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CAUSE OF DELAYS IN TRANSMISSION PROJECTS IN ETHIOPIAN ELECTRIC POWER: THE CASE OF THE ADDIS ABABA TRANSMISSION AND DISTRIBUTION REHABILITATION AND UPGRADING PROJECT

By

Biniyam Zewdu Girum

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Addis Ababa, Ethiopia

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Advisor: Maru Shete (PhD, Associate Professor of Development Economics)

THESIS SUBMITTED TO THE SCHOOL OF POST GRADUATE STUDIES ST.MARY'S UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN DEGREE IN PROJECT MANAGEMENT

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ST.MARY'S UNIVERSITY
SCHOOL OF POST GRADUATE STUDIES

By

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APPROVED BY:

_____	_____	_____
Chair person, Department of Graduate Committee	Signature	Date
Dr. Maru Shete (Associate Prof.)	_____	_____
Advisor	Signature	Date
Muluadam Alemu (Ph.D)		22/06/2022
Examiner, Internal	Signature	Date
Dr. Yilkal Wassie (Asst. Prof.)	_____	_____
Examiner, External	Signature	Date

DECLARATION

I, Biniyam Zewdu, the undersigned person declare that the thesis entitled “Cause of Delays in Transmission Projects in Ethiopian Electric Power: The Case of the Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project” is my original and submitted for the award of Master of Art Degree in Project Management from St. Mary University at Addis Ababa and it hasn’t been presented for the award of any other degree. Under this study, fellowship of other similar titles of any other university or institution of all sources of material used for the study has been appropriately acknowledged and notice.

Biniyam Zewdu	_____	_____
Candidate	Signature	Date

CERTIFICATION

This is to certify that Mr. Biniyam Zewdu has properly completed his research work entitled “Cause of Delays in Transmission Projects in Ethiopian Electric Power: The Case of the Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project” with our guidance through the time. In my recommendation, his task is appropriate to be submitted as a partial fulfillment requirement for the Master of art Degree in Project Management.

Research Advisor

Dr. Maru Shete (Associate Professor of Development Economics)

_____

Signature and Date

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ABBREVIATIONS/ACRONYM

AATDRUP	Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project
JICA	Japan International Cooperation Agency
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PT	Power Transmission
ROW	Right of Way
SPSS	Statistical Package for Social Sciences
TL	Transmission Lines
EEP	Ethiopian Electric Power
VIF	Variance Influence Factor
WBS	Work Breakdown Structure
SCADA	Supervisory control and data acquisition
OHTLs	Over Head Transmission Lines

ABSTRACT

Efforts to reduce the delay by mitigation or eliminate the delay by acceleration are measures that depend on the projects being considered for those measures. Based on the general objective of the research to find out the causes of delay in the Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project, this study addressed three specific objectives, the magnitude of the causes of delay and project delay, by using descriptive analysis, and also carried out investigation the influence of causes of delay in project life cycle phases by utilizing multivariate regression model. Project life index and multivariate regression diagnostic tests were also carried out. The target population for this study was 452 individuals stratified based on the surveyed project actors where a sample of 212 respondents was established and only 171 responded. Questionnaires were self-administered and were dropped and picked immediately respondents were done filling them. Data collected was then presented using tables and figures. Statistical Package for Social Sciences (SPSS) software was used to analyze data. The findings revealed that the most project delay is towards execution project life cycle followed by planning phase. In addition, it is found out that the occurrence of project delay was rated as high. Lack of communication due to internal project influences has been the top propjet delay source. Further, this study revealed that the most project delay is towards inadequate resources, poor project planning, lack of communication, lack of monitoring and evaluation and client dissatisfaction across each the project life cycle respectively. The study concluded that pitfalls in project life cycle have been a source of transmission project delay. Finally, towards maintaining and improving late execution of the project as compared to the planned completion period and these delays are often as a result of miscommunication, the study recommends: leading, integrating people, and taking decisions to make a project a success and building trust and relationships among team members, as well as propagate desirable personal behaviors and clear communication rules by implementing the identified respective approaches for action.

Keywords: Causes, Delay, Project, Power, Transmission

CHAPTER ONE

INTRODUCTION

1.1Background of the Study

Delay as a cause of that poor project performance results in a number of economic, social and other consequences the impact of which is bigger especially in large scale projects. Different scholars and researchers in the area of project management have provided definitions of the concept of delay. For example, Meena and Babu (2015) define delay as the time overrun either beyond completion date specified in a contract or beyond the date that the parties agreed upon for the delivery of a project. Similarly Pall *et.al* (2019) define project delay in a more elaborate manner as the additional time involved in completing a project beyond its contractual duration and a situation in which a contractor, consultant or client /owner jointly or independently contribute to the delay of a project's completion time.

Project delays are often classified under four categories: critical versus non-critical, excusable and non-excusable, compensable and non-compensable and concurrent versus non concurrent. Among this classification, the most indicated delay type can be Critical delays that are the delays that affect the project completion time or date whereas non critical delays are those delays that do not affect the project completion time (Meena and Babu, 2015). One of the project areas where delays frequently occur is the power sector which consists of three subsectors: power generation, power transmission and power distribution. The power transmission sector which acts as an essential link between power generation and power distribution has some features that differentiate it from the other two sectors such as: feasibility studies, project approval, tendering and contract award, transmission projects development, design, foundation work, erection and installation, commissioning and handover to the operations team. Apart from these a power transmission project typically comprises the construction of one or more stations, substations and transmission lines (Pall, 2021).

Power transmission projects are vital for the power sector of any country. Especially in developing countries like Ethiopia, it is very difficult to achieve any national objectives of creating a better living condition for citizens and realizing multi-faceted development without the

key role of the power sector in general and the effectiveness of transmission projects in particular. However, Banobi & Jung (2019) confirmed that worldwide power transmission projects experience delay and there is an urgent need to understand the unique causes of delays in PT projects. They mentioned five major causes of delay : owner related causes (for example the owner 's insufficient project management capability), contractor related (which according to (Ogunlana et.al,2007) refers to problems such as material management problems, organizational deficiencies, planning, scheduling and equipment allocation problems, financial difficulties and inadequate site inspection), design-related causes of delay (for example poor design management), infrastructure and socially related causes of delay (such as the surrounding infrastructure and social environment) and externally related causes of delay (which refers to uncontrollable external factors that delay such as the host country's political climate and site's geological status among others. In this vein Pall et.al (2019) mention : right of way (ROW) problems, frequent changes in TL routes, accessibility of the tower locations, poor communication and coordination among the parties and payment delays as the most critical factors of project delays.

The Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project (AATDRUP) were one of the projects undertaken in the power sector in Ethiopia. This project which was carried out by a Chinese company called CAMCE Engineering and SINO Hydro Corporation Ltd was planned to be completed within 18 months. The effective date for the commencement of the project was 18 July 2019. While it was supposed to be closed out on 18 January 2021 as per the agreement this project was completed after a 12 months delay in January 2022. Then, this study aimed to realize the causes of delay in the selected power project in this regard.

1.2Statement of the Problem

As has been said previously the effectiveness of work in the power sector in general and power transmission in particular is very important for the development of a country. As Pall et.al (2019), emphasize it, the timely completion of PT projects can significantly contribute to the betterment of human civilization by making electricity accessible whenever and wherever it is

needed. This is because without a reliable PT link, power generation and distribution systems are effectively disabled.

It is in realizing this key role of the power sector that Ethiopia which has a huge potential for generating electric power planned to generate income besides satisfying the local demand. To that end the Ethiopian Electric Power Office did active investment in the power sector and made a lot of new power plants operational. One of the objectives set out by the office is increasing the power demand in Addis Ababa from 800 MW in 2014 to 3600 MW in 2034 (JICA, 2018.) However the performance of power transmission projects in Ethiopia including this particular project called the Addis Ababa Transmission and Distribution Rehabilitation and upgrading project (AATDRUP) is affected by a number of factors among which project delay is a major one.

According to the researcher's observation, there are different factors that cause delays in the power transmission projects in Ethiopia among which : lack of coordination between EEP offices, lack of communication among the project parties, delay on fees for land, farm or any kind of compensation and payment , too many interests of stakeholders, hidden agendas of supervisors and their lack of knowledge and bureaucracy, late delivery of materials on site, failure to meet schedule because of late arrival of equipment, rework caused by low quality standards and design error, procrastination on the side of subcontractors, deployment of small number of crew on site to minimize cost, lack of the right tools and equipment, deployment of advance payment to other personal needs or other ongoing projects and low quality work to maximize profit are the main ones.

While the effectiveness of the project activities in the power transmission sector in the country is hampered by the above mentioned causes of delay and other factors such as aging, shortage of supply and deteriorated investment (JICA 2018) there are few studies conducted on the topic. But Meaza (2017) studied about the construction projects in the distribution line (MV and LV stations only) that aimed at providing electricity to rural towns and villages in the country. The other study on the topic by Aster (2018) focusing on ETSIP2 lot one project studied the causes of substation construction project delay.

One of the issues the research by Meaza (2017) addressed was cost overrun probably because the contract was given based on time price estimation and the contractors in such projects are local

contractors while projects like the Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project are conducted by foreign companies. The impact of project delay is bigger in such projects because there is a large demand for machinery and equipment (e.g. vehicles, construction machinery, turbines, power transmission equipment, information equipment etc.) to implement the large scale infrastructure development) which caused foreign currency shortages (JICA 2018). While delays in such big projects like the AATDRUP result in huge consequences, to the knowledge of the researcher there is no study that addressed the delay factors in the power transmission projects in Addis Ababa. What is more those studies conducted on the topic of power transmission projects in Ethiopia did not consider the causes of project delay from the point of view of project life cycle. In these studies there is also a methodological gap in that for example the study by Meaza (2017) used RII as a tool of analysis while the right tool was regression. Therefore to fill the above mentioned research gaps this study attempted to investigate the delay factors in the aforementioned project by focusing on time delay factors and the relationship between the various activities in project phases (life cycle) and delay.

1.3 Objective of the Study

1.3.1 General Objective

The general objective of this study was to find out the causes of delay in the Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project and recommend ideas as mitigation strategies to solve the problem.

1.3.2 Specific Objectives

The specific objectives of the study were:

- To assess the magnitude of the causes of delay in transmission power project at Addis Ababa
- To identify the level of Addis Ababa Transmission and Distribution Rehabilitation and upgrading project delay
- To examine to what extent the causes of delay influence transmission power project delay in the five project life cycle phases

1.4 Hypothesis

- **Hypothesis 1 (H_1)** – In initiation project life cycle phase, the most project delay is towards Inadequate Resources (it has a *positive and significant* effect on delays in transmission projects).
- **Hypothesis 2 (H_2)** – In planning and scheduling project life cycle phase, the most project delay is towards poor project planning (it has a *positive and significant* effect on delays in transmission projects)
- **Hypothesis 3 (H_3)** – In execution project life cycle phase, the most project delay is towards lack of communication (it has a *positive and significant* effect on delays in transmission projects)
- **Hypothesis 4 (H_4)** – In Performance and Control project life cycle phase, the most project delay is towards lack of monitoring and evaluation(it has a *positive and significant* effect on delays in transmission projects)
- **Hypothesis 5 (H_5)** – In closure project life cycle phase, the most project delay is towards client dissatisfaction (it has a *positive and significant* effect on delays in transmission projects)

1.5 Significance of the Study

The importance of this study will be to shed light on the project delay, and the result of the magnitude of the causes of delay in the five phases and level of Addis Ababa Transmission and Distribution Rehabilitation and upgrading project delay. The results and findings of this study will give benefits range from the public projects to individual and group researchers as well as numerous institutions and industries. The managers may use this knowledge to address the concerns of the employees and managers in their work hence improving public project performance. Moreover, employees will also benefit from this study through reorganizing the gaps and project delay factors that can affect the overall project performance.

The conclusions of the study are of also benefit to policy makers to craft policies that are appropriate to the public projects, policies that lead to improved performance in public mega projects. The government also harvests the benefit of this study as the findings gives clues to identify factors that cause project delays and associated challenges.

By identifying the critical factors that cause project delays, the finding of this study has enable to project management of mega projects in the country obtains an insight about the systems functionality by highlighting the gains achieved and the challenges faced. To sum up, the findings of the results provide valuable insights for the researchers and practitioners who are interested project delay, how best they can utilize their limited resources and to pay adequate attention to those factors that are most likely to have an impact upon the implementation of various projects. As this study attempts to contribute something towards filling the research gap on the topic area the researcher strongly hopes that the findings have significance in addressing the problem better and in indicating solutions. The researcher also hopes that the findings of this study will serve as an additional reference material for those who conduct a research on a similar topic in the future.

1.6 Scope of the Study

This thesis tries to find out the causes of delay in the AATDRUP. In doing so the study covered the project performance and delay related matters that occurred since the beginning of the project until the time the research was conducted. Though the study might raise some issues related to generation and distribution activities in projects held in other parts of the country the scope of this study was limited to the transmission aspect in this particular project in Addis Ababa. This study investigating delay causes in transmission projects is limited to projects executed at the AATDRUP, during its implementation periods. It is not concerned with other projects executed outside the electricity projects, or projects outside AATDRUP. The target sample size was limited to 212 personnel, including mainly experts, supervisors, planners, project engineers and managers as they are intimately involved in the planning and executing of projects during turnarounds. Data were collected using developed questionnaires, which took about twenty minutes to complete.

1.7 Limitations of the Study

There were limitations such as unavailable data based on project life cycle and unwillingness to provide data used that affected this study and its data collections operations. Predominantly, some respondents were discouraged to provide data as they were unable to relate how the

research would assist them directly or indirectly. The researcher however assured them that the findings of the research will be useful in the organization. Only when the researcher was able to identify and manage these limitations, respondents had been ultimately convinced through discussion about the aim of the study, its academic capabilities and benefits from it. Besides, the study used questionnaires which were voluntary and relied on data as provided by the respondents. The secrecy policy in an organization affected the research and the researcher generated in introduction letter from the university to the management in order to avoid doubt and also to enable the management to disclose much information concerning the research study. Due to financial, time and other constraints the study was limited to covering project delay factors particularly focusing on the time delay in the aforementioned project. Therefore the study had its own limitations in showing the whole picture of project performance and the problem of delay in the power transmission sector in the country as a whole.

1.8 Organization of the Study

This study is organized in five chapters. Chapter one discusses the background of the study, the research problem, the general and specific objectives, the research questions and the scope, limitation, significance and organization of the study. Chapter two presents a detailed review of the related literature and a discussion of the conceptual or theoretical framework of the study. Chapter three discusses aspects of methodology used in conducting the research. Chapter four deals with the discussion and analysis of findings as well chapter five presents the conclusion and recommendation.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

This section covers four sub sections. The second sub section (2.2) presents brief overview of the project life cycle, related theories and factors aggravating project delays. Section (2.3) covers an empirical review related to the research from global and Ethiopia project delays empirical related literature reviews. Next section (2.4) presents research gap, and then, the fourth sub section (2.5) made the conceptual framework of the study. Overall, this chapter presents the review of related literature and a summary of the researches or an empirical review of the studies conducted on the topic under investigation.

2.2 Theoretical Literature Review

2.2.1 Concepts, Definitions and Theory of Project Life Cycle

While there are several definitions of projects in the literature, one of the best has been cited by Pamarthi and Borra (2015), who stated: "A project is an organization of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, or high risk undertakings which have to be completed by a certain date, for a certain amount of money, with some expected level of performance. At a minimum, all projects need to have well defined objectives and sufficient resources to carry out all the required tasks." A project can be defined as having the following characteristics, according to the definition provided by (Care, 2019), and accepted for the purpose of this research: a defined beginning and end (specified time to completion), a specific, preordained goal or set of goals (performance expectations), a series of complex or interrelated activities, and a limited budget.

Mpofu *et al.,* (2017) clarifies that a large industrial project involves numerous differentiated activities that must focus on one final target. From the start of the project until the completion and delivery of the plant, the organizational structure must function smoothly based on cooperation and interaction in order to meet the client's obligations. In order to achieve this goal,

a company must have a high level of capability and experience in planning and optimizing various project activities, as well as advanced management tools and methodologies to control time and cost constraints and meet the demanding requirements of increasing efficiency. Project management is a specialist discipline of management that has evolved to coordinate and regulate some of modern industry's most complex activities. The evolving corporate environment of the twenty-first century has broadened the scope of operations that fall under the purview of project management techniques and project management methods. Projects are open systems because they operate in an open environment and must respond to ever-changing dynamics of situations, causing them to become far more adaptable than ever before.

