

Assessment of Construction Delay Factors: A Case Study of a Leading Real Estate Company in Ethiopia ¹

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Abstract

Construction in Ethiopia's residential private housing market typically suffers from considerable delays, resulting in a significant amount of time added to the duration of the project compared to initially expected. This paper assesses the root real causes of using construction delay factors for a leading real estate company in Ethiopia. The methodology used is a quantitative research design. Data collection took place among 50 construction professionals. Data analysis employed both Root Cause Analysis (RCA) and the Relative Importance Index (RII). Contractor-related delay causes arise from scheduling issues (RII 0.84), inadequate site safety (RII 0.74), and delayed delivery of materials (RII 0.74). The use of new technologies in project management and effective logistics would help mitigate these contractor-caused delays. Owner-related reasons for delay stem from managerial problems (RII 0.68), and contract disputes (RII 0.67). Streamlined approval processes, more clearly defined cost escalation provisions, and a liquid asset base to enable timely payments are all necessary to address owner-caused delays. In addition, consultant-caused delays relate directly to poor quality control (RII 0.72), and slow approvals (RII 0.66). Both may require more stringent technical oversight and a more rapid response to requests for additional information to reduce the need for costly rework. Lastly, external factors that impact construction projects include shortages in the marketplace (RII 0.79). Supply chain hedging, and purchasing large quantities of materials at one time will also help protect the project from high prices and supply interruptions. Ultimately, this study finds that systemic changes within organizations, such as adopting scientific scheduling, adding inflation escalators into contracts, and proactively managing their supply chains can help alleviate the many delays ranked at or near the top and provide for resilient project completion for a top real estate firm in Ethiopia.

Keywords: Construction Delays, Real Estate Development, Relative Importance Index (RII), Ethiopia, Fish bone Diagram, Project Management.

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1. Introduction

Construction projects are an essential component of development. This includes residential and commercial building construction, transportation construction such as roads, highways, railroads and airports. Industrial facility construction is also included. Construction projects have become increasingly important for the continued health of the economy. However, construction projects are extremely difficult to manage due to the various number of uncertainties, the amount of complexity involved in managing a multitude of stakeholders, and the variety of technological problems encountered throughout the process. Delays in completing a construction project are a significant problem for all construction projects around the world. However, it appears that this issue has reached epidemic proportions in developing countries. Delays have been identified as a major obstacle to successful construction project delivery.

Delays in completing construction projects continue to be a serious issue regarding project delivery. It is stated that the success of a construction project is determined by three elements: time, cost, and quality. To meet the requirements necessary for achieving each of these aspects, careful planning, coordinated execution, and efficient management of project resources, stakeholders and processes are required. A commonly referenced model known as the "project management triangle" supports this assertion. The triangle suggests that there is a relationship among the three project objectives. If one objective is compromised, at least one other will be affected negatively affected (Amoah et al., 2021). For example, would be if a delay occurs during the construction phase extending the schedule, this could result in additional costs and/or potential loss of quality.

Despite being a persistent problem, delays continue to affect project success. It was found that in Ethiopia delays occur frequently. Delays were found to exist on a very large scale. Schedule slippages ranged from 60 % to over 126 % of the planned duration (Tessema et al., 2022) . These types of delays create higher costs than originally anticipated, lower returns on investments, and ultimately decrease the total benefit to both society and the economy resulting from the creation of new infrastructure. Additionally, delays in project delivery can cause damage to stakeholder relationships, harm existing supply chain arrangements, and limit the ability to complete national development efforts.

While various forms of general infrastructure in Ethiopia have received documentation, the private real estate sector in particular has experienced volatile dynamics regarding interactions among private developers and contractors. There is a substantial void of empirical research examining the reasons behind why construction companies have experienced slippage of 126% or greater;

therefore, a targeted investigation will be conducted into this volatile private sector. To determine the sources of this phenomenon, it is crucial to evaluate how technical, managerial, external environment, and financial factors are exhibited within the Ethiopian context.

There are numerous causes of construction delays and they are often interdependent. Technical issues including design errors, poor site management, and equipment failure are among the primary contributors. Managerial inefficiencies, including delays in decision-making, poor communications, and suboptimal project planning, play a significant role (Viles et al. 2020). Delays due to financial constraints including delayed payments and budget overruns can worsen delays through constrained procurement and workforce mobilization (Kebede, 2025). Additional external environmental factors contributing to delays include unfavorable weather, civil unrest, changes in regulations, and land disputes (Xie 2022), which complicate the predictability and management of delays.

These challenges are exacerbated a leading real estate company in Ethiopia through institutional weaknesses, limited incorporation of modern project management methodologies and inadequate infrastructures related to procurement and logistical systems. As a result many projects experience poor planning, slow approval processes, and lack of coordinated communication among stakeholders resulting in both schedule slippage and cost overruns (Abdo et al. 2024). Therefore, project delays have become a normal condition rather than an exceptional occurrence in a leading real estate company in Ethiopia, ultimately impairing its overall performance and economic contributions.

Understanding the underlying causes of these delays is paramount to establishing effective delay mitigation strategies. The literature suggests that delaying project completion requires a multi-faceted strategy encompassing technical, managerial, financial, and external delay factors (Ali et al. 2019). In a leading real estate company in Ethiopia there exists an urgent need for empirical studies that investigate specific delay factors pertinent to the local construction community in order to facilitate targeted interventions (Desta & Msenga, 2025).

This research will focus on the construction projects associated with a leading real estate company in Ethiopia that utilizes traditional contractual arrangements. Through client surveys, contractor surveys, and consultant surveys, the research aims to determine those delay factors that are considered most important and provide actionable solutions. Ultimately, the purpose of this research is to develop and contribute to existing knowledge regarding delay mitigation strategies and enhance project delivery performance within Ethiopia.

Successful implementation of delay management strategies can yield improved scheduling performance, reduced costs, and enhanced construction quality standards. These improvements in construction quality can ultimately serve as a foundation for supporting national development objectives and attracting investments while creating a robust and resilient construction industry capable of fulfilling Ethiopia's developmental aspirations (Mekonnen et al. 2025; Zegey & Darsa 2024).

