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School of Commerce

Department of Project Management

Factors That Affect Timely Completion of Construction Projects: In The Case of Ethiopian Electric Power Transmission and Substations Projects.

By

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STATEMENT OF DECLARATION

I, Dawit Gebregziaber, have carried out a research project on Factors That Affect Timely Completion of Construction Projects: In the Case of Ethiopian Electric Power Transmission and Substations Projects independently in partial fulfillment of the requirement for the award of master degree in project management with the guidance and assistance of the research advisor, Bantie Workie (PhD). I further announce that this research project is my original work, and that I have properly recognized all sources of materials used in the research project.

Declared By	Confirmed By
Name of student:	Advisor's Name:
Dawit G/Egziabher Signature :_____	Bantie Workie Signature :_____
Date:_____	Date:_____

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Acronyms

EEP	Ethiopian Electric Power
SPSS	Statistical Package for the Social Sciences
MoFED	Ministry of Economic Development

Abstract

The goal of this research was to determine the factors that trigger construction project delays in Ethiopian Electric Power (EEP). The study used a descriptive and explanatory research design to accomplish this purpose, with employees of the company serving as primary data sources. Questionnaires were used to obtain the requisite firsthand details. The survey was performed using the census process, with 77 workers from EPP's construction task force filling out questionnaires. 70 questionnaires were correctly filled and returned from the distributed questionnaires. The data was analyzed using quantitative descriptive and inferential statistical methods. To model the impact of resource allocation, project planning, project monitoring, and project leadership on project completion time, a multiple linear regression was used. The study shows only two variables, resource allocation and planning, have statistically significant effects on project completion time. Resource distribution was the most powerful indicator, followed by project planning. The study proposed that a systematic project planning practice be developed and used that can grasp the major tasks that must be accomplished. In addition, the study recommended that avenues be implemented to ensure that the correct amount and quality of materials are supplied for the projects.

***Keywords**; project, project planning, project resource allocation, project monitoring, project leadership*

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CHAPTER ONE

INTRODUCTION

This study tries to assess factors that affect timely completion of power transmission construction projects in the case study of Ethiopian Electric Power. In this chapter, background of the study, statement of the problem, research objectives and questions, significance and scope of the study are presented.

1.1 Background of the study

A construction project is commonly considered as successful if it is completed within the specified time, quality, and to the satisfaction of customers (Assaf and Al-Hejji, 2006). Contrary to this delay is a common phenomenon in most construction projects causing a negative impact on both the employer, the contractor and other stakeholders? (Abdul-Rahman 2006).

It is obvious that project delays would result in additional cost and consequently impact the quality of the project. However, the effects of delay is not limited on the project itself, but it also has an impact on the overall economy of the country and thus it seeks the focus in the attempt of the economic development of a country (Divya and Ramya, 2015).

The causes of delay can be divided in the following manner compensable delay (due to the employer), excusable delay (due to the employer), and excusable delay (by acts of the third party such as natural disaster). These delays may happen either together or separately affect the critical path of the project Menasi (2007)

Although delay common incident in worldwide projects it is much severe in developing countries. In case of Ethiopia from the government's capital budget 60% is allocated to construction industry which makes it the highest recipient of the budget as reported by Ministry of Economic Development (MoFED, 2016). However, one significant problem that impaired planned economic development of the country is significant delay of this public construction projects (ECIDP, 2014).

With this in mind, this study tries to explore factors that affect construction project time of completion in the country. The study focuses on power transmission projects that are the responsibilities of Ethiopian Electric Power (EEP). Ethiopian Electric Power (EEP) is a government-owned power company responsible for feasibility studies, design and survey of electricity generation, transmission and substation, leasing and selling electricity transmission lines, Ethiopian Electric Power (EEP) is a government-owned power company in charge of feasibility studies, design and survey of electric Power generation, high voltage transmission and substation, selling and leasing of transmission lines, and conducting universal electric access projects (EEP). ((EEP) Report, 2020).

Ethiopian Electric Power (EEP) has constructed more than 20,000 Km of High Voltage Power transmission lines and around 208 high voltage substation. Currently the company is trying to expand its PT network to improve electricity access (EEP Report, 2020)

1.2 Statement of the problem

According to (Nega, 2008). The critical success factor for successful completion of the project are time, cost and quality specifically in developing countries as public projects are realized with limited resource. However, most public construction projects suffer a huge schedule delay.

There are several variables which can influence project objectives differently. This include: the dynamic nature of the external environment, the frequent change in technology, organizational structure and size, complexity of the project, Project cost, organizational culture, people involved and strategy. To minimize the cost and time overrun of any project contingencies for both budgets and schedules plays a vital role in providing the project manager with the estimating caution they need. To significantly reduce and control the uncertainties in a project effective planning and allocating of these contingencies is important for any project manager. (PMI 2010).

In Ethiopia's construction practice, it is very rare that construction projects are completed on the time specified or agreed upon. Ismeal (1996) reported that delays are endemic to construction projects in Ethiopian. His study indicates, most of the projects experience delay from 100% to 460% of the original contract time.

Power is one of the key economic sectors and is the main force which facilitates the growth of the national economy in Ethiopia. Therefore, the government of the country has set out to expand

power transmission and make service delivery reliable and efficient. In 2016, the government has planned to increase electricity coverage in the country from 60% in 2014/15 to 90% in 2019/20. In addition, expansion of the transmission network from 16,018km (2014/15) to 21,728km (2019/20) is one of the prioritized targets of the government (GTPII, 2016). To achieve this objective EPP is undertaking several transmission projects. However, the projects suffer from a number of problems that impact cost, time, and quality performances. Project delays has a huge cost overrun in Ethiopian Electric Power according to the 2020 EEP Report the company has lost more than 120 billion Birr due to delay in projects out of which 24 billion Birr cost overrun is caused by delay in transmission and substation projects and more than 20% of the companies yearly budget is allocated for power transmission projects. By putting such facts in mind, the study makes an effort to describe the factors which are a foundation for Power Transmission project delays. In addition the study tries to fill the knowledge gap as most studies on construction project delays done in Ethiopia focus on road and housing projects.