While the theoretical definitions of the life-cycle phases of a system can be applied to a project. These phases include: conceptual, planning, testing, implementation and closure. According to Oyegoke and Kiyumi (2017) explains lack of clear statement and understanding of the project scope, vague technical requirements, too optimistic estimates of cost, timescale or benefits, incomplete or flawed risk assessment, inappropriate strategy of the intended project, insufficient regard paid to cash flows and the provision of funds are some of the factors that affect the performance of a project at the planning stage. Lock says that on the other hand good project definition and a sound business case, appropriate choice of project strategy, strong support for the project and its manager from higher management, availability of sufficient funds and other resources, firm control of changes to the authorized project, technical competence, a sound quality culture throughout the organization, a suitable organization structure appropriate regard for the health and safety of everyone connected with the project good project communications, well-motivated staff and quick and fair resolution of conflict are the factors that affect the success or failure at the fulfillment or execution phase of a project (Pall, 2021).

2.2.1.1 Conceptual Phase

The initial appraisal of an idea is included in the first step, the conceptual phase. The early risk analysis and the consequent influence on other time, cost, and performance requirements, as well as the possible impact on company resources, are the most important aspects of this step. A "first cut" at the feasibility of the project is also included in the conceptual phase (Harold, 2017).

2.2.1.2 Planning Phase

The planning phase is the second step. It is mostly a refinement of the elements identified in the conceptual phase, and it necessitates a firm identification of the resources required as well as the setting of realistic time, cost, and performance requirements. The first production of documentation required to support the system is also included in this phase. The conceptual phase of a project based on competitive bidding would include deciding whether to bid, and the planning phase would include developing the whole bid package (i.e., time, schedule, cost, and performance). For example, Pamarthi and Borra (2015) emphasize the point that some specific activities done at the planning and execution phases on the design or construction scheme have an impact and can adversely affect the project schedule and budget. According to their argument planning and reporting are important elements in which: R & R and clearance planning, communication planning, procurement planning and management, stake holder identification, schedule integration, cost reporting, schedule reporting, risk reporting, quality reporting, environmental health safety and security reporting and quality reporting are among the key determinants of project success.

2.2.1.3 Testing Phase

The third phase (testing) consists primarily of testing and final standardization in preparation for operations. During this phase, almost all documentation must be finished. It's best to avoid requiring implementation to begin before technology development and testing is finished. This is a case of "concurrency." Of fact, concurrency is occasionally used on purpose to complete a project under extremely tight deadlines, but it frequently leads to serious redesign and reworking issues (Harold, 2017).

2.2.1.4 Implementation Phase

The fourth phase is the implementation phase, which integrates the project's product or services into the existing organization. Only if the right attitudes exist on the project can it be implemented efficiently. The odds of success are significantly reduced unless there is a big commitment to making the project a success, unless everyone working on the project is highly motivated, and unless attitudes are supportive and positive. The importance of top-level commitment and support cannot be overstated; without it, the project will be severely imperilled

(Oyegoke and Kiyumi, 2017). While commitment is essential, it must be to achievable goals. If rational, sensible projects are to be launched, it is critical that they are not immune to criticism. As a result, evaluate the project in the specification stage and guarantee that it continues to receive objective, frank feedback as it progresses. This is unfortunate since it implies that defining the project's concept is not something that the project manager is concerned with. As the preceding demonstrates, this is insane. Not only does the specification process need to be actively controlled, but it also needs to address all of the elements that could jeopardize its success—not just technical challenges and economics, but also ecological, political, and community considerations, as well as implementation issues (Harold, 2017).

2.2.1.5 Closure Phase

The closure phase assesses the whole system's efforts and provides information for the conceptual phases of new projects and systems. In terms of establishing priorities, this final phase has an impact on other on-going projects. No attempt has been made to determine the scale of a project or system thus far (Pall, 2021). Large projects often necessitate full-time staffing, whereas lesser initiatives, while going through the same system life-cycle phases, may simply necessitate part-time workers. This means that a single person can be in charge of numerous projects, each of which may be at a different life-cycle phase (Harold, 2017). In addition to any "check list" work that may be required, the professional must ensure that all administrative aspects of concluding the contract are completed before certifying completion. This includes, but is not limited to, filing certificates with governmental bodies, providing certificates to the contractor or contractors, certifying "as-built," and ensuring that all required operating manuals and warranties are present.

2.2.2 Cause of Delays in Transmission Projects

Power transmission which is a key link in the overall power sector value chain aims at evacuating power from power generating units which are spread across the country and supplying to various distribution entities, which in turn supply power to end consumers. The power transmission system typically comprises transmission lines, sub-stations, switching stations, transformers and distribution lines (Care, 2019).

2.2.2.1 Initiation Phase

The Initiation Phase is the first phase of a power transmission and other similar projects. This phase of a project involves activities such as: performing a feasibility study, identifying key stake holders, selecting management tools and carefully determining an idea for a project to determine whether or not it benefits the organization and the society.

Internal Challenges in Initiation Phase

According to Pall (2021) a power transmission (PT) project typically comprises the construction of one or more stations, /substation(s) and transmission lines TL(s). A project on power transmission stations/sub-stations and transmission lines involves the primary activities of transmission projects acquisition and transmission projects development, the construction of various types of buildings, equipment and structure foundations, roads, rail-cum-roads, open and closed drains, underground and overhead water tanks, and TL tower foundations , and also site surfacing. In the context of power transmission projects the list activities include : transmission projects acquisition, tower foundation (tower and equipment, control building, staff quarter, pump houses, cable trenches, road drain tower and special equipment erection etc. as some activities belong to power plant project road project, building construction, hydrocarbon project and another infrastructure project (Achintya, 2020).

External (Economic) Factors in Initiation Phase

In addition to the ones mentioned above other kinds of infrastructure, including equipment foundations, are installed to accommodate the highly sophisticated automated equipment in the station or /substation that steps up or down the voltage of the transmitted electricity. In describing the activities conducted in most projects in terms of the project phases Pamarthi & Borra (2015) say that during the development phase, the project sponsoring department prepares the estimates of project works as well as of the time and the cost (funds) needed to complete project works. These estimates are approved by the appropriate authority in the department. In addition, a project generally requires approval from several other departments. In the beginning of the construction or the implementation phase, a contract is signed between the sponsoring department and a contractor.

2.2.2.2 Planning Phase

Project Definition or Planning Phase is the second phase of projects which constitutes activities such as putting in a written form the project plan, project charter and/or project scope, outlining the work to be performed and prioritizing the project, calculating a budget and scheduling and determining what resources are needed (Jarrin , 2016).

Internal Challenges in Planning Phase

In further describing the role some of the activities mentioned above play in project success Pamarthi and Borra (2015) say that communication planning can eliminate the mismatch between stakeholders' expectations, helping ensure the buy-in from all affected parties to prevent any hurdles in the future, schedule integration enables building a detailed master schedule where dependencies across different projects plans and external factors can be built in and addressed regularly. In addition it helps to avoid any gaps and mismatch between stakeholders' planning and expectations. In relation to the question of the most powerful success determining factor Pall (2021) hold a different view and argues that it is schedule control which is the most crucial determinant of a successful project. This is because according to Pall (2021) time overruns cause loss of revenue for the employer and may also create losses for the contractor including loss of overheads and increased material and labor costs.

External (Technology) Factors in Panning Phase

While there are differences in what factors affect project performance and on which one is the key among them the arguments and views mentioned above are indicative of the need to consider the aspect of project life cycle while dealing with the term project performance and the factors that determine its success or failure. The failure to do the necessary activities at each stage and the problem or defect in doing the activities results in delays. While the intensity of the factors may vary from one phase to another it is obvious that they occur from the initiation to the closeout phase. In this regard one of the sources for the causes of delays at the planning stage of projects is consultants who are mostly responsible for preparing the designs. Among the critical consultant –design related causes of delay: delays in commenting on design documents, unclear and inadequate details in drawings, mistakes and discrepancies in drawings and lack of experience (Pall 2021) are the main ones.

2.2.2.3 Execution Phase

The other problems that may occur at the different phases and mainly at the execution phase of projects are sector specific. There are some characteristics which sometimes make power transmission projects a bit challenging from the other two.

Internal Factors in Execution Phase

According to Pall et.al (2020) among the main sector specific causes of delay right of way (ROW) problems is the most critical factor. The fact that right of way (ROW) issues have many different dimensions, such as restrictions on crossing educational institutes, religious places, forests, graveyards, market places and households, the need to make alterations to the ROW of a transmission line when faced with sudden changes in river courses, unpredictable ground conditions (e.g., sand boiling) or the landowner attempting to hinder TL construction on their transmission projects occur and also the need to give special technical attention when OHTLs cross railways, waterways, roadways, telephone lines or existing transmission and distribution lines contribute to the challenging nature of the transmission line construction activity. Apart from this frequent TL route changes, accessibility to TL tower locations are the other critical sector specific factors that cause delays in power projects (Pall et.al 2020).

External (Scio-cultural) Factors in Execution Phase

In team settings social skills are predominantly important, since working in team enhances the interdependence among employees, characteristically producing better divergence, workload sharing, and coordination. Social skills comprised things such as social perceptiveness, persuasion, inculcating, and helping others. These enhance the importance of social tasks, which reflects actions focused on maintaining and controlling team's existence. Teamwork and generosity create the stamina of a great team, without them a team cannot practically compete. The team working as one unified unit is going to be the key in project's success. Organizations who have embrace the concept, have reported augmented recital in work production, problem solving and has encouraged new growth. In any field teamwork is an answer for managing work and communication. The solution to teamwork is placing the needs of the project over one's own little desires and cares (UK Essays, 2018). According to Imani and Shirasaka (2015), culture is an area that has been identified as a cause of project failure. A growing trend of culturally

diverse project team makes it difficult to share a common “cultural norms”. Managing team members ‘expectations on cultural norm which are reflections of one's national, corporate and project backgrounds is not easy since most of times they are hidden as tacit knowledge. The authors conclude that for an effective project execution the factors outside of the team such as corporate culture and business practices, vendor-customer power balance or a business owner's PM literacy should be reinforced by the APM initiated enterprises in order to maximize team performance. With these internal and the external factors combined, a chance for successful APM becomes high

2.2.2.4 Performance and Control Phase

The Performance and Control Phase is the fourth phase of a project which involves activities such as comparing project status and progress to the actual plan, as resources perform the scheduled work.

Internal Factors in Performance and Control Phase

During this phase, project managers may need to adjust schedules or do what is necessary to keep the project on track (Jarrin, 2016). There are different phases of a project the number of which might vary from one type of project to another. While they have some specific features commonly project phase and project life cycle are used interchangeably in that collectively the project phases are known as the project life cycle.

External Factors (Legal) in Performance and Control Phase

In describing what project phases and life cycles mean and in underlining the need to have them in the implementation of projects Oyegoke and Kiyumi (2017) says that because projects are unique undertakings they involve a degree of uncertainty. Therefore, organizations performing projects will usually divide each project into several project phases to improve management control and provide for links to be ongoing operations of the performing organization.

2.2.2.5 Closure Phase

The Close out Phase comes after project tasks are completed and the client has approved the outcome and it entails doing an evaluation to highlight project success and/or learn from project history.

Internal Factors in Closure Phase

In describing the activities at this stage, Jarrin (2016) says that the close out phase of a project is generally marked by a review of both key deliverables and project performance to date towards one determining if the project should continue into its next phase and two detecting and correcting errors cost effectively. With regard to their specific features and the activities, each project phase is marked by completion of one or more deliverables. A deliverable is a tangible, verifiable work product such as a feasibility study, a detail design, or a working prototype. The deliverables, and hence the phases, are part of a generally sequential logic designed to ensure proper definition of the product of the project. Whereas project life cycles generally define what technical work should be done in each phase and who should be involved in each phase. As has been said before, the number of phases in a project varies based on the type and nature of the project. For example transmission project cycle consists of five main phases. They are: attracting players, planning and project award, project execution and commissioning, O and M and project exit.

External Factors (Political) in Closure Phase

In relation to the occurrence of delay factors from the perspective of project life cycle, the key actors in this cycle and their role in the delay Islam & Trigunarsyah (2017) by citing Islam et.al (2015) say that due to lack of improper management, delays may arise at feasibility stage of the project and continue till to the end of construction work. In the lifecycle of a construction project three parties e.g., owner, consultant, and contractor are closely involved. Thus, they are the key players of schedule delays of a project. With regard to the intensity of the delay from the point of view of project phases Pall (2021) hold that it is reasonable to expect that most delays occur at the construction /execution phase of a project as significant proportion of the contractual time is spent during this stage.

2.3 Empirical Literature Review

2.3.1 Studies across the Globe

In relation to this Pall et.al (2020) citing Pall et.al, 2016) and Gordon-Watt, M. (2009) say that PT is at the heart of the power sector, and project management in the PT sector is challenging

because of the presence of high-voltage PT lines and right of way (ROW) issues, which makes PT projects significantly different in scope from other linear power and non-power projects. Similarly, Anwar and Malik (2017) stress that due to the unpredictable nature of hydropower projects various externally imposed or naturally created various complex situations might arise from conception phase to completion phase.

In emphasizing the role effective communication could play in the occurrence of delay, Oyegoke and Kiyumi (2017) articulates that as most projects require people from many different skills or professional disciplines to work together it is important to ensure a strong and fast communication links exist up, down and across the project organization and in the project team so that there are no delays while information has to cross departmental boundaries. When there is such kind of good information flow decisions can be made more easily and with greater speed and action can follow decisions with little or no delay. In power transmission projects factors other than poor communication and coordination such as poor project planning & scheduling, complexity of project, remote location of site (Anwar and Malik, 2017) are also among the main project related causes of delay.

Delays in projects in general and in power transmission projects in particular are caused by external factors. Among the critical delay causing external factors included natural disasters, unexpected geological conditions, and political instability or control (Banobi and Jung, 2019), political intervention, local public resistance and unforeseeable ground conditions (Pall et.al 2020) and the increase in the price of materials (Alamira and Marey- Perzeb, 2020) are some. In the power transmission and distribution sector in Ethiopia currency shortage and large demand for machinery and equipment (JICA, 2018), low productivity level of laborers lack of electromechanical equipment accessories in local market equipment damage during transportation (Aster, 2028), inadequate production of raw material in the country, poor site conditions and fluctuations (Meaza, 2017.)

This study by Pall *et.al* (2020) is one of the few empirical studies conducted on the topic area. The objectives of the study were to: identify and classify the potential causes, or factors, of delays to PT projects, rank the importance of the factors according to the various parties involved, explore the extent of their agreement and establish the relationships between the delay factors. This study revealed that sector specific factors, general factors and external/unavoidable

factors are the most critical groups of delay factors, with the top-ranked factors being right of way problems of transmission line (TL), frequent changes in TL routes, and accessibility to the TL tower locations.

Among the studies conducted in other parts of the world is the research by Pamarthi and Borra (2015) which attempted to identify various factors of delays during the capacity planning and the execution phase of balance of payment and the major factors with the perspective of client and contractor for delay damages in power projects in India. The study is qualitative in nature and it secondary data (the literature) as a major source of data and suitable delay analysis techniques in discussing and analyzing its findings. According to the findings of the study : technical and natural factors, the contractual failures, the way the project planning was conducted, the consideration of contingency, the completeness or incompleteness of the project, the estimation of the project cost, the sloppy and vague nature of the project planning process organizational and institutional failures, the presence or lack of cooperation between the departments, time overruns, economic factors, equipment and man power shortage are among the major factors that caused delays in power transmission projects in India.

The other similar study conducted on the topic in other parts of the world is this study by of causes of delays in power transmission projects is the one by Nundwea and Mulengab (2017) which attempted to: find out the causes of delays in the construction of electricity transmission lines in Zambia and make recommendations that could be used to improve on the effectiveness and efficiency in the management of electricity transmission line projects. The research used questionnaires and interviews as major methods of data collection and the data was gathered from key personnel such as project managers and engineers engaged on different projects from both clients and contractors selected through purposive sampling. Descriptive statistical techniques were used to analyze the findings and the causal factors were listed using Relative Importance Index.

Among the factors identified by the study: inclement weather conditions, poor financial management skills by the contractor, constraints in the process such as late approval of contracts and release of advance payment at ministerial level, poor planning scheduling or resource management skills, delay of material delivery to site, poor quality control plans, and poor coordination with project participants are among the critical delay causal factors. In discussing

the topic this study gave due attention to the role of project management system in explaining the problem of project delay in that country.

2.3.2 Studies Related to Power Transmission Delays in Ethiopia

Among several studies conducted on the performance of the power sector in Ethiopia hold a different view, Zelalem (2020) explained that one of the factors that are constraining the development of the country is the chronic power problems the country is facing including insufficient generation capacity, low connectivity and poor reliability of transmission and distribution. This study added that the performance of the power sector in Ethiopia has been generally below expectations. The low levels of access to electricity throughout the region, the erratic and intermittent supply, low capacity utilization and availability, deficient maintenance and high transmission and distribution losses are some indications of this very low performance.