2. Literature review

Construction delays have been examined in several settings internationally due to their direct effects on project performance and overall industry success. Multiple causes and variables that create delays have been analyzed by researchers with most categorized under technological, organizational/managerial, financial, external and contractual (Aburumman et al., 2023; Kebede, 2025). This analysis is essential to develop strategic mitigation methods and enhance project delivery. Additionally, current research has indicated that a project's resiliency is not simply dependent on its technical plan; rather, it is determined by the organizational governance structure(s) that will enable an organization to respond to changes occurring within the project environment (Lv et al. 2023).

Technical Reasons: Technical issues are one of the largest contributors to construction delays. Examples of technical causes include errors in design, incomplete or delayed designs, inadequacies in site investigations, and unanticipated site conditions. For instance, when designers disagree about aspects of a project design or make frequent changes to a project, it necessitates reworking which prolongs the time required to complete a construction activity (Aggarwal & Kapoor, 2021). Equipment failures or shortages of materials and supplies at a job site similarly impede a project's progress (Ali et al., 2019). When organizations do not plan properly and manage a job site ineffectively, both of these issues are exacerbated. Reviews of literature suggest that while these technical issues continue to persist among those in this sector, the use of emerging digital technologies to identify and address potential bottlenecks prior to causing significant delays on the project's critical path is an increasing trend (Sepasgozar et al., 2020).

Organizational Reasons: Research has shown that ineffective practices by project managers are significant contributors to delays. Practices such as poor scheduling, lack of coordination among all parties involved in the project, delayed decision-making, and insufficient supervision frequently prevent the successful completion of a project (Amoah et al., 2021). Poor communication between team members and stakeholders of a project results in misunderstandings and rework that increase the amount of time needed to complete a project (Selcuk et al., 2022). The application of modern

project management techniques, such as Critical Path Method (CPM) and Earned Value Management (EVM), is being researched as a solution to prevent these issues (Chidambaram et al., 2021). In addition to identifying the causes of the issue, the cognitive perspective of the project team(s) and the project governance structure will also have a significant impact on determining which influence mechanisms can help support the resilience of a project when it is experiencing pressure (Lv et al., 2023).

Financial Reasons: Financial constraints greatly affect construction timetables. Delays in payments to contractors, lack of sufficient funds, and budget overruns can stop an activity or cause it to proceed slowly. A lack of financial means usually results in shortfalls of materials and layoffs of workers delaying a project (Arefieva et al., 2019). In some instances, financial disagreements among stakeholders can further delay decisions and progress on a project.

External Factors: Unpredictable external environmental factors are another major source of delay. Weather conditions, such as prolonged periods of either heavy rain or excessive temperatures, can completely halt an ongoing construction activities. Other factors, such as political unrest, government regulations that alter the terms of a contract, land disputes, and protests by local communities can also delay the execution of a project (Brower & Mahajan, 2013). While these factors cannot be controlled by a contractor, they should be included in a contractor's risk assessment and contingency plans (Mekonen et al., 2025).

Contractual Factors: The type and terms of contract clauses significantly influence occurrence of delays. Fixed-price contracts provide little flexibility for changes in scope of work resulting in disputes and delays. Poorly written contracts offer few provisions for dealing with unexpected events leading to disputes and delays (Dessalegn Belay, 2017). Proper contracting and clearly defining roles and responsibilities will help in preventing delays.

Previous studies have indicated that institutional inefficiency in Ethiopia is a common issue. Using modern project management tools and procurement-related delays contributes to delays experienced by projects implemented in Ethiopia (Desta & Msengana, 2025). Resource limitations and limited capacity of local companies also restrict the efficient completion of projects .

Although considerable knowledge exists regarding causes of construction delays, there remains a perceived necessity to conduct localized studies considering the particular elements impacting delay causation within Ethiopian construction projects. These studies would enable policy makers and practitioners to adopt targeted initiatives designed to reduce delays and enhance the efficiency of projects.

Utilizing a comprehensive strategy that integrates technical, managerial, financial, external, and contractual considerations presents the greatest potential for reducing delays and enhancing project outcomes. The remaining sections will examine specific causes described in prior studies and how they pertain to the leading real estate company in Ethiopia.

Current literature extensively covers Ethiopian public building projects and road construction. However, there is a significant research gap regarding the private real estate developer-contractor dynamic. This study addresses this void by providing empirical data delay factors affect the performance of a leading real estate in Ethiopia.

3. Methodology

The research methodology describes the methodological approach and procedures used to determine the major causes of delays in a leading real estate construction company projects and their effects. This section explains the research design, data collection methods, sample selection plan and the statistical analysis methods used during the study.

3.1 Research Design

In this study, a descriptive and analytical research design is being utilized, so that the causal variables can be described systematically, and their comparative importance is examined within the context of a leading real estate company in Ethiopia's projects. A quantitative-methods approach has been adopted.

3.2 Population and Sampling

The target population includes all of those who are involved in construction projects and in engineering related departments at a leading real estate company in Ethiopia. A leading real estate company in Ethiopia is a large-scale real estate developer primarily operating in Addis Abeba, involved in residential and mixed-use development.

A purposeful sampling technique was employed to select knowledgeable key informants with direct experience with delays in construction projects (Etikan et al., 2016). To capture different viewpoints regarding project delays, 50 respondents who possess specific technical and project knowledge were surveyed.

3.3 Data Collection Methods

Structured questionnaires were used to collect the data. The structured questionnaires included a discretized weighted scale that measured the extent or magnitude of several delay factors cited in the literature review. This specific 0-5-10 weighting system was chosen to provide a clear numerical distinction between non-existent factors and chronic issues.

Prior to use in data collection, the questionnaires were tested for clarity and reliability. It was determined that the questionnaire had satisfactory clarity through content validity checks conducted by experts in the research area. Internal consistency was tested by conducting an item-to-item reliability test, known as Cronbach's alpha coefficient, and it was found to be 0.82. This indicates there is internal consistency. Thus, the items measuring delay factors were statistically reliable and valid for evaluating delay factors in a leading real estate company in Ethiopia.

A structured questionnaire was developed to identify delay-causing factors at a leading real estate company in Ethiopia and categorize them into external and internal source categories. Each identified factor was assigned a weight to indicate both how often it occurred and its severity. The weights include: always exists (10); sometimes happens (5); does not exist (0).