1.3 Objectives of the Study

1.3.1 General objective

The primary aim of this research is to assess the factors that influence the timely completion of power transmission projects in Ethiopia.

1.3.2 Specific Objectives

The study had the following specific objectives;

1. To evaluate the effect of project planning to complete power transmission projects on schedule
2. To examine the effect of resource allocation to complete power transmission projects on schedule.
3. To assess the effect of project monitoring to complete power transmission projects on schedule
4. To find out the effect of project leadership to complete power transmission projects on schedule.

1.4 Basic Research Questions

1. What effect does project planning have on timely completion power transmission projects?
2. What effect does project resource allocation have on timely completion of power transmission projects?
3. What effect does project monitoring have on timely completion of power transmission projects?
4. What are the effects of project leadership on timely completion of power transmission projects?

1.5 Significance of the Study

There are several valuable benefits expected from this study. The significance of establishing the issues related to Power Transmission construction project delays provides a greater insight and understanding on the causes of delays particularly among the main project players: contractors, client and consultants.

This can be done by bringing theoretical ideas explored in a number of literatures to use in real-world construction projects. These results are hoped to direct efforts to improve the success of High Voltage Power Transmission construction projects and to be useful to project participants.

This study will also be important to the government in formulation of policies related to public projects and the way these policies are implemented. The findings of this study will provide useful guidelines for policies regarding public projects, which can minimizes project failures and reduces risks.

1.6 Scope of the Study

The study was limited only to Power Transmission Projects undertaken by Ethiopian Electric Power/EEP/. Power Transmission Projects undertaken by companies other than EEP and projects that are not active in the current fiscal year are not included in the study.

1.7 Organization of the Paper

The rest chapters of this paper organize in to four chapters.

The second Chapter of the paper discusses the relevant literatures from the point of view of academics in this field. Chapter three constitutes of the methodology employed in the study. It includes the research design, source of data, sample and sampling technique, data collection techniques and data analysis.

The fourth chapter of this work includes analysis, presentations and interpretations of collected data.

The final chapter, chapter five provides summary of major findings, the conclusion of the study and suggests possible recommendations.

Chapter Two

Literature Review

This chapter introduces the relevant literature on the study in order to gain a better understanding of the research topic and to briefly clarify some of the major areas of the subject matter at hand. The chapter begins by presenting concepts related with construction projects, time performance of projects, project delay, project planning, project monitoring and leadership. Related studies and their findings are presented in the second part of this chapter. The chapter also presents conceptual framework of the study.

2.1 Theoretical Review

2.1.1 Definition of Construction Projects

According to PMBOK, a project is a Temporary undertaking that seeks to generate a specific product, service, or outcome. Project have a fixed beginning and end. The end of a project is approached when the project's goals have been met, or when the project is canceled because its goal will not or cannot be achieved, or when the project's need no longer feasible or exists.

Temporary does not always indicate short term. Projects may be completed in a short period of time or take years. The fact that temporary does not generally refer to the product, service, or outcome provided by the project as most projects are conducted to generate long-term results (PMI, 2010).

As defined by Majid, (2006), construction projects are series of projects related to the construction field who have limited time dimension with specific allocation of resources, in order to realize an idea and a particular purpose, after the idea is feasible.

According to Majid, (2006), construction projects are a collection of projects in the construction sector that have a limited time span and resource allocation in order to realize an idea and a specific goal after the idea is feasible.

All construction project begins with planning, design and financing and continues until the structure is ready for use. Through its life time construction projects passes through a long and complex processes. Construction projects consists of many smaller projects activities which are sequential and linked to one another.

Series of activities consisting of planning, design phase, procurement phase, the execution phase, maintenance phase, and preparation for operation or use.

As explained by Ahmed et.al. (2003) construction project management is entirely different from managing other projects. The distinction largely lies on the nature and characteristics of construction projects. It is important to take these differences into account when in order to succeed in managing construction projects.

Construction projects are generally capital-intensive (requiring the investment of large sums of money), complex, and require extensive management skills, as well as the participation and coordination of a variety of experts from different fields. They are often labor-intensive, requiring a significant amount of materials and physical tools.

Furthermore several laws and regulations are applicable in construction industry which are intended to bind all parties involved and to protect public interest and ensure their safety and mitigate environmental impact (Bennett, 2003).

2.1.2 Construction Projects Performance

To complete projects within budget, in the specified period of time and with the agreed quality is the ultimate goal of any project. Enhancing the performance of a project increases the success rate of the project. Several researches has been conducted on the performance of construction projects. According to Dissanayaka and Kumaraswamy (1999) the choice of procurement system is the main contributing factor for the poor performance of the construction industry.

Theodore (2009) identified the key performance criteria of construction projects as financial situation, progress of work, quality level, health and safety, allocation of resources, relationship with clients, with consultants, management skills, disputes and claim, relationship with subcontractors, credibility and amount of subcontracting.

According to Chan and Kumaraswamy (2002), construction schedule (time) is becoming increasingly relevant as it is often used as a criterion for measuring a project's success and the productivity of the project organization.

2.1.3 Construction Project Time Performance

Completing projects on time with allocated budget and specified quality is the main objective of any project as the delay in project completion time will directly affect the cost of competing the construction project. Time is one of the top performance criteria for construction client.