In the power transmission and distribution sector in Ethiopia some of the owner related causes of delay include: damaged materials and equipment (JICA, 2018), delay in progress payment, contract Amendment/design modifications (replacement and addition of new work to the project and change in specifications) and slowness in decision making (Meaza, 2017), poor and unorganized procurement (Aster, 2018) are among the owner related factors of delay. The other sources of project delay are contractors and there are a number of causes mentioned as factors for delays in projects in general and in power transmission projects in particular.

There are also factors that cause delays in power transmission and other similar projects. For example lack of effective channel of communication and the failure to ensure an effective communication and coordination between and among the project stakeholders is one of the major causes. The work of creating such a channel begins at the planning stage and it should be there at the execution, controlling and close out phases. And delays are caused when the responsible bodies (the owner, consultant and contractor) fail to do so.

The study by Meaza (2017) explained the causes of delays in the power distribution sector in Ethiopia were discussed and analyzed in sufficient detail and some factors that are highly affecting the power sector in general such as price fluctuations and equipment and logistics related problems were found out by this study. However the study did not use any distinct conceptual framework the incorporation of which could have made the discussion and analysis

much better. This study by Aster (2018) is the other research conducted on the power sector in Ethiopia and particularly on power transmission. The study attempted to assess the causes of delay in the above mentioned project by gathering the necessary data through literature review, a questionnaire survey, unstructured interview and own observation. The study also revealed that with regard to the types of delays in categories contractor-related delays was ranked the most significant category that cause delays followed by consultant related and client related delays. While this found out some of the major delay factors such as equipment it said very little about the negative role inflation, political instability and some sector specific factors play in power transmission project delays in Ethiopia.

Kirubel (2021) aimed at findings out the factors that caused delay to the GIBE III hydroelectric power project According to the findings of the study, quality assurance and specification, incomplete plans and specification, slow decision making, bureaucracy in the owners organization, delay in quality related communication to production, unreasonable client and end user expectation of quality as well as insufficient working drawings details, contractors request on updating or changing initial drawings, frequent scope change by client re-work due to mistake during construction, technical problem faced, long period for approval of test and inspections, discrepancies between contract documents, lack of technical knowledge and design errors, unexpected occurrence, effect of local community, labor strike and site accidents, geological issues during the dam foundation preparation and unstable tunnel. late deliveries of material to site, dispute or variation order of material to site, lack of effective communication, lack of site management and supervision, adversarial/oblivious relationship between consultant and contractor, client heavy involvement, client delayed decision, time constraints of design and failure to manage conflict were among the factors that caused delays to GIBE III hydroelectric power project. It is possible to say that the study found out quite a number of delay factors and it addressed the matter in a sufficient detail.

2.4 Summary and Research Gap

There are different factors that cause delays in projects including power transmission construction. These factors are classified in different ways among scholars and researchers in the area in which some classify them by the sources or parties responsible for the delays while others

make classifications based on the type of factors. In this thesis the discussion on delay factors is done by using project phase and project life cycle as an umbrella under which the relationship between the various activities in each phase and the project delay is investigated. As has been mentioned above, problems or defects that occur at the execution phase and caused by different parties (owner, consultant, contractor etc.) result in delays.

According to Banobi and Jung (2019), Pall *et al*., (2020), Anwar and Malik (2017) and Pall (2021) owner related causes are among the major causes of delays in power transmission projects. Some of the critical factors in this category include: insufficient project management capability (Banobi and Jung 2019), approval process of project documents (Pall *et al*., 2020), failure in making progress payment, owner demand change order and change in scope (Pall, 2021) slow decision making (Anwar and Malik 2017), poor financial capability, problems in procurement system and inadequate human resource. These studies ignored the cause of delay based on project life cycle. They focused on management factors, human factors, cost, payment related and other issue. Among the contractor related causes of delay: inadequate human resources (Anwar and Malik, 2017), improper planning and scheduling of projects, poor site management and supervision and rework due to errors during construction (Pall, 2021), organizational deficiencies (Banobi and Jung (2019), inadequate experience of contractors (Pall *et al.*, 2020) are among the main ones. In the power transmission and distribution sector in Ethiopia some of the major contractor related causes are submit claims with mistakes and shortage of capital (Meaza, 2017), poor and unorganized procurement and delays in subcontractor's work (Aster, 2018) among others.

While it is understandable that the number of phases might differ from one type of project to the other different scholars and authors classify project phases in different ways. Some hold that projects have four phases, while others say that projects in general have five broad phases. Still others classify phases into six and above. For example according to Pamarthi and Borra (2015) projects have the following four broad phases: set up, planning, execution and close out. Power transmission is one of the three main activities done in the process of power supply in addition to generation and distribution.

2.5 Conceptual Framework

The following conceptual framework has been established based on the theoretical literature review. As a result, project delay is a significant denominator that can have a negative or positive impact on a project's completion time compared to its planned duration. The investigation was concentrate on how a problem that occurred during the project life cycle affects the project timeline.

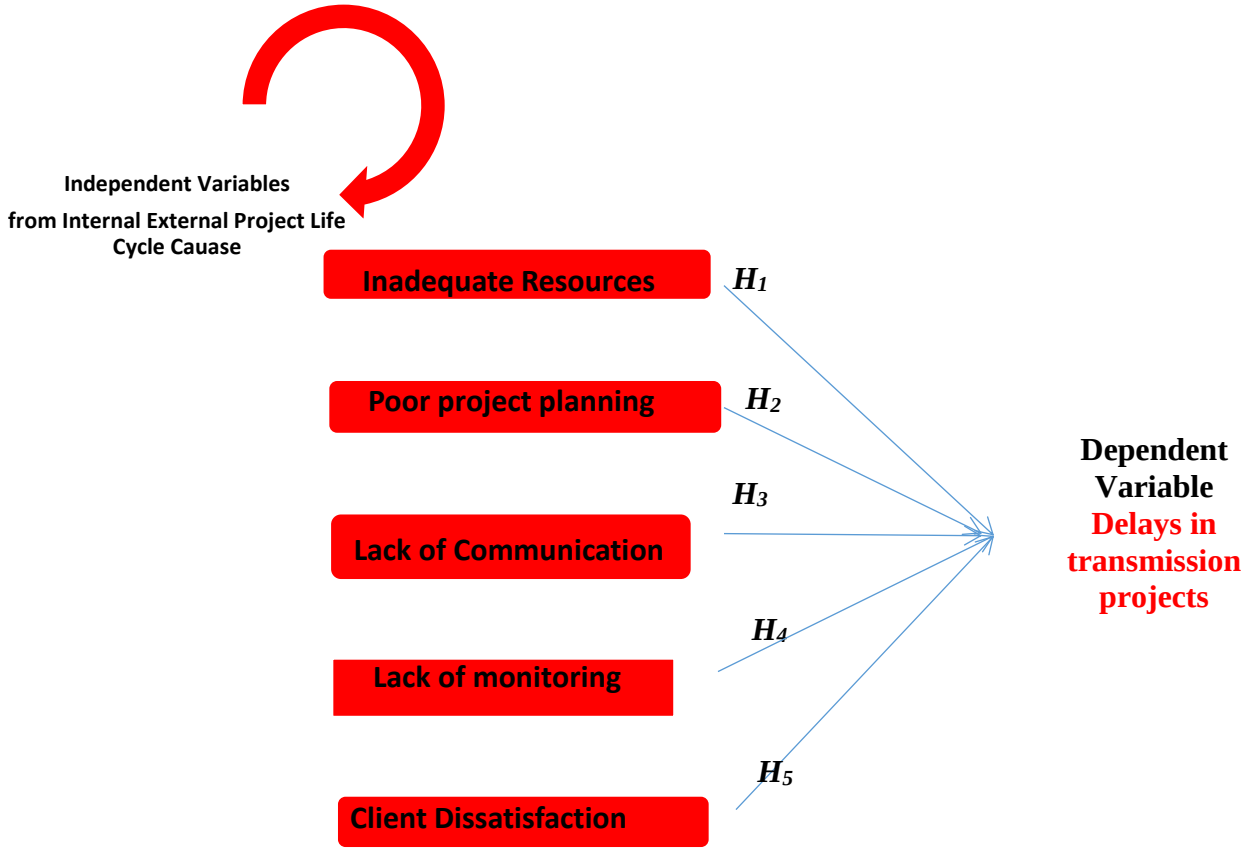


Figure 2.1 Conceptual Framework Cause of Delay Based on Project Life Cycle

Adapted from Ganesh and Borra (2015) and Pall (2021)

The conceptual framework of this study is based on the implementation of projects and managerial factors with the consideration five various factors under the study project delay in Ethiopia. The conceptual framework of this study was based on five independent variables and one dependent variable as represented diagrammatically in the above figure. The study uses a conceptual framework in order to answer the research questions. According to the study, the

delay of a project are basically conceptualized as being dependent on inadequate resources, poor planning, lack of communication, lack of monitoring and evaluation and customer dissatisfaction. Ganesh and Borra (2015) stated that a common theme across the challenges enumerated earlier is the need for sound project management principles in a well-structured framework. This is likely to enable the project owner to clearly evaluate all aspects of project execution across the project lifecycle.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in conducting the study. The chapter has parts that discuss: the research design, research approach, sampling design, data type and sources, data collection method, data analysis methods, validity and reliability and ethical issues.

3.2 Description of the Study

3.2.1 Study Site Selection

The study was conducted in Addis Ababa in which the surveyed Project head quarter is located. Also, Addis Ababa is the center of Ethiopia's economy and almost all the head quarter of the private and public sectors are located in this city. The city has through recent years seen a robust annual growth rate and population counts as of 2012 are growing more than five million (Addis Ababa City Administrations, 2022).

3.2.2 Organization Description

The principal activities in the Addis Ababa Transmission, Distribution Rehabilitation and Upgrading Project includes rehabilitation and short term expansion plan (counter measures for overloading and deterioration of transmission and substation equipment, and measures against overload and voltage drop of MV distribution feeders). According to the project document the activities are classified in two. The scope of the first (AATDRUP-A) includes : the procurement of plant design, supply and the installation of five substations : (1) extension of Gelan systems with 132/33 KV, 50 MVA power trafo bays each, extension of the existing 132 KV bus bar, installation of a new 32 KV switch gear among others, (2) extension of Legetafo 230 KV substation, two (2)132 /33KV, 50 MVA power trafo bays each (3) extension of Sebeta 132 KV substation with 2 two (2)132 /33KV, 50 MVA power trafo bays each (4) extension of Sebeta 2-400KV substation with 1 230/33, 125 MVA trafo bay and (5), extension of Debrezeit 3 -400 KV substation with 2 230/33 KV, 50 MVA trafo bays. The schedule for the competition was 18

months from effective date 18 July 2019 and the contractor is a Chinese company called CAMCE Engineering with contract price USD 11,790,307.00 and ETB 20,679,113.00.

The scope of (AATDRUP-B) includes: the procurement of plant design, supply and installation of three substations : existing Kaliti 1- 230 KV, 2 *132 /15 KV trafos, 1*132 /33 KV trafo, 33 KV outdoor to indoor GIS switch gears, 2- existing Elala Geda and extension of Elala Geda 132 KV with 1- 132 /33-31.5 MVA trafo bay and existing Holeta 500 KV- power trafo bay equipment, 15 KV outdoor and indoor Air insulated switch gear and 132/15 KV 50 Trafo bay . The schedule for the completion of the project was 18 months from effective date 13 July 2019 and the contractor is a Chinese company called SINO hydro corporation Ltd with contract price USD 5,289,938.40 and ETB 5,020,690.38

There are 29 substations out of which 22 are bulk power points with the highest voltage over 132kV and 7 primary substations with the highest voltage as 45kV or 33kV. The transmission line is configured in a ring shape so as to surround the center of the city. Addis Center substation, Addis West substation and Addis East substation are the important feeding points for power demand and they are supplied as a radial line from 132kV ring network (Addis Ababa Transmission, Distribution Rehabilitation and Upgrading Project, 2022).

3.3 Research Approach

According to Kothari (2014) a research design constitutes the conceptual structure within which research is conducted and the blueprint for the collection, measurement and analysis of data. It includes an outline of what the researcher did from writing the hypothesis and its operational implications to the final analysis of data. In the data collection, discussion, analysis and presentation this research has an explanatory research design.

Creswell (2014) classified scientific research approaches into three: quantitative, qualitative, and mixed research. Quantitative research is an approach for testing objective theories by examining the relationship among variables, which can be measured and analyzed using statistical procedures. Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem whereas, mixed research approach involves in quantitative (numeric) and qualitative (descriptive) forms of primary data in a single study. Thus for the purpose of attaining objectives of the research and answering research

questions qualitative research approach was used. It was applied to get insight and understanding of the situation in transmission project delay in Ethiopia.

3.4 Research Design

In line to address the research gap identified and meets the specific objectives, explanatory research design was employed. Explanatory design seeks to establish cause-and-effect relationships. Its primary purpose is to determine how events occur and which ones may influence particular outcomes (Kothari, 2014). They are considered by research hypotheses that specify the nature and direction of the relationships between or among variables being studied. The researcher employed descriptive and explanatory research together due to the fact that the major purpose of descriptive is to describe characteristics of a population or a phenomenon.

Here the study described the respondents' attractiveness towards causes of transmission project delays and their project characteristics. As mentioned in chapter one of this draft the objectives of this research are to: To assess the magnitude of the causes of delay in the five phases at Addis Ababa Transmission and Distribution Rehabilitation and upgrading project, to identify the level of Addis Ababa Transmission and Distribution Rehabilitation and upgrading project delay, and To examine the causes of delay in terms of inadequate resources, poor planning, lack of communication, poor monitoring and dissatisfaction influence Addis Ababa Transmission and Distribution Rehabilitation and upgrading project delay in the five project life cycle phases. As it attempts to find out the relationship or association between the variables and the frequency with which they occur this study is explanatory /causal in its approach. In addition, this study attempted to examine the factors affect transmission project delay. Moreover, it employed mathematical models and theories pertaining to transmission project delays. Thus, explanatory research is an appropriate research design for the reason that this study attempted try to investigate the influence of factors affecting transmission project delays, i.e., to study the relationship between the stated dependent and independent variables of the study.

Besides, the study provided a complete picture of transmission project delays condition in Ethiopia and explained the project life cycle that is the essential task of project manager under project management concepts. Thus, the researcher combined both the cause and reason to the transmission project delays and this can be found out by explanatory research and describe the

transmission project delays, so the researcher employed both explanatory and descriptive together.

3.5 Data Type and Sources

One key type of data that was used to answer the research questions are primary data gathered through questionnaires which were distributed among 212 respondents working in the aforementioned power transmission project. Secondary data was also be used as an input for this study. When using the secondary data the researcher took the necessary caution to check for its reliability, suitability and adequacy.

3.6 Unit of Analysis

The study unit of analysis was individuals namely employees from client side, consultants, contractors and stakeholders of Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa.

3.7 Population and Sampling

3.3.1 Target Population

Research population, according to Kothari and Garg (2014), is the sum total of all the entities under consideration by researcher. The target population of the study comprised of employees from client side, consultants, contractors and stakeholders. According to the employees from client side, consultants, contractors and stakeholders, there are ***452*** individuals in the study area.

3.3.2 Sample Frame

The sample framework was obtained from February 2022 employees' payroll, and the sample was drawn from Addis Ababa branches and head office.

3.3.3 Sample Size

Sampling is the process of selecting a number of individuals for a study in such a way that the individual selected represents the large group from which they are selected (Kothari, 2004).

According to Kothari (2014) for the target population which is not large in number from 5%-10% of the total could be enough. Although there is more complex formula, the general rule of thumb is that not less than 50 participants for a correlation or regression are required. The formula is presented below:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{452}{1 + 452\ (0.05)^2}$$

$$= \boldsymbol{212}$$

Where n = the sample size

N = size of population

e = the level of accuracy (e = 0.05)

Out of the total population, this study took **212** respondents as sample size that was selected for the survey as per the sampling technique based on the following formula specifically a known formula called Yamane (1973):

3.3.4 Sampling Procedure

Since sampling technique determines the reliability of generalization and conclusion of the study; the researcher gave utmost attention to the study design and sample size. This study employed both probability and non-probability sampling methods. Stratified random sampling technique was functioned particularly branches of the surveyed project and its associated project actors- employees of client, consultant, contractors and stakeholders firm and employees' current working position as the basis for selecting samples from the target population among probability sampling techniques. This sampling technique is important to select from senior, middle level and other staffs equally based on their proportion as compared to others. All targeted employees and officials have got the chance to include in the survey. Then after, the researcher constructed a proportionate stratified sample to determine the sample size from each branch and select by systematic random sampling technique. In addition, it then used simple random sampling technique to recruit employee and project officials for participation in the study. The rationale

behind using systematic random sampling technique is because it helps the researcher to approach employees during the service hours thereby increase the response rate.

Further this study applied convenience sampling method to select the most active project actors for the purpose of determining fact and good information on the delay of project delay of the surveyed project based on the questionnaire. Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa have three four project actors as per their involvement in 2021 activities. From the total sample population the number of respondents to be included from each selected actor was decided based on proportion of total actors at each project performer list. Finally to get the decided number of sample respondents the researcher used the selected respondents from each branch to be asked to fill the questionnaire using random sampling method.