The study can provide more detailed information on delay causes and be accountable to stakeholders by using a tripartite model of the three parties involved in the project (Owner, Contractor, Consultant) as categories for the delay-causing factors that are grouped into technical, managerial, financial, and environmental types.

This method will remove ambiguity from the project participants' roles. It will also enable a clear plan of action for each project participant in order to correct the problems over which they have some level of control over. Additionally, it will provide an individualized guide for organizational improvement.

The prepared questionnaire assesses contractor-related delay causes (e.g., poor site management, unrealistic schedule expectations, lack of contractor experience), consultant-related delay causes (e.g., delays in obtaining approvals, poor contract management) and owner-related delay causes (e.g., bureaucratic delays, difficulties in purchasing materials, design errors, financial constraints).

Additionally, weather conditions, changes in regulations and shortages in the market are evaluated as potential external causes by assigning this matter to the main stakeholders (i.e. owner/consultant/contractor) where appropriate.

The evaluation results will enable the identification of priority areas for focused intervention and proposed solutions for addressing each of these delay causes. Therefore, both systematic analysis

and practical delay reduction measures will be possible for the construction projects of a leading real estate company in Ethiopia.

3.4 Data Analysis

Quantitative data were analyzed using descriptive statistics and Relative Importance Index (RII) (Hair et al., 2013; Kebede, 2025). RII enabled a clear ranking of delay-causing factors according to the perceived impact of each. **The RII is calculated as follows:**

$$RII = \frac{\sum(f \times w)}{A \times N}$$

Where:

- f = frequency of responses at each level
- w = weight assigned to each response level (e.g., 0 / 5/10 scale)
- A = maximum weight (e.g., 10)
- N = total responses

3.5 Ethical Considerations

Each participant provided informed consent prior to participating in the study. All responses were treated confidentially to avoid damaging the reputations of professionals associated with a leading real estate company in Ethiopia.

3.6 Limitations of this Study

There are several limitations to this methodology. Although all methods were employed to maximize reliability, there are some limits to it. One limitation is that the number of respondents used for RII was limited ($n = 50$) and they are all from a leading real estate company in Ethiopia. As such, it is difficult to generalize these results to all real estate companies in Ethiopia and other sectors in Ethiopia.

Specifically, the private real estate sector was targeted and therefore, the results may not be applicable to the public sector or civil engineering projects. Another limitation of this study is based on the reliance on informant perception.

3.7 Rationale for Using Methodology

RII has been identified as a "gold standard" in research related to construction delays (Taherdoost, 2022). A 10-5-0 weighted scale is used so as to emphasize the most common causes of delay, which will enable the RII to identify extreme factors requiring prompt managerial intervention. This analytical approach represents a common methodological practice in current high-impact studies examining construction delays in emerging markets and is suitable for evaluating the performance of a leading real estate company in Ethiopia.

4. Data Analysis and Findings

In this section an overview of the data analysis provided on the responses from 50 survey participants using descriptive statistical methods to determine the principal reasons for the delays that occur in the leading real estate company construction projects. The degree of importance of the potential delay-causing factors will be compared across all categories based on the quantifiable values generated during our research process including average percentage values, ranking values and averages. This analysis will follow a logical sequence that makes sense, starting with demographic data for respondents, followed by categorical analysis, finishing with an overall RII ranking (Taherdoost, 2022).

4.1 Respondents Profile

To provide some level of assurance regarding the validity of the results, preliminary evaluations conducted on the demographic profiles of the 50 participants who completed the surveys to validate the reliability of the data used in subsequent RII analyses. In addition, as indicated in Table 1, the study is representative of construction professionals within a leading real estate company in Ethiopia. More importantly, as noted in Table 1, 66% of participants have over ten years of experience working in the Ethiopian construction industry. This provides a very high degree of validity concerning their expertise, which supports the subsequent RII rankings. As stated by Abdo et al. (2024) it will be necessary to have experienced professionals involved in order to properly identify the systemic delay elements in the Ethiopian context.

Table 1: Demographic Characteristics of Respondents (N=50)

Category	Classification	Frequency (f)	Percentage (%)
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Professional Role	Construction professionals	50	100%
Years of Experience	1–5 Years	5	10%
	6–10 Years	12	24%
	> 10 Years	33	66%
Education Level	BSc Degree	31	62%
	MSc / Post-graduate	19	38%
Total		50	100%

4.2 Overall Causes of Project Delays

The data reveals four main categories influencing project delays a leading real estate company in Ethiopia, ranked by their average importance:

The Root Cause Analysis (RCA) has been depicted using a fishbone diagram to help illustrate all possible causes of delays within the leading Ethiopian real estate firm as described below.

A. Owner-Related Causes

The following categories were developed based on the Root Cause Analysis (RCA) presented in the provided fishbone diagram illustrating all the specific delay factors encountered at the leading Ethiopian real estate company.

A. Owner-Related Delay Factors

Owner related delay factors represent the largest portion of the fishbone diagram, with a total of seven (7) specialized areas of inefficiency causing significant delays in project timelines. **Managerial delays** are caused by slow decisions made by owners, owner interference and imposing unrealistic contract durations on contractors; these managerial delays are compounded by inexperience of both client and PMO along with owner imposed suspensions of work. Administrative delays have been found to be influenced by the length of time required to assign contractor(s), organizational structure issues and **contract related delays** can be attributed to frequent change orders, major disputes, prolonged contract negotiations resulting from errors in contract documents or quantity estimates that lead to cost underestimates. **Financial constraints** also contribute substantially to delays by including delays in owner interim payments to

contractors, late payments to suppliers/subcontractors, and ongoing budget conflicts related to projects.

Resource and technical management also create significant barriers to progress and may include **material related delays** caused by market shortages, procurement lags, poor stock control and substandard materials. **Labor related delays** may include low productivity, shortages of skilled workers, equipment failures and lack of new technologies. **Design related delays** may occur when there are constant changes to designs, incomplete drawings and errors during the initial design phase that require additional time to prepare. **Human element and training communication related delays** have been found to exist when staff motivation is reduced due to salary issues and poor communication exists between parties involved in the project.