Clients use construction time as the most important criteria to evaluate the performance of the contractors as it is a good and measurable indicator of project performance (Abubeker 2015)

According to Abubeker (2015), project time is defined as the time taken to complete the work from the time the commencement of the work until the work is finished. Project time performance is the most important indicator of project. Time overrun is a common scenario and is a serious issue in construction projects with just few projects are completed on time.

According to Ismail (2011), one of the most critical criteria for project success is on time completion of projects. Unfortunately, the construction industry has a reputation for poor performance with regard to time, which has culminated in the inability to meet specified deadlines. As a result, almost every projects suffer a significant amount of delay and additional cost. .

2.1.4 Construction Project Delay (Time Overrun)

Delay in construction refers to when the actual progress of a construction project's phases falls behind scheduled, or when the project deadline is not met (CIOB, 2008). The term "delay in the context of construction" refers to an extended period of construction and interruptions of events that cause the construction schedule to be disrupted. Delay is generally accepted as the most dangerous, expensive, common, and complex problems facing during project execution (Cheung et al., 2001).

Construction projects are infamous for their delays. What the experience of construction projects around the world could tell us is that delays happen in almost every project regularly (Ahmed et al., 2003).

According to (Majid, 2006) a project is delayed when it is specified completion time has not been met. The construction industry's biggest challenge, especially in developing countries, is project delays. Pourrostam et al. (2011). However project delays are not limited to developing economies; they are a global phenomenon (Memon et al., 2011).

When projects are delayed, according to Koushki (2005), they are either granted a time extension or the project activities are enhanced, resulting in additional costs. Despite the fact that all parties involved with the project agree on the increased expense and time associated with the delay, commonly contractors and clients disagree on whether a contractor has the right to demand extra costs.

According to Ochoa (2013), proper project scheduling with feasible and attainable time schedule will largely determine the success or failure of a project specifically for commercial construction projects. Delays in the construction schedule have a detrimental effect on both contractors and clients, forcing the client to incur or pay extra cost while still being unable to use or occupy their property for its intended purpose.

2.1.5 Classification of Project Delays

There are a range of factors that lead to construction project delays. Ahmed et al. (2003) classified delays into two categories: internal causes, which originate from the parties involved in a specific contract, and external causes, which stem from circumstances outside the parties' control. These include natural disasters, government decisions, and material supplies.

According to Scott (1993) delays are classified in to three categories delays caused by the employer, delays caused by the contractors and delays caused by external factors. Ahmed et al. (2003) and Ochoa (2013), on the other hand, categorized delay as concurrent, excusable, or non-excusable. Theodore (2009), has also classified delay in four parts Excusable or non-excusable and Critical or noncritical

Critical and Non-Critical Delays

According to (Theodore, 2009) Critical delays are those that impact the completion of the project or, in some cases, a milestone date. Noncritical delays are those that do not impact the project's completion or a milestone date. All projects have critical path and forecasting of this critical path is vital as delay in one of the activities in the critical path delays the completion of the entire project Trauner et al. (2009). In the opinion of the researcher these are the main factors to determine the completion date:- the contractor’s duration with respect to the critical path activities, the project, he physical constraints of the project, as well as the activity sequence and phasing

Excusable and Non-Excusable

A delay can be considered as excusable if it is caused by unexpected incidents outside the control of the contractor or subcontractor. Such delays can be compensable and under this circumstance the contractor is entitled to as for additional cost and time extension. If the delay is non compensable additional time can be granted additional time but not additional money as compensation. Excusable delays commonly referred as "Force measures" or "Acts of God" as it happen through the fault of any party involved. The client commonly gives time extension for such delays but not additional money (Alaghbari et al 2007).

Non-excusable delays are predictable and can be avoidable such delays are within the control of the contractor or subcontractor. According to Ahmed et al (2005) Non-excusable delays might be the outcome of wrong estimation of productivity, equipment or machinery failure, poor scheduling, error during construction, in appropriate staffing, or bad luck. Delays of this kind are naturally the contractors fault and no relief is allowed.

Concurrent Delays

According to levy (2006) concurrent delays to be an overlapping one. The author recognized that such delays are caused by either the clients or the contractor. Levy (2006) went on to claim that when these delays occur, both parties are held liable, and no party will recover damages. Concurrent delays consists of multiple independents causes that can happen simultaneously. Such delays sometimes can be a mixture of both excusable and non-excusable delays.

2.1.6 Effects of Project Delays (Time Overruns)

Delay in construction projects will always have a detrimental effect for all parties involved. According to Aibinu and Jagboro (2002) the six possible consequences of delay which are common to most countries are:- increase in project cost, time overrun, conflicts, arbitration and lawsuits, as well as complete project abandonment.

The following six impacts were identified in a study by Sambasivan and Soon (2007) on the effects of construction delays in the construction industry: absolute abandonment the project; arbitration; time overrun; additional cost; conflict between involved parties; litigation. Moreover Ahmed et al.

(2003) mentioned that delay in construction project could cause cash flow problem provocative relationship, mistrust, leaving the project, feeling of fear among parties and litigation.

Project delays has a huge cost overrun in Ethiopian Electric Power according to the 2020 EEP Report the company has lost more than 120 billion Birr due to delay in projects out of which 24 billion Birr cost overrun is caused by delay in transmission and substation projects.

2.1.7 Project Planning

Barbara (2004) delineates project planning as analyzing the detail activities of the project in advance and identifying what needs to be done, who will do the job, how much it will cost what kind of resource is required. He also stated that project planning includes identifying possible issues and risks and devising contingency plan. He further divided the project planning process into three stages: project analysis, comprehensive planning, and recording and communicating the plan.