Table 3.1 Sample Size Determination

No	Project Actors	Population	Proportion	Sample Size
1	**Client**	**127**	**0.46903**	**60**
	Employees	97		45
	Managers	30		14
2	**Contractors**	**145**	**0.46903**	**68**
	Top Local Firms	87		41
	Active Foreign Firms Representative	58		27
3	**Consultants**	**72**	**0.46903**	**34**
	Owners	20		9
	Experts	52		24
4	**Stakeholders**	**108**	**0.46903**	**51**
	Government Officials	28		13
	Government Workers	39		18
	International Funders*	41		19
	Total	**452**		**212**

*International Funders (Africa Development Bank, IMF, and World Bank)

Source: AA Transmission and Distribution System Rehabilitation and Upgrading Project, 2022

Overall, stratified proportion sampling which as on the basis of their location was used to get information from Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa in order to collect the data from the target population. This technique is preferred because it is used to assist in minimizing bias when dealing with the population. With this technique, the sampling frame can be organized into relatively homogeneous groups (strata) before selecting elements for the sample. In this study the total population of the study was 212 formally permanent employees of Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa was obtained.

3.8 Data Collection Tools

3.8.1 Questionnaire

It is one key data collection method used in this study. The questionnaires included various questions prepared based on internal and external factors in project life cycle in a semi-structured manner. Except for a few number of questions the items of choice in the remaining questions were presented using Likert scale format. The questionnaire developed from the study of Anwar and Malik (2017) and Pall (2021) and all of the items were measured by using a five-point Likert-type response scales, anchored at 5 strongly agree and 1 strongly disagrees. The questionnaire with mainly closed and open ended questions was used to collect data from respondents. This study used closed questions as it had some advantages: easy to process answers; enhances the comparability of answers, and makes them easier to show the relationship between variables. It is better than open question for this research. The questionnaires were divided into three sections to capture the background information of the respondents, causes of project delays.

3.8.2 Interview Checklist

Interview sessions were prepared to gather pertinent information about the study area, delay in projects and internal and external associated factors their relationships, effects and practices. The study mainly employed phone interview due to COVID 19. It was tried to cover up to ten employees and managers who were working in various departments of the surveyed project. The major interview session participants included a project managers, experts, support organization

officials and stakeholders who were deemed to be conversant with electricity project operations of Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa.

3.8.3 Document Review

The other data collection methods or techniques that were used in this study are observation and documents related to the topic under investigation. For that purpose different documents such as tenders, agreements, reports, action plans published by the organization (EEP) or external parties were used as an important source of data.

3.9 Data Collection Method

Although a variety of methods for administering surveys are available, the most popular are face-to-face, telephone, and mail. In general, each of these methods has its own advantages and disadvantages. The major thought for the researcher in deciding on the form of survey administration is response rate versus cost. Employees (Client and consultants) were contacted via face-to-face while top contractors were wrote through email and face-to-face for foreign and local contractors respectively. Meanwhile stakeholders were communicated via email and face-to-face for other international organizations and government institutions respectively. All interviews were made via telephone conversation except higher government and project officials. As indicated by Geoffrey, David and David (2005) using a rule of thumb, if high rate of return is the main goal, then face-to-face or telephone surveys are the optimal choices, while mail surveys are the obvious choice when cost is an issue. The above table helps to understand the data collection method of this study.

3.10 Validity and Reliability

3.10.1 Assessing Validity

Validity means an instruments ability to measure what is meant to be measured. There are three types of validity in a study: content validity, predictive validity, and construct validity. This study addressed face and content validity through the review of literature and adapting instruments used in previous research. In addition, ten individuals including projects leaders,

experts, students from master degree studies and client representative were participated to validate the questionnaire before data collection were authoritatively administrated.

3.10.2 Pilot Test

A pilot test was conducted with ten questionnaires; preliminary draft of the questionnaire was pre-tested to improve upon the clarity of the question items. Non-sample respondents were given the questionnaire to read and comment on the meaningfulness of the question items and their comment were incorporated. Accordingly, repeated questions were removed and amendments were done. The size was guided by the suggestion by Saunders et al., (2009) that minimum of ten (10) members of pre-testing is adequate.

3.10.3 Reliability Test

Reliability is the extent to which a study's operations can be repeated, with the same results and it also involves the accuracy of the chosen research.

Table 3.2 Reliability Statistics Test Result

Variables	Reliability Statistics	
	Cronbach's Alpha	N of Items
Inadequate Resources	.880	8
Poor project planning	.852	8
Lack of communication	.824	8
Lack of monitoring and evaluation	.813	6
Client Dissatisfaction	.832	6
Effect of Project Delay	.826	6

Source: Survey result, 2022

As multiple items in all constructs used, the internal consistency/reliabilities of dimension of individual each independent factors and project delay was assessed with Cronbach's Alpha and the reliability values for all constructs were tested and verified as greater than 0.75, which were considered acceptable (Kothari and Garg, 2014). The overall Cronbach alpha of the scales used

in this study was rated as excellent. Consequently, it indicates the reliability of the scales was very high depicting a very strong internal consistency among the measurement items and the selected instrument accurately measures the variables selected. In this regard, values of 0.75 or greater were considered all constructs depicted that the value of Cronbach's alpha are above the suggested value of 0.75 thus it can be concluded that the study was reliable to capture the constructs.

3.11 Data Quality

Data were checked for consistency and completeness by supervisors, double-checked by the principal investigator. Data quality was assured using different techniques such as training was given to data collectors about the contents of the questionnaire and frequent supervisions were done. Data collectors also assisted the respondents in case of difficulties. Problems encountered at the time of data collection were reported immediately and appropriate actions taken. Properly designed questionnaires and in-depth interview guides were prepared; and pretest was done prior to the study and corrections also made. The questionnaires were checked for missing values and inconsistency. Questionnaires that were found to have lots of missing values and inconsistencies were excluded from the study and considered as non-respondent.

3.12 Methods of Data Analysis

After the collection process of relevant data were completed; proper method of data analysis was used. The analysis indicated transformation of raw data in to a form that makes easy to understand and interests it. First, the empirical data was analyzed by descriptive statistics (frequency, mean and standard deviation). Next, the data was analyzed using statistical techniques of correlation analysis as the study used Likert scale, Pearson correlation were used.

3.12.1 Data Preparation

Data was entered by the principal investigator using SPSS V.25 for cleaning and analysis. The accuracy of data entry was checked by running frequency analysis and making range checks every time. Errors of data entry were corrected by cross-checking with the filled questionnaires.

3.12.2 Descriptive Analysis

Descriptive statistics included the mean and standard deviation used to capture the characteristics of the variables under study. It was displayed in a meaningful and understandable manner to assist in describing and interpreting the results of the research. Descriptive statistics was computed to describe the socio-demographic characteristics of participants and to summarize the respondents' perception. The data was also collected qualitatively have been first transcribed into text, next organized based on the objective of the study and then was analyzed by coding, giving meaning, categorization, editing and through thematic organization and descriptive narration.

3.12.3 Analysis Using Inferential Statistics

Besides, inferential statistics like Pearson correlation and regression was applied to see the effect of the independent variable on the dependent variable. Inferential statistics included bivariate correlation, which used to analyze the relationship of the independent variable. Besides, correlation and linear regression to test for relationships while a multiple linear regression model was used to determine the combined effect on the relationship between dependent and independent variables. Multiple linear regression also allows determine the overall fit (variance explained) of the model and the relative contribution of each of the predictors to the total variance explained. When one selects to analyze his or her data using multiple regression, part of the process involves checking to make sure that the data he or she want to analyze can actually be analyzed using multiple regression.

3.12.4 Model Specification

Model specification - the statistical regression model of the study was based on the theoretical regression model. After results have been computed analysis of the research findings were done using multiple regression statistical analysis method. The relationship between delay variables and project delay is then mathematically described using multiple regression equation models as follows, based on the conceptual model of the study shown in equation 1 below.

$$Yi = \alpha + \beta1(X1) + \beta2(X2) + \beta3(X3) + \beta4(X4) + \beta5(X5) + e$$

Where;

- Y_i = Project Delay.
- X_1 = Inadequate Resources
- X_2 = Poor project planning
- X_3 = Lack of communication
- X_4 = Lack of monitoring and evaluation
- X_5 = Client Dissatisfaction
- e- errors

3.13 Ethical Issues

Ethical approval was obtained from St. Mary University, Post Graduate Studies Program. Ethical letter or official permission was also obtained from various firms. Then after, the objectives and benefits of the research were discussed in detailed with the selected organizations officials. Then, a similar discussion was held with officials and staffs. The study took into account the well-established and thorough research ethics reminds us that it is unethical to a researcher to present a biased report or not to report the truth as it is.

Participation in the study is voluntary and confidentiality of the information was assured during as well as after data collection. The participants was informed about their right not to participate, privacy, risk and no direct benefits of the study and not to answer any question or all of the questions. Data collectors obtained verbal consent from employees after informing them about the nature of the study and that their participation was voluntary. The information sought was be used for any other purpose than that to which participants consented and will not be passed to a third party. After the successful thesis defense and approval, Academic Commission and the University Senate, the questionnaire will be incinerated in a secure manner.

3.14 Operational Definitions and Expected Signs

Table 3.3 Summary of variables definition and scale of measurement

Variables incorporated	Symbol	Unit of measurement	Sign Expected
Dependent Variable			
Project Delay - the time overrun either beyond completion date specified in a contract or beyond the date that the parties agreed upon for the delivery of a project (Meena and Babu, 2015)	PD	Likert scale	
Explanatory Variables			
Inadequate Resources – Starting a project without secure an adequate source of finance (Pall, 2020).	DIP	Likert scale	+
Poor project planning - uncertainly bring down response strategies where they are at the threshold or the completion stage (Tadesse, 2017)	DPSP	Likert scale	+
Lack of communication – unable to build trust and good relationship (Gahtak, 2020).	DEP	Likert scale	+
Lack of monitoring and evaluation - proper inspection/supervision, poor quality control, inadequate supervision and inspection of work, inadequate site inspection, lack of effective monitoring and feedback (Tadesse, 2017)	DMCP	Likert scale	+
Client Dissatisfaction – client's satisfaction is determined by the differences between what is expected and the actual perception of service provision and assumed that any deviation from what is expected creates client dissatisfaction,	DCP	Likert scale	+

Source: Survey result, 2022

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents findings of the study, followed by their interpretations and discussion as compared and contrast to previous studies. It includes the frequency of response rate and respondents profile of sampled respondents as well as response analysis by descriptive statistics followed by regression analysis. It also contains qualitative data analysis to answer the research objective.

4.2 Response Rate

The survey questionnaire was administrated by face to face and emails sent out from March – April, 2022, interested participants being given two hours to respond to the initial response. Response rates are presented in more detail in below. .

Table 4.1 Response Rate

No	Description	Distributed Questionnaires	Returned	%
Distribution and Returns of questionnaires by project actors				
1	**Client**	**60**	**51**	**85**
	Employees	45	42	93
	Managers	14	9	64
2	**Contractors**	**68**	**56**	**82**
	Top Local Firms	41	34	83
	Active Foreign Firms Representative	27	22	81
3	**Consultants**	**34**	**28**	**82**
	Owners	9	6	67
	Experts	24	22	92
4	**Stakeholders**	**51**	**36**	**71**
	Government Officials	13	6	46
	Government Workers	18	15	83
	Others	19	15	79
Response Rate		**212**	**171**	**81**

Source: survey result, 2022

A total of 212 self-administrated questionnaires were distributed to the respondents with close follow up and guide in filling the questioners. Accordingly, 171 respondents properly filled and returned the questionnaires in suitable form; and they were used to analysis. It indicates that eighty one percent (81 %) response rate was attained; it meant the majority of the total targeted respondents were participated in the study. In addition, ten interviewees were conducted over phone based on the prepared interview checklist and the results of their responses are discussed accordingly.

4.3 Respondents' Profile

This part of the data presentation summarized demographic profiles of the respondents, i.e. distribution of respondents in sex, age, and educational, marital status as well as their contact years with surveyed project. In view of that, their responses are presented in the following table and followed by the implication of the responses.

The study was enchanted that most of the respondents were university graduated (well educated), worked in transmission projects management and experience with transmission and distribution rehabilitation and upgrading project. Besides, they were passed most of their working time in the transmission and distribution rehabilitation and upgrading project tools, system and work processes. This shows that the researcher was not biased and collected the data considering all the respondents irrespective of their gender. It was believed that the sampled staffs would provide appropriate responses for the transmission projects management effectively. This indicated that majority of the respondents could understand the subject under study i.e., transmission and distribution rehabilitation and upgrading project delays. This indicates that the study providentially included those employees who have extensive experience surveyed project get better picture of the transmission projects management under study from their experience.

Table 4.2 Summarized Demographic Profiles of the Respondents

Variables (Category)		Count N	%
Gender	Female	70	40.9
	Male	101	59.1
Age (in year)	Less than 30	18	10.5
	31 -46 tears	79	46.2
	47-65 years	56	32.7
	Above 66 years	18	10.5
Educational Status	Below High school	0	0.0
	Diploma and Degree	90	52.6
	Masters	74	43.3
	Refused or Others	7	4.1
Marital Status	Single	47	27.5
	Married	85	49.7
	Divorced	22	12.9
	Refused or Others	17	9.9
Experience in working with mega projects	Less than a year	28	16.4
	About two or three years	54	31.6
	4 – 6 years	49	28.7
	Above 7	40	23.4
Experience with Transmission and Distribution Rehabilitation and Upgrading Project	Less than a year	31	18.1
	About two or three years	58	33.9
	4 – 6 years	36	21.1
	7 – 10 years	37	21.6
	Above 11	9	5.3
Practiced in the power industry	Less than a year	10	5.8
	About two or three years	39	22.8
	4 – 6 years	24	14.0
	7 – 10 years	11	6.4
	Above 11	87	50.9

Survey Result, 2022

Before analyzing data, the background information on the staffs at different level has been shown throughout the above table. Findings of this study shows that, out of 171 the total of employees respondents of this study, 70 (40.9 %) in number of the respondents are females and 101 (59.1 %) of the sampled respondents are male. Even if the distribution of gender participants in the study is relatively equal even if the majority of the respondents are male, the results show that male project participants or actors could be controlling the engagement in transmission projects at surveyed project level. Accordingly, the percentages stipulate an increase in the number of men engaging in transmission projects at surveyed project level undertakings. This could be recognized to further availed participation and employable in similar projects through various including funds educational and financial support to women hence empowering more women to engage in more transmission projects.

The above table shows that, among 171 sampled respondents, 10.5 % of the total respondents were of age below 30 and above 18 years or there were young adults, 46.2 % of them were of age 31 to 46 years or middle-aged adults, and only 10.5 % of the respondents were older adults or aged older than 66 years. This could be considered the study gathered information from well experienced and aged people who acquired knowledge in transmission projects.

The above table displays that, among 171 sampled respondents, more than half of them (52.6 % of the total respondents) had diploma and first degree, 43.3 % of them attended university postgraduate (masers and above). In the same way, most of the respondents (85 in number) are married and single (47 in numbers). In view of this, the majority respondents are married showing that they have been exercising the role of accountability and responsibility and in better social relations they are taking part. Likewise, the majority (54) of the sampled respondents had more than two years working indicated experience in working with mega power projects and 140 of them had well experience in working with transmission and distribution rehabilitation and upgrading project.

4.4Level of Project Delays Causes

This response analysis presents respondents' opinion regarding their level of agreement on six dimensions with various questions about cause's project life cycle delays. The results were interpreted based on the following measurement scale intervals or range; 4.51-5.00 very

excellent, 3.51-4.50 very good, 2.51-3.50 good or average or moderate, 1.51-2.50 fair and 1.00-1.50 poor (Aster, 2018).

4.4.1 Causes for Project Delay in Initiation Project Life Cycle

The inputs of the initiation phase, also called "concept phase" or "identification phase," are the keeping up with technological innovations, economic trends, requests from customers, distributors or sales people, new products put on the market by competitors, or brainstorming processes. One can argue whether or not this first phase belongs to the project in a broad implication, but common sense leads to think that the initiation phase is an endless process, which continuously initiates new feasibility phases. In view of that, their responses are presented in the following table and followed by the implication of the responses.