B. Contractor-Related Causes

Delays caused by contractors occur for two reasons: either through the failure to execute an operation properly or due to poor use of resources. The four major categories where problems arise are as follows. In **Operations and Scheduling**, there have been numerous instances of stagnant performance resulting from prolonged and chronic delays in scheduling, the creation of overly optimistic schedules, and poor site management. In addition to these problems, **technical and quality issues** contribute to both the causes and effects of these delays. These causes primarily result from the contractor having inadequate staff qualifications, insufficient contractor experience, and/or using substandard construction techniques that cause defects and errors within the structure during its construction.

From a **logistics and financial standpoint**, the contractor's ability to finance their own projects has resulted in many cases of delayed project momentum. Contractors who fail to provide timely deliveries of materials, and those who submit unclear or incomplete payment requests, also impede the progression of cash flow throughout the project. The final category representing the site **environment and communication** includes: poor working conditions at the site, causing work stoppages due to poor safety, limiting hours of work shifts, and poor communication with the client (real estate owner) creating obstacles to maintaining the project's critical path.

C. Consultant-Related Causes

The consultant-related issues that contribute to delays constitute the managerial/technical oversight area of the fishbone diagram. Consultant-related issues with respect to **supervision** are

typically due to poor administrative decisions; within this category, the major issue is the lack of skill in QA (quality assurance), which can be attributed to the consultants' lack of relevant experience. The result of these technical oversights is typically additional work, i.e., "rework," which creates a need to continue to stall the project's progress.

From an administrative viewpoint, when the consultant acts as a facilitator for the project's progression, poor contract management and poor scheduling control create a hindrance for both parties. The process inefficiencies created by administrative delays are compounded by several procedural delay areas, including delays in approval of drawings and payment approval.

D. External Related Sources

Three main categories of external-related risks exist. All can cause delays in the project's timeline. The first category is economic/market-related (e.g. the material market has shortages of materials and/or fluctuating prices). These shortages and fluctuations will disrupt the procurement schedule. The second category is site/social (the majority of this category involves neighbor disputes or problems with the property itself e.g. site-specific environmental issues, general problems with the site neighbors and border disputes that have created an unstable working environment). Weather is one example of an environmental factor. In particular, rain has been responsible for the halt of all on-site construction activity, resulting in a delay in completing the project according to the initial plan.

Overall the possible delay causes under the four categories are shown in Figure 1. It is based on these delay factors that data collected from the research participants.

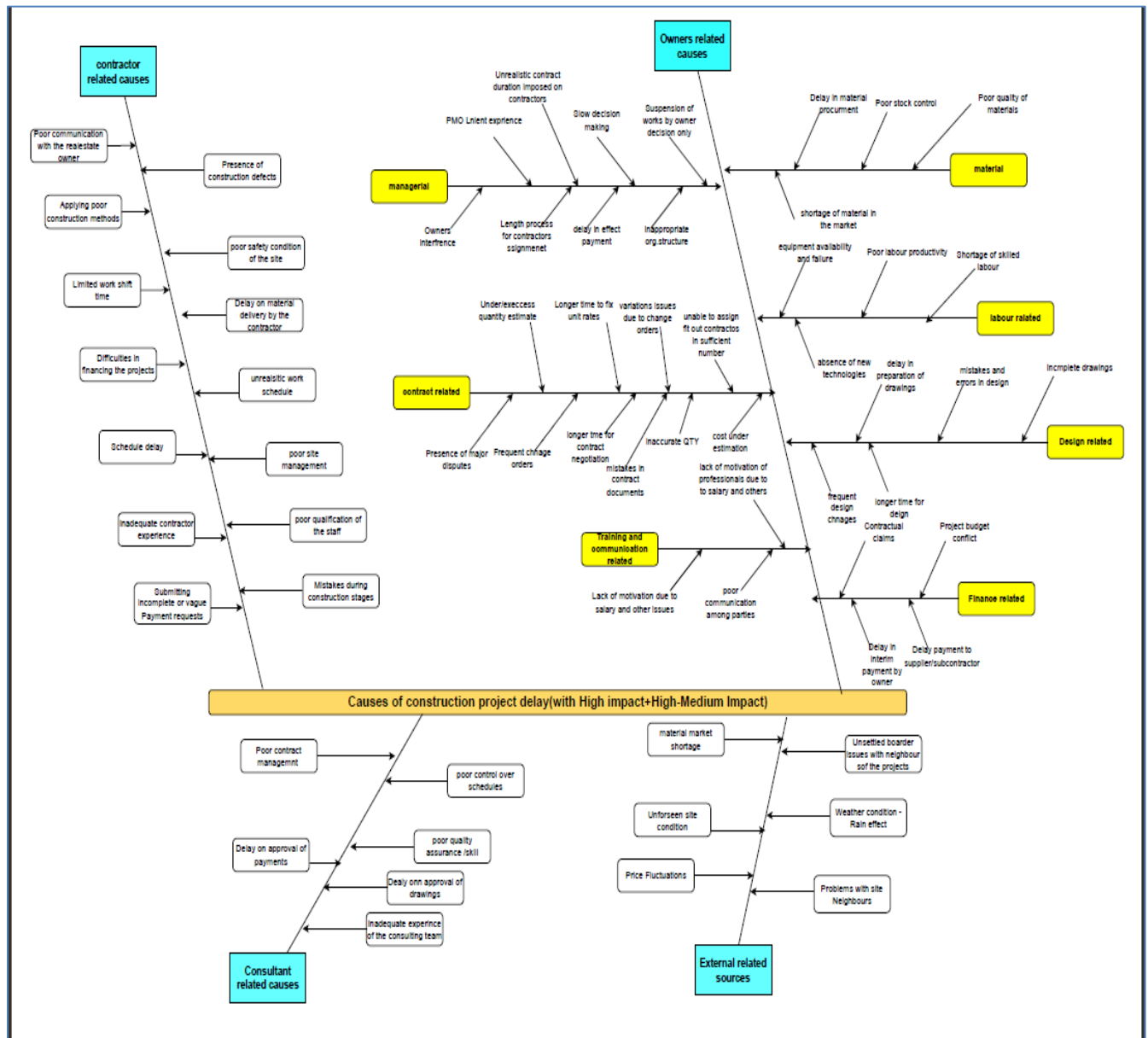


Figure 1: Fishbone Diagram for Causes of Construction Project Delay (Original)

4.3 Descriptive Statistics and Relative Importance Index (RII)

A descriptive statistic presents the results from survey questions in a summary form through mean values and relative importance of responses may be seen.