Lester and Lester (2012) describes a project plan as a road map showing from the beginning to the end of the project. Project planning requires skill beyond preparing a document explaining about schedule and budget.

Complex projects a number of activities that exceeds a certain threshold level of magnitude require structured planning platform otherwise it is very difficult to understand and manage the project Formal planning is the foundation for coordinating project work and assigning tasks to each individuals involving in the project activity.

The project plan provides the most important tool for execution and completing a project successfully. Project planning is dynamic process and it will change over time depending on the actual scenario. It is the project manager's responsibility to prepare the project plan and updating it. It serves as the foundation for all project management efforts. Such a plan, should be as accurate and comprehensive as possible without being too lengthy. It's a document that allows the project manager to manage each activities and mile stones rather than being managed by them.

Good project planning is the foundation in determining the success of a project as it is directly related with the performance of the project. According to Faniran, Oluwoye and Lenard (1998) the

aim of project planning is to successfully complete a project that is with in specified period of time, estimated cost and as per the required quality.

Construction planning plays a vital role for successful completion of any project, planning identifies measurable task or activities with respect to time need to complete the task, estimated cost of the task it also shows how to execute to respected task. Moreover planning identifies the list of activities, how it is to be done, the timing of the activities to be done, the place to be done, the resources needed to do the task, assign responsible person and performance measurement (Chitkrara ,2001).

2.1.8 Project Resource Allocation

The term "resources" commonly refers to the manpower, equipment, and services that the project would need to run smoothly. Estimating activity resource requirements helps decide which resources and in what quantity, such as manpower, materials, and other resources, are required for each activity (PMI 2010).

Resource planning is nothing but estimating the material, human resource and equipment needed to perform a specific activity or task. As correct project estimation has a positive impact on project completion Wrong resource estimation is also thought to have a negative impact on project schedule as time estimation is heavily reliant on resource availability and accurate estimation. This consequently has an effect on project completion timelines. Estimation of resources needed has to be done properly and carefully as scarcity in resource will delay the project (Fortune & White, 2006).

Since there are limited resources, a combination of resource utilization for competitive advantage and cost minimization of resource requirements in projects with fixed completion times is needed. Traditional time-cost trade-off analysis, assumes that the time and cost of an option within an activity are deterministic Feng et al (2000). Contrary to this, in practice time and cost are both unpredictable. As a result, when assessing the time-cost trade-off issue, uncertainty should be taken into account when reducing project time or cost.

Piet Joubert (2010 cited in Yatich, 2016) describes Resources allocation is not an end by it selves it is a tool accomplish the project objectives. People with relevant skills and competencies are the most important resource. Finance, services, equipment, information, and knowledge are the other

major categories of resources. A proper needs analysis must be performed in order to determine the project priorities and objectives to achieve a cost-effective application of necessary resources. It is the Work Breakdown Structure (WBS) that shall be used as a source document to determine the need for resource. Once a criteria specification is completed, the project's baseline, which must be resourced, would be known. It is from the specification that the actual requirement of the project will be spell out.

According to PMI (2013) the following processes defines the resource requirement.

1. Plan Cost:- in this processes policies and procedures are developed to for planning, Managing and controlling project cost such policies and procedure will show guidance and direction on future cost management.
2. Budgeting:- is the processes of approving the estimated cost will be used to monitor and control the performance of the project.
3. Costs control:- The process of keeping track of the project's progress in order to update project costs and manage improvements to the cost baseline, as well as recognizing deviations from the schedule and taking corrective steps to reduce risk. Therefore to ensure a more reliable control system the estimation needs to be more accurate

Yatich (2016) describes resource accusation as another processes meaning the processes of physically obtaining the required inputs to perform an activity. The resources which may be need for any project includes those which are restricted on period by period bases such resources can be skilled man power, as well as those that are consumed and constrained over the project's lifetime, such as capital. The use of resource-constrained project scheduling with time-resource trade-offs approach is allowed to find different options to complete each job in the project during the planning stage. The project funding is a critical component of the acquisition process. In order to avoid uncertainties proper management of the accusation of resources is very important the risks of the accusation process than needs to be addressed includes seasonal Shortage labor disputes or leaving of skilling manpower, equipment breakdown competing demands the need for the same resource in different projects, delayed delivery of materials or equipment and other issues that could affect the project. Sometimes it may be necessary to update to incorporate the problem of the supply of resources. Resource leveling can be used to ensure that the demand and supply of

resources are inline. Any change in task which is in the critical path will affect the completion period of the entire project.

2.1.8 Project Monitoring

Project monitoring is important for proper management and decision making as it systematically collects and analyzes data on a regular basis to track the progress of a project program's and measures the execution against pre-determined goals and objectives. (MoFED, 2008).

World Bank (2011) added that it is “a continuing function that uses systematic collection of data on specified indicators such as schedule, cost and quality to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.’’

Monitoring entails the continuous gathering of data that is used to tracks progress against pre-set project goals and helps to clarify how the intervention is performing over time. Monitoring is internal to the organization it involves the creation of bench marks of success and it is integrated to the day-to-day activities of the project the results of the monitoring activity shall pass to management for decision making.

The key objective of monitoring is to be able to spot issues at the prior stage, when the possibility to make changes in order to enhance the success of the project is available. Monitoring also includes aspects of transparency and accountability, as it verifies that projects adhere to agreements and project schedules International Union for Conservation of Nature [IUCN] (2005),

It is the project manager responsibility to track the project against schedule on a regular basis. This helps to ensure whether the project is progressing as per the baseline schedule or not and to early identify and solve problems. Updating of the Gant Chart and Schedule network is relevant for the project follow-up.