Table 4.3 The Causes related to Initiation Phase (N=171)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
Defect while creating the project charter	21	12.3%	11	6.4%	8	4.7%	126	73.7%	5	2.9%	3.49	1.087
Omission or error in estimate	8	4.7%	20	11.7%	11	6.4%	105	61.4%	27	15.8%	3.72	1.019
The failure to secure an adequate source of finance for the project	8	4.7%	28	16.4%	14	8.2%	112	65.5%	9	5.3%	3.50	.984
Problem in the feasibility of the project	11	6.4%	14	8.2%	10	5.8%	105	61.4%	31	18.1%	3.77	1.048
										Internal Causes		**3.62**
Lack of foreign currency or high fluctuations	11	6.4%	16	9.4%	12	7.0%	97	56.7%	35	20.5%	3.75	1.084
Lack of skilled labour	9	5.3%	15	8.8%	17	9.9%	92	53.8%	38	22.2%	3.79	1.053
Banking facility	9	5.3%	29	17.0%	20	11.7%	91	53.2%	22	12.9%	3.51	1.081
Lack of business infrastructures	10	5.8%	14	8.2%	12	7.0%	96	56.1%	39	22.8%	3.82	1.061
										External causes		**3.72**
										Grand Mean		**3.67**

Survey Result, 2022

As per the findings in the above table, the respondents indicated that lack of business infrastructures crated project delay the performance of the company in a strongly agree or great extent as shown by 22.8 %, in a agree as shown by 56.1 %, in neutral as shown by 7.0 % and in a little extent as shown by 5.8 %. This implies that a decision-maker unable to decide or not to transform the project concept into a project due to lack of business infrastructure. Islam and Trigunarsyah (2017) recalled that at that point, in the case of a plant, the capacity is decided, the locations are chosen, the financing is arranged, the overall budget and schedule are agreed, and a preliminary organization is set up.

The mean score 3.67 was rated as very good. \this implies that they had a rational attitude toward such initiation phases is to identify as many project concepts challenges as possible, and to eliminate the discordant ones through a pre-selection procedure, with respect to the objectives of the organization. Results in the above table show that all the mean values were greater than 3.49 and less than 3.82; this is an indication that the respondents agreed with the various statements on more external causes (3.67) for intuition phase than internal capability (3.62). Similarly, the standard deviation values were less than two which is a small standard deviation and therefore suggests that respondents had similar opinions.

4.4.2 Causes for Project Delay in Planning Project Life Cycle

Commonly implemented planning and scheduling techniques are such— deterministic, non-recursive (i.e. which do not allow loops), non-discursive—it is difficult to make schedules which can be consolidated at the life-cycle model levels (Pamarthi & Borra, 2015). Anwar & Malik (2017) stated that before offering what a project practitioner can gain in being aware of few project life-cycle models, accurately forecasting the work to be done, the duration and the resources needed to complete a project is not sufficient to ensure its performance. It is understandable to say that this contributes to the success of a project.

Table 4.4 Planning Project Life Cycle Causes for Delay (N=171)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
Improper planning and scheduling	12	7.0%	13	7.6%	11	6.4%	70	40.9%	65	38.0%	3.95	1.177
Design problems that lead to wrong construction and rework	20	11.7%	9	5.3%	16	9.4%	80	46.8%	46	26.9%	3.72	1.247
Changes in key personnel responsible for the advance planning and execution	17	9.9%	19	11.1%	14	8.2%	56	32.7%	65	38.0%	3.78	1.327
Poor and unorganized Procurement Practice in the client organization	13	7.6%	19	11.1%	9	5.3%	86	50.3%	44	25.7%	3.75	1.177
										Internal Causes	**3.80**	
Unable to use internet technology	19	11.1%	20	11.7%	17	9.9%	81	47.4%	34	19.9%	3.53	1.248
Intermittent of tasks due to slow-moving ICT facilities developments	21	12.3%	12	7.0%	13	7.6%	92	53.8%	33	19.3%	3.61	1.229
Undeveloped digital knowledge	21	12.3%	15	8.8%	10	5.8%	84	49.1%	41	24.0%	3.64	1.278
Ill-mannered Scheduling due to weak internet connection	25	14.6%	19	11.1%	12	7.0%	81	47.4%	34	19.9%	3.47	1.325
										External causes	**3.56**	
										Grand Mean	**3.68**	

Survey Result, 2022

In analysing causes of project delay, respondents' perceived delay causes in planning and scheduling phase. The mean score 3.68 was rated as very good. It implies that it needs cautions in planning schedule as issues such as possible rework, change control, product and project quality, or project risks shall also be taken into account when planning and scheduling the project. In this case, internal factors (3.80) more contributed than external factors (3.68). Results in the above table show that all the mean values were greater than 3.47 and less than 3.95; this is an indication that the respondents agreed with the various statements on causes in planning and scheduling phase. Similarly, the standard deviation values were less than two which is a small standard deviation and therefore suggests that respondents had similar opinions. Unambiguously, the majority of the interview respondents were in agreement that there is too much plan too much

with less creative approach in a pre-project phase. There is incorrect plan and the surveyed project unable to deliver it in conformance with specification, on time and on budget.

4.4.3 Causes for Project Delay in Execution Project Life Cycle

Table 4.5 Execution Project Life Cycle Causes for Delay (N=171)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree			
	N	%	N	%	N	%	N	%	N	%	Mean	SD
Right of way (ROW) problems of transmission lines (TL)	3	1.8%	1	.6%	22	12.9%	84	49.1%	61	35.7%	4.16	.802
Lack of effective communication and coordination among the parties	5	2.9%	1	.6%	18	10.5%	90	52.6%	57	33.3%	4.13	.844
Late site handover to contractor	9	5.3%	6	3.5%	33	19.3%	93	54.4%	30	17.5%	3.75	.963
Delayed approval of major changes in the scope of work by consultant	4	2.3%	6	3.5%	44	25.7%	91	53.2%	26	15.2%	3.75	.839
										Internal Causes	**3.95**	
Work cultural difference in urban and rural	4	2.3%	16	9.4%	4	2.3%	124	72.5%	23	13.5%	3.85	.852
Low level of workers; education	5	2.9%	8	4.7%	3	1.8%	134	78.4%	21	12.3%	3.92	.767
Traditional beliefs towards work	5	2.9%	12	7.0%	30	17.5%	95	55.6%	29	17.0%	3.77	.916
Negative work place culture	8	4.7%	5	2.9%	34	19.9%	102	59.6%	22	12.9%	3.73	.893
										External causes	**3.82**	
										Grand Mean	**3.88**	

Survey Result, 2022

In analysing causes of project delay, respondents' perceived delay in execution project life cycle. The grand mean 3.88 was rated as very good. It shows that there are very serious concerns with the overlapping or with the fuzziness of interfaces between phases, the spreading of responsibilities and of decisions which are made complicated and more usually, this surveyed project faced uncertainty and imprecision associated with the execution of any project.

Results in the above table show that all the mean values were greater than 3.73 and less than 4.16; this is an indication that the respondents agreed with the delay in execution project life cycle. In the same way, the standard deviation values were less than two which is a small standard deviation and therefore suggests that respondents had similar opinions. The highest

mean scores were found in internal causes that shows internal factors fabricated more of project delays in the surveyed project. More specifically, there are more challenges that were related to right of way (ROW) problems of transmission lines (TL) and there is high lack of effective communication and coordination among the parties. Islam and Trigunarsyah (2017) stated that it is the determination of project life-cycle models to illustrate simply the "progress philosophy" of the projects, in order to promote a better understanding and a better communication within the projects.

4.4.4 Causes for Project Delay in Monitoring Project Life Cycle

Table 4.6 Monitoring Project Life Cycle Causes for Delay (N=171)

Survey Result, 2022

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree			
	N	%	N	%	N	%	N	%	N	%	Mean	Std. Deviation
Hidden agenda of supervisors	12	7.0%	12	7.0%	23	13.5%	106	62.0%	18	10.5%	3.62	1.007
Poor site management and supervision	6	3.5%	14	8.2%	0	0.0%	132	77.2%	19	11.1%	3.84	.857
Lack of quality and controlling standards	4	2.3%	4	2.3%	43	25.1%	81	47.4%	39	22.8%	3.86	.877
									Internal Causes		**3.77**	
Lack of law enforcement practices	13	7.6%	27	15.8%	8	4.7%	82	48.0%	41	24.0%	3.65	1.220
Monopolized government projects	12	7.0%	29	17.0%	10	5.8%	77	45.0%	43	25.1%	3.64	1.225
Lack of awareness about existing laws	18	10.5%	28	16.4%	10	5.8%	85	49.7%	30	17.5%	3.47	1.252
									External causes		**3.59**	
									Grand Mean		**3.68**	

Table 4.6 presents transmission based project management & monitoring has been cratered more internal causes (3.77) than external factors (3.59). The grand mean (3.68) was rated as very good. Outcomes of the study in the above table show that all the mean values were greater than 3.64 and less than 3.86; this is an indication that the respondents agreed with the delay in this project life cycle. Likewise, the standard deviation values were less than two which is a small standard

deviation and therefore suggests that respondents had similar opinions. The largest mean (3.86) exhibits there is lack of quality and controlling standards in the power transmission sector in Ethiopia is a factor that caused delay in the AATDUP and the next largest mean score (3.84) shows that there is poor site management and supervision is one of the causes of delay in the AATDUP. The majority of the interview responses show that project managers and occasionally project team members are not dedicated to controlling and monitoring project implementation process. Project team does not help run project evaluation process which precedes project implementation process.

4.4.5 Closure Project Life Cycle Causes for Delay

Table 4.7 Closing Out Project Life Cycle Causes for Delay (N=171)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
Releasing resources and completing the project	2	1.2%	31	18.1%	22	12.9%	76	44.4%	40	23.4%	3.71	1.055
Final Payment delay on the owner side	6	3.5%	28	16.4%	34	19.9%	72	42.1%	31	18.1%	3.55	1.075
Recording and archiving Project documents	1	.6%	24	14.0%	34	19.9%	71	41.5%	41	24.0%	3.74	.996
										Internal Causes		**3.67**
Political instability	6	3.5%	21	12.3%	20	11.7%	78	45.6%	46	26.9%	3.80	1.077
Ever-changing government office or structure	10	5.8%	34	19.9%	15	8.8%	70	40.9%	42	24.6%	3.58	1.221
Corruption	4	2.3%	10	5.8%	20	11.7%	91	53.2%	46	26.9%	3.96	.913
										External causes		**3.78**
										Grand Mean		**3.72**

Survey Result, 2022

The finding shows that corruption is one of the causes of delay in the AATDUP as shown by the largest mean of 3.96. The grand mean 3.72 was rated as very good; it implies there is a high causes that creates delay in project activities. Research outcomes of the study in the above table show that all the mean values were greater than 3.55 and less than 3.96; this is an indication that the respondents agreed with the delay in this project life cycle. Likewise, the standard deviation

values were less than two which is a small standard deviation and therefore suggests that respondents had similar opinions. The lowest mean (3.58) exhibits ever-changing government office or structure is not one of the cause of delay in the AATDUP. This implies that this project is independent and it has a priority sector from government side.

4.4.6 Consequence of Project Delay

Table 4.8 Consequence of Project Delay (N=171)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Std. Deviation
	N	%	N	%	N	%	N	%	N	%		
Delay Claims frequently happen in transmission projects.	13	7.6%	17	9.9%	39	22.8%	76	44.4%	26	15.2%	3.50	1.103
Activities abandonment frequently arises in transmission projects.	8	4.7%	20	11.7%	35	20.5%	85	49.7%	23	13.5%	3.56	1.018
Delay penalty often ascends in transmission projects.	9	5.3%	14	8.2%	24	14.0%	100	58.5%	24	14.0%	3.68	.992
										Internal Causes	**3.58**	
Litigation often ascends in transmission projects.	7	4.1%	18	10.5%	36	21.1%	90	52.6%	20	11.7%	3.57	.970
Disputes frequently arises	10	5.8%	21	12.3%	29	17.0%	87	50.9%	24	14.0%	3.55	1.064
Termination of contract often ascends by court	7	4.1%	19	11.1%	23	13.5%	99	57.9%	23	13.5%	3.65	.984
										External causes	**3.59**	
										Grand Mean	**3.58**	

Items	Never		Seldom		Neutral		Sometimes		Always		Mean	Delay Rate
	N	%	N	%	N	%	N	%	N	%		
Project Delay	16	9.36%	15	8.77%	43	25.15%	71	41.52%	26	15.20%	3.44	69%

Source: Survey result, 2022

Survey outcomes in the above table show that all the mean values were greater than 3.50 and less than 3.68; this is an indication that the respondents agreed with the various statements on attitude towards project delay. The grand mean score 3.58 was rated as very good; it implies there is less project delay contribution through this project life cycle. Likewise, the standard deviation values were less than two which is a small standard deviation and therefore suggests that respondents

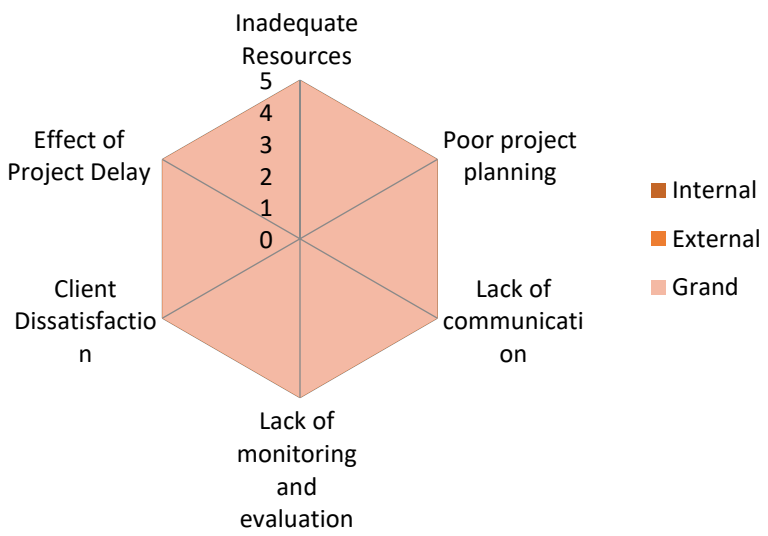
had similar opinions. The lowest mean (3.50) was minimal delay claims frequently happen in transmission projects. Internal and external factors have been equal delay consequences due to this life cycle as the highest mean (3.68) from internal factors relatively has comparable mean (3.65) of external factor. The main consequences of delay included delay penalty often ascend in transmission projects.

The prevalence rate project of delay activities was found as 69 % (3.44 mean Score) which is considered as high. But it was lower than the findings of Tadesse (2017) who found 3.66 that were rated by the factors with means exceeding to 3.8 present a fairly high agreement of the respondents. The majority of the interview responses stated that while dozens of projects in power industry in the country have been approved, most of the projects are delayed by delays which occurred due to various reasons. Delays are most prevalent in the power sectors due to the vast scale of the projects and causes huge amount of losses to both the owner and the contractor. Hence it would be a worthwhile effort to use the above mentioned delay analysis techniques to analyse delays in power project which will result in saving large sums of money and would help in making the country self-sustaining.

4.5 Project Life Cycle index

This study lent project management tool called The Life Cycle Index tool. It has been developed and applied by ABB Automation GmbH, Service Process Control at Ratingen, Germany. In 2009, the innovative tool has won the ABB service innovation award. Due to the success of the market introduction and customer acceptance the tool is now under preparation for an ABB global roll-out (Niemann, 2009).

Thanks to the “Life Cycle Index”, operators can now for the first time record, assess and plan the productivity potential and risks of their control system installations in an objective manner. This study used radar graph to compare the mean scores of internal and external causes of project delay in each project life cycle.



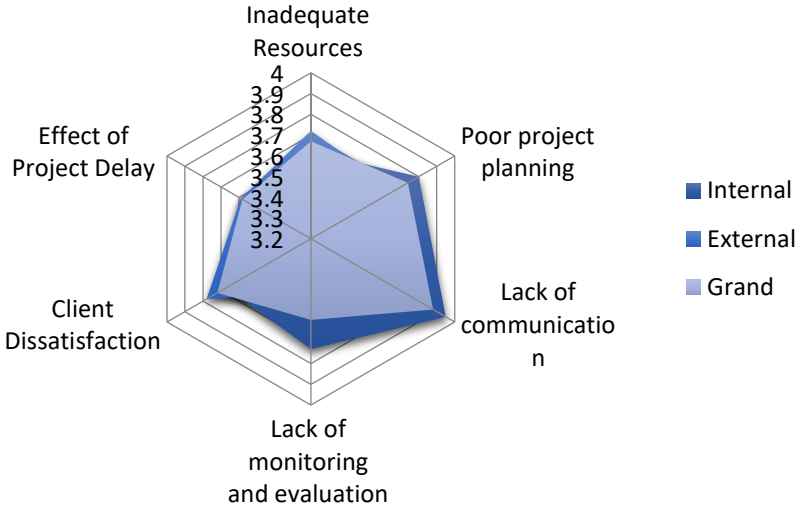


Figure 4.1 Project Life Cycle Index

This study assumed its mean results as re-indexing the project life cycle index. The grand mean was approaching to project life cycle index was more exhibited to lack of communication (3.88) and followed by poor project planning (3.74). This implies that project execution and project planning have been the top causes for project delay. The majority of the interview responses supported that project execution fabric the highest project delay resulted in organizational or institutional failures. As reasoned above, execution of power projects needs dynamic co-operation of several departments within as well as among various ministries.

