation.

Strength of the Relationship:

The strength is determined by the absolute value of the correlation coefficient, which ranges from 0 to 1.

Very Strong: Coefficients close to 1 or -1 indicate a very strong relationship.

Strong: Coefficients between 0.5 and 0.7 (or -0.5 and -0.7) suggest a strong relationship.

Moderate: Coefficients between 0.3 and 0.5 (or -0.3 and -0.5) indicate a moderate relationship.

Weak: Coefficients between 0 and 0.3 (or 0 and -0.3) suggest a weak relationship.

No Correlation: a coefficient of 0 indicates any linear relationship between the variables

CHAPTER FOUR

4. ANALYSIS AND DISCUSSIONS

4.1. Introduction

This thesis provides a comprehensive analysis to assess the impact of poor communication and coordination challenges on project performance in selected construction projects in Ethiopia. Drawing from a literature review and past studies, it discusses the general landscape of performance measurement. Additionally, it examines the theoretical background of performance measurement to identify potential factors influencing project performance in specific university construction projects.

In these chapter explanations to the issues related to distribution of the questionnaire, collection of responses, subsequent analysis and discussion of the data acquired through the responses from professionals including the case study are presented.

The primary objective is to rank the identified performance factors and determine the key factors that require attention in measuring project performance under contracts. This will help significantly reduce the impact of poor communication and coordination challenges on project performance in university construction projects.

4.2. Descriptive statistics of respondent's background

In this section, the data is being explored and some descriptive summaries of the study variables are presented. The descriptive summaries of the study variables are gender, educational background, and position of respondents and work Experience are followed in detailed tables 4.1below.

Table 4.1.Respondents' distribution back ground

NO.	Name of All project party	Number All of distribution	Number of responses	Number of distributed in %	Number of respondents in %
1	Client	20	20	100	100
2	Contractor	22	20	100	90.9
3	Consultant	21	20	100	95.23
4	Regulatory Authority	12	12	100	100
Total		75	72	100	96.53%

A total of 75 questionnaires were distributed as follows: 20 to consultant engineers working on three university projects, 22 to contractor engineers working on three university projects, and 21 to client engineers working on three university projects. Additionally, 12 questionnaires were distributed to engineers on the construction supervision team at the Ethiopian Construction Authority. Of the 75 questionnaires distributed, 72 responses were received, comprising 20 (100%) from clients, 20 (90.9%) from contractors, 20 (95.23%) from consultants and 12(100%) from Ethiopia construction Authority.

Table 4.2 Education back ground

Description	**Educational Level of Respondents**					
Education back g roundof respondents	**Certificate**	**Diploma**	**B.SC**	**M.SC**	**Non professional**	**Total respondents**
	2	2	39	29	1	72
Present %	2.8%	2.8	54.16	40.2%	1.3%	100%

Table 4.3.Position of respondents

Description	**Position Level of Respondents**					
Position of the respondent	**CEO/Director**	**Project manager**	**Project/office &/ Engineer**	**Economist**	**Others/ Eca sup.vis and marketing/**	**Total respondents**
	8	9	46	-	9	72
Present %	11.11%	12.5%	63.88%	0	12.5%	100%

Table 4.4. Work Experience of respondent

Description	**Experience Level of Respondents in years**				
Work experience of the respondent	**0-5 years**	**5-10years**	**10-15years**	**More than 15 years**	**Total respondents**
	15	36	11	10	72
Present %	20.83%	50%	15.27%	13.9%	100%

4.3. Top ten critical common factors

Analysis of the data has been made using the above-mentioned statistical methods considering the identified critical factors project performance. The results of this part of study provide an indication of the relative importance index and rank of critical factors influencing the impact of poor communication and coordination challenges on project performance in three university construction projects in Ethiopia. The results of this part of study provide an indication of the relative importance index and rank of factors affecting the project performance in university construction projects. Prior to identifying critical client, contractors ,consultants and ECA related factors affecting project performance, the reliability and internal consistency of the data were tested to ensure validity.

4.3.1 Relative Importance Index (RII)

The RII is the relative importance of each variable according to each responses weight.

Table 4.5:- common factors, average RII values and ranks

NO.	A. factors related to poor communication in project performance	RII					Ranks
		client	Contractor	consultant	Cons. Authority	Average RII	
1	Lack of a shared language and cultural differences between stakeholders and kers can led to misunderstandings that impact project performance.	0.35	0.62	0.61	0.7	0.57	35
2	Lack of standardized communication protocols that are without clear rules can to cost and time overruns in projects.	0.96	0.87	0.89	0.78	0.86	10
3	Multiple stakeholders with different roles complicate communication cesses	0.56	0.7	0.73	0.68	0.67	33
4	Possessing differed skills levels among construction teams can led to Rework redesign occurrence	0.79	0.78	0.7	0.77	0.76	25
5	A lack of an effective communication system and platform can led to interpretation among parties and delays in project timelines.	0.83	0.90	0.95	0.92	0.90	3
6	Inconsistent reporting by contractors and consultants makes it difficult for eholders to track progress accurately.	0.92	0.88	0.93	0.88	0.91	2
7	In adequate Stakeholder information such as their roles, responsibility	0.81	0.89	0.88	0.92	0.88	5

	and communication preference						
8	Variations in technical knowledge among qualified technical teams can led to understandings about project requirements.	0.69	0.75	0.79	0.85	0.77	19
9	Less Frequency of communication can impact of project performance	0.76	0.74	0.73	0.88	0.78	18
10	The lack of reporting feedback to each level of hierarchy can negatively act project performance.	0.77	0.78	0.81	0.83	0.80	14
11	The project's communication methods, including email, phone calls, and in-son meetings, are not clearly established, led to ambiguity.	0.72	0.65	0.73	0.73	0.71	29
12	Gender differences	0.50	0.52	0.44	0.47	0.48	36
13	Worker's lack of motivation to improve working skills	0.72	0.75	0.76	0.65	0.72	27
14	The complexity of the construction industry	0.64	0.71	0.71	0.77	0.71	30
B	**factors related to poor coordination in project performance**						
15	Large-scale projects involve multiple parties with varying interests, making rdination challenging	0.75	0.7	0.75	0.82	0.76	24
16	Traditional contractual arrangements often hinder flexible collaboration ween parties involved in projects.	0.97	0.89	0.91	0.75	0.88	6
17	The use of ineffective construction management strategies, such as the ence of integrated systems, disrupts seamless coordination among teams.	0.72	0.74	0.79	0.85	0.78	17
18	Lack of clear objectives, Lack of mutual respect and trust among construction ns are the cause of project performance.	0.92	0.93	0.90	0.77	0.88	7
19	The way teams coordinate their efforts is impacted by varying organizational ctures, potentially leading to errors in instructions or technical details.	0.63	0.76	0.74	0.65	0.70	31
20	Inadequate control over subcontractors' work by main contractors, often due	0.75	0.79	0.77	0.83	0.79	16

	nsufficient supervision, results in poor oversight, leads to inconsistencies in n quality and timing."						
21	Construction projects frequently encounter conflicts and disputes stemming n inadequate coordination.	0.72	0.87	0.78	0.85	0.81	12
22	Construction projects are frequently disrupted by public concerns and delays decision-making, which can cause ineffective teamwork coordination and mately lead to project timeline overruns.	0.90	0.89	0.97	0.92	0.92	1
23	Goal selection, task decomposition	0.65	0.71	0.72	0.60	0.67	32
C	**Factors related to project managers and Stakeholders**						
24	construction managers' commitments and meeting stakeholder expectations uire effective communication to align their goals with project objectives, phasizing its critical role in maintaining stakeholder satisfaction	0.91	0.87	0.84	0.92	0.89	4
25	Effective communication aid in identifying risks early, and how does rdination ensure that mitigation strategies are implemented promptly, tributing to the success of risk management?	0.74	0.83	0.82	0.78	0.79	15
26	Positive team dynamics foster an environment where open communication is ouraged, enhancing collaboration among team members and reinforcing its ue for cohesive teamwork.	0.70	0.84	0.82	0.83	0.80	13
27	Leveraging technology facilitates smoother information exchange across ns, improving overall coordination by providing tools for efficient data sharing collaboration	0.9	0.51	0.84	0.82	0.77	20
D	**Factors related to relation ships**						
28	customer relationships	0.74	0.72	0.73	0.78	0.74	26

29	contractors relationships	0.9	0.87	0.86	0.87	0.88	8
30	Supplier relationships	0.73	0.71	0.78	0.85	0.77	21
31	consultant relationship	0.81	0.8	0.87	0.9	0.85	11
E	**Factors related to External conditions**						
32	Legal and regulatory limitations	0.68	0.76	0.76	0.87	0.77	22
33	Weather condition	0.66	0.76	0.75	0.72	0.72	28
34	Stability of politics	0.72	0.83	0.80	0.68	0.76	23
35	Market conditions	0.86	0.96	0.84	0.87	0.88	9
36	Others conditions	0.61	0.56	0.54	0.75	0.61	34

The analysis of Table 4.5, Provides a comprehensive insight into the ten most critical factors affecting communication and coordination challenges in university construction projects in Ethiopia, with a focus on their impact on project performance. The descriptive statistics reveal that the measures of central tendency, such as mean values, exhibit a progressive decline from top to bottom among these factors. Conversely, the measures of variability, including standard deviation, show a corresponding increase. This trend indicates that the variability of impact becomes more pronounced as the ranking descends, underscoring the complexity of these challenges. Overall, these statistical findings underscore the substantial influence that communication and coordination challenges have on the performance of construction projects in Ethiopian university emphasizing the need for effective strategies to mitigate these impacts.

4.3. 2. Common ten most significant communication and coordination related factors

The study analysed the average Relative Importance Index (RII) values and their corresponding rankings for the most frequently cited factors from questionnaire responses across three university construction projects and the Ethiopian Construction Authority (ECA). The results are presented below.

100% - The analysis identified common factors across three university construction projects and the Ethiopian Construction Authority (ECA) survey (four of four initiatives).

75% - The analysis identified common factors across three university construction projects and the Ethiopian Construction Authority (ECA) survey (three of four initiatives).

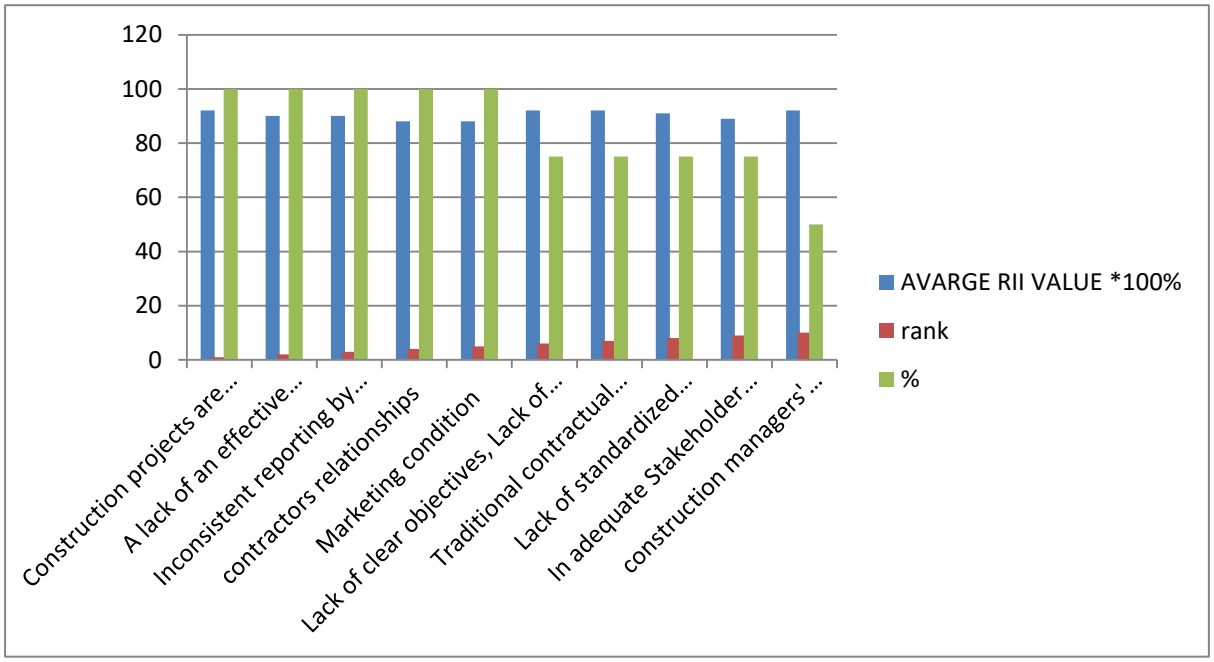
50%- The analysis identified common factors across three university construction projects and the Ethiopian Construction Authority (ECA) survey (two of four initiatives).