According to (Yang et al 2010) Performance measurement is critical in project management and it is the basic requirement for tracking the progress of the project against time, cost and quality. Narbaev (2013) observes that the main objectives of construction project management is to complete the project on schedule, within the approved budget and as per the agreed quality. He argues that effective Performance Monitoring together with extreme effort of project management

plays a vital role to achieve those objectives. Perfect Plan without continuous and timely follow-up it is difficult to know the progress and effectiveness of the project.

According to (Narbaev 2013) If past success is expected to continue or if there are no improvements in project management, project Monitoring helps you to assess what happened and predict what could happen in the future. Project Mentoring tracks actual executed work against the baseline and make the necessary preventive and corrective actions. The sooner the actions the lesser the damage it will cause as late decision will result in additional cost or and time overrun.

2.1.9 Project Leadership

According to Müller and Turner (2010) in project Management the two critical success factors are leadership competency profiles and stakeholder management.

Berg, M.E. and Karlsen, J.T. (2014) suggested the role of project manager to influence and motivate their team members to improve the success of the project. The bases for their argument is positive psychology theory that is an optimistic human vision. To achieve positive outcomes, they cited the use of signature power, positive meaning, positive feelings, and positive relationships. By shaping his or her employees' thinking, context, and self-talk, the project manager guides and affects them. It is necessary to create a culture in which everybody uses their skills and resources to optimize project success rather than seeking to further their own interests in the process. This can be done by encouraging appealing project visions, objectives and milestones.

Ballard et al (2014) found that using an adaptive management approach would lead to better results. They discovered that project execution is built on a framework of aligned governance and an adopted contract strategy. A successful project requires good communication both within the project, among partners, and with external stakeholders. The local community and the national government are examples of external stakeholders. Stakeholder meetings and group forums build consensus and ensure engagement and approval from local policy makers. Moreover, properly developed governance and procedures tested projects tools and risk management are critical for completing project tasks successfully.

According to Lundy and Morin (2013), many scholars have considered leadership skills to be central to project success, he adds that that effective change is 70% to 90% leadership and only

10% to 30% management. Leadership is one of 46 competencies as identified by the International Project Management Association (IPMA) and can be seen as critical to project managers' success.

Nixon et al (2012), suggested that it is important to recognize the distinctions between project management and project leadership, in order to clearly understand the impact of leadership performance on the success or failure of a project. He also further explained that Project management is described as the preparation and organization of project activities through decision-making processes that enhance a project's productivity and effectiveness.

Leadership, on the other hand, entails motivating and guiding others to achieve project objectives, as well as motivating and guiding individuals to recognize their full potential and achieve more difficult and demanding organizational goals. Effective leadership persuades people that progress is necessary, stimulates new ways of thinking and problem solving, and then inspires people to collaborate in order to complete the project's objectives in challenging work environment.

2.1.10 Timely project Completion

Timely project completion is the projected completion time as in the contract for the construction of the project. Construction time has always been used as a benchmark for assessing the performance of a project and the efficiency of the implementing organization. It is very important to the stakeholders especially the users because they are waiting to use the product as soon as possible. Timely completion therefore as observed earlier in this study is a success factor. Project success is a term that has elicited enormous research with differing views on various aspects of it. Its definition has changed over the years for instance in the 1960s, project success was measured in technical terms. However later, project success was stated in terms of meeting the following objectives: completed within planned time, planned budget and the required quality level (Kerzner 1998).

According to Gwaya (2014) all the three objectives are internal to the project and do not necessarily indicate the preference of the client. After the TQM, a project was considered to be a success by not only meeting the above three objectives but also making sure that the project is accepted by the client. For a project to be said to be a success therefore, it needs to be completed on a schedule that is satisfactory to the client.

According to Conchuir (2011) there are six key time management processes, five of which are in the planning process group and one in the monitoring and controlling (PMI 2010).The first process is to identify each activity that has to be carried out, then base the time estimates on these components of work. This helps to communicate with the stakeholders objectively, to ensure that all activities are included and to bring understanding of what has to be done. Once the activities have been defined, the next step is to define their order. This uses the complete list of activities together with enough detail about each to work out relationships between them. Sequencing process sorts the various activities into the order in which they will be implemented (PMI, 2010; Conchuir, 2011).

Failure to follow the sequence may be too costly. The major tools and techniques used at this level are the schedule network diagrams like the CPM diagrams. The next step is to estimate the work periods which will be needed to complete individual tasks or activities (PMI, 2010). The Project Management Institute states several inputs for this process with expert judgment as one of the key tools and techniques. The fourth step is to determine which resources in terms of labor, equipment; facilities etc are needed for each activity (PMI, 2010; Conchuir 2011).

These estimates have to be as accurate as possible. This process uses various tools and techniques according to the Project Management Institute that includes bottom-up estimating and use of the project management software. Once all the activity durations and their sequence have been determined they are used to create the project schedule (order) (PMI, 2010, Conchuir, 2011).

2.2 Empirical Review

Studies conducted in relation to construction project time performance in different countries of the world are examined in this part.

Aftab (2014) investigated the causes of construction time overruns in Malaysia and came to the conclusion that there are many major factors that contribute to construction time overruns. Accordingly, contractors' inadequate planning and scheduling was a major cause of time overruns.

According to a study conducted by Koushki (2005) on Cost increases and Delays in the construction of private residential projects in Kuwait He identified that the main causes of cost and

time overrun are change orders originated from both the client and the contractor, poor client's financial conditions, lack of owners experience.