Sampled respondents also confirmed that there is a conflict between the individual and the organizational objectives at every stage of hierarchy. Consequently, hierarchical organizations are inherently weak in inducing the desired efforts from the people involved. This is particularly factual of government organizations. The interview respondents' experiences indicate that unexpected or unrealistic expectation made project planning had a complicated circumstantial for delay. It shows that life cycle planning is essential where users have ambitious plans to achieve constant increases in productivity.

On other hand, lack of communication has been created through internal factors (4.16, the highest mean) and external factors (3.92, the highest mean). This study found that the highest internal factors categorized in poor planning and lack of communication efforts (the top mean scores 3.80 and 3.95 respectively). While external factors have been highly active in execution and closing phases (the highest mean scores 3.82 and 3.78 respectively). This assured that project execution creates the most project delay as per the sampled respondents. In line with this study, literatures confirm similar results. For example, Pall (2021) revealed that execution phase exhibited intensive delay or the most delays occur at the execution phase of a project and Pamarthi & Borra (2015) identified the execution phase of balance of payment and the major factors with the perspective of client and contractor for delay damages in power projects in India. This is due to the fact that significant proportion of the contractual time is spent during this stage. A shared subject across the challenges counted earlier is the need for sound project management principles in a well-structured framework. This is expected to enable the project owner to clearly evaluate all aspects of project execution across the project lifecycle. A sound project reporting system allows the project owner to efficiently keep track of all the aspects of project execution thus assisting ensure problems are addressed and resolved in a timely manner.

4.6 Inferential Analysis

This study used two type of inferential analysis namely correlation and multiple regression analysis.

4.6.1 Correlation Analysis

This study used a simple bi-variate relationship analysis between the dependent and independent variables. This study used the rating of relationship between two variables based on Aster (2018) on the relationship between two variables will be from 0.01 up to 0.09 negligible association, 0.10 up to 0.29 low association, from 0.30 up to 0.49 moderate association, from 0.50 up to 0.69 substantial association from 0.70 and above very strong association. A Pearson's Product Moment Correlation was conducted to establish the strength of the relationship between the variables. The findings are presented in the below table.

Table 4.9 Result of Correlation Analysis Pearson Correlation (N=171)

Variables		Inadequate Resources	Poor project planning	Lack of communication	Lack of monitoring	Client Dissatisfaction	Project Delay
Inadequate Resources	Pearson Correlation	1					
	Sig. (2-tailed)						
Poor project planning	Pearson Correlation	.157*	1				
	Sig. (2-tailed)	.040					
Lack of communication	Pearson Correlation	.274**	.502**	1			
	Sig. (2-tailed)	.000	.000				
Lack of monitoring	Pearson Correlation	.368**	.284**	.365**	1		
	Sig. (2-tailed)	.000	.000	.000			
Client Dissatisfaction	Pearson Correlation	.269**	.347**	.389**	.521**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
Project Delay	Pearson Correlation	***.461****	***.566****	***.599****	***.534****	***.504****	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

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

Source: Survey result, 2022

Contrasting the multiple regression analysis, simple correlation analysis attempts to quantify the direction of association between two variables. Accordingly, an assessment of the correlation matrix between all the independent variables and project delay are positively related.

Using correlational analysis, this study found that there is a substantial association or relationship between inadequate resource (r=.471; .000) and project transmission delay (Sig. (2-tailed) .000 with correlation is significant at the 0.01 level (2-tailed). In line with this study, Aster (2018) perceived inadequate resource and project transmission delay. It implies that inadequate resource the cause of project delay in this phase.

This study employed correlational analysis and it found that there is a substantial association or relationship between poor project planning (r=.566; .000) and project transmission delay (Sig. (2-tailed) .000 with correlation is significant at the 0.01 level (2-tailed). In proportion to this study, Ganesh and Borra (2015) found that it has positive relationship with project transmission delay. It suggests that it the cause of project delay in this phase.

This study engaged in correlational analysis and it found that there is a substantial association or relationship between lack of communication (r=.599; .000) and project transmission delay (Sig. (2-tailed) .000 with correlation is significant at the 0.01 level (2-tailed). Like this study, Pall *et.al* (2020) found that it has positive relationship with project delay as it expected that miscommunication will aggravate project delay. Within its highest correlation value, it implies that it is the most cause of project delay in this phase.

Using this analysis, this study found that there is a substantial association or relationship between lack of monitoring (r=.534; .000) and project transmission delay (Sig. (2-tailed) .000 with correlation is significant at the 0.01 level (2-tailed). In line with this study, Jarrin (2016) perceived it has positive relationship with project transmission delay. Within its moderate correlation value, it implies that it is one of the most causes for project delay in this phase.

This study used the same analysis and it found that there is a substantial association or relationship between client dissatisfaction (r=.504; .000) and project transmission delay (Sig. (2-tailed) .000 with correlation is significant at the 0.01 level (2-tailed). In proportion to this study, Ganesh and Borra (2015) found that it has positive relationship with project transmission delay. Within its moderate correlation value, it implies that it is one of the most causes for project delay in this phase.

This study found that the majority of the interview responses as execution could be the main cause for delay due to the fact that the identification of the risks (opportunities or threats) which are likely to affect the project execution and the conformance to the specification of the final deliverable, their evaluation and their mitigation. It is further found that planning phase is charted secondly with its next higher correlation value. The result of this study is consistent with the similar study done by Tadesse (2017) who presented correlation matrix table that observed that there is a positive, strong and statistically significant correlation between project implementation delay factors (poor project initiation, poor project monitoring, evaluation and controlling system, poor project planning/design system, poor communication, improper project closure and improper implementation) and project completion delay, as the correlation coefficient between each factors and project delay described as 0.738, 0.923, 0.692,0.912,0.827 and 0.778 respectively and in all cases at 1% significance level ($p < 0.01$).

4.6.2 Multiple Regression Analysis

Multiple regression is a flexible method of data analysis that may be appropriate whenever a quantitative variable (the dependent or criterion variable) is to be examined in relationship to any other factors (expressed as independent or predictor variables). Relationships may be nonlinear, independent variables may be quantitative or qualitative, and one can examine the effects of a single variable or multiple variables with or without the effects of other variables taken into account (Stephanie, 2018).

4.6.2.1 Assumptions and Diagnostic Test

Attempts have been conducted to test normality, multicollinearity, autocorrelation and test for average value of the error term are found in appendices part; next to the data collection instrument in this study. The assumption test was done based on theoretical and empirical multiple regression concepts and results found on Appendix next to data collection method. The test results show that the normality, Multicollinearity, autocorrelation and test for average value of the error term were met the assumptions of regression analysis. It includes the data was normally distributed with no Multicollinearity and autocorrelation problems. This section contains diagnostic tests for testing the regression assumptions such as multi collinearity test,

homoscedasticity, normality test, sampling adequacy, and normality tests for parameter stability were performed.

Multicollinearity Test

Problem may arise when two or more predictor variables are correlated. The VIF detects multi collinearity by measuring the degree to which the variance has been inflated. A VIF greater than10 is thought to signal harmful multi collinearity as suggested by Frost (2017)

Table 4.10 Summary of Collinearity Statistics

		Collinearity Statistics	
	Model	**Tolerance**	**VIF**
1	(Constant)		
	Inadequate Resources	.838	1.193
	Poor project planning	.719	1.391
	Lack of communication	.663	1.509
	Lack of monitoring and evaluation	.653	1.531
	Client Dissatisfaction	.665	1.504

Source: Survey result, 2022

The Variance inflation factor (VIF) was checked in all the analysis which is not a cause of concern according to Stephanie (2018) who indicated that a VIF greater than 10 is a cause of concern.

Normality Test

This study used the descriptive statistic of Kurtosis and Skewness statics calculation and demonstrates that the distribution is normal because Kurtosis and Skewness are in between -2 and +2, thus data is normally distributed and had a reasonable variance to use subsequent analysis. From the finding on the histogram test on normality, the study found that significance in both test were less than 0.05 which is leads to the rejection of the null hypothesis that that data on the all variables were not normally distributed this is an indication that data on the variables were normally distributed.

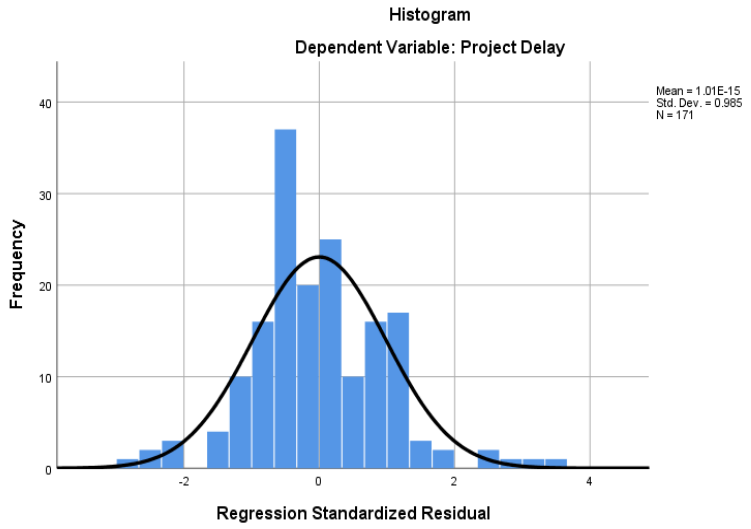


Figure 4.2 Histogram

Source: Survey result, 2022

Test for Autocorrelation

If the observations have a natural sequence in time or space, the lack of independence is called autocorrelation. Assumption that is made of the multiple linear regressions disturbance terms is that the covariance between the error terms over time (or cross-sectional, for that type of data) is zero. To test the presence of autocorrelation, the popular Durbin-Watson Test was employed in this study. The Durbin-Watson statistic is 1.546 found with the specified range from 1.5 to 2.5, representing that the residuals are uncorrelated; therefore, the independence assumption is met for this analysis (Frost, 2017).

Table 4.11 Result of Durbin-Watson (N=171)

Model Summary[b]

Model	Durbin-Watson
1	1.546

a. Predictors: (Constant), Client Dissatisfaction, Inadequate Resources , Poor project planning , Lack of communication, Lack of monitoring and evaluation
b. Dependent Variable: Project Delay

Source: Survey result, 2022

Sampling Adequacy

In order to validate the validity of study's variables, tests of sampling adequacy were employed. This empowered the study recognize whether the items were appropriate for factorial analysis.

The Table below shows Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity. The test results show that the scales had values above the threshold of 0.7 as established by Frost (2017) who stated that KMO of 0.50 is acceptable degree for sampling adequacy with values above 0.5 being better. Bartlett's Test of sphericity which analyses if the samples are from populations with equal variances produced p-values less than .05 ($p < .001$). Since the Bartlett's test significances were less than 0.05 further indicates an acceptable degree of sampling adequacy (sample is factorable). Unlike the study's findings, values closer to 0 depict computational problems with the factor analysis: an issue of singularity, which implies multicollinearity in the data. Thus, it is acceptable to proceed with factor analysis.

Table 4.12 Result of KMO and Bartlett's Test Results (N=171)

Phases	KMO	Bartlett's Test of Sphericity			Determinant
		Approx. Chi-Square	Df	Sig.	
Inadequate Resources	.847	712.781	28	.000	.014
Poor project planning	.801	778.971	28	.000	.009
Lack of communication	.804	438.664	28	.000	.072
Lack of monitoring and evaluation	.729	580.408	15	.000	.007
Client Dissatisfaction	.766	443.935	15		.070

Source: Survey result, 2022

Linearity Test

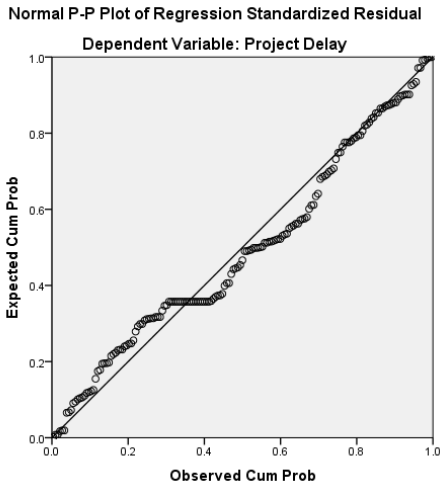


Figure 4.3 Normal P-P Plot
Source: Survey result, 2022

The mean value of response variable (Y) is a straight line function of the independent variables, X' A violation of this assumption may indicate that there is a non-linear relationship between the response and explanatory variables. In consequence, the linear regression model may not be applicable or fitted to the data under consideration. Therefore, the graph below shows that the regression can run.

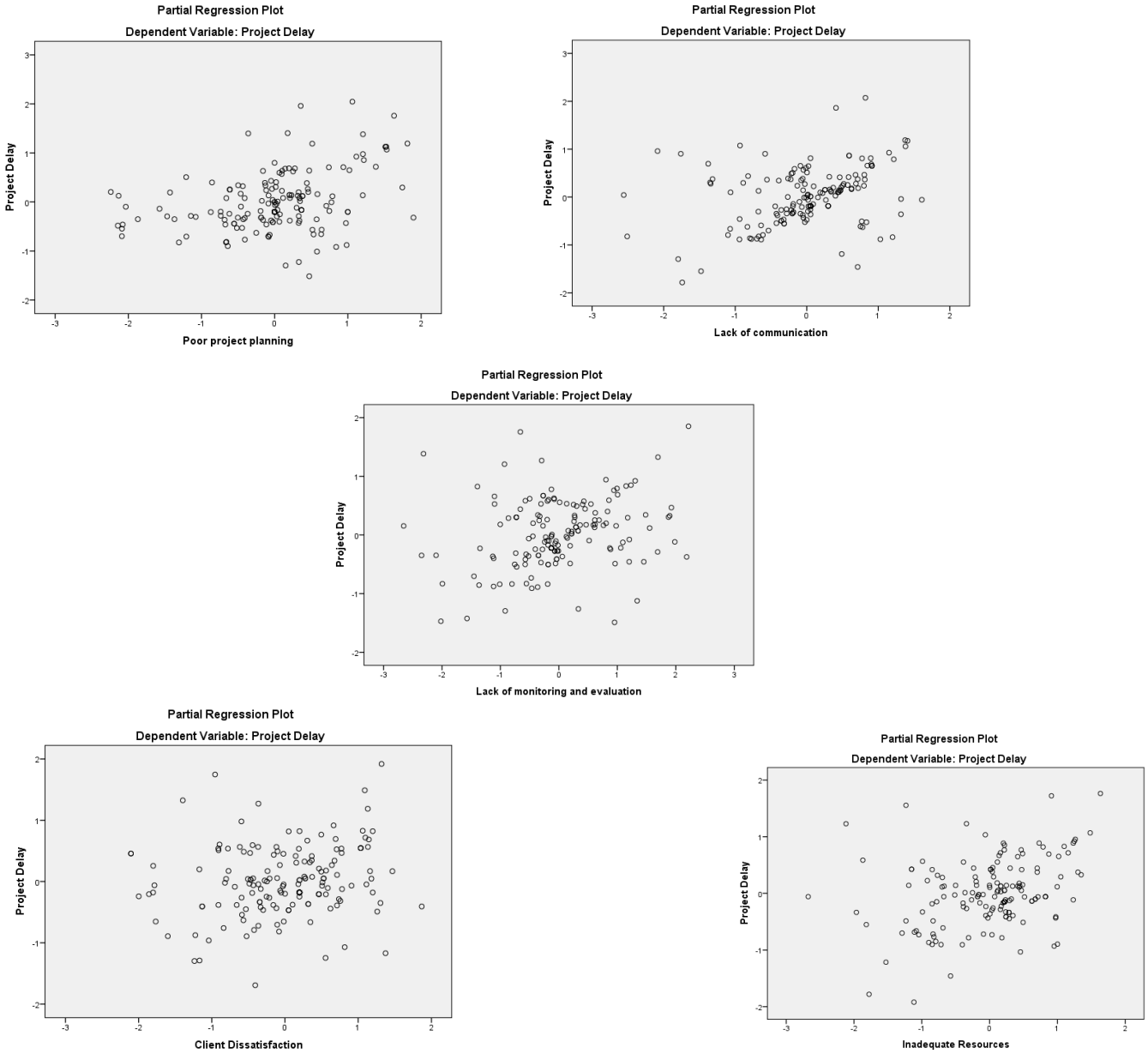


Figure 4.4 Scatter Plots
Source: Survey result, 2022

When the homoscedasticity assumption has been met, the residuals will present as being randomly scattered around the horizontal line depicting ri=0. The above figure portrays the test result of a residual plot demonstrating a relative equal clustering of residuals along the horizontal line in a rectangular shape, therefore, the homoscedasticity assumption seems to have been met. It refer to homogeneity of variances that is, all of the treatment groups have the same variance. The homoscedasticity assumption can be tested through the visual examination of the same residual plots of the standardized residuals and predicted values depicted in the assumption of linearity. When the homoscedasticity assumption has been met, the residuals will present as being randomly scattered around the horizontal line depicting ri=0. The study found the test result of a residual plot demonstrating a relative equal clustering of residuals along the horizontal line in a rectangular shape, therefore, the homoscedasticity assumption seems to have been met.