25% - The analysis identified common factors across three university construction projects and the Ethiopian Construction Authority (ECA) survey (one of four initiatives).

Table 4.6 Common Ten most significant communication and coordination factors and average RII values

NO	**Key communication and coordination factors impacting university construction project performance.**	**average RII**	**RANK**	**100%**
1	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.	0.92	1	100%
2	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.	0.90	3	100%
3	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	0.91	2	100%
4	contractors relationships	0.88	8	100%
5	Marketing condition	0.88	9	100%
6	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.	0.88	7	75%
7	Traditional contractual arrangements often hinder flexible collaboration between parties involved in projects.	0.88	6	75%
8	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects	0.86	10	75%

9	In adequate Stakeholder information such as their roles, responsibility and communication preference	0.88	5	75%
10	construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction	0.89	4	50%



Figur-2: common top ten factors

1. University construction projects often face significant challenges stemming from public concerns and prolonged decision-making processes. These issues result in poor coordination among teams, ultimately leading to extended project timelines. Analysis of data from three university projects and Ethiopian construction Authority -sector surveys reveals that ineffective teamwork coordination, coupled with public interest conflicts and bureaucratic delays, emerged as the most critical factors affecting project outcomes. Survey responses from stakeholders identified these elements as the foremost contributors to project inefficiencies. The Relative Importance Index (RII) of 0.92 underscores their dominant role compared to other variables, highlighting the urgent need for improved collaboration frameworks and streamlined decision-making protocols in such projects.

2. Ineffective Communication Systems as a third Critical Factor, The absence of robust communication systems and collaborative platforms in university construction projects often results in misinterpretations between stakeholders and delays in project timelines. Survey data from three Ethiopian university projects and national construction-sector analyses identify this deficiency as the second most significant factor impacting project performance.

The lack of integrated communication tools and standardized protocols creates bottlenecks in information sharing, leading to avoidable setbacks. According to responses from the Ethiopian Construction Authority and project-specific surveys, these gaps directly correlate with timeline overruns. The Relative Importance Index (RII) of 0.90 further validates the critical role of communication infrastructure in ensuring project efficiency.

3. Inconsistent Reporting as a Critical Performance Factor, irregular reporting practices by contractors and consultants in university construction projects create significant challenges for stakeholders in monitoring progress effectively. Survey data from three Ethiopian university projects and national construction-sector analyses identify inconsistent reporting as the third most dominant factor influencing project performance.

Discrepancies in documentation and progress updates hinder transparency, leading to misaligned expectations and operational inefficiencies. Responses from the Ethiopian Construction Authority and project-specific surveys attribute timeline delays and accountability gaps directly to these irregularities. The Relative Importance Index (RII) of 0.90 underscores the critical need for standardized reporting frameworks to mitigate risks and enhance project oversight.

4.Contractor Relationships as a Key Performance Factor, Suboptimal relationships between sub-contractors and stakeholders rank as the fourth most critical factor influencing the performance of university construction projects. Poor coupled with inadequate communication and coordination among stakeholders, often leads to deviations from standard timelines, budget overruns, and inefficient resource allocation.

Data analysis from three Ethiopian university projects and sector-wide surveys conducted by the Ethiopian Construction Authority highlight how fractured stakeholder dynamics disrupt adherence to project benchmarks. Specifically, weak collaboration and ambiguous accountability structures contribute to recurring inefficiencies. The Relative Importance

Index (RII) of 0.88 underscores the necessity of fostering trust and alignment among all parties to ensure project success.

5. Marketing Conditions as a Critical Performance Determinant, Volatile marketing environments characterized by global and national economic instability and unreliable forecasting mechanisms emerge as the fifth most influential factor affecting university construction project performance. These conditions disrupt adherence to standardized timelines, cost frameworks, and resource allocation protocols, particularly in institutionally complex projects.

Data from three Ethiopian university projects and national construction-sector surveys reveal that unpredictable market fluctuations and insufficient predictive analytics undermine procurement strategies and supply chain resilience. This aligns with global construction-sector challenges identified in reports such as the Management of Global Construction Projects, which emphasizes the risks posed by geopolitical uncertainties and fragmented market intelligence. The Relative Importance Index (RII) of 0.88 underscores the urgency of integrating adaptive marketing frameworks to mitigate these risks.

6. Unclear project objectives and insufficient mutual trust among construction teams represent the sixth most significant factor undermining performance in university construction projects. These deficiencies often lead to misaligned priorities, communication breakdowns, and inefficiencies in resource allocation, ultimately compromising timelines, budgets, and quality standards.

Contractual and Operational Implications, the absence of well-defined goals and collaborative team environments creates systemic risks, particularly in multi-stakeholder agreements where accountability and clarity are paramount. Data from three Ethiopian university projects and national construction-sector surveys conducted by the Ethiopian Construction Authority confirm that poorly articulated objectives and fractured team relationships directly correlate with delays, cost overruns, and contractual disputes. The Relative Importance Index (RII) of 0.92 is analysed.

7. Traditional procurement models, characterized by inflexible contractual arrangements, significantly hinder collaborative dynamics among stakeholders in university construction projects. These conventional frameworks often create adversarial relationships, misaligned

incentives, and communication silos, leading to inefficiencies in timeline adherence, cost control, and resource optimization. The Relative Importance Index (RII) of 0.92 is analysed.

Data from two Ethiopian university projects and national construction-sector surveys conducted by the Ethiopian Construction Authority identify rigid traditional contracts particularly those following the design-bid-build model as a primary contributor to project underperformance.

8. Standardized Communication Protocols as a Critical Performance Factor, The absence of clearly defined communication protocols in university construction projects frequently results in cost overruns, timeline deviations, and resource misallocation. These deficiencies in standardized communication frameworks disrupt stakeholder alignment, creating ambiguities in roles, reporting hierarchies, and decision-making processes.

Data from two Ethiopian university projects and national construction-sector surveys conducted by the Ethiopian Construction Authority reveal that unstructured communication practices—such as inconsistent reporting formats and ad-hoc information sharing(informal, temporary system where devices or individuals share information directly and opportunistically without a pre-established, centralized infrastructure) directly correlate with inefficiencies. The Relative Importance Index (RII) of 0.91 is analysed.

9. Inadequate stakeholder information including unclear roles, responsibilities, and communication preferences impacts the performance of university construction projects. Such information gaps often lead to projects failing to meet required standards. Data from two Ethiopian university projects and national construction-sector surveys conducted by the Ethiopian Construction Authority (ECA) indicate a high Relative Importance Index (RII) value of 0.89, underscoring this issue as a critical factor in project performance.

10. Effective communication is essential for aligning construction managers' commitments and stakeholder expectations with project goals, playing a critical role in ensuring stakeholder satisfaction. However, inconsistent application of this communication role across projects leads to benchmarking standard failures and heightened stakeholder dissatisfaction. Analysis of data from one Ethiopian university project and national construction-sector surveys conducted by the Ethiopian Construction Authority (ECA) revealed a high Relative Importance Index (RII) value of 0.89, highlighting this commitment factor as a key determinant of project success.

4.3.3 Top ten critical factors Pearson correlation analysis and standard requirements

Table 4.8 Top ten clients related critical factors Pearson correlation analysis

No	**Description**	Traditional contractual arrangements often hinder flexible collaboration between parties involved in projects.	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.	construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction	contractors relationships	Leveraging technology facilitates smoother information exchange across teams, improving overall coordination by providing tools for efficient data sharing and collaboration	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.	Market conditions	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.
1	Traditional contractual arrangements often hinder	1	0.384	0.514*	0.229	-.066	-.094	-.243	-.228	.543*	0.339

	flexible collaboration between parties involved in projects										
2	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	0.384	1	0.080	.080	.027	-.264	-.226	-.213	.507*	.317
3	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	.514*	0.080	1	.167	-.221	-.275	.000	.554*	.142	.086
4	Lack of clear objectives, Lack of mutual respect and trust among construction	.229	.080	167	1	.055	.000	.000	.000	.650**	.516*

	teams are the cause of project performance.										
5	construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction	-.066	.027	-.221	.055	1	.774**	-.273	-.183	.249	.444
6	contractors relationships	-.094	-.264	-.275	.000	.744**	1	-.389	-.366	.067	.355
7	Leveraging technology facilitates smoother information	-.243	-.226	.000	.000	-.273	-.389	1	.438	-.115	-.101

	exchange across teams, improving overall coordination by providing tools for efficient data sharing and collaboration										
8	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns	-.228	-.213	.554*	.000	-.183	-.366	.438	1	-.270	-.095
9	Market conditions	.543*	.507*	.142	.650**	.249	.067	-.115	-.170	1	.807**
10	A lack of an effective communication	.339	.317	.086	.516*	.444	.355	-.101	-.095	-.807**	1

	system and platform can led to misinterpretation among parties and delays in project timelines.										

Therefore the interpretation between the top ten client-related variables is outlined below for more detailed information, which can be found in Table 4.8.

Traditional contractual arrangements often impede flexible collaboration among parties involved in a project. This issue is more closely related to inconsistent reporting by contractors and consultants, which makes it challenging for stakeholders to accurately track progress and assess market conditions. The findings show significant correlations ($r = 0.514$ and 0.543, $p < 0.05$) between these factors. Specifically, inconsistent reporting by contractors and consultants contributes additional to market condition more significantly to the variability in traditional contractual arrangements than other variables do. This suggests that such reporting issues have a greater impact on hindering flexible collaboration in projects.

The absence of standardized communication protocols with clear rules can lead to cost and time overruns in projects. This issue is more strongly associated with market conditions, as evidenced by a significant correlation ($r = 0.507$, $p < 0.05$). The findings suggest that market conditions account for a larger portion of the variability in the lack of standardized communication protocols than other variables do. This implies that market conditions have a more substantial impact on the challenges posed by inadequate communication protocols in projects.

Inconsistent reporting by contractors and consultants significantly hinders stakeholders' ability to track project progress accurately. This issue is closely linked to traditional contractual arrangements, which often impede flexible collaboration among project parties. Construction projects are frequently disrupted by public concerns and delays in decision-making, leading to ineffective teamwork coordination and ultimately causing project timeline overruns. The study found correlations of 0.514 and 0.554 ($p < 0.05$), indicating that these disruptions and traditional contractual arrangements contribute more substantially to the variability in inconsistent reporting than other factors. As a result, they exacerbate the challenges stakeholders face in monitoring progress accurately.

The absence of clear objectives and mutual respect and trust among construction teams are significant factors affecting project performance. A lack of an effective communication system and platform can lead to misinterpretation among parties and delays in project timelines. Additionally, market conditions play a crucial role. The findings show that the degree of freedom in market conditions has a strong correlation with project performance,

with correlation coefficients of r (198) = 0.650** and 0.516*, respectively, at $p < 0.01$ and $p < 0.05$. The results indicate that ineffective communication systems and market conditions account for more variability in project performance issues such as unclear objectives and lack of team cohesion than other factors.

construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction was much more strongly positively related to contractors relationships, Degree of freedom, $r(198)=.774$, $p<0.01$. The finding indicated that contractors relationships much more of the variability in construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction than the rest of other variables.

Construction projects often face disruptions due to public concerns and delays in decision-making, which can lead to ineffective teamwork coordination and ultimately result in project timeline overruns. Inconsistent reporting by contractors and consultants poses a significant challenge for stakeholders, making it difficult to accurately track project progress. The findings show a positive correlation between these factors and project timeline issues, with a correlation coefficient of r (198) = 0.554 at $p < 0.05$. The results suggest that inconsistent reporting by contractors and consultants is more strongly associated with project timeline issues than other variables.

Market conditions were strongly and positively related to several factors. Traditional contractual arrangements often impede flexible collaboration among project stakeholders. The absence of standardized communication protocols with clear rules can lead to cost and time overruns in projects. Moreover, an ineffective communication system and platform can result in misinterpretation among parties and delays in project timelines. The degree of freedom, with correlation coefficients of 0.543, 0.507, and 0.807 (significant at $p < 0.05$ and $p < 0.01$, respectively), indicates that these factors explain more of the variability in market conditions than other variables. The findings suggest that traditional contractual arrangements, lack of standardized communication protocols, and ineffective communication systems are key contributors to project issues, influencing market conditions more significantly than other factors.