In their study on factors influencing the success of construction projects in the Gaza Strip, Enshassi et al. (2009) discovered that the most significant factors agreed by the client, consultants, and contractors were: average delay due to closure and materials shortage, availability of resources as expected during the project period, project manager leadership skills, material escalation, availability of skilled personnel, quality of equipment and raw materials in project.

According to Wambugu (2013), project planning impacted the completion time of the Kenyan rural electrification projects, and project planning's 15 qualities and significance had been considered a major cornerstone of a successful project. Hamilton and Gibson (1996) in their Journal of Management in Engineering; Benchmarking pre project planning effort found that the probability of meeting cost and schedule related objectives is enhanced by enhancing pre-project planning. In a study of program management in the construction industry, Shehu and Akintoye (2009) discovered that successful planning was the number one critical success factor listed. Of all the Critical Success Factors (CSF) analyzed, proper planning had the highest criticality index of.870. Correspondingly, Ngoc Se (2010) stated that a well-defined project plan allows a project to be completed on time, on budget, and with the desired quality.

Iyagba, Odusami and Omirin, (2003) did a research on the relationship between project leadership, team composition and construction project performance in Nigeria. The tests of the hypotheses led to the conclusion that there was significant relationship between the project leader's professional qualification, his leadership style, team composition and overall project performance.

According to Wambugu (2013) poor supervision and inspection would lead to rework which consequently lead to delay in meeting the schedule. This also leads to additional cost on project and may finally lead to project abandonment. The effect of management and supervision on the overall progress of the construction project was clearly highlighted in the report. Workers will want to take breaks whenever they want if there is no adequate supervision, and work will tend to be delayed. On time inspection is crucial as it proves the quality of the work, the material and the effectiveness of the operation and helps to easily understand and follow the timely progress of the

work. Proper inspection in the preceding activity may be a condition to start the subsequent activity therefore as a result of poor inspection the succeeding activities on a construction schedule may not be accompalished.

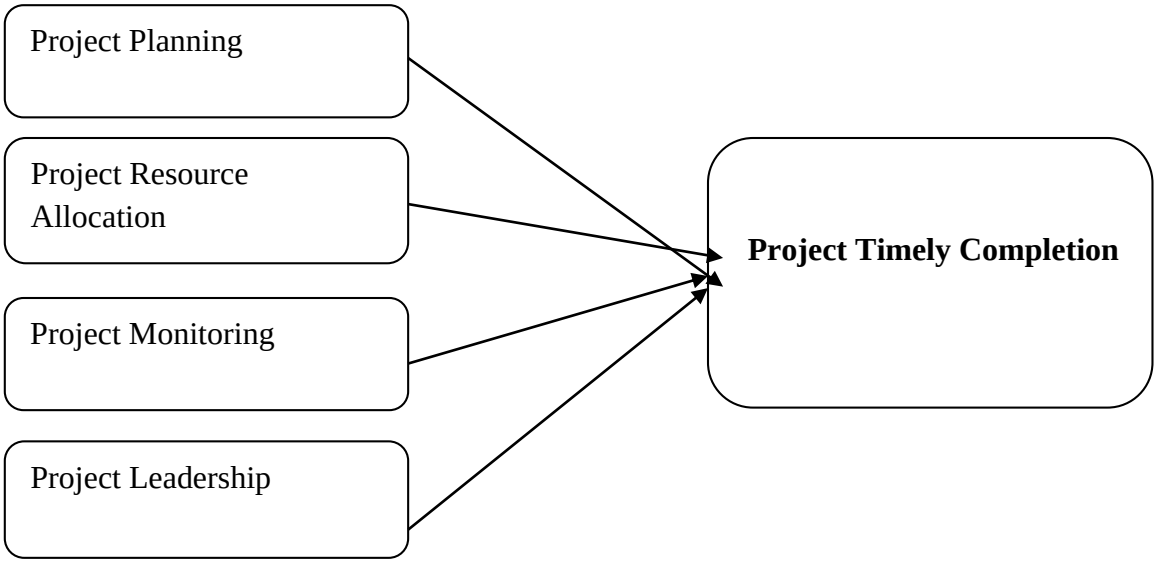
When it comes to studies made about Ethiopia, According to Ashenafi Kiros (2006), during the execution phase of the project, numerous unforeseen problems and adjustments from the initial design occur, resulting in cost and time performance issues. Weak site management, unforeseen ground conditions, and slow decision-making by all project teams are found to be the three most important factors causing delays and cost issues.

Furthermore, Abdo (2006 cited Shewaferahu Tilahun 2016) made a survey on delays in public building construction projects in Ethiopia. The result of the research indicated that 94% of the 52 surveyed public building projects undertaken by local Contractors between the years 1995 to 2005 have encountered delays. Moreover, the time extension ranges from 10% to 367% and the Average delay is found to be 89.9%. Among the most frequent causes of delay mentioned in the study include scarcity of materials, late material supply and less emphasis to planning.

2.3 Conceptual Framework

Based on the related literature review and the points with regard to each element and their role on the timely completion of projects, the conceptual framework is developed. The framework shows the variables of the study which include Project planning, project resource allocations, project monitoring and project leadership, as the independent variable that affect the timely completion of a project (dependent variable). The study's conceptual framework is based on the results of numerous scholars. (Chan and Kumaraswamy 2002; Wambugu, 2013; Theodore, 2009).

Figure 2.1: Conceptual framework



Source; (Chan and Kumaraswamy 1997; Wambugu, 2013; Theodore, 2009; Dainty et al, 2003).

Chapter Three

Research Methodology

This chapter briefly outlines the methodology followed in the course of the study. Design of the research, sources of data, data collection techniques, population of the study, sampling technique and sample size are highlighted in this chapter.