Error Term

Test for average value of the error term is zero (E (ut) = 0); the first assumption required is that the average value of the errors is zero. Therefore, since the constant term (i.e. α) was included in the regression equation, the average value of the error term in this study is expected to be zero.

4.6.2.2 Multiple Regression Test Results

Table 4.13 Regression Test Results Model Summary (N=171)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778[a]	.605	.593	.553

a. Predictors: (Constant), Client Dissatisfaction, Inadequate Resources , Poor project planning , Lack of communication, Lack of monitoring and evaluation
b. Dependent Variable: Project Delay

Source: Survey result, 2022

The above table portrays the result of multiple regression test and its measurement is made by inferring the value of R^2 to explain the magnitude of the effect of the independent variable on the dependent variable. Here below illustrated are the linear regression of five independent variables and dependent variable. As exposed in the above table, the overall bundle of determinant factors of the five independent variables were 60.5 % (R^2 = .605) explained the dependent variable. This

suggests that 60.5 % of project delay in depends on the independent variables while the remaining 39.5 % is determined by other unaccounted factors in this study.

Table 4.14 Regression Test Results ANOVA (N=171)

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	77.174	5	15.435	50.503	.000[b]
	Residual	50.427	165	.306		
	Total	127.602	170			

a. Dependent Variable: Project Delay

b. Predictors: (Constant), Client Dissatisfaction, Inadequate Resources , Poor project planning , Lack of communication, Lack of monitoring and evaluation

Source: Survey result, 2022

As the second table shows the result F= 50.503, it can be concluded that the combination of determinant factor have positive effect on project delay which is statistically significant. Thus, this study rejects the null hypothesis. F-test is used to determine whether any one of the predictor variable is related to explanatory variable in model equation. From the above Table 13, it is evident that F significance value is less than .05 thus; at least one independent variable is linearly related to dependent variably thereby proving the validity of model equation.

Table 4.15 Test of Significance - Regression Test Results Coefficients (N=171)

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	-.042	.264		-.158	***.875***
	Inadequate Resources	***.249***	.057	***.233***	4.363	***.000***
	Poor project planning	***.272***	.053	***.295***	5.110	***.000***
	Lack of communication	***.257***	.059	***.262***	4.360	***.000***
	Lack of monitoring and evaluation	***.161***	.049	***.199***	3.282	***.001***
	Client Dissatisfaction	***.122***	.055	***.134***	2.230	***.027***

a. Dependent Variable: Project Delay

Source: Survey result, 2022

The regression equation gives us two unstandardized slopes, both of which are partial statistics. OLS unstandardized coefficients can be interpreted as a one unit increase in X is associated with

a coefficient sized increase (decrease) in Y. Standardized coefficients are the estimates resulting from an analysis carried out on variables that have been standardized so that their variance is 1. This means that they are in "standard deviation" terms or units and can be compared to each other. Whereas unstandardized coefficients literally tell us the change in Y for every 1 unit change in X. He also stated that the model summary table reports the strength of the relationship between the independent and the dependent variable.

From this multiple regression table, this study found similar results as there is a positive and significant effect of inadequate resources (.0001) on transmission project delay. In line with this study, Pall (2021) involved the primary activities of transmission projects acquisition and transmission projects development, thus it has positive effect on transmission project delay. It was noted that it created a concurrent delay that has become a very common representation as part of some analysis of construction delays.

This study employed multiple regression table and it found there is a positive and significant effect of poor planning (.0001) on transmission project delay. Consistent with this study, Ganesh & Borra (2015) said that communication can disregard the mismatch between stakeholders' prospects. It helps to integrate schedules that allow eluding any gaps and mismatching between stakeholders' planning and expectations; so it has positive effect on transmission project delay.

Using multiple regression table, this study found that there is a positive and significant effect of lack of communication (.0001) on transmission project delay. In line with this study, Pall *et.al* (2020) among the main sector specific largely causes of delay right of way (ROW) problems is the most critical factor that implies it has positive effect on transmission project delay.

This study used multiple regression table and it found there is a positive and significant effect of lack of monitoring (.001) on transmission project delay. Consistent with this study, Jarrin (2016) focused on the need to adjust schedules or do what is necessary to keep the project on track during this phase, so it has positive effect on transmission project delay.

This study deployed multiple regression table and it found there is a positive and significant effect of client dissatisfaction (.027) on transmission project delay. In line with this study, Islam & Trigunarsyah (2017) stated that the important performers should not be corrupted and their role in the delay helps to the occurrence of delay factors from the perspective of project life cycle. Actually, the least mentioned delay causes in both the case scenarios included; accidents

during work, corruption challenge, political interference and monopolization of material by the owner.

Model Specification

The multiple linear regression model of the study is based on the theoretical regression model as indicated follows

$$\mathbf{Y=a+\beta_1x_1+\beta_2x_2+\beta_3x_3+\beta_4x_4+\beta_5x_5+\beta_6x_6+e}$$

$$\mathbf{Y=-.042+\ .249\ x_1+.272x_2+.257x_3+.161\ x_4+.122\ x_5+\ e}$$

Where: Y= project delay, a= the y intercept. X_1 –X_5 causes of project delay and **e** represents error term. a is the intercept term- it gives the mean or average effect on Y of all the variables excluded from the equation, although its mechanical interpretation is the average value of Y when the stated independent variables are set equal to zero.β_1, - β_6 refer to the coefficient of their respective independent variable which measures the change in the mean value of Y, per unit change in their respective independent variables. This highest beta values indicated that lack of communication and poor project planning has been the main causes of project delay which are included in planning and execution project life cycle. .

4.7 Discussion

This study aimed to find out the causes of delay in the Addis Ababa Transmission and Distribution System Rehabilitation and Upgrading Project and recommend ideas as mitigation strategies to solve the problem. Thus, the results of this study are discussed below based on the hypothesis and objects raised in Chapter one.

Hypothesis 1 – In initiation project life cycle phase, the most project delay is towards *Inadequate Resources* (It is has a positive and significant effect on delays in transmission projects).

This study tested the most project delay in initiation project life cycle phase; it employed correlation analysis and found that the most project delay in initiation project life cycle phase is towards inadequate resources; and it that it has a significant relationship with transmission project delay with correlation is significant at the 0.01 level (2-tailed); and to make sure that it actually influence the transmission project delay (Sig, 0.0001), multiple regression analysis has

been conducted. And the result of the regression analysis shows that it has positive and significant impact on it; consequently, the stated alternative hypothesis is accepted. The result of this study is consistent with the similar study done by Abdul & Malik (2017) revealed that contractor related delays in terms of inadequate contractor's human resources and shortage of material & equipment of contractor had a positive and significant effect on project completion with values (β=0.163, t = 3.341, p < 0 .001). This study, then, concluded that inadequate resources had a negatively and significant effect on project completion. Pall et al., (2020), Aster (2018) and Meaza (2015) found that inadequate availability of raw material in the country is the most important factor causing delay in project implementation in the context of power projects. Ganesh and Borra (2015) found that contractors further aggravate and contribute to delay due to lack of resources and labor productivity in this surveyed project. Thus, this study revealed that the most project delay is towards inadequate resources in initiation project life cycle phase.

Hypothesis 2 – In planning and scheduling project life cycle phase, the most project delay is towards poor project planning (it has a positive and significant effect on delays in transmission projects).

This study examined and found that the most project delay in this project life cycle phase is towards poor project planning by correlation analysis; and to make sure that poor project planning actually influence the transmission project delay (Sig, 0.0001), multiple regression analysis has been conducted. And the result of the regression analysis shows that poor project planning has positive and significant impact on it; consequently, the stated alternative hypothesis is accepted. The finding agrees with results of previous researches including Mfanimpela (2015) and Mohamed and Chafi (2020) stated that cost overruns and money wastage largely occurred due to poor planning while unnecessary delays happen as a consequence of poor scheduling. Over all they determined the most important delay causes included ineffective planning and scheduling and lack of collective planning and skilled workforce. Abdul & Malik (2017) revealed that project related delays in terms of poor project planning & scheduling had a positive and significant effect on project completion with values (β=0.096, t = 2.150, p < 0 .033). This is due to lack of planning and scheduling particularly nonexistence of the work breakdown structure (WBS). Profiling causative factors leading to construction project delays in the United Arab Emirates (Mpofu et al., 2017) found that inadequate planning and scheduling, poor project

planning and control, cost and time overruns in public sector projects. In addition, Oyegoke and Kiyumi (2017) found that poor project planning and management skills, inadequate technical skills, poorly done ground surveys in the case of mining projects, and delays in construction and equipment supply by other public enterprises. Therefore, this study supported its hypothesis as the most project delay is towards poor project planning in planning and scheduling project life cycle phase.

Hypothesis 3 – In execution project life cycle phase, the most project delay is towards lack of communication (it has a positive and significant effect on delays in transmission projects).

This study employed correlation analysis and found that the most project delay in execution project life cycle phase is towards lack of communication; and it that it has a significant relationship with transmission project delay with correlation is significant at the 0.01 level (2-tailed); and to make sure that it actually influence the transmission project delay (Sig, 0.0001), multiple regression analysis has been conducted. Besides the result of the regression analysis shows that lack of communication has positive and significant impact on it; consequently, the stated alternative hypothesis is accepted. The finding agrees with results of previous researches. For instance, Tadesse (2017), utilizing multiple regressions, revealed that poor communication had a positive and significant effect on project completion with values (β=0.361, t = 10.212, p < 0 .01). This finding is also supported findings of by Nundwe & Mulenga (2017) who found that lack of effective communication was a major factor causing project delays and identified that distance and lack of face-to-face communication, misinterpretation of written text, lack of communication expectations, lack of communication plan and information distribution path have a negatively and significant influence on project completion time. Meaza (2015) also discussed the project conflicts stimulated mainly by poor communication and coordination by contractor with other parties. Further, Wudineh (2017) found that the commitment to project goals and objectives and poor communication among stakeholders affect success of construction projects to a high extent. Thus, this study supported its hypothesis as in execution project life cycle phase, the most project delay is towards lack of communication.

Hypothesis 4 – In monitoring and controlling project life cycle phase, the most project delay is towards lack of monitoring and evaluation (it has a positive and significant effect on delays in transmission projects).

This study used correlation analysis and found that the most project delay in this project life cycle phase is towards poor project monitoring; and it that it has a significant relationship with transmission project delay; and to make sure that poor project monitoring actually influence the transmission project delay (Sig, 0.001), multiple regression analysis has been conducted. And the result of the regression analysis shows that poor project planning has positive and significant impact on it; consequently, the stated alternative hypothesis is accepted. As changes to the scope of work, delayed payments, poor monitoring and control was tested and this finding agrees with results of previous researches. For example, Tadesse (2017), employing multiple regressions, revealed that poor project monitoring, evaluation and controlling system had a positive and significant effect on project completion with values ($\beta = 0.469$, $t = 10.854$, $p < 0.01$). Pall et al, (2021) also implied that understand the delay due to lack of task clarity and assessment and monitoring tools like key performance indicators. Ganesh and Borra (2015) noted that poor project monitoring, evaluation and controlling system had a negatively and significant effect on project completion. The findings agree with Aster(2018) and Oyegoke and Kiyumi (2017) that pointed out the factors always happen relate to poor project monitoring, evaluation and controlling system are; no proper inspection/supervision, poor quality control, inadequate supervision and inspection of work, inadequate site inspection, lack of effective monitoring and feedback. Therefore, the most project delay is towards lack of monitoring and evaluation in monitoring and controlling project life cycle phase.

Hypothesis 5 – In closure project life cycle phase, the most project delay is client dissatisfaction (it has a positive and significant effect on delays in transmission projects).

This study used correlation analysis and found that the most project delay in this project life cycle phase is towards client dissatisfaction; and it that it has a significant relationship with transmission project delay; and to make sure that poor project monitoring actually influence the transmission project delay (Sig, 0.027), multiple regression analysis has been conducted. And the result of the regression analysis shows that client dissatisfaction has positive and significant impact on it; consequently, the stated alternative hypothesis is accepted. The finding agrees with

results of previous research like Abdul & Malik (2017) who revealed that contract related delays in terms of poor contract management, change orders and ineffective delay penalties had a positive and significant effect on project completion with values (β=0.120, t = 2.453, p < 0 .015). Pall (2021) stated that it is reasonable to expect that most delays occur at closing phase that included lack of improper management, corruption and others. Aster (2018) found that the factors that cause delay in construction projects on behalf of client were ranked firstly lack of skill in contract administration while slow decision making by client is the most contributing causes of delay by the client for the contractor. For Harold (2017) customer demands are now being handled using total quality management (TQM); ever-improving system for provides for more meaningful customer satisfaction. Consequently, for Pall (2021), delay in progress payment is ranked the most causes of delay factor while the client respondents rated it as the second factor. Delays may arise at feasibility stage of the project and continue till to the end of construction work. This study confirmed that the most project delay is client dissatisfaction in closure project life cycle phase.

Table 4.16 Summary of Hypothesis

Hypothesis	Sig.	Expected Sign	Decision
Hypothesis 1 – In initiation project life cycle phase, the most project delay is towards inadequate resources.	***.0001***	Positive	Support
Hypothesis 2 – In planning and scheduling project life cycle phase, the most project delay is towards poor project planning.	***.0001***	Positive	Support
Hypothesis 3 – In execution project life cycle phase, the most project delay is towards lack of communication.	***.0001***	Positive	Support
Hypothesis 4 – In monitoring and controlling project life cycle phase, the most project delay is towards lack of monitoring and evaluation.	***.001***	Positive	Support
Hypothesis 5 – In closure project life cycle phase, the most project delay is client dissatisfaction.	***.027***	Positive	Support

Source: Survey Results, 2022

CHAPTER FIVE

SUMMARY OF KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Key Findings

This study found that the most project delay is towards execution project life cycle followed by planning phase. In addition, it found that the occurrence of project delay was rated as high. Lack of communication due to internal project influences has been the top propjet delay source. Further, this study revealed that the most project delay is towards inadequate Resources in initiation project life cycle phase. Following, the study found that the utmost project delay is towards poor project planning in planning and scheduling project life cycle phase. The, this study revealed that the greatest project delay is towards lack of communication in execution project life cycle phase. Besides, it is found one that in monitoring and controlling project life cycle phase, the most project delay is towards lack of monitoring and evaluation. Finally, the study verified that in closure project life cycle phase; the most project delay is client dissatisfaction.

5.2 Conclusions

The study concluded that there is high level project of delay activities in Transmission and Distribution System Rehabilitation and Upgrading Project in Addis Ababa. Further, this study comes also conclude that pitfalls in project life cycle have been a source of transmission project delay. This is a site that interconnects the company's products and services and also informs customers on how to use certain services. Related causes particularly lack of communication in project execution have been created the greatest delays, followed by poor planning, and generally internal factors related delays have been the main factors.

In detailed, adequate resources availability has to be ensured for the proposed projects. As result, this study concluded that inadequate resources have a positive and significant effect on delays in transmission projects. In planning and scheduling project life cycle phase, poor project planning has a positive and significant effect on delays in transmission projects. This is because timely completion of power projects is very crucial to the development of our country. The complexity

of work involved in power project and the involvement of several parties like government, environmental agencies, owner (power utility), contractors and sub-contractors make the timely completion of power project a very challenging task.

Delay in power project can be due to several reasons like delay in land acquisition, delay in supply of equipment's, delay in approval of drawing and design documents, etc. Accordingly, this study established to lack of communication has a positive and significant effect on delays in transmission projects in execution project life cycle. It also concluded that monitoring and evaluation has a positive and significant effect on delays in transmission projects in monitoring and controlling project life cycle phase. Finally, this study comes to conclude that client dissatisfaction has a positive and significant effect on delays in transmission projects in closure project life cycle phase.

5.3 Recommendations

Timely completion of power projects is very vibrant to the development of our country. The complexity of work involved in power project and the involvement of several parties like government, various agencies, owner (power utility), contractors and sub-contractors make the timely completion of power project a very challenging task. The major delay in power project can be due to several reasons like delay in inadequate recourses, poor planning, monitoring and communication and dissatisfaction. Thus, this study provides the fowling references.

- This study found poor communication as a major contributor to the causes of delays. Thus, it suggests that standards and guidelines for effective communication among project personnel and the project's clients are very essential, and allow for the unexpected bumps along the way. Communications should be administered at all levels about the objectives of the projects to be executed.
- Quality controls should be value-added during project execution. The procurement processes should be upgraded. The scope change during project execution should be side-stepped at all cost. The scope should be fixed before execution begins, and any scope change should be sanctioned and checked closely by the project managers, supervisors and engineers.