A lack of an effective communication system and platform can lead to misinterpretation among parties and delays in project timelines. This issue was strongly and positively related to the lack of clear objectives and the absence of mutual respect and trust among construction teams, which are significant factors affecting project performance and market conditions. The degree of freedom, with correlation coefficients of 0.516 and -0.807 (significant at $p < 0.05$ and $p < 0.01$, respectively), indicates that these factors explain more of the variability in communication-related project issues than other variables. The findings suggest that unclear objectives and a lack of team cohesion are major contributors to project performance issues and market conditions, influencing communication challenges more significantly than other factors.

The remaining variables from top ten in client- side variables were statistically analysed for correlation, with detailed results presented above in Table 4.7. The correlation coefficients for all factors ranged from -1 to 1.

Pearson correlation analysis Top ten critical factors results for all contractor-side variables across the three universities

Table 4.9 Top ten contractors related critical factors Pearson correlation analysis

No.	**Description**	Market conditions.	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance..	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines..	Inadequate Stakeholder information such as their roles, responsibility and communication preference	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.	Traditional contractual arrangements often hinder flexible collaboration between parties involved in projects.	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	Construction projects frequently encounter conflicts and disputes stemming from inadequate coordination.	contractors relationships
1	Market conditions	1	.432	.490*	.229	.586**	-.185	.514*	.418	-.198	-.061

2	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.	.432	1	.086	.315	.335	.034	.140	-.105	.000	.043
3	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines..	.490*	.086	1	.102	.109	.024	.357	.688**	-.177	-.124
4	In adequate Stakeholder information such as their roles, responsibility and communication preference	.229	.315	.102	1	.177	.140	-.042	.187	-.144	.178
5	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.	.586**	.335	.109	.177	1	-.024	.399	.469*	.000	-.030
6	Traditional contractual arrangements often hinder	-.085	.034	.024	.140	-.024	1	.239	.138	.000	-.124

	flexible collaboration between parties involved in projects.										
7	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	.514*	.140	.357	-.042	.399	.239	1	.343	-.289	-.203
8	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	.418	-.105	.688**	.187	.469*	.138	.343	1	.000	-.109
9	Construction projects frequently encounter conflicts and disputes stemming from inadequate coordination.	.198	.000	-.177	-.144	.000	.000	-.289	.000	1	-.176
10	Contractor's relationships.	-.061	.043	-.124	.178	-.030	-.124	-.203	-.109	-.176	1

Marketing conditions showed a strong positive correlation with construction project disruptions caused by public concerns and delays in decision-making ($r(198) = 0.586^{**}$, $p < .001$). These disruptions often result in ineffective team coordination and project timeline overruns. Additionally, the absence of an effective communication system/platform was linked to misinterpretations among stakeholders and delays ($r = 0.490^{*}$, $p < .005$), while inconsistent reporting by contractors and consultants hindered accurate progress tracking, ($r = 0.514^{*}$, $p < .005$). A full list of correlations is provided in Table 4.9. These findings suggest that public concerns explain a greater proportion of marketing condition variability compared to other factors like communication gaps or reporting inconsistencies.

The absence of an effective communication system and platform, which can lead to misinterpretations among stakeholders and project timeline delays, demonstrated a strong positive correlation with the lack of standardized communication protocols ($r(198) = 0.688^{**}$, $p < .001$). These protocol deficiencies, characterized by unclear guidelines, were more strongly associated with cost and time overruns in projects than market conditions ($r(198) = 0.490^{*}$, $p < .005$). A complete list of correlations is presented in Table 4.9. These findings indicate that the absence of standardized communication protocols specifically the lack of clear rules explains a greater proportion of the variance in communication system inefficiencies (misinterpretations and delays) compared to other factors such as market conditions.

Construction projects are often disrupted by public concerns and decision-making delays, which can result in poor team coordination and project timeline overruns. These disruptions showed a stronger positive correlation with market conditions ($r(198) = 0.586^{**}$, $p < .001$) than with the absence of standardized communication protocols a lack of clear guidelines that often leads to cost/time overruns ($r(198) = 0.469^{*}$, $p < .005$) and other top ten factors listed in Table 4.9. The findings indicate that market conditions account for a significantly larger proportion of the variance in project disruptions (public concerns, decision delays, and their cascading effects) compared to other variables like communication protocol deficiencies.

Inconsistent reporting by contractors and consultants, which hinders stakeholders' ability to track project progress accurately, demonstrated a stronger positive correlation with market conditions degree of freedom ($r(198) =$ correlation coefficient 0.514,signicant at $p < .005$) than with other top ten variables. These findings indicate that market conditions account for a

significantly larger proportion of the variance in inconsistent reporting issues compared to other contributing factors.

The absence of standardized communication protocols specifically the lack of clear rules showed a stronger positive correlation with ineffective communication systems/platforms (which cause misinterpretations and project delays) than with public concerns and decision-making delays in construction projects. Statistical results indicate:

Communication System Deficiencies: $r(198) = 0.688^{**}$, $p < .001$

Public Concerns/Decision Delays: $r(198) = 0.469^{*}$, $p < .005$

These findings, along with other top ten factors listed in the analysis, demonstrate that communication system flaws (misinterpretations and timeline delays) account for a significantly larger proportion of the variance in cost/time overruns caused by unstandardized protocols compared to external factors like public concerns or team coordination issues.

The remaining variables from top ten in contractor side variables were statistically analysed for correlation, with detailed results presented above in Table 4.9. The correlation coefficients for all factors ranged from -1 to 1.

Pearson correlation analysis Top ten critical factors results for all consultants-side variables across the three universities

Table 4.10 Top ten consultants related critical factors Pearson correlation analysis

NO.	Description	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns..	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	Traditional contractual 71arrangement often hinders flexible collaboration between parties involved in projects.	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	In adequate Stakeholder information such as their roles, responsibility and communication preference.	consultant relationship	contractors relationships	Marketing condition.
1	Construction projects are frequently disrupted	1	-.150	-.162	.267	.380	.053	.229	.665**	.316	.229

	by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.										
2	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.	.432	1	.086	.315	.335	.034	.140	-.105	.000	.043
3	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	-.162	-.059	1	-.200	.030	-.170	-.015	-.164	-.189	-.258

4	Traditional contractual arrangements often hinder flexible collaboration between parties involved in projects.	.267	-.186	-.200	1	.094	.066	.126	.078	-.089	-.248
5	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.	.380	-.039	.030	.094	1	-.164	.664**	.604**	.322	.166
6	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.	.053	.564**	-.170	.066	-.147	1	-.340	.245	.084	.344
7	In adequate Stakeholder information such as their roles, responsibility and	.229	-.097	-.015	.126	.664**	-.340	1	.415	.371	-.181

	communication preference										
8	consultant relationship	.665**	.399	-.164	.078	.604**	.245	.415	1	.649**	.345
9	contractors relationships	.316	.382	-.189	-.089	.322	.084	.371	.619**	1	.109
10	Market conditions	.229	.073	-.258	-.248	.166	.344	-.181	.335	.109	1

Construction projects often face disruptions from public concerns and decision-making delays, which can result in poor team coordination and project timeline overruns. These disruptions showed a stronger positive correlation with consultant relationships ($r(198) = 0.665^{**}$, $p < .001$) than with other top ten variables, as detailed in Table 4.10.The findings indicate that consultant relationships account for a significantly larger proportion of the variance in project disruptions (public concerns, decision delays, and their cascading effects) compared to other factors.

Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects was strongly positively correlated to A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines., degree of freedom(r(198)= correlation coefficient 0.564, significant at p<.001,than to other top ten variables complete list of correlation is presented in Table 4.10. These finding indicated that A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines much more of the variables in Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects than does other factors.

In adequate Stakeholder information such as their roles, responsibility and communication preference was strongly positively correlated Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance, degree of freedom(r(198)= correlation coefficient 0.664**, significant at p<.001,than to other top ten variables complete list of correlation is presented in Table 4.10. These finding indicated that Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance much more of the variables in In adequate Stakeholder information such as their roles, responsibility and communication preference than does other factors.

consultant relationship was strongly positively correlated to contractors relationships, Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance, Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns ,degree of freedom(r(198)= correlation coefficient 0.665**,0 .604** and 0.649** respectively , significant at p<.001,than to other top ten variables complete list of correlation is presented in Table 4.10. These finding

indicated contractors relationships, Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance, Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns much more of the variables in consultant relationship than does other factors.

Contractors relationships was strongly positively correlated to consultant relationships, degree of freedom(r(198)= correlation coefficient 0.619**, significant at p<.001,than to other top ten variables complete list of correlation is presented in Table 4.10. These finding indicated that consultant relationships much more of the variables in contractors relationships than does other factors. Table 4.10 indicates that the remaining respondents maintained a neutral stance.

Pearson correlation analysis Top ten critical factors results for ECA-side variables across the three universities

Table 4.11 Top ten ECA related critical factors Pearson correlation analysis

NO.	Description	construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.	In adequate Stakeholder information such as their roles, responsibility and communication preference	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns..	consultant relationship	Less Frequency of communication can impact of project performance	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	contractors relationship	Market conditions	Legal and regulatory limitations
1	Construction projects are frequently	**1**	0.242	-0.022	0.506	0.131	0.371	0.060	0.181	0.452	0.181

	disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.										
2	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines.	0.242	**1**	**.797****	**.593***	0.101	0.286	**.598***	0.139	0.557	0.139

3	In adequate Stakeholder information such as their roles, responsibility and communicatio n preference	-0.022	**.797****	**1**	0.390	-0.101	0.022	0.184	-0.070	0.139	-0.070
4	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns..	0.506	**.593***	0.390	**1**	0.101	0.550	0.046	0.348	0.557	0.348

5	consultant relationship	0.131	0.101	-0.101	0.101	**1**	-0.393	0.000	**.828****	0.207	**.621***
6	Less Frequency of communication can impact of project performance	0.371	0.286	0.022	0.550	-0.393	**1**	0.299	-0.181	0.361	-0.181
7	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.	0.060	**.598***	0.184	0.046	0.000	0.299	**1**	0.047	**.614***	0.047
8	contractors relationships	0.181	0.139	-0.070	0.348	**.828****	-0.181	0.047	**1**	0.357	**.786****
9	Market conditions	0.452	0.557	0.139	0.557	0.207	0.361	**.614***	0.357	**1**	0.571
10	Legal and regulatory limitations	0.181	0.139	-0.070	0.348	**.621***	-0.181	0.047	**.786****	0.571	**1**

Ineffective communication systems and platforms can cause misinterpretations and project delays, strongly correlating with inadequate stakeholder information (roles, responsibilities, communication preferences). Such deficiencies frequently disrupt projects through public concerns, decision-making delays, and poor teamwork coordination, ultimately leading to timeline overruns. Inconsistent contractor/consultant reporting further complicates progress tracking. Statistical analysis ($r(198) = 0.797^{**}, 0.593^{*}, 0.598^{*}$; $p<0.001$, $p<0.05$) reveals these factors exert a significantly stronger influence than other variables (see Table 4.11).

Inadequate stakeholder information (roles, responsibilities, communication preferences) strongly correlates with ineffective communication systems, leading to misinterpretations and project delays ($r(198) = 0.797^{**}$, $p<0.001$). This factor exerts a significantly greater influence compared to other variables (see Table 4.11).

Construction project disruptions (public concerns, decision-making delays) causing ineffective teamwork and timeline overruns strongly correlate with ineffective communication systems, which lead to misinterpretations and delays ($r(198)=0.593^{*}$, $p<0.05$). These factors exert significantly greater influence than others, as detailed in Appendix-Table 4.11.

Consultant relationships strongly correlate with marketing conditions and legal/regulatory limitations ($r(198)=0.828^{**}$, $p<0.001$; 0.621^{*}, $p<0.05$), exerting greater influence than other variables (see Table 4.11).

Inconsistent contractor/consultant reporting, hindering accurate progress tracking, strongly correlates with ineffective communication systems (misinterpretations, delays) and marketing conditions ($r(198)=0.598^{*}$, 0.614^{*}; $p<0.05$), exerting greater influence than other variables (see Table 4.11).

Contractors relationships was strongly positively correlated to consultant relationships and Legal and regulatory limitations degree of freedom($r(198)$= correlation coefficient 0.828^{**} and 786^{**} , significant at $p<.001$,than to other top ten variables complete list of correlation is presented in Table 4.11. These finding indicated that consultant relationships and Legal and regulatory limitations much more of the variables in contractors relationships than does other factors.

Marketing conditions strongly correlate with inconsistent contractor/consultant reporting ($r(198) = 0.614^{*}$, $p<0.05$), which hinders progress tracking and exerts greater influence than other variables (see Table 4.11).