Descriptive statistics based

Table 2: Categories of Delay Causes

Category	Average Percentage	Rank
Contractor-related causes	29.72%	First
Owner-related causes	25.39%	Second
Consultant-related causes	24.18%	Third
External factors	20.71%	Fourth

The most prevalent cause of delays in a leading real estate company in Ethiopia (see Table 2), after a very close second, is contractor-related issues, followed by owner-related issues. Both external factors and consultant-related causes are less influential than the first two. These findings suggest that the timely completion of projects depends heavily on how well a project team manages itself internally, performs its contracted duties with the contractor(s), and maintains an organized project environment for the owner (Amoah et al., 2021; Ali et al., 2019). There appears to be a small margin when comparing contractor related (29.72%) and owner related (25.39%) issues ;therefore, it would seem that there is an issue of shared responsibility within the project life cycle. This is also supported by the recent study of Mekonen et al. (2025) which concluded that the major cause of stagnation in regional Ethiopian construction projects was primarily due to internal stakeholders' inefficiency.

Relative Importance based

A Relative Importance Index (RII) is used to rank potential causes of delays in a leading real estate company in Ethiopia in order of their perceived importance, and is determined using the following formula:

$$RII = \frac{\sum(f \times w)}{A \times N}$$

Where W represents the weight assigned (0, 5, 10), A is the maximum weight (10), and N is the sample size (50). The application in this study determining the scores of the causes were determined using a scale of 0-10. Ranking was then established by calculating the relative importance index (RII) for each cause. A higher value for RII is considered indicative of greater influence on the delay process. The application in this study involved:

Table 3: Descriptive Statistics Findings:

Delay Causes	Relative importance Index(RII)
Contractor related causes	0.62
Consultant related causes	0.54
Owner related causes	0.64
External related	0.56

Based on the comparative RII data in Table 3, owner-related causes (0.64) are identified as the primary driver of project delays in a leading real estate company in Ethiopia, suggesting that the most significant bottlenecks stem from the client’s internal bureaucracy and financial liquidity. Zegeye and Darsa (2024) report similar findings; they found that, in Ethiopia, the owners' administrative bottlenecks significantly impacted the contractors' schedules. Contractor-related causes (0.62) rank as the second most impactful category, highlighting that operational failures in scheduling and site management are nearly as disruptive as the owner's influence. While external-related factors (0.56) and consultant-related causes (0.54) also contribute to project stagnation, their lower relative importance indicates that stakeholders view the internal inefficiencies of the owner and contractor as the most urgent areas for reform in a leading real estate company in Ethiopia.

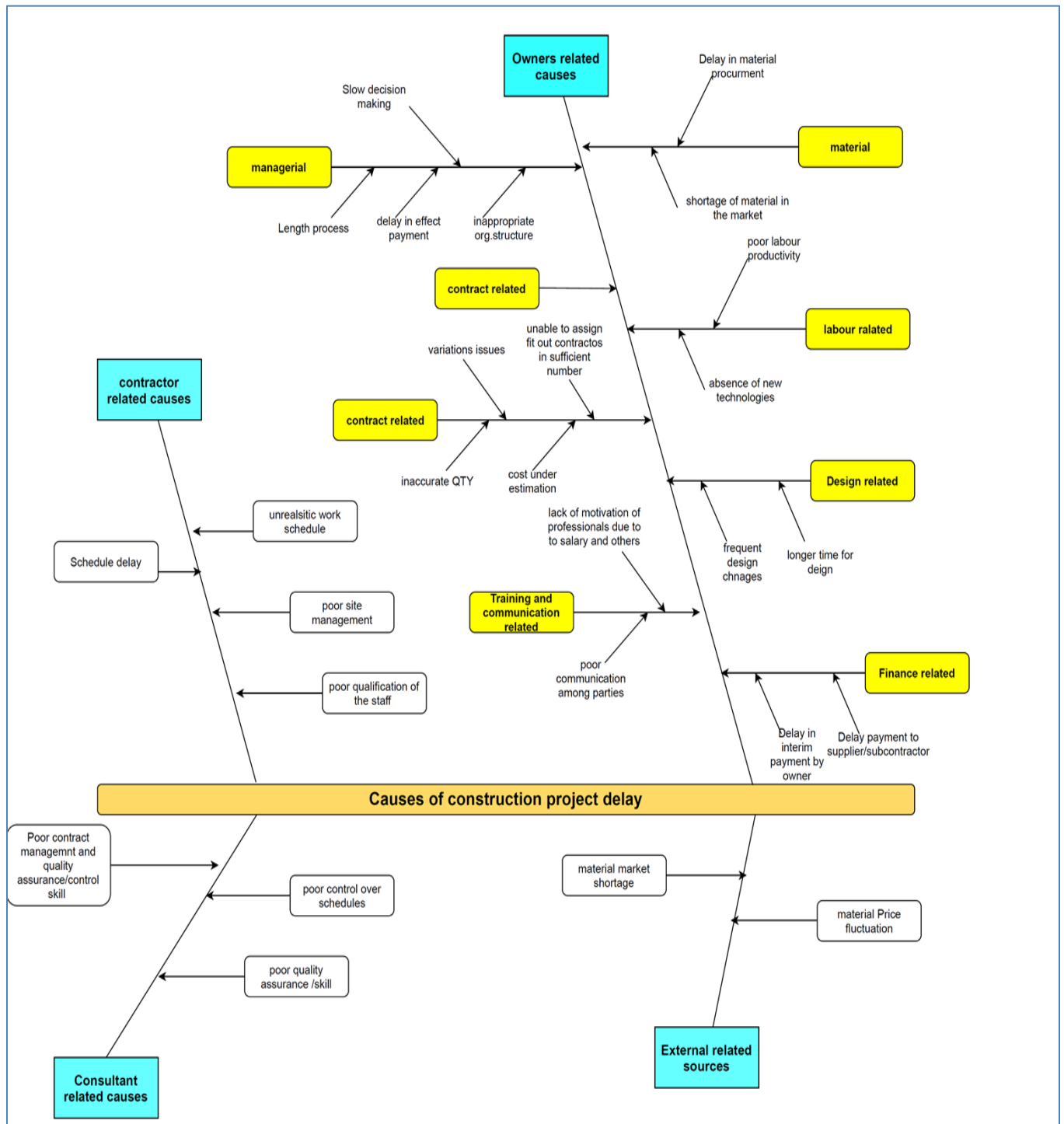


Figure 2 : Fishbone Diagram for top ranked Causes of Construction Project Delay(after data analysis)