3.1 Research Design

This research used descriptive and explanatory research design. Descriptive research was employed as a main research method of this study and is going to be used to describe resource allocation, project planning, project leadership and monitoring together with their role on timely completion of projects. As described by Suryabrata, (2003) descriptive method is a method that describes the study systematically, factually and accurately utilizing facts and behaviors.

The research also used explanatory research design as it explains the relationship between resource allocation, project planning, project leadership and monitoring with timely completion of power transmission projects. Thus, to examine the relationship between timely completion of power transmission projects and each of the four mentioned elements, the study used pearson's's Correlation analysis.

3.2 Research Approach

There are two basic approaches to research, quantitative approach and qualitative approach. In order to investigate the problems, this study used a quantitative analysis design. Quantitative approach involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion. This usually means survey research where a sample of population is studied (questioned or observed) to determine its characteristics, and it is then inferred that the population has the same characteristics (Kothari, 2004).

Consequently, the study in hand requires analyzing the relationship between variables and testing using statistical procedures. Due to this nature of the study the quantitative research approach was adopted.

The strengths of the quantitative methodology are- it follow scientific approach; bias from the researcher's influence is less; it can employee large sample size; it can test the validity and

reliability of the instrument. So, the results can be believed and generalized for larger population. This study employed a quantitative approach to analyze quantitative data gathered from systematic questioners used to perform the analysis.

3.3 Target Population

According to EPP report (2020) there are 17 power transmission and sub-station projects which are actively running. EEP as the client of the projects has a project management unit assigned for each project. The project management unit of each project consist project managers, site managers, electro-mechanical and civil engineers together with other members who are working on the projects. So, the study targets EEP's project management unit members of the currently active power transmission projects.

Table 3.1; Target Population

No	Name of Power Transmission Project (PTP)	No. of Project Management Team Members
1.	Ethio-Kenya Power System Inter-Connection Project	12
2.	Beles PTP	9
3.	Semera-Afdera PTP	10
4.	Mekele–Daloel PTP	9
5.	Akaki-Koyae-Kilinto-BoleLemi PTP	11
6.	Akaki-Dukem- Debrezeit- Modjo- Ginchi PTP	11
7.	Azezo_Chilga-Fincha-Shanbu-Metu-Mash PTP	9
8.	Dejen-DebreMarkos-Desse_Hormat PTP	10
9.	Adama II PTP	11
10.	Awash-Weldiya PTP	12

11.	Bahirdar-Weldiya-Kombolcha PTP	8
12.	Genale Dawa III-Yirgalem-Wolayita Sodo PTP	10
13.	Gimbi-Tulu-Kapi PTP	9
14.	GibeIII PTP	13
15.	Southern District Transmission and Substation Rehabilitation Project	11
16.	Addis Ababa Transmission and substation Rehabilitation and Upgrading Project	12
17.	Head Office Substation Project	10
Total		177

Source; EPP Report

3.4 Sample Procedure and Sample Size

From the power transmission projects that were the target population, the research purposively selects seven power transmission projects and takes all project management unit members as a sample for the study. The study selects the seven projects because of their convenience to the researcher.

Table 3.2; Sample Size

No.	Project Name	No. of Project Team Members
1	Akaki-Koyae-Kilinto-BoleLemi PTP	11
2	Akaki-Dukem- Debrezeit- Modjo- Ginchi PTP	11
3	Adama II PTP	11

4	Awash-Weldiya PTP	12
5	Azezo_Chilga-Fincha-Shanbu-Metu-Mash PTP	9
6	Addis Ababa Transmission and Substation Rehabilitation and Upgrading Project	12
7	Head Office Substation Project	10
Total		77

According to table 3.2 above, the sample size of the study is the77 EEP power transmission taskforce who are currently working as Project Management Unit team members in the selected transmission projects. These include project managers, site managers, electro-mechanical and civil engineers who are working on the projects.

3.5 Source of Data and Data Collection Instruments

The research used primary data collection instruments to collect data from the sources. The primary data was obtained using structured questionnaires that were distributed to employees of the project both in head office and project site office.

The questionnaire's items were taken from previous studies. The adopted objects were slightly changed to suit the study's context. The questionnaire used in this study is divided into two parts. The first segment is intended to gather demographic data from each respondent. The second section includes data for assessing variables, which is structured on a five-point Likert scale ranging from "strongly disagree" to "strongly agree."

3.5 Data Analysis Method

The data from respondents was analyzed using the SPSS version 23.0 software tool, which was used to analyze the data collected via questionnaire. The research uses tables to present data gathered from primary sources, which are demonstrated in the form of mean and standard deviation. The research employs descriptive statistics and Pearson's Correlation coefficient to analyze the relationship between project timely completion and each of the four variables. Aside

from that, the analysis employs multiple regression to assess the effect of independent variables on dependent variables.

3.6 Reliability

The reliability of instruments measures the consistency of instruments. Creswell (2003) considers the reliability of the instruments as the degree of consistency that the instruments or procedure demonstrates. The reliability of a standardized test is usually expressed as a correlation coefficient, which measures the strength of association between variables.

The researcher conducted reliability test before proceeding to the main study. The important of the reliability test was to determine probable weaknesses in the research instrument so that measures of minimizing the identified errors could be affected. To test the reliability of the scales Cronbach's alpha was used.

Table 3.1; Reliability Test Statistics

Variables	**No of Items**	**Cronbach's Alpha result**
Resource Allocation	7	0.741
Project planning	8	0.861
Project Monitoring	6	0.774
Project Leadership	5	0.773

Source; own survey & SPSS output (2020)

Different authors accept different values of this test in order to achieve internal reliability, but the most commonly accepted value is 0.70 since it had to be equal to or higher than to attain internal reliability (Hair et al., 2003). Table 3.1 above, depicts that the values of Cronbach's Alpha for each field of the questionnaire. As it is shown in the Table, for each field Cronbach's Alpha value is in the range between 0.741-0.861. This range is regarded as high; the outcome confirms the reliability of each field of the questionnaire.