- Resource planning, scheduling and forecasting should be improved with lasts power information system technologies to avoid adding resources in the middle of the project execution. The scheduling time associated with budget estimates should be improved as well; research findings indicate that planning is not done appropriately. Planning, scheduling and forecasting software should be investigated and purchased and used by the organization.
- Award of contract, exaction and finalizing contracts should be done keeping in view the expertise of bidders in respective field. This will confirm the award of contract to best company and chances of project completion within estimated budget and time will be increased.
- This study exceedingly suggests that public and private institutions including universities may compile ‘best practice’ that is commonly used by many professionals to address those practices which lead to success in their profession. This should be done from those projects that have small deviation in the cultures, needs, and viewpoints but that does not exist a single ‘best practice’ that is accepted by all the practitioners in the USA, Europe, Asia, Australia, or Africa. Projects with different cultural backgrounds have to be planned and executed in that specific context.
- Diverse organizational bodies (PPP- Public Private Partnership or Private Public Partnership) should standardize some mega projects practices for the management of projects.

5.4 Implications for Stakeholders

This study learns and indicates that stakeholders are those people that affect or could be affected by the project delay. The research finding is that not all of them are involved at the beginning of the project. It is therefore suggested to involve all stakeholders at the creation of the project. The quality control should also be improved. The purchasing of long lead materials should be improved, and consequently the delivery of those materials should improve. Very nearly every industry is concerned about effective management of large-scale complicated projects. Most of the money in cost overruns is misused due to poor planning while unnecessary delays happen as a consequence of poor scheduling. Effective communication and planning and scheduling should be to develop properly and should be seen attentively. Stakeholders of power projects should be

said on a strategic management theory that would offer insights that could be leveraged to make organizational project management environments more effective through improved research foundations.

5.5 Areas for Further Research

The researcher believed that this study should be extended so as to cover all mega projects in Ethiopia as the researcher believes that the current study was carried out at transmission projects and the focus was only directed to delays but ignored cost escalation in executing projects during improvements. Delays and cost escalations also affects projects that are executed outside improvements. It is therefore recommended that future studies should focus on cost factors as well as delays in project execution with other power projects as a whole. After analysing the results of the study, that there is strong need to study about Project Management System integration as well as institutionalizing critical success factors framework implementation, digital stakeholders' involvement and others.

REFERENCES

Abdul, Anwar. & Malik, Sohail A. (2017). A Conceptual Model of Delay Factors Affecting Government Funded Hydropower Projects Developing Country Studies www.iiste.org ISSN 2224-607X (Paper) ISSN 2225-0565 (Online) Vol.7, No.10

Al Amria T & Marey-Pérezb Manuel (2020) towards a sustainable construction industry: Delays and cost overrun causes in construction projects of Oman, *Journal of Project Management* 5 (2020) 87–102

Aster, Muluneh. (2018). Assessment on Causes of Substation Construction Delay: Case of Electricity Transmission system Improvement program 2 lot I project (Etisp 2 lot I) MA thesis Addis Ababa University School of Commerce, Addis Ababa, Ethiopia

Banobi, Edwin T. and Jung Wooyong. (2019). Causes and Mitigation Strategies of Delay in Power Construction Projects: Gaps between Owners and Contractors in Successful and Unsuccessful Projects sustainability, *Sustainability* 2019, Volume 11, Issue 5973

Care, Ratings. (2019). Rating Methodology- Power Transmission Project Sion (East), Mumbai, India

Creswell, JW (2014), *Research Design: Qualitative, Quantitative, and mixed methods Approaches (4th ed.),* Sage publications, inc.

Ethiopian Electric Power (2021). Ethiopian Electric Power Strategic Plan for the 2021-22(2014 E.C) Budget Year, EEP Head Office, Addis Ababa, Ethiopia

FICCI. (2013). Power Transmission the Real Bottle Neck, An Overview of the Indian power transmission sector, its challenges and recommendations, New Delhi India

Frost, J. (2017). How to interpret R-squared in regression analysis. Retrieved fromhttp://statisticsbyjim.com/regression/interpret-r-squared-regression/ Accessed on 02 May 2022

Gahtak, Achintya. (2020). Critical Success Factors Framework for Power Sector Projects, PhD Thesis, Galgotia University, Greater Noida, India

Harold, Kerzner. (2017). *A Systems Approach to Planning, Scheduling, and Controlling*, John Wiley & Sons, Inc., Hoboken, New Jersey

Islam, Muhammad Saiful, and Trigunarsyah, Bambang. (2017). Construction Delays in Developing Countries: 2017 *KICEM Journal of Construction Engineering and Project Management* ISSN 2233-9582

JICA (2018). Preparatory survey on the Addis Ababa transmission and distribution system Rehabilitation and Upgrading Project Final Report, Japan International Cooperation Agency, NEWJEC Inc., Addis Ababa Ethiopia

Kothari, C.R (2014). *Research Methodology, Methods and Techniques*, Fourth Revised Edition New Age International (P) Ltd., Publishers, New Delhi

M. Mohamed Saad Bajjou, A. Chafi, (2020). Empirical study of schedule delay in Moroccan construction projects, *International Journal of Construction Management*, Volume 20, 2020-Issue 7

Meaza, Alemayehu. (2017). Causes of delays on construction projects in Ethiopian Electric Utility Enterprise: the case of Universal Electric Access Program, MA Thesis, St Mary's university Addis Ababa Ethiopia

Meena V. & Babu Suresh K. (2015). Study on Time Delay Analysis for Construction Project Delay Analysis, International Journal of Engineering Research and Technology, Vol. 4, issue 03

Mfanimpela, Zacharia Mhlanga. (2015). Investigating causes of delays and cost escalation in project execution during Turnarounds, the degree of Master of Business Administration, Graduate School of Business & Leadership, College of Law and Management Studies

Mpofu, B., Ochieng, E. G., Moobela, C., & Pretorius, A. (2017). Profiling causative factors leading to construction project delays in the United Arab Emirates. Engineering, Construction and Architectural Management, 24(2), 346-376. Doi: 10.1108/ECAM-05-2015-0072

N.-J. Yau and J.-B. Yang. (2012). Factors Causing Design Schedule Delays in Turnkey Projects in Taiwan: An Empirical Study of Power Distribution Substation Projects, *Project Management Journal*, vol. 43, no. 3, pp. 50–61, Jun. 2012, doi: 10.1002/pmj.21265.

Nagaya, H., Imani, T., & Shirasaka, S. (2015). Socio-cultural enabler for agile project management. Paper presented at PMI® Global Congress 2015—EMEA, London, England. Newtown Square, PA: Project Management Institute.

Niemann, Jörg. (2009). Life Cycle Management in der Prozessleittechnik, In: atp Automatisierungstechnische Praxis. Oldenbourg Industrieverlag, Heft 4 (2009), 51. Jahrgang, 2009

Nundwe, Moses & Mulenga, Michael N. (2017). Delays in Construction of Electrical Power Transmission Lines in Zambia American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS) (2017) Volume 30, No 1, pp 82-96

Oyegoke, A. S., & Kiyumi, N. A. (2017). The causes, impacts and mitigations of delay in megaprojects in the Sultanate of Oman. Journal of Financial Management of Property and Construction, 22(3), 286-302. Doi: 10.1108/JFMPC-11-2016-0052

Pall Goutom K. (2021). Causes of Delays in Power Transmission Projects in Bangladesh (PhD Thesis, Queens Transmission projects University of Technology, Queens Transmission projects Australia

Pall Goutom K., Bridge Adrian J. Gray Jason and Skitmore Martin. (2020). Causes of Delay in Power Transmission Projects: An Empirical Study, *Energies* Volume 13, Issue 17

Pamarthi, Ganesh K. and Borra Tejaswini. (2015). Analysis and Rectification of Factors Contributing Delays in Construction of Power Projects International Journal of Scientific & Engineering Research, Volume 6, Issue 11,

Silas, H. Murithi. Makokha, Elizabeth N. Otieno, Calvin. (2017). Factors Affecting Timely Completion of Public Construction Projects in Trans-Nzoia County International Journal of Scientific and Research Publications, Volume 7, Issue 4

Stephanie. (2018). Beta Weight: Definition uses. Retrieved from http://www.statisticshowto.com/beta-weight/ Accessed on 02 may 2022

Tadesse, Tulu. (2017). Determinants of Project Implementation Delay: The Case of Selected Projects Financed By Development Bank of Ethiopia, St. Mary's University, School Of Graduate Studies

UKEssays. (2018). Sociocultural Issues in Project Management, Retrieved from https://www.ukessays.com/essays/management/sociocultural-issues-of-project-management-management-essay.php?vref=1

Stephen O. Ogunlana (2007) Critical COMs of success in large-scale construction projects: Evidence from Thailand construction industry International Journal of Project Management 26 (2008) 420–430

Wei Kang, Sik. (2010). Causes effects and methods of minimizing delays in construction projects BSC Thesis, Malaysia Technology University

Wudineh, Yemane. (2017). Critical Success Factors and Success Criteria of Construction Projects: the case of Ethiopian Electric Power, School of Commerce MA Degree in Project Management, AAU

Zelalem, Girma. (2020). Success, Gaps and Challenges of Power Sector Reform in Ethiopia, *American Journal of Modern Energy*, Volume 6, number 1 pp. 33-42

APPENDIX

Appendix I – Questionnaire

ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

(Questionnaire Filled by Project Actors)

Dear Respondent,

My name is Biniyam Zewdu, a post graduate student at St. Mary University. I am conducting an MA thesis titled "Cause of Delays in transmission projects in Ethiopian Electric Power; the case of the Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project." This questionnaire was prepared to gather the necessary data for the above mentioned research. Therefore I kindly request you to read carefully and answer all the questions as genuinely and truthfully as possible.

I would also like to inform you that the data gathered through this questionnaire will be used only for academic purposes and your responses will be kept confidential. Please not that your name will not be mentioned and thank you for your cooperation.

Best regards,

Biniyam Zewdu

Tel – +251911573025

Email – b4biniyam@gmail.com

Part I – Respondents' Demographic Information

Direction *- please insert (x) in the box for your appropriate answer your demographic or personal information,*

Gender:	Male	☐	Female	☐				
Age	Less than 30	☐	31 -46	☐	47-65	☐	Above 66	☐
Education Level	Below High school	☐	Diploma and Degree	☐	Masters	☐	Refused or Others	☐
Marital Status	Single	☐	Married	☐	Divorced	☐	Refused or Others	☐

Your experience in working with Projects

Less than one year	☐	About two or three years	☐	4 – 6 years	☐	Above 7	☐

Please indicate your experience with Transmission and Distribution Rehabilitation and Upgrading Project

Less than one year	☐	About two or three years	☐	4 – 6 years	☐	Above 7	☐

Others please indicate _____

For how many years have you practiced in the power industry?

Less than one year	☐	About two or three years	☐	4 – 6 years	☐	Above 7	☐

Part II – Causes of Transmission Project Delays

Direction *- please insert (x) in the box for your appropriate answer your demographic or personal information,*

Question 1 – How do you perceive and rate the following listed possible cause for transmission project delays in Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project? Please put "X" mark with the answer you choose and note that 1 represents for "Strongly Disagree"; 2 for "Disagree"; 3 for "Neutral"; 4 for "Agree" and 5 for "Strongly Agree".

Note – *AATDUP* *(Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project)*

	Measure Items	1	2	3	4	5
In initiation project life cycle phase, the most project delay is towards						
	Internal Causes					
DIPI1	Defect while creating the project charter is one of causes of delays in AATDUP					
DIPI2	Omission or error in estimate is one of the causes of delay in the AATDUP					
DIPI3	The failure to secure an adequate source of finance for the project is one of the causes of delay the AATDUP					
DIPI4	Problem in the feasibility of the project is one of the causes of delay in the AATDUP					
	External or Economic Causes					
DIPE1	Lack of foreign currency or high fluctuations are causes for project delays.					
DIPE2	Lack of skilled labor or workers are causes for project delays.					
DIPE3	Banking facility (loan and other issues) is causes for project delays.					
DIPE4	Lack of business infrastructures are causes for project delays.					
In planning and scheduling project life cycle phase, the most project delay is towards						
	Internal Causes					
DPSP 1	Improper planning and scheduling is one of the causes of delay in the AATDUP					
DPSP 2	Design problems that lead to wrong construction and rework are among the factors that caused delay in the AATDUP					
DPSP 3	Changes in key personnel responsible for the advance planning and execution is one of the factors that caused delay in the AATDUP					
DPSP 4	Poor and unorganized Procurement Practice in the client organization is one of the factors that caused delay in the AATDUP					
	External or Technology Causes					
DPSPE1	Unable to use internet technology due high internet price that					

	creates causes for project delays.					
DPSPE2	Intermittent of tasks due to slow-moving ICT facilities developments are causes for project delays.					
DPSPE3	Undeveloped digital knowledge is causes for project delays.					
DPSPE4	Ill-mannered Scheduling due to weak internet connection that's causes for project delays.					
In execution project life cycle phase, the most project delay is towards						
	Internal causes					
DEPI1	Lack of effective communication and coordination among the parties is another factor that caused delay in the AATDUP					
DEPI2	Late site handover to contractor is another factor that caused delay in the AATDUP					
DEPI3	Delay in progressive payments is one of the causes of delay in the AATDUP					
DEPI4	Delayed approval of major changes in the scope of work by consultant is another cause of delay in AATDUP					
	External (Scio-cultural)					
DEPE1	Work cultural difference in urban and rural is a factor that caused delay in the AATDUP					
DEPE2	Low level of workers; education is a factor that caused delay in projects.					
DEPE3	Traditional beliefs towards work is a factor that caused delay in the AATDUP					
DEPE4	Negative work place culture is a factor that caused delay in the AATDUP					
In Performance and Control project life cycle phase, the most project delay is towards						
	Internal causes					
DMCPI1	Hidden agenda of supervisors is one of the cause of delay in the AATDUP					
DMCPI2	Poor site management and supervision is one of the causes of delay in the AATDUP					
DMCPI3	Lack of quality and controlling standards in the power transmission sector in Ethiopia is a factor that caused delay in the AATDUP					
	External or Legal causes					
DMCPE1	Lack of law enforcement practices is a factor that caused delay in the AATDUP					
DMCPE1	Monopolized government projects is a factor that caused delay in the AATDUP					
DMCPE1	Lack of awareness about existing laws is a factor that caused delay in the AATDUP					
In Closure project life cycle phase, the most project delay is towards						
	Internal causes					
DCPI1	Releasing resources and completing the project is one of the					

	causes of delay in AATDUP					
DCPI2	Final Payment delay on the owner side is one of the cause of delay in the AATDUP					
DCPI3	Recording and archiving Project documents is one of the cause of delay in the AATDUP					
	External or Political causes					
DCPE1	Political instability is one of the cause of delay in the AATDUP					
DCPE2	Ever-changing government office or structure is one of the cause of delay in the AATDUP					
DCPE3	Corruption is one of the cause of delay in the AATDUP					
Main impacts of the delay in the AATDUP						
EPD1	Delay Claims frequently happen in transmission projects.					
EPD2	Activities abandonment frequently arises in transmission projects.					
EPD3	Delay penalty often ascends in transmission projects.					
EPD4	Litigation often ascends in transmission projects.					
EPD5	Disputes frequently arise in transmission projects.					
EPD6	Termination of contract often ascends					

Items	**Never**	**Seldom**	**Neutral**	**Sometimes**	**Always**
	1	**2**	**3**	**4**	**5**
Power Project Delay happened in Ethiopia					

Question 5 Please indicate the reason of transmission project delays.

_____

_____

_____

Question 6 Write ideas do you recommend for each of the five major phases of the project so that the problems in the power transmission projects and the power sector in Ethiopia be solved :

- At the project initiation phase _____
- At the planning and scheduling phase _____
- At the execution phase_____
- At the monitoring and control phase _____
- At the close out phase _____

Thank you!

Appendix II – Interview Checklist

I am Biniyam Zewdu, *a postgraduate student of St. Mary University. I am conducting an academic research regarding causes of transmission projects delays in Ethiopia.*

If you allow me, can I proceed? Thank you for your support and cooperation!

1. What are the major causes for transmission project delay in Ethiopia?

_____

_____

_____

2. What are the major causes for transmission project delay in Addis Ababa Transmission and Distribution Rehabilitation and Upgrading Project

_____

_____

_____

3. Write ideas do you recommend for each of the five major phases of the project so that the problems in the power transmission projects and the power sector in Ethiopia be solved :

- At the project initiation phase _____

  _____
- At the planning and scheduling phase _____

  _____
- At the execution phase_____

  _____
- At the monitoring and control phase _____

  _____
- At the close out phase _____

  _____

THANK YOU!