4.4 Owner-Related Causes Breakdown

Further segmentation of owner-related problems shows how much each category contributes to time extensions. Table 4 illustrates the greatest barriers related to the owner's side in a leading real estate company in Ethiopia are financial and contractual.

Table 4: Ranking of Owner-Related Delay Categories

Cause Category	Average score	RII	Rank
Finance-related causes	6.39	0.65	Third
Contract-related causes	6.63	0.67	Second
Managerial causes	6.72	0.68	First
Design related	6.05	0.61	Fifth
Training and Communication	5.31	0.55	Sixth
Labor and equipment Category	6.19	0.62	Fourth
Material-related causes	6.64	0.68	First

Based on the data in Table 4, Managerial Causes and Material-related Causes were equal as the biggest obstacles to achieving project success in a leading real estate company in Ethiopia, each with the same RII of 0.68. This emphasis on Managerial Issues supports the work by Desta and Msenga (2025), which identifies Institutional Management as one of the critical elements of Project Resilience in Ethiopia. The fact that these two cause types have the same rank is a clear indication that inefficient decision making processes and oversight during the procurement process are the main hindrances to the Project Owner's ability to achieve project success. Contract-related issues (RII = 0.67), and Financial Issues related to projects (RII =0.65), follow closely behind, indicating a "liquidation trap" existing in the Ethiopian real estate industry. Many owners rely on payment stages made from buyers, and when a buyer defaults on his or her payment obligations, this immediately stops all progress on the project. In addition to causing delays to the completion date of the project, the lack of inflation escalator provisions in contracts, also creates prolonged

disagreements among parties concerning adjusted cost estimates, thereby extending the duration of the project. Finally, the lower ranks for Labor (0.62), Design (0.61), and Training (0.55) indicate that stakeholders believe that it is much more critical for a leading real estate company in Ethiopia, to focus on internal operational and organizational reforms rather than to spend time addressing technical or environmental issues.

4.5 Contractor-Related Causes

Analysis of contractor-related causes for a leading real estate company in Ethiopia indicates the following major contributors:

Table 5: Ranking of Contractor-Related Delay Categories

Cause	Average Score	RII	Rank
Schedules Delay	8.44	0.84	First
Poor safety conditions of the site	7.19	0.74	Second
Delays on material delivery on site- for delivery by him	7.19	0.74	Second
Difficulties in financing the projects	6.88	0.69	Third

Based on the results from Table 5, Schedule Delay was determined to be the greatest contractor related barrier for a leading real estate company in Ethiopia due to its higher ranked RII value of 0.84. These types of critical delay factors are commonly referenced in the current body of literature regarding poor operational performance (Viles et al., 2020).It can be concluded that the contractor's failure to comply with the established timeline has been the major cause of the project being delayed. Safety Conditions were rated as the second greatest contractor related barrier along with Delays in Material Delivery with an RII of 0.74. The large impact of the logistics of materials highlights Bedada's (2023) finding that there is a high risk that Ethiopian contractors will experience disruptions within their supply chains. The significant impact of safety issues means there are many opportunities for operational disruptions to occur at the construction site resulting in lost time. Additionally, the large impact of material delivery issues points to poor logistics on the part of the contractor regarding managing the flow of materials throughout the project. Financing difficulties (RII=0.69) ranked third which implies while financial issues within the contractor may hinder ability to fund a project, they are secondary compared to how well or poorly

the contractor manages their schedules and sites relative to delaying the project. Finally, the fact that there are such high RII values among the top factors indicates that stakeholders feel that contractors need to significantly improve their operational execution and management of resources to reduce delays for a leading real estate company in Ethiopia.

4.6 External Causes

External factors impacting delays in a leading real estate company in Ethiopia include:

Table 6: Ranking of External Causes-Related Delay Categories

Cause	Average Score	RII	Rank
Market shortage of Materials	7.81	0.79	First
Unsettled border issue with neighbors of the project site	6.25	0.63	Second
Regulatory changes/price fluctuations	5.63	0.57	Third

The data in Table 6 identify market shortages of materials as the most important external barrier to the implementation of projects; it holds the top rank with an extremely large relative importance index (RII) of 0.79. The difficulty described here, is a systemic risk factor, as stated by Tessema et al. (2022) in their analysis of construction risks for Ethiopia. The very high RII indicates that all real estate in Ethiopia will be exposed to a high degree of risk from supply chain interruptions primarily related to the availability of key finishing materials (rebar and concrete). Border issues related to unsettled neighbor disputes rank second (0.63 RII); these local land disputes and site boundary conflict risks can have significant non-technical impacts on the continued execution of a project by the leading real estate company in Ethiopia. Price fluctuations and regulatory changes rank third (0.57 RII); the latter reflects the vulnerability of a project's budget and regulatory compliance to macroeconomic instability. Overall, although there may be some legal or regulatory issues related to project implementation, the presence of the largest external constraint to meeting project time frames is clearly related to resource availability within the market.