Legal and regulatory limitations strongly correlate with consultant and contractor relationships ($r(198) = 0.621^{*}$, $p<0.05$; 0.786^{**}, $p<0.001$), exerting greater influence than other variables (see table 4.19). Table 4.11 in indicates that the remaining respondents maintained a neutral stance.

4.4. Results and discussion of factors by category

To identify the critical challenges affecting project performance in Ethiopia university construction projects the case of poor communication and coordination on stakeholders. The identified factors were ranked in their order of importance. The following steps have been followed to rank the factors and sort out the critical ones.

Relative importance indices have been carried out using statistical method.

Factors have been ranked in the order of their common factors among four categories grouped in presently/%/.

Importance indices have also been determined for each of the ten major causes affecting performance by taking the average of the importance indices under each common factor group.

The major groups of factors affecting performance have also been ranked and the degree of agreement level of the sets of rankings was determined.

This study examines the ranked factors of communication and coordination challenges on project performance, focusing on university construction projects in Ethiopia. The analysis identifies 10 primary factors (selected from 36 critical factors) that significantly influence performance, categorized as follows: 40% communication-related, 30% coordination-related, 10% project manager and stakeholder factors, 10% relationship factors, and 10% external conditions.

When comparing factors influencing the performance of university construction projects in Ethiopia with those in other countries, the majority of factors remain similar; however, their degree of impact varies across different nations.

Based on the identified factors and evaluated impact this section detailed discussion addresses and to improved mitigation measures following the outcome of the study in order to minimize the major affecting factors and their increases project performance.

Table- 4.12 Rank of factors by category

FACTORS	**AVARGE %**	**AVARGE RII**	**RANK**
Communication factor	40%	0.92	1
Coordination factor	30%	0.92	2
Project managers and stakeholders factors	10%	0.92	3
Relationship factors	10%	0.88	4
External factors	10%	0.87	5

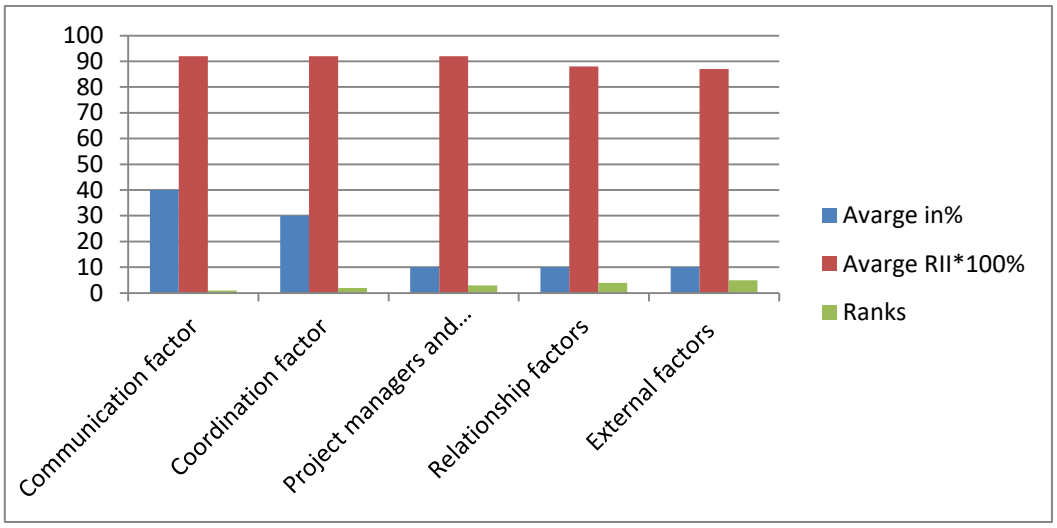


Figure-3: Rank of factors by category

From data analysis results the major grouped factors impacts on project performance in specific university construction projects are:-

1. COMMUNICATION FACTOR

Effective communication in construction requires a blend of technology, structured protocols, and cultural adaptability. By adopting global best practices such as centralized digital

platforms, stakeholder workshops, and regulatory alignment the industry can mitigate risks, enhance safety, and improve project outcomes worldwide.

Communication in construction is an approach to interpersonal interactions that aims to promote understanding and collaboration between the different stakeholders of a project. Good communication ensures the project is completed within time and budget.

Construction projects involve a communication chain consisting of architects, engineers, contractors, subcontractors, suppliers, and clients. Each individual has their own unique expertise and responsibilities, and they collaborate with each other in an effort to ensure a seamless project completion. However, lack of clear communication can lead to the breakdown of this collaboration. Therefore, it is important for the flow of information to be constant throughout the process.

The study was conducted the major communication factors category consists fourteen factors, among these factors the respondents strongly agree factors are lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects, A lack of an effective communication system and platform can led to misinterpretation among parties and delays in project timelines, inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately and in adequate Stakeholder information such as their roles, responsibility and communication preference are major causes for project performance in university construction projects.

The first critical communication factor identified by survey respondents is the absence of standardized protocols with clear guidelines, which respondents strongly agreed contributes significantly to cost and time overruns in projects. This issue, which holds the highest relative importance index (RII = 0.91) as detailed in Table 4.23, has been shown to severely undermine university construction project performance. Supporting these findings, studies such as Bemard.I (2021) highlight the frequent lack of institution-specific communication frameworks in construction projects, compelling teams to depend on unstructured, ad-hoc methods. These ineffective communication practices are further intensified by inadequate management and leadership competencies (RII = 0.928), resulting in inconsistent information sharing among contractors, architects, and university administrators, with detrimental impacts on project performance (Akram & Alemu, 2022).

Second Major Communication Factor: Ineffective Communication Systems and platform can led to misinterpretation among parties and delays in project timelines. The absence of robust communication systems and platforms emerged as the second most critical factor negatively affecting university construction project performance. This deficiency leads to frequent misinterpretations between stakeholders and significant delays in project timelines, profoundly impacting overall project performance according to survey respondents. Table 4.23 the factor's significance is underscored by its high Relative Importance Index (RII = 0.90).

The Third critical communication factor is inconsistent reporting by contractors and consultants, which impedes stakeholders' ability to accurately track project progress. This issue is pivotal in university construction projects, where precise performance monitoring is essential. Survey data reveals that while contractors are contractually obligated to submit monthly progress reports to consultants, frequent failures or inconsistencies in fulfilling this responsibility hinder effective stakeholder oversight. As shown in Table 4.23, this factor holds a high Relative Importance Index (RII = 0.90), underscoring its significant impact on project performances efficacy. Additionally practices other literatures study stated as construction projects in Debre-Markos University's projects delay due to information delay main cause by client factors relative important index (RII)= 0.89 was measured (Abebe.D,2023). From study area this report has number of cause's inconsistency of report by contractors and consultants specially those parties and client related factors projects are non-finished predefined schedule and costs survey respondents strongly agree inconsistency of report delivery impacts to track projects progress by stakeholders.

Inadequate Stakeholder Information as a Critical Communication Factor:-the fourth major communication challenge lies in insufficient stakeholder information management, particularly concerning roles, responsibilities, and communication preferences, which significantly hinders project performance in Ethiopian university construction projects. Empirical data from survey respondents in the study area strongly indicates those stakeholders' roles, responsibilities, and communication preferences are inadequately addressed during project execution. This deficiency creates information barriers during critical phases such as design, specification preparation, and construction, leading to delays and deviations from planned schedules. Consequently, projects experience cost overruns and timeline extensions.

As demonstrated in Table 4.23, this factor exhibits a high Relative Importance Index (RII = 0.89), underscoring its critical impact. This finding aligns with prior studies, According to Riahi (2017), stakeholder management requires developing appropriate management strategies to effectively mobilize stakeholders by involving them in project decisions and implementation. Project teams need to effectively plan and engage in meaningful communication with stakeholders and monitor stakeholder relationships throughout projects.

The five factor is Project managers and team should manage and communicate with stakeholders in the most effective way, enabling them to concentrate resources where the maximum benefit will be derived (Salhan, 2020). Projects often fail to systematically identify and categorize stakeholders based on their influence, interests, or communication needs. This leads to exclusion of critical groups (e.g., local communities, subcontractors) during planning phases, resulting in misaligned objectives. For instance, studies on urban planning projects in Addis Ababa highlight ad-hoc stakeholder identification practices, causing conflicts between project teams and affected communities (karlse, 1998). Stakeholder engagement is frequently characterized by informal, non-institutionalized methods, such as irregular meetings or unstructured feedback channels. This inconsistency creates gaps in understanding preferences; particularly for historically underserved groups (e.g., women, youth, and marginalized regions) (Behailu et al.2024). The lack of standardized communication protocols exacerbates delays during design and construction phases (Abebe.A, 2020). According to Damtew.E (2012) unclear messaging and hierarchical communication structures hinder effective knowledge sharing. For example, vertical (top-down) communication dominates in many projects, leading to delayed responses and poor feedback integration. This is compounded by technical jargon and poor documentation, which alienate non-expert stakeholders. The convergence of these results highlights the urgent need for systematic stakeholder information management to mitigate risks and enhance project performance.

2. COORDINATION RELATED FACTOR

The study was conducted the major coordination actors category consists ninth factors, among these factors the respondents strongly agree four factors are construction projects those are:- frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns, traditional contractual arrangements often hinder flexible collaboration between parties involved in projects, Lack of clear objectives, Lack of mutual respect and trust among

construction teams are the cause of project performance are major causes for project performance in university construction projects.

The first critical coordination-related factor identified through the survey highlights strong stakeholder agreement: public concerns and decision-making delays frequently disrupt university construction projects. These disruptions directly undermine effective teamwork coordination, contributing significantly to timeline overruns. Furthermore, secondary data from project documentation supports these findings, revealing that ineffective stakeholder collaboration and poor coordination mechanisms often lead to prolonged work suspensions and delayed approvals. Such inconsistencies in intergroup coordination frequently result in projects failing to meet contractual deadlines.

Quantitative analysis of survey responses validates these findings, with a Relative Importance Index (RII) of 0.92 reflecting strong consensus among respondents regarding the critical nature of coordination challenges. Furthermore, existing literature supports that construction projects frequently experience time overruns. While stakeholders may hold differing views on what constitutes project failure at the university level, certain projects unquestionably fail by any objective measure. To systematically address project failure, most prior studies adopt Freeman's [1984] triple constraint framework, which evaluates success based on adherence to budgetary limits, quality standards, and scheduled timelines.

The second critical coordination-related factor stems from traditional contractual frameworks that persistently hinder flexible collaboration among project stakeholders. Survey data indicates that rigid contractual agreements in university construction projects frequently create operational challenges. This rigidity complicates the resolution of issues arising from unforeseen variables, including cultural factors, external conditions, political dynamics, scheduling constraints, and other elements not explicitly covered in contractual terms. Quantitative analysis substantiates this finding, with a Relative Importance Index (RII) of 0.92 highlighting its substantial influence on project coordination.

Furthermore, existing literature identifies partner disputes stemming from deteriorating working relationships as a primary cause of project failure in construction contexts (Laan et al., 2011). This issue often originates from traditional procurement practices that rely on competitive tendering-based contracts while neglecting relational collaboration in partner selection processes.

Within traditional contracting systems, formalized stakeholder relationships frequently transform differing perspectives into disputes and claims. Such conflicts typically lead to unnecessary cost overruns and delays that could be prevented through alternative approaches (Holt et al., 1995).

Scholars further argue that traditional contracts inherently restrict flexible collaboration among stakeholders. Jones's (2001) analysis of the Australian construction sector demonstrates how traditional contracting fosters a defensive culture, where parties prioritize safeguarding their contractual positions through extensive time and resource investments. During disputes, stakeholders tend to focus on assigning blame rather than developing practical solutions. This adversarial environment perpetuates risk-transfer strategies during negotiations, as parties continually attempt to shift liabilities to others (Jones, 2001).

The third critical coordination-related factor involves ambiguous project objectives and insufficient trust among construction teams, which significantly undermine performance in university construction projects. These shortcomings frequently result in mismatched priorities, communication failures, and inefficient resource distribution, ultimately jeopardizing timelines, budgets, and quality standards

Contractual and Operational Consequences: Poorly defined goals and non-collaborative team environments introduce systemic risks, especially in multi-stakeholder agreements requiring clear accountability. Evidence from three Ethiopian university projects and national construction sector surveys conducted by the Ethiopian Construction Authority demonstrates that vague objectives and fragmented team dynamics directly contribute to delays, budget overruns, and contractual conflicts. The Relative Importance Index (RII) analysis yields a score of 0.92, indicating high significance.

Scholarly research underscores the necessity of precise project objectives aligned with organizational functions to achieve institutional targets effectively. Such projects rely on collaborative efforts where individuals work collectively toward shared outcomes. According to Katzenbach and Smith (1994), articulate, effective teams comprise "a small group of people with complementary skills committed to a common purpose, performance goals, and approach, holding themselves mutually accountable." For this study, teamwork includes both collective tasks and interdependent activities requiring integration across intra-group and inter-group collaboration. The analytical framework integrates insights from co-located

teams, geographically dispersed teams operating across time zones, and teams with mobile members.

3. PROJECT MANAGERS AND STAKEHOLDER RELATED FACTORS

The study was conducted the major project managers and stakeholder related factors category consists fifth factors, among these factors the respondents strongly agree one factors this is:- construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction are major causes for project performance in university construction projects.

The first critical on project managers and stakeholder related factors are construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction. This factor undermining university construction projects involves insufficient project manager commitment and misaligned stakeholder expectations. Effective communication plays a pivotal role in bridging these gaps; ensuring goals align with project objectives, and maintaining stakeholder satisfaction. Analysis of this factor evaluates its impact on performance in selected university construction projects, where poor managerial engagement and communication failures directly compromise long-term project outcomes

University projects often face systemic issues where project managers lack dedication and fail to harmonize stakeholder interests. Ineffective communication exacerbates these challenges, leading to misaligned objectives and diminished project performance. Survey data from respondents strongly corroborates this assessment, with a Relative Importance Index (RII) of 0.92, highlighting the severity of these issues.

The combination of weak managerial commitment and poor stakeholder communication creates a high-risk environment for project delivery. These deficiencies not only hinder immediate goal attainment but also erode trust among stakeholders, endangering timelines, budgets, and quality standards. Addressing these gaps through structured communication frameworks and accountability measures is essential for improving project outcomes. Scholarly research highlights the multidimensional responsibilities of project managers in achieving stakeholder satisfaction, with studies examining diverse aspects of their role. For

instance, Ireland (1992) investigated how project managers ensure client satisfaction, while Ammeter and Dukerich (2002) focused on their capacity to foster cohesive team development. Subsequent analyses explored specialized managerial functions: Liebowitz & Megbolugbe (2003) examined knowledge management implementation, Blindenbach-Driessen & Ende (2006) positioned project managers as innovation leaders in project-oriented organizations, and Crawford and Nahmias (2010) emphasized their critical role in change management.

4. FACTORS INFLUENCING STAKEHOLDER RELATIONSHIPS

The study was conducted the major stakeholder relationships category consists fifth factors, among these factors the respondents strongly agree one factors this is contractor relationship factor, Stakeholder relationships, particularly contractor dynamics, play a pivotal role in university construction projects. Survey data highlights strong consensus among respondents that contractors' collaboration with other participants significantly influences project outcomes, as reflected by a high Relative Importance Index (RII) of 0.88. Contractors adhering to schedules, budgets, and quality standards foster trust-based interactions, directly improving efficiency and minimizing delays, cost overruns, and disputes. However, ineffective relationship management strategies often lead to inefficiencies, increased expenses, and conflicts, underscoring the need for structured collaboration frameworks.

The foundation of stakeholder relationships is often shaped by contractual frameworks. Traditional procurement methods and standard contracts prioritize assigning liabilities over fostering collaboration, as noted by Macneil (19740, who introduced relational contracting to emphasize mutual planning and cooperative relationship building. Unlike conventional approaches that focus on blame allocation, relational contracting encourages shared responsibilities and trust, which are critical for long-term project success. This shift is particularly relevant in complex projects where rigid contracts fail to address evolving challenges, leading to adversarial interactions among stakeholders.

In regions like the UAE, construction projects face severe delays, cost escalations, and disputes due to poor stakeholder relationships, trust deficits, and adversarial practices (Faridi & El-Sayegh, 2006; Elhag et al., 2020). The rapid growth of the UAE's construction sector has exacerbated these issues, with disputes taking an average of 14.5 months to resolve-the longest globally (Awwad et al., 2016). Unfair risk allocation and owners' reluctance to share

risks further strain relationships (Elhag et al., 2020). Studies emphasize that equitable risk distribution and clear contractual terms enhance collaboration and performance (Xu et al., 2018; Wang et al., 20190, suggesting that aligning incentives through balanced contracts could mitigate these challenges in university projects.

5. FACTORS RELATED TO EXTERNAL CONDITIONS

Marketing conditions represent a critical external factor influencing university construction project performance in Ethiopia. Survey respondents strongly agree that market instability significantly impacts project outcomes, with analysis indicating a high Relative Importance Index (RII=0.88). Most university construction projects in Ethiopia face challenges due to volatile market conditions, which directly disrupt timelines, budgets, and overall success. This instability necessitates adaptive strategies to mitigate risks linked to fluctuating material costs, labor shortages, and broader economic uncertainties prevalent in the country.

According to Werku Koshe and Kumar N. Jha (2016), material price escalation is a key factor affecting project timelines in Ethiopia. During cost estimation, estimators must account for inflation, as construction material, labor, and equipment costs often fluctuate unpredictably. These price surges lead to severe consequences, including project delays, unreliable price quotes, increased costs, and even material theft. To address these challenges, collaborative risk management strategies-such as proactive contract adjustments and value engineering-are essential. Early procurement of critical materials, on-time ordering practices, and securing supplier commitments can mitigate escalation risks, particularly for materials with lengthy procurement timelines.

Inflation-driven price hikes for materials and equipment remain a persistent challenge, especially in developing countries like Ethiopia. Unpredictable inflationary trends and artificially induced scarcity by suppliers exacerbate delays and cost overruns. Since inflation is time-dependent, minimizing project delays helps reduce its financial impact. Effective mitigation requires early involvement of specialty contractors, design team collaboration, and client-contractor cooperation. Strategies such as stockpiling common materials, securing early supply agreements, and combating opportunistic pricing practices are vital to enhancing project resilience against market volatility.

4.5. Impacts of related to inadequate communication and poor coordination

Five predominant impacts stemming from poor communication and coordination challenges have been identified as critical to project performance, based on questionnaire survey data, interview data from university project office coordinator leader, collected documents data specific three projects in three universities and Ethiopia's construction authority. This analysis uses average Relative Importance Index (RII) values from two or more sector datasets, selecting impacts scores exceeding 50% as the most dominant factors affecting university construction project outcomes.

Table 5.1.The impact related to poor communication and coordination challenges on project performance in all side respondents

No.	Description	RII Values					
		Clients	Contractors	consultants	Eca	Average RII	Ranks
1	Un-Using a well-established channel of communication, Inadequate design planning and site management by the contractor, along with limited experience, coupled with the client's financial limitations and delayed payments, can adversely impact the project's planning and scheduling.	0.87	0.88	0.94	0.97	0.92	1
2	Poor quality planning and control mechanisms, combined with imperfect design specifications, can have a major impact on the overall quality of a project.	0.91	0.83	0.90	0.92	0.89	2
3	A lack of education and experience, combined with clients' poor budget allocation and resource limitations, significantly affects project results and leads to cost overruns.	0.90	0.89	0.90	0.87	0.89	3
4	Poor coordination and relationships among stakeholders adversely impact projects, particularly in resource allocation.	0.81	0.86	0.84	0.93	0.86	5
5	Inadequate risk assessments, identification and mitigation strategies' significant impact of projects performance.	0.79	0.86	0.88	0.90	0.85	6
6	Ineffective communication plan and strategies, combined with poor coordination, and inadequate reporting among stakeholders hinder the overall performance of a project.	0.81	0.87	0.91	0.92	0.88	4
7	Unclear roles and responsibilities among stakeholders, along with delays in decision-making.	0.91	0.85	0.77	0.83	0.84	7

Table 5.2 The Five critical common related to poor communication and coordination on projects performance

Description	**Average RII**	**100 %**	**Rank**
Un-Using a well-established channel of communication, Inadequate design planning and site management by the contractor, along with limited experience, coupled with the client's financial limitations and delayed payments, can adversely impact the project's planning and scheduling.	0.92	50%	1
Poor quality planning and control mechanisms, combined with imperfect design specifications, can have a major impact on the overall quality of a project.	0.89	50%	2
A lack of education and experience, combined with clients' poor budget allocation and resource limitations, significantly affects project results and leads to cost overruns.	0.89	50%	3
Ineffective communication plan and strategies, combined with poor coordination, and inadequate reporting among stakeholders hinder the overall performance of a project	0.88	50%	4
Poor coordination and relationships among stakeholders adversely impact projects, particularly in resource allocation	0.86	50%	5

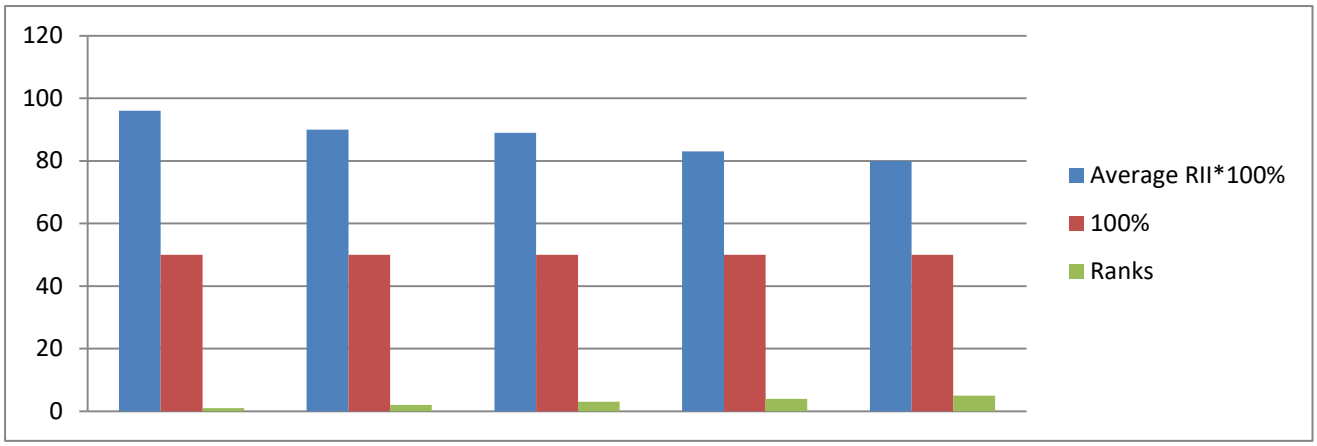


Figure-4: Top Five critical common impacts in three universities and Ethiopia's construction authority respondents.

The primary critical impacts stem from contractors' Un-Using a well-established channel of communication, inadequate planning, poor site management, and lack of experience, compounded by clients' financial constraints and payment delays. These factors detrimentally affect project planning and scheduling in university construction projects. Table 5.2 Survey data indicates strong agreement among respondents regarding the severity of these impacts, with an average Relative Importance Index (RII) of 0.92. Additionally, 93.1% of respondents collectively rated the impacts as both "very high" and "high," demonstrating near-unanimous consensus on their significance to project performance. These are the root causes of delays (RII=0.92) and align with the 93.1% consensus on high-severity impacts. By strengthening contractor competency, financial accountability, and institutional oversight, universities can mitigate risks and improve project performance. Documented data collected from three projects in three university reveals that delayed projects experience significant time overruns, with measured averages ranging from 235.69% to 270%.

The second critical factor is Poor quality planning and control mechanisms, combined with imperfect design specifications, can have a major impact on the overall quality of a project. These limitations severely compromise time, cost, and quality management in university construction projects. Survey data table 5.2 indicates strong consensus among respondents regarding the severity of these effects, evidenced by an average Relative Importance Index (RII) of 0.89. Additionally, 87.5% of participants collectively rated the impacts as both "very high" and "high," highlighting near-unanimous agreement on their detrimental influence on project outcomes. Documented data from three university construction projects reveals

significant cost and time overruns in incurred expenses and schedules, with measured averages ranging from 0.41% to 438.9% for costs and 235.69% to 270% for timelines.

The third critical factor involves a lack of education and experience, combined with clients' poor budget allocation and resource limitations, which leads to substantial cost overruns. These inefficiencies severely undermine financial management in university construction projects. Table 5.2 indicates Survey findings reveal strong consensus among respondents about the severity of these impacts, reflected in an average Relative Importance Index (RII) of 0.89. Furthermore, 97.2% of participants collectively rated the impacts as both "very high" and "high," underscoring near-unanimous agreement on their detrimental effect on project performance. Documented data collected from three projects in three university reveals that incurred cost projects experience significant cost overruns, with measured averages ranging from 0.41% to 438.8%.