4.7 Consultant-Related Causes

Analysis of consultant-related causes indicates the following primary contributors to project delay in a leading real estate company in Ethiopia:

Table 7: Ranking of Consultant-Related Delay Categories

Cause	Average Score	RII	Rank
Poor Quality Assurance/Control	7.19	0.72	First
Poor control over schedule ,approval and control	6.56	0.66	Second
Poor Contract management skill	5.94	0.60	Third
Delay on approval of payments	5.94	0.60	Third

Based on the data from Table 7, the consultant's inability to perform good quality assurance/control has been determined to be the most significant barrier for the consultant in terms of consultant related factors, having the highest ranking score with an RII of 0.72. Due to this lack of proper oversight, a significant amount of time may need to be spent reworking tasks, which is defined by Crawford and Bryce (2003) as being detrimental to the overall performance of the project. Therefore, it can be inferred that it is the consultant's failure to adhere to high standards of monitoring of construction in a leading real estate company in Ethiopia that is ultimately responsible for the amount of rework and subsequently the delays experienced by the contractor. Poor control over schedule and approvals was ranked SECOND, with an RII of 0.66; therefore, there were many administrative roadblocks in the consultant's offices hindering the progress of the project. Third place was shared by poor contract management skills and delays in approving payments with an RII of 0.60.

Overall, the top ranking of quality control issues indicates that stakeholders have identified technical supervision and compliance as the most pressing areas requiring improvement within the consultants' abilities in a leading real estate company in Ethiopia.

4.8 Root Cause Analysis and Fishbone Diagram

4.8.1 Root Cause Analysis

The root cause analysis(RCA) is an analytical method to determine how a project has failed to meet its objectives by identifying the underlying systemic problems. In this RCA, for a leading real estate company in Ethiopia, all the possible causes were categorized into several broad categories, including contractor, owner, consultant and external factors. A fishbone (Ishikawa) diagram was utilized to identify the relationship between the primary categories of delays (Cottam et al., 2019; Sarstedt et al., 2020).

4.8.2 Comprehensive RII Ranking of Top 10 Delay Factors

Relative Importance Indices (RIIs) were used as an indicators to determine the relevance of each of the major categories of delays for the leading real estate company in Ethiopia. Table 8 shows all of the primary causes of delays for that firm, ranked from highest to lowest priority.

Table 8: Comprehensive Relative Importance Index (RII) for the top 10 identified delay factors

Rank	Specific Delay Cause	Responsible Category	Avg. Score	RII
1	Schedule Delays	Contractor	8.44	0.84
2	Market Shortage of Materials	External	7.81	0.79
3	Poor Safety Condition of the Site	Contractor	7.19	0.74
4	Delays on Material Delivery (Contractor-led)	Contractor	7.19	0.74
5	Poor Quality Assurance/Control	Consultant	7.19	0.72
6	Difficulties in Financing Projects	Contractor	6.88	0.69
7	Managerial Causes	Owner	6.72	0.68
8	Material-related Causes	Owner	6.64	0.68

9	Poor Control over Schedule and Approvals	Consultant	6.56	0.66
10	Contract-related Causes	Owner	6.63	0.67

The RII ranking data in Table 8 provides a hierarchy of delay factors for a leading real estate company in Ethiopia, yet it fails to illustrate the complex causal links that drive project failure. To bridge this gap, a Root Cause Analysis (RCA) is employed to synthesize the identified causes into a comprehensive Fishbone Diagram.

This analysis reveals that the top-ranked factors—"Schedule Delays" (Rank #1) and "Market Shortage of Materials" (Rank #2)—are not isolated incidents but the cumulative result of systemic failures across all stakeholders within a leading real estate company in Ethiopia. As noted in Ghufran et al. (2022) we must view these factors from a systems thinking perspective to see how they all interconnect with one another within the Construction Supply Chain. As reported in Enshassi et al. (2019), the inability to mitigate these systemic delays is further exacerbated by Technical Limitations which include, but are not limited to, the slow implementation of Digital Coordination Tools that can provide Real Time Visibility on supply chain and Scheduling Bottlenecks. For instance, the contractor's schedule slippage is often a direct consequence of "Poor Safety Conditions" and "Logistical Failures" (RII 0.74), while the consultant's "Poor Quality Control" (RII 0.72) creates administrative bottlenecks. When these operational issues intersect with the owner's "Managerial Inefficiencies" (RII 0.68) and external market volatility, they create a compounding effect that moves a project from a simple delay into total stagnation.

As illustrated in Figure 2, the root causes were grouped by themes to demonstrate how "inaccurate estimates" (contractual branch) commonly will create "finance related issues" (owner branch) in a leading real estate company in Ethiopia, leading to the need for an "unrealistic work schedule" (contractor branch). This creates a "cycle of delay," where one root cause produces many symptoms or effects through multiple stakeholders (Yang & Cheng, 2020; Zhao et al., 2023). By establishing the primary "bones of contention," the research identifies a gap in management for all real estate ventures in Ethiopia.

4.8.3 Root Cause Analysis of top 10 Selected delay factors

The use of the fishbone diagram shown above (Figure 2) illustrates the many different reasons why there are so many problems with delays in construction projects. Like the tables from the RII method mentioned earlier, the fishbone diagram shows how the lower level or secondary issues

are related to higher level or primary issue areas. The four primary areas include Owner, Contractor, Consultants, and Externally caused delays (Chidambaram et al., 2021; Ali et al., 2019).

Contractor-Related Factors (Rank 1, 3, 4, 6)

The contractor is responsible for the largest percentage of all the top ranked delay factors, largely due to the operational and financial instabilities associated with it. These are caused by a combination of an inability to manage the company's "cash flow," and the resultant "chronic financial difficulties (Memon & Rahman, 2014)." This will hinder the contractor from being able to quickly mobilize the labor and equipment necessary to execute the project. Additionally, there appears to be a lack of "qualified technical personnel" on the construction site, and "poor site management," which hinders the contractor from executing their planned work program (Viles et al., 2020). Furthermore, these problems appear to have been further complicated by the "lack of safety programs" and "inadequate training" provided to employees (Sepasgozar et al., 2020). Consequently, the contractors are forced to shut down the work on the project, when they perceive that it may create hazardous working conditions.

Owner-Related Factors (Rank 7, 8, 10)

The owner's influence on the project schedule is mainly defined by administrative bottlenecks and procedural delays. An important cause of this bottleneck is the slowness in decision-making processes; this creates stoppages when the contractor requires immediate clarification or approval to proceed (Zegeye & Darsa, 2024). Another very important factor is the delays in progress payments from the owner which cripple the contractor's liquidity and therefore slow down work (Mekonen et al., 2025). Additionally, the frequent introduction of change orders and the presence of ambiguities in contract documents will also create long disputes between parties and extensive rework (Abdo et al., 2024). Poor coordination with local authorities regarding necessary permits further acts as a significant barrier created by the owner that hinders maintaining the project timeline.