The fourth critical factor Ineffective communication plan and strategies, combined with poor coordination, and inadequate reporting among stakeholders hinder the overall performance of a project. These inefficiencies severely disrupt time management in university construction projects. Tables 5.2 highlight survey findings that demonstrate a strong consensus among respondents regarding the severity of these challenges, as evidenced by an average Relative Importance Index (RII) of 0.88. Moreover, 83.3% of participants collectively rated the impacts as both "very high" and "high," emphasizing near-unanimous acknowledgment of their adverse effects on project outcomes. Case studies of three university construction projects further substantiate these claims, with documented data revealing extensive timeline overruns. Specifically, project schedules experienced deviations ranging from 235.69% to 270%, illustrating the profound consequences of unclear accountability and delayed approvals.

The fifth critical factor centres on Poor coordination and relationships among stakeholders, which resulted in suboptimal resource allocation and subsequent operational inefficiencies. These shortcomings directly undermine project performance and resource management in university construction initiatives. Survey findings table 5.2 demonstrate a strong consensus among respondents regarding the severity of these challenges, supported by a Relative Importance Index (RII) average of 0.86. Furthermore, 83.3% of participants collectively categorized the impacts as both "very high" and "high," reflecting near-common recognition of their adverse effects on project success. Case studies of three university construction

projects corroborate these findings, revealing substantial cost and schedule overruns. Documented data shows cost deviations ranging from 0.41.6% to 438.9% and timeline extensions between 263.3% and 403.6%, underscoring the pervasive consequences of poor coordination

4.6. Mitigation measures for the impacts of related to poor communication and coordination on project performance

Top ten Common Mitigation Strategies for Poor Communication and Coordination Challenges

- Common Mitigation Procedures was Identified in my Research Study**:-**

The study analysed average Relative Importance Index (RII) values and ranked the most frequently cited factors from questionnaire responses across three university construction projects and the Ethiopian Construction Authority (ECA). The results are presented table 6.1, as follows below.

100% - The analysis identified common mitigation strategies across three university construction projects and the Ethiopian Construction Authority (ECA) survey (four of four initiatives).

75% - The analysis identified common mitigation strategies across three university construction projects and the Ethiopian Construction Authority (ECA) survey (three of four initiatives).

50%- The analysis identified common mitigation strategies across three university construction projects and the Ethiopian Construction Authority (ECA) survey (two of four initiatives).

25% - The analysis identified common mitigation strategies across three university construction projects and the Ethiopian Construction Authority (ECA) survey (one of four initiatives).

Table 6.1:- Common top ten Impact mitigation mechanisms in all sides university projects

Description	**100%**	**RII values**				**Average RII**	**Rank**
		Clients	**contractors**	**Consultant**	**Eca**		
Using a well-established channel of communication	100	0.91	0.95	0.96	0.97	0.95	1
Appointing a capable project manager.	100	0.85	0.94	0.97	0.98	0.94	2
Have a clearly laid out work plan	100	0.90	0.88	0.95	0.93	0.92	3
Developing risk management plan	100	0.91	0.89	0.92	0.93	0.91	4
Obtaining sufficient funding & resources	100	0.83	0.92	0.96	0.92	0.91	5
Developing communication and coordination plan.	75	0.86	-	0.97	0.95	0.70	6
Effective stakeholder communication:.	75	0.84	0.89	0.97	-	0.68	8
Transparent Communication	75	0.90	0.89	-	0.95	0.69	7
Collaborative partnership with stakeholders	75	0.84	0.90	-	0.93	0.67	9
Fix Regular Meetings	50	0.98	-	0.98	-	0.50	10

1. Using a well-established channel of communication: - Effective communication is a cornerstone of successful construction projects, where multiple stakeholders-including architects, engineers, contractors, and clients-must collaborate closely to achieve shared goals. Well-established communication channels provide a structured framework that ensures information flows smoothly, accurately, and timely among all parties involved. These channels help minimize misunderstandings, reduce delays, and enhance coordination, ultimately improving project outcomes and efficiency. In an industry characterized by complexity and dynamic changes, having clear and reliable communication pathways is essential to managing risks and maintaining productivity.

Establishing well-defined communication channels involves more than just choosing the right tools; it requires setting clear protocols, defining roles and responsibilities, and fostering an environment of open dialogue and feedback. By standardizing how information is exchanged, construction teams can avoid confusion and ensure everyone is aligned on project objectives, timelines, and problem-solving strategies. This introduction explores the significance of well-established communication channels in construction projects and highlights their critical role in enhancing collaboration, decision-making and overall project performance.

Selecting the right communication method is crucial for conveying messages effectively. While emails and phone calls may work well for general updates, some situations call for in-person meetings or digital tools.

For instance, scheduling a face-to-face meeting for complex discussions can reduce misunderstandings and clarify intricate details. Knowing when to use each communication format allows project managers to avoid ineffective communication and tailor their approach to each task's needs.

1.1.**Communication channel in construction projects**;-

The most useful communication channels in construction projects combine traditional methods with modern digital tools to ensure clear, timely, and effective information flow among diverse stakeholders. Commonly used channels include:

Instant Messaging and Collaboration Platforms: These are ideal for day-to-day, real-time interactions among team members, enabling quick updates and immediate problem-solving.

Email: Suitable for formal communications, documentation, and sharing detailed information that requires a record, such as change orders or official notices.

Scheduled Meetings: Regularly held daily briefings, weekly updates, and progress meetings help align teams, clarify roles, and discuss complex issues face-to-face or virtually.

Project Management Software: Tools like Procore or similar platforms centralize communication, document sharing, task tracking, and real-time updates, enhancing coordination among contractors, subcontractors, and stakeholders.

Visual Communication: Use of drawings, photos, 3D models, and Building Information Modelling (BIM) facilitates understanding of complex information and design changes.

Phone Calls and In-Person Conversations: For urgent or sensitive matters where immediate feedback or clarification is needed.

2. Appointing a capable project manager

Appointing a capable project manager is crucial for the success of construction projects, given the complexity and numerous moving parts involved. A skilled project manager oversees key aspects such as time management, cost control, risk mitigation, procurement, and stakeholder coordination, ensuring that the project progresses smoothly from planning through to completion. Their expertise helps keep the project on schedule and within budget while maintaining quality and safety standards, ultimately minimizing delays and financial overruns. Moreover, effective project managers facilitate clear communication among diverse teams, proactively address challenges, and foster strong client relationships, all of which are essential for delivering construction projects successfully and efficiently.

2.1. Qualities of should a capable project manager have in university construction projects.

A capable project manager in construction should possess a combination of technical expertise, leadership, and interpersonal skills to successfully guide projects from inception to completion. Key qualities include the ability to thrive under pressure and manage stress effectively, as construction projects often face unexpected challenges such as delays, material issues, and budget overruns. Organization and multitasking skills are essential, enabling the manager to juggle multiple tasks and projects while ensuring deadlines and quality standards are met. Technical proficiency is also critical, as understanding blueprints, building codes, and construction methods allows the manager to make informed decisions and maintain credibility with the team.

Strong communication skills are vital for conveying complex information clearly to diverse stakeholders, including clients, contractors, and engineers, while also fostering collaboration and resolving conflicts. A good project manager is an inspiring leader who motivates the team, sets clear expectations, and maintains a positive attitude even during setbacks. Accountability and honesty are important traits, as the manager must hold themselves and others responsible for meeting deadlines and quality standards, and be willing to deliver difficult news transparently. Additionally, effective problem-solving and contingency planning helps mitigate risks and keep the project on track despite unforeseen issues.

Negotiation skills further support securing fair agreements and managing resources efficiently. Together, these qualities enable a project manager to deliver projects on time, within budget, and to the desired quality.

3. Have a clearly laid out work plan

Having a clearly laid out work plan is essential for the successful performance of university construction projects, as it provides a detailed roadmap that guides all phases of the project from initiation to completion. A well-structured work plan breaks down the project into manageable tasks, assigns responsibilities, and sets realistic timelines, which helps in coordinating resources efficiently and anticipating potential bottlenecks. This clarity enables project managers and stakeholders to monitor progress, ensure adherence to quality and safety standards, and make informed decisions promptly. In the context of university construction, where multiple complex activities and stakeholders are involved, a comprehensive work plan enhances communication, reduces delays, and ultimately contributes to delivering the project on time and within budget.

4. Developing risk management plan

Developing a comprehensive risk management plan is critical for enhancing the performance of university construction projects, which often face numerous uncertainties and challenges that can lead to delays, cost overruns, and compromised quality. A well-structured risk management plan systematically identifies, analyses, and prioritizes potential risks-ranging from design changes and financial constraints to environmental factors and stakeholder coordination issues-before construction begins. This proactive approach enables project teams to implement effective mitigation strategies, allocate resources efficiently, and establish clear responsibilities among clients, contractors, and consultants. Studies on Ethiopian university projects reveal that the absence of formal risk management practices often results in reactive problem-solving, poor coordination and significant project delays, underscoring the necessity of integrating risk management into the overall project plan. By continuously monitoring and updating the risk management plan throughout the project lifecycle, university construction projects can improve decision-making, enhance safety, and increase the likelihood of delivering projects on time, within budget, and to the desired quality standards.

5. Obtaining sufficient funding & resources.

Obtaining sufficient funding and resources is a fundamental factor influencing the performance of university construction projects, as these projects typically require substantial financial investment and material support to meet their scope, quality, and timeline objectives. In Ethiopia, university construction initiatives often rely heavily on government funding, supplemented by limited internal sources and occasional borrowing, which can sometimes lead to delays or scope adjustments when resources are inadequate or distributed late. A well-planned and secured funding strategy ensures that all project phases-from design and procurement to construction and supervision-are adequately supported, reducing interruptions and enabling timely completion. Moreover, access to necessary resources such as skilled labor, equipment, and materials is equally critical; shortages or mismanagement can severely impact project quality and schedule. Therefore, establishing reliable funding channels and efficient resource allocation mechanisms is vital for enhancing the success and sustainability of university construction projects, ultimately contributing to the expansion and improvement of higher education infrastructure in Ethiopia.

6. Developing communication and coordination plan

Developing a comprehensive communication and coordination plan is vital for enhancing the performance of university construction projects, which involve multiple stakeholders such as architects, contractors, university officials, and regulatory bodies. A well-designed plan establishes clear communication channels, defines roles and responsibilities, and sets protocols for information sharing, ensuring that all parties remain aligned throughout the project lifecycle. This structured approach minimizes misunderstandings, reduces delays, and facilitates timely decision-making by providing regular updates and addressing issues proactively. In the context of university construction, where complex activities and strict compliance requirements are common, effective communication and coordination foster collaboration, improve resource management, and ultimately contribute to delivering projects on time, within budget, and to the desired quality standards.

To improve coordination among different teams in university construction projects, several key strategies can be employed. First, establishing clear communication channels is essential; using centralized project management software and setting regular meetings (daily or weekly) ensures all stakeholders-architects, contractors, suppliers, and university officials-are aligned

and informed, reducing misunderstandings and streamlining decision-making. Second, clearly defining roles and responsibilities prevents task overlap and confusion, fostering accountability and efficient workflow. Third, fostering a collaborative work environment through team-building activities, open feedback culture, and shared goals encourages cooperation and trust among diverse teams. Fourth, regularly reviewing and updating project plans with input from all stakeholders helps adapt to changes and maintain alignment with objectives. Fifth, implementing risk management plans prepares teams for potential disruptions, minimizing their impact on coordination. Lastly, leveraging collaborative digital tools that centralize documents, schedules, and communication enhances transparency and real-time coordination across teams, regardless of location. Together, these strategies create a cohesive, responsive, and efficient project environment critical for the successful delivery of university construction projects.

7. Transparent and Effective stakeholder communication

Transparent and effective stakeholder communication is essential for the successful performance of university construction projects, as it fosters trust, collaboration, and timely decision-making among diverse parties such as university officials, contractors, architects, and regulatory bodies. Clear and open communication channels ensure that all stakeholders are well-informed about project goals, progress, risks, and changes, which helps minimize misunderstandings, conflicts, and delays. Research shows that tailored communication strategies-incorporating frequent updates, feedback mechanisms, and the use of appropriate media like meetings, reports, and digital platforms-enhance stakeholder engagement and project visibility, ultimately improving project outcomes. In complex university construction projects, where multiple interests and expectations must be balanced, maintaining transparency and responsiveness through a structured communication plan is critical to aligning stakeholder needs, managing expectations, and delivering projects on time, within budget, and to the required quality standards.

8. Collaborative partnership with stakeholders and Fix Regular Meetings

Collaborative partnerships with stakeholders are fundamental to the success of university construction projects, as they foster mutual understanding, trust, and shared commitment among diverse parties such as university management, contractors, government agencies, and local communities. Effective collaboration ensures that stakeholders' interests and concerns

are integrated into project planning and execution, which helps to minimize conflicts, improve resource allocation, and enhance overall project performance. Research indicates that active stakeholder engagement leads to smoother project implementation and higher satisfaction levels, as it promotes transparency, accountability, and joint problem-solving throughout the project lifecycle. In the context of university construction, where complex technical, financial, and social factors intersect, building strong partnerships is essential to align objectives, manage risks, and deliver projects on time and within budget.

Fixing regular meetings is a critical strategy to maintain effective coordination and communication among stakeholders in university construction projects. Scheduled meetings provide structured opportunities for project teams and stakeholders to share updates, address challenges, make decisions, and ensure alignment on project goals and timelines. These meetings foster continuous dialogue, reduce misunderstandings, and enable timely identification of issues before they escalate into major problems. Studies show that regular, well-organized meetings enhance stakeholder engagement and collaboration by creating a platform for transparent information exchange and collective accountability. In university construction projects, where multiple teams and interests must be managed simultaneously, fixed meetings help maintain momentum, build trust, and support adaptive management, ultimately improving project efficiency and success.

4.7. Summary of major findings

A university construction project faces various challenges that can be broadly categorized into several factors. This study aims to evaluate the impact of communication and coordination challenge on the performance of university construction projects, using a case study approach. The goal is to identify effective mitigation strategies to address and reduce the negative impacts caused by these communication and coordination factors.

Effective communication, led by a capable project manager, is crucial for successful university construction projects. Establishing well-defined channels using both modern digital tools-like project management software, instant messaging, and BIM-and traditional methods such as regular meetings, email, and visual aids ensures that all stakeholders remain aligned, informed, and engaged. A skilled project manager oversees all aspects of the project, from planning to completion, ensuring it stays on schedule and within budget, while also proactively addressing challenges and fostering strong relationships. Furthermore, a clearly

laid-out work plan and a comprehensive risk management plan help in coordinating resources, anticipating bottlenecks, and mitigating potential issues that could lead to delays or cost overruns. Transparent communication with stakeholders, coupled with collaborative partnerships and fixed, regular meetings, builds trust and facilitates timely decision-making, all contributing to the successful delivery of university construction projects. Obtaining sufficient funding and resources is also essential to prevent interruptions and ensure timely project completion.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The following conclusions are drawn from the basic questionnaire based on the study's findings: This research aimed to assess the impact of communication and coordination challenges on the performance of university construction projects in Ethiopia. The results indicate that multiple communication and coordination factors influence project performance. These factors vary in both how often they occur and the extent to which they affect project outcomes, making both frequency and severity critical for analysing project progress. Therefore, the study evaluated these 36- factors by considering their occurrence rate and the severity of their impact. Additionally, the various communication and coordination factors were ranked according to their Relative Importance Index (RII).

Among 36 factors analysed, the top ten major factors affecting construction projects were identified as follows: Public concerns and delays in decision-making frequently disrupt construction projects, resulting in poor teamwork coordination and ultimately causing project schedule overruns. The lack of an effective communication system and platform often leads to misunderstandings among parties, causing delays in project completion. Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to accurately track progress. Additionally, challenges such as strained contractor relationships, unfavourable market conditions, unclear project objectives, and a lack of mutual respect and trust among construction teams adversely affect project performance. Traditional contractual arrangements often limit flexible collaboration among involved parties. Moreover, the absence of standardized communication protocols with clear guidelines can contribute to cost and time overruns. Insufficient stakeholder information-such as unclear roles, responsibilities, and communication preferences-also impedes effective project management. For construction managers, meeting commitments and satisfying stakeholder expectations depends on clear and effective communication that aligns goals with project objectives, underscoring its crucial role in ensuring stakeholder satisfaction.

The study also aimed to analyse the impacts of inadequate communication and poor coordination on the performance of selected university construction projects. Based on data collected from questionnaires, interviews with university project office coordinators, project

documents from three universities, and information from Ethiopia's construction authority, five key impacts of communication and coordination challenges were identified as critical to project performance. This analysis utilized the average Relative Importance Index (RII) values from multiple sector datasets, with impact scores above 50% considered the most significant impacts influencing university construction project outcomes. The major impacts, ranked by RII values, are as follows: poor contractor planning, site management, and lack of experience, combined with client financial constraints and payment delays, adversely affect project planning and scheduling; improper budget allocation by stakeholders leads to cost overruns; inadequate risk management negatively impacts project performance; poor coordination results in inefficient resource allocation; and unclear roles and responsibilities among stakeholders, along with decision-making delays, further hinder project progress.

Finally, the research developed mitigation strategies to address poor communication and coordination challenges affecting project performance, using a case study of three university construction projects in Ethiopia. The study identified common mitigation procedures by analysing the average Relative Importance Index (RII) values and ranking the most frequently cited strategies from questionnaire responses collected from the three university projects and the Ethiopian Construction Authority (ECA). The analysis categorized the mitigation strategies based on their prevalence across the surveys as follows:

100%: Strategies identified in all four initiatives (three university projects and ECA), 75%: Strategies identified in three out of four initiatives, 50%: Strategies identified in two out of four initiatives,25%: Strategies identified in one out of four initiatives,

The top ten common mitigation strategies are: Using well-established communication channels, Appointing a capable project manager, Developing a clearly defined work plan, Creating a risk management plan, Securing sufficient funding and resources, Developing comprehensive communication and coordination plans, Ensuring effective stakeholder communication, Promoting transparent communication, Building collaborative partnerships with stakeholders, and Scheduling regular meetings are major mitigation strategies.

5.2. Recommendations

Based on the findings and analysis of communication and coordination challenges affecting university construction projects and their mitigation strategies, the following strategic recommendations are proposed to improve project performance:

For the University (Project Owner)

- Implementing a centralized, cloud-based construction project management software or platform like BIM, Procore, or Aconex is a powerful solution for managing projects efficiently.
- Use a comprehensive digital project management system that integrates scheduling, budgeting, risk management, and communication tools. This platform should enable real-time updates, document sharing, and progress tracking accessible to all stakeholders.
- Establish Clear Communication Protocols and Stakeholder Roles Digitally
- Define and publish roles, responsibilities, and communication preferences within the platform to reduce ambiguity and improve accountability.
- Ensure Adequate Funding and Resource Allocation Transparency
- Use financial management modules to track budget allocations and expenditures, enabling transparent and timely funding disbursement to contractors and consultants.
- Schedule Regular Virtual and In-Person Meetings with Automated Reminders
- Utilize calendar integrations and video conferencing tools to maintain fixed, regular meetings that foster collaboration and timely decision-making.
- Promote Collaborative Partnerships via Shared Digital Workspaces
- Facilitate collaboration through shared document sources and communication channels that encourage transparent and open dialogue among all parties.
- While preparing the contract documents, the responsibilities of stakeholders regarding communication and coordination were clearly defined, along with explicit provisions.

For the Contractor

- Adopt Construction-Specific Communication Tools
- Use specialized apps or platforms (e.g., BIM, Procore, Aconex's, software etc.) to provide consistent and accurate reporting, reducing misunderstandings and delays.
- Develop and Maintain a Detailed Digital Work Plan and Risk Management Plan

- Leverage digital tools to create, update, and share work schedules and risk assessments, enabling proactive management of bottlenecks and resource allocation.
- Enhance Site Management with Mobile Reporting and Monitoring Tools
- Equip site managers with mobile apps for real-time progress reporting, issue tracking, and resource management to improve planning and scheduling accuracy.
- Implement Standardized Communication Protocols
- Follow established digital communication guidelines to ensure consistent, timely, and clear reporting to the university and consultants.
- Invest in Training on Digital Tools and Communication Skills
- Regularly train staff on the use of software tools and effective communication techniques to improve coordination and reduce errors**.**

For the Consultant

- Implementing and enforcing digital tools like Building Information Modelling (BIM), collaborative design software, and web-based systems enhances coordination between contractors and the university, ensuring alignment on project objectives and effective management of changes.
- Developing standardize Reporting Formats and Frequency via Digital Systems
- Provide consistent, clear, and timely progress reports using digital templates and automated distribution to keep all stakeholders informed.
- Facilitate Transparent and Open Communication Channels
- The design engineer should ensure that the design aligns effectively with the university's objectives from the beginning.
- Maintain open digital channels for feedback and issue resolution, promoting trust and mutual respect among teams.
- Assist in Developing Communication and Coordination Plans
- Support the university and contractor in creating comprehensive digital communication plans that define protocols, tools, and schedules.
- Leverage Data Analytics for Risk and Performance Monitoring
- Use analytics tools to monitor project risks, schedule adherence, and budget status, enabling early identification of potential issues.
- The design engineer assumes responsibility for any quality-related issues.

- The design engineer consistently monitors the contract to address stakeholder communication issues and recommends solutions for gaps related to communication, reporting delays, decision delays, claims, and disputes.

  Establish Formal Communication Plans and Clear Channels

For policy maker

Ethiopia Construction Authority likely promotes or would support formal, structured communication plans to be adopted by project stakeholders. Clear, official communication channels should be used to avoid misinformation and ensure timely and accurate information flow among clients, consultants, contractors, and other stakeholders.

- Adopt Digital Communication and Collaboration Platforms
- Improve Coordination through Regular Monitoring and Feedback Mechanisms
- Develop and Enforce Communication Management Manuals and Training
- Emphasize Contract Administration and Documentation Practices

These recommendations align with the identified top mitigation strategies such as using well-established communication channels, appointing capable project managers, developing clear work and risk management plans, securing sufficient resources, and scheduling regular meetings. They address the critical communication and coordination factors that impact university construction project performance, aiming to reduce delays, cost overruns, and misunderstandings among stakeholders.

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APPENDICES

Appendix I

RESEARCH QUESTIONAIRE

Dear Participant:

My name is Gardachew Mulat, and I am currently pursuing a master's degree in Construction Technology and Management. You have been selected as a participant for my research, which aims to conduct a comprehensive analysis of the impact of poor communication and coordination on project performance. This study focuses on construction projects at selected universities in Ethiopia, including Semera University, Mizan-Tepi University, and Addis Ababa Science and Technology University. Please be assured that all your responses will be kept strictly confidential and used solely for the purposes of this research. Additionally, I would appreciate it if you could complete and return the questionnaire within one week of agreeing to participate, as a timely response is essential to ensure the study is completed on schedule. I appreciate your time and cooperation very much, and I look forward to hearing from you.

Sincerely yours

Gardachew Mulat.

The researcher

Tel: +251 931148198

E-mail: mulatgardie74@gmail,com

SECTION -A: GENERAL INFORMATION

Directions: The questions that follow are about you, your company, or Organization. Please indicate your response by marking (X or √) the applicable box (es) or, if appropriate, fill in the blank spaces provided to express your response if the blank space are not sufficient use the back of paper.

1. Sex ☐ Male ☐ Female

2. Age ☐ 20- 30yrs ☐ 31 -40yrs ☐ 41-50yrs ☐ 51yrs & above

3. Professional Back ground_____

4. Educational Background ☐ Certificate ☐ Diploma ☐ B.Sc. ☐ M.Sc ☐ Other

5. Position of the Respondent ☐ CEO/Director ☐ project manager ☐ project engineer

☐ Economist ☐ marketer/business manger

Other please specify_____

6. Number of Year Experience ☐ 0-5 ☐ 5-10yrs. ☐ 10-15yrs.

☐ More than 15 yrs.

7. Type of Organization ☐ Employer ☐ Consultant ☐ Contractor ☐ Regular Authority

☐ Financer, other please specify_____

8. Provide License and Grade/ Category: _____

SECTION –B: IDENTIFICATION THE BARRIERS WHICH AFFECTING IMPACT RELATED TO POOR COMMUNICATION AND COORDINATION ON PROJECT PERFORMANCE IN UNIVERSITY CONSTRUCTION PROJECT?

A list of key factors influencing poor communication and coordination on project performance in university construction projects is outlined in the tables. These factors were identified through literature reviews and site Observation sources. Based on your experience, please assess whether each factor can or cannot impact project performance. Then, rank these criteria according to their likelihood of affecting project performance due to poor communication and coordination in university construction projects you have been involved with. To indicate your response, mark (X) next to each option using a five-point Likert scale.