Consultant-Related Factors (Rank 5, 9)

The consultants' contributions to project delays are mainly due to lapses in their technical oversight and a lack of responsive administration. "Inadequate Quality Assurance and Control" can be attributed to the poor site supervision, a failure to adhere to technical specifications, and ultimately leads to the need for costly corrective action (Crawford & Bryce, 2003). Delays in approval of large or complex work items, i.e., shop drawings and material samples also create significant barriers. When the consultant does not respond promptly to Requests for Information (RFIs) it prevents the

contractor from moving along the Critical Path, thereby creating a compounded delay in the completion of each project milestone(Memon & Rahman, 2014).

External Factors (Rank 2)

The lack of an overall strategy for procurement is another issue, as well as other concerns (such as a lack of coordination among stakeholders) that are outside the direct control of either the owner, the general contractor or the consultants. As such, this represents a form of "systemic risk," which can be mitigated through early procurement strategies and contingency plans(Ghufran et al., 2022). Market and supply chain volatility cause significant and frequent delays in high ranked projects. Procurement difficulties caused by "shortage of materials available on the market" along with price swings in critical products (such as cement and steel), create both short-term and long term procurement gaps, but cannot be addressed until after the construction process has begun(Bedada, 2023; Tessema et al., 2022).

5. Conclusion and Recommendations

5.1 Conclusion

This report was conducted using an empirical research methodology based on the RII and RCA to identify sources of construction delay for a major residential developer in Ethiopia. Based on this investigation, it has been determined that construction delay is not an isolated incident; rather, it represents a systemic failure that is part of an ongoing cycle of delay among internal stakeholder groups.

Although owner-related causes represent the majority of delay related stagnation due to bureaucratic and financial liquidity constraints (RII=0.64) identified during this investigation, it was found that the single most critical source of individual delay causing factors was identified to be contractor schedule delay (RII = 0.84). Further, the study identified that the Ethiopian residential construction industry is significantly impacted by external factors (rank 2) primarily represented by material shortages such as reinforcement bars and cement.

Ultimately, the statistical reliability of these findings is confirmed by the high Cronbach's alpha (0.82) indicating that there is a need for substantial organizational and operational reform across all three stakeholder categories (owner, contractor, consultant) in order to provide assurance of project viability and resilience within an unstable economic climate.

5.2 Recommendations

To mitigate the identified causes of delay, we have developed the following proposals for remedies, which were derived from the specific remedial measures indicated within the results of our literature review and the relative importance index (RII) ratings.

Contractor-Related Recommendations

It is recommended that contractors use a more science-based methodology in managing projects. Specifically, this would involve contractors moving away from unrealistic scheduling expectations by using modern project management tools to create, simulate and manage accurate baseline schedules (Viles et al., 2020). It is also imperative that contractors implement a comprehensive safety program and provide ongoing site-specific safety training to reduce the number of work-stoppage events related to accidents or non-compliance (Sepasgozar et al., 2020). Finally, contractors need to optimize logistics. They must coordinate purchasing strategies with the construction schedule to ensure that all materials procured under their control are ordered and received prior to when they are needed at the job site. This will eliminate potential bottlenecks created by materials at the job-site (Bedada, 2023).

Owner-Related Recommendations

The author recommends that owners develop methods to improve managerial efficiency. In particular, owners should streamline their internal approval processes and flatten their decision-making hierarchy (Zegeye & Darsa, 2024). This will allow owners to prevent administrative gridlock that often occurs because of slow and/or delayed approvals. Owners should also take steps to mitigate the "liquidation trap." The "liquidation trap" occurs when an owner has sufficient funds to make a progress payment to a contractor but does not do so until after the contractor has completed a significant amount of additional work due to a previous slow or delayed progress payment (Mekonen et al., 2025). This creates a cash flow gap where the contractor is unable to pay their subcontractors and suppliers. Therefore, owners should establish and maintain adequate levels of liquid assets to assure timely progress payments to contractors regardless of whether homeowners are making installment payments. Lastly, it is strongly recommended that owners achieve contractual clarity. Contractual clarity can be achieved by including clear and concise language regarding inflation escalation provisions and clearly defining what constitutes completion of each aspect of the contract scope (Abdo et al., 2024). This will help to prevent unnecessary and costly litigation between parties over issues that could have been resolved administratively.

Consultant-Related Recommendations

It is recommended that consultants increase their level of technical oversight by enhancing their commitment to quality control and quality assurance. Quality control and quality assurance can be improved by providing quality control personnel who will closely supervise and inspect the construction activities and by establishing and maintaining formal quality assurance protocols (Crawford & Bryce, 2003). These quality control and quality assurance protocols can include document control procedures, inspection reports, and corrective action documentation. By taking these measures, consultants can decrease the likelihood of technical errors occurring during construction. Technical errors can result in a great deal of wasted project time since the contractor may be forced to perform additional work to correct mistakes made during the original construction activity. Beyond technical duties, consultants should respond promptly to requests for information submitted by other parties involved in the project (Memon & Rahman, 2014). Responding promptly to these requests will enable the consultant to function as a facilitator of progress instead of creating an administrative bottleneck.

External Factor Recommendations

In order to combat the high risk associated with market shortages and volatile supply chains, project teams should proactively utilize supply chain hedging techniques (Ghufran et al., 2022). Supply chain hedging can be implemented by having contractors purchase materials in bulk quantities prior to beginning actual construction activities or by entering into long term, fixed price agreements with suppliers for critical finishing materials (i.e., rebar and cement) (Tessema et al., 2022). Better coordination among regulators and at borders is necessary to mitigate non-technical risks. As soon as possible, owners and contractors should meet with local government officials and neighbors adjacent to the project area to identify any potential land or property boundary issues prior to commencing construction. If left unaddressed, land or property boundary issues can quickly evolve into work stoppage events that negatively impact the overall construction schedule (Kumar & Anbanandam, 2020).

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