Rating scales are strongly agree=5, Agree=4, Neutral=3, Disagree=2, and strongly disagree=1. Also, please indicate and add if any factor which is not identified in the table. **NB:** dear respondents, while you are filling the questionnaire, don't forget that all the factors and related questions are regarding to impact of poor communication and coordination on project performance in university construction projects perspective.

Table 1: Identifying factors that related to the impact of poor communication and coordination challenges on project performance university construction projects in Ethiopia.

S.no	**Description**	**1**	**2**	**3**	**4**	**5**
1.	**Factors related to poor communication In construction projects.**					
1.1	Lack of a shared language and cultural differences between stakeholders and workers can led to misunderstandings that impact project performance.					
1.2	Lack of standardized communication protocols that are without clear rules can led to cost and time overruns in projects.					
1.3	Multiple stakeholders with different roles complicate communication processes					
1.4	Possessing differed skills levels among construction teams can led to Rework and redesign occurrence					
1.5	A lack of an effective communication system and platform can led to misinterpretation among parties and delays in					

	project timelines.					
1.6	Inconsistent reporting by contractors and consultants makes it difficult for stakeholders to track progress accurately.					
1.7	In adequate Stakeholder information such as their roles, responsibility and communication preference					
1.8	Variations in technical knowledge among qualified technical teams can led to misunderstandings about project requirements.					
1.9	Less Frequency of communication can impact of project performance					
1.10	The lack of reporting feedback to each level of hierarchy can negatively impact project performance.					
1.11	The project's communication methods, including email, phone calls, and in-person meetings, are not clearly established, led to ambiguity.					
1.12	Gender differences					
1.13	Worker's lack of motivation to improve working skills					
1.14	The complexity of the construction industry					
2	**Poor coordination related factors**					
2.1	Large-scale projects involve multiple parties with varying interests, making coordination challenging					
2.2	Traditional contractual arrangements often hinder flexible collaboration between parties involved in projects.					
2.3	The use of ineffective construction management strategies, such as the absence of integrated systems, disrupts seamless coordination among teams.					
2.4	Lack of clear objectives, Lack of mutual respect and trust among construction teams are the cause of project performance.					
2.5	The way teams coordinate their efforts is impacted by varying organizational structures, potentially leading to errors in instructions or technical details.					
2.6	Inadequate control over subcontractors' work by main contractors, often due to insufficient supervision, results in poor oversight, leads to inconsistencies in both quality and					

	timing."					
2.7	Construction projects frequently encounter conflicts and disputes stemming from inadequate coordination.					
2.8	Construction projects are frequently disrupted by public concerns and delays in decision-making, which can cause ineffective teamwork coordination and ultimately lead to project timeline overruns.					
2.9	Goal selection, task decomposition					
3.	**Project managers and Stakeholder related factors**					
3.1	construction managers' commitments and meeting stakeholder expectations require effective communication to align their goals with project objectives, emphasizing its critical role in maintaining stakeholder satisfaction					
3.2	Effective communication aid in identifying risks early, and how does coordination ensure that mitigation strategies are implemented promptly, contributing to the success of risk management?					
3.3	Positive team dynamics foster an environment where open communication is encouraged, enhancing collaboration among team members and reinforcing its value for cohesive teamwork.					
3.4	Leveraging technology facilitates smoother information exchange across teams, improving overall coordination by providing tools for efficient data sharing and collaboration					
4	**Factors connected to relationships**					
4.1	customer relationships					
4.2	contractors relationships					
4.3	Supplier relationships					
4.4	consultant relationship					
5	**Factors related to External factors**					
5.1	Legal and regulatory limitations					
5.2	Weather condition					
15.3	Stability of politics					
5.4	Market conditions					
5.5	Others conditions					

SECTION_C: IMPACTS OF RELATED TO POOR COMMUNICATION AND COORDINATION ON PROJCTS PREFORMANCE.

Please indicate your level of IMPACTS with the following statements by selecting the appropriate response on the scale:

1 = VARY LOW, 2 = LOW, 3 = NEUTRAL, 4 = HIGH, 5 = VARY HIGH

Table 2: From literatures review and site observation related to Impacts poor communication and coordination on project performance in university construction projects.

S.no	Description	1	2	3	4	5
1	Un-Using a well-established channel of communication, Inadequate design planning and site management by the contractor, along with limited experience, coupled with the client's financial limitations and delayed payments, can adversely impact the project's planning and scheduling.					
2	Poor quality planning and control mechanisms, combined with imperfect design specifications, can have a major impact on the overall quality of a project.					
3	A lack of education and experience, combined with clients' poor budget allocation and resource limitations, significantly affects project results and leads to cost overruns.					
4	Poor coordination and relationships among stakeholders adversely impact projects, particularly in resource allocation.					
5	Inadequate risk assessments, identification and mitigation strategies' significant impact of projects performance.					
6	Ineffective communication plan and strategies, combined with poor coordination, and inadequate reporting among stakeholders hinder the overall performance of a project.					
7	Unclear roles and responsibilities among stakeholders, along with delays in decision-making.					

SECTION –D: MECHANISMS OF IMPROVING RELATED TO POOR COMMUNICATION AND COORDINATION ON PROJECT PERFORMANCE IN UNIVERSITY CONSTRUCTION PROJECTS.

5= highly necessary, **4=Necessary, 3=Moderate, 2=Low necessary, 1=Un- necessary**.

NB: Dear Respondents, please note that all improvement methods and related questions in this questionnaire pertain to addressing poor communication and coordination issues impacting project performance in university construction projects.

Table-3**:** From literatures review and site observation related to Mechanisms of improving poor communication and coordination issues impacting project performance in university construction projects.

S.no	**Description**	**1**	**2**	**3**	**4**	**5**
1	Using a well-established channel of communication					
2	Choose the Right Communication Tools					
3	Fix Regular Meetings					
4	Developing risk management plan					
5	Have a clearly laid out work plan					
6	Transparent Communication					
7	Developing communication and coordination plan					
8	Cloud-based tools centralize data and streamline communication in construction projects.					
9	Encourage Open Feedback Channels					
10	Define Response Times Guidelines formulation of appropriate reporting system					
11	Economic stability measure					
12	Promote honesty among superiors and workers					
13	Environmental sustainability initiatives.					
14	Employer provide communication workshop to develop relationship between superiors and workers					
15	Appointing a capable project manager					
16	Obtaining sufficient funding & resources					

17	Supply chain optimization strategies.					
18	Use market analysis tools.					
19	Effective stakeholder communication:					
20	Decision-making & problem-solving collaboration					
[i]21	Collaborative partnership with stakeholders					
22	Superiors should be trained for leadership					
23	Building capacity continuously					
24	Use Legal compliance formworks					

SECTION E: OPEN-ENDED QUESTIONS IN YOUR OPINION.

1. In your opinion, what challenges have you encountered in communicating with team members during this project……

2. How do you believe communication can be improved among different stakeholders involved in the project……

3. What methods have you found most effective for conveying important project updates?

……

4. What are the primary obstacles to effective coordination between various teams on this project?.....

5. How do you think we can enhance the collaboration between stakeholders? .....

6. In your opinion, how does communication and impact the overall performance of this project?

……

Appendix II

Case study Project one- research and technology centre lot -1

No.	description	Project Status
1	Type of work	Research and technology centre-lot-1
2	Employer	Addis Ababa science and technology university
3	Contractor	Yotak construction Plc
4	Consultant	Yehonnes abbay consulting and architects and Engineering
5	Date of sign of contract	31-may-2018GC
6	Type of contract	ADD measurement
7	Contract value main agreement	2,081,901,404.18ETB without vat
8	Variation order	8,545,132.68 ETB without vat
9	Total amount	2,090,446,536.86 ETB without vat
10	Performance security amount 10%CP	209,044,653.69 ETB without vat
11	Advance payment amount 25%CP	522,611.634.21 ETB with out vat
12	Amount of liquidity damage	0.1% of final contract price/day; maximum amount 10% of final contract price
13	Amount of retention	5% of every interim payment
14	Contract time	548 cal.day
15	Date of site hand over	14-Jun-2018Gc
16	Mobilization date	21 cal.day
17	Commencement date	5-July-2018GC

18	Original completion date	4-Jan-2020GC
19	Extension of time approved/including administration/	1540cal.day
21	Unjustified delay time	273cal.day
22	Revised completion date	Nov-17-2024GC
23	Defective liability period	365cal.day
24	Revised completion time	2325 cal.day /548+1504+273/
25	Time elapsed in day	2310cal.day
26	Percentage of time elapsed to date in November month	100.65%
27	Work schedule to date in birr	2,074,205,056.18 ETB with out vat
28	Work accomplished to date in birr	1,048,457,196.03 ETB main contract
29	Percentage of Work accomplished to date	50.15%……..% of main contract amount.
30	Physical work accomplished in birr	1,048,457,196.03 ETB main contract amount.
31	Percentage Physical work accomplished status	50.15%
32	Time over run	235.69%
33	Cost over run	0.41%
34	Quality of works	Good

Case study I

No.	description	Project Status
1	Type of work	G+4 student dormitory building
2	Employer	Mizan tepi university
3	Contractor	Bokra construction and trading plc.
4	Consultant	SG consulting Engineering plc.
5	Date of sign of contract	Oct-10/2017Gc
6	Type of contract	ADD measurement
7	Contract value main agreement	660,249,950.29 ETB with vat
8	Amendment contract	2,897,705,811.11 with vat
9	Total amount	2,897,705,811.11 with vat
10	Performance security amount 10%CP	66,024,995.03 ETB with vat
11	Advance payment amount 15%CP	99,037,492.54ETB with vat
12	Amount of liquidity damage	0.1% of final contract price/day; maximum amount 10% of final contract price
13	Amount of retention	5% of every interim payment
14	Main Contract time	900 cal.day
15	Date of site hand over	25-oct--2017Gc
16	Mobilization date	21 cal.day
17	Commencement date	Oct-10/2017Gc
18	Original completion date	10-may-2020GC
19	Extension of time approved	900cal.day
20	Unjustified delay time	630cal.day
21	Revised completion date	January 12, 2026GC
22	Defective liability period	365cal.day
23	Time elapsed in day	1656cal.day
24	Percentage of time elapsed to date	68.14%

25	Work schedule to date in birr	1,974,496,739.18 ETB with vat
26	Work accomplished to date in birr	945,236,565.78ETB with vat
27	Percentage of Work accomplished to date	47.87%
28	Physical work accomplished in birr	945,236,565.78ETB with vat
29	Percentage Physical work accomplished status	47.87%
30	Cost overrun	438.8%...from main contract agreement
31	Time overrun	270% …..from main contract agreement
32	Quality of works	poor

Case study Project three- Infrastructural works

No.	description	Project Status
1	Type of work	Infrastructural works
2	Employer	Semera- university
3	Contractor	Ethiopia construction works corporation /ECWC/
4	Consultant	Ethiopia construction design and supervision works corporation
5	Date of sign of contract	24 may 2019 Gc
6	Type of contract	ADD measurement
7	Contract value main agreement	with vat 707,304,700.29 ETB birr and Euro 5,985,928.98
8	Amendment contract	with vat 808,640,179.25 birr and Euro 5,985,928.78
9	Total amount	…
10	Performance security amount 10%CP	70,730,470.029 ETB with vat….based on main cp
11	Advance payment amount 20%CP	141,460,940.058 ETB with vat…. based on main cp
12	Amount of liquidity damage	0.1% of final contract price/day; maximum amount 10% of final contract price
13	Amount of retention	5% of every interim payment
14	Main Contract time	545 cal.day
15	Date of site hand over	15days After sign of contract agreement
16	Mobilization date	21 cal.day
17	Commencement date	Jun-15/2019Gc

18	Original completion date	NOVOMER 30/2020 G.c
19	Extension of time approved	1540cal.day/including administration time extension/
20	Unjustified delay time	……
21	Revised completion date	30-January/2024G.C
22	Defective liability period	365cal.day
23	Time elapsed in day	2146cal.day
24	Percentage of time elapsed to date	97.15%
25	Work schedule to date in birr	With vat 808,640,179.25ETB and Euro 5,985,928.78
26	Work accomplished to date in birr	248,997,946.58ETB with vat
27	Percentage of Work accomplished to date	35.2%
28	Physical work accomplished in birr	248,997,946.58ETB with vat with vat
29	Percentage Physical work accomplished status	35.2%
30	Cost overrun	87.47%...from main contract agreement
31	Time overrun	261.39% …..from main contract agreement
32	Quality of works	good