Chapter Four

Data Presentation, Interpretation and Discussions of Results

The main goal of this study is to evaluate the factors affecting the completion time of power transmission projects in Ethiopia. The data was collected through questionnaires from EEP power transmission taskforce employees who are currently working as Project Management Unit team members. The respondents' collected data was analyzed using proper statistical tools. The data presentation and discussion are presented in this chapter.

4.2 Demographic Characteristics of Respondents and Response rate

4.2.1 Response rate

As described in the previous chapter the study used a sample size of 77 Ethiopian Electric Power(EEP) employees, Thus, out of the seventy-seven questionnaires were distributed to employees of Ethiopian Electric power 70 questionnaires were correctly filled out and returned, resulting in a response rate of 91%. This response rate was high enough for the study's conclusions to be drawn.

4.2.2 Demographic Characteristics of the Respondents

The demographic information of respondents is provided in the following section. Sex, age, and work experience of respondents are among them. Respondents were asked questions about their demographic profiles in order to collect information on these topics, and their answers are presented below.

Table 4.1 below displays the general characteristics of the respondents. Accordingly, 84.3 percent of the respondents were male, while 15.7 percent were female, as shown in table 4.1 below. According to the result the majority of EEP power transmission taskforce employees are male. The respondents were also asked to state their highest level of education. According to the results, 2.9 percent of respondents stated their highest level of education as a diploma, 84.3 percent stated their highest level as a bachelor's degree, and the remaining 12.9 percent stated their highest level of education as a master's degree. According to the findings the majority of the respondents in the sample had a bachelor's degree. This finding indicates that the majority of EEP's power transmission project taskforce employees (97 percent) have a bachelor's degree or higher. This

result shows that the respondents are academically qualified to comprehend and react to the survey items.

Table 4.1; Demographic Characteristics of the target respondent

	Frequency(n)	**Percentage (%)**
Gender		
Male	59	84.3
Female	11	15.7
Total	**70**	**100.0**
Level of education		
TVET certificate	-	-
Diploma	2	2.9
Bachelor's Degree	59	84.3
Master's Degree	9	12.9
Total	**70**	**100.0**
Work Experience in the Organization		
Below 3 years	-	-
3 to 5 years	2	2.9
6 to 10 years	59	84.3
11 to 20 years	9	12.9
Total	70	100.0
Total number of projects Involvement		
None	-	-
1- 3	19	27.1
4 to 6	34	48.6
Above 7	17	24.3
Total	**70**	**100.0**

Source: Own survey (2021)

In addition, as shown in table 4.1, respondents were asked to state the number of years they had worked in EEP. According to their responses, 2.9 percent of respondents had work experience ranging from 3 to 5 years, 84.3 percent of respondents had worked for a period ranging from 6 to 10 years, and 12.9 percent of respondents had worked for a period ranging from 11 to 20 years. This implies that most of the employees (96.2%) have above 5 years of experiences accumulated in the organization. Moreover, as shown in table 4.1 above, all respondents have an experience

working in projects. This in turn can add recognized value for this study, as the respondents have the experience to give their perspective on project related area.

4.2 Results and Findings of the Study

This study has appraised the role of project resource allocation, project planning, and project monitoring and project leadership on timely completion of power transmission projects in the case of Ethiopian Electric Power (EEP). A Likert scale questionnaire was used to assess the respondents' attitudes toward the variables. Descriptive statistics, inferential statistics, and multiple regressions were used to evaluate the results. The study's results and conclusions are summarized in this section of Chapter 4.

4.2.1 Descriptive Analysis

The respondents were asked to rate their response on each statement proposed on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree). Inline to this, the data was first descriptively analyzed using mean and standard deviation (SD). The neutral (average) value of 3 was used to test the mean value results from the Likert scale tests. An output of more than 3 indicates a high, while an output of less than 3 indicates a low.

As presented in table 4.2 below, the first statement sought to establish the degree to which respondents agreed to existence of skillful workers to carry out power transmission project related tasks at the organizations. About 20.1% of the respondents strongly disagreed or disagreed, 37.1% of the respondents felt neutral and 42.9% of the respondents agreed or strongly agreed. This shows that most respondents agreed that skillful workers are available to carry out power transmission project related tasks at the organizations.

In the remaining items in table 4.2 below most respondents felt neutral about the statements related to resource allocation at the organization. In general, as could be observed in table 4.2 below, the overall mean of the set of items was 3.15. This implies that employees' opinion about power transmission project resource allocation at EEP is close to neutral. The overall standard deviation for all the items was less than 1.00, suggesting that the respondent's perception were identical.

Table 4.2; Respondents opinion about of Project Resource Allocation

	Percent (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Skillful workers are available to carry out power transmission project related tasks	1.5	18.6	37.1	38.6	4.3
There is proper Quality control of materials needed for power transmission projects	-	20.0	40.0	37.1	2.9
There is sufficient supply of materials needed for power transmission projects		10.0	51.4	32.9	5.7
Financial resources needed for power transmission projects are provided without delay	1.3	34.3	38.6	22.9	3.0
There is sufficient Numbers of equipment needed for power transmission projects	1.4	21.4	48.6	25.7	2.9
Sufficient time is given for transmission project design and quantity preparation/ development	1.6	17.1	50.0	31.4	-
Item Mean	**3.15**				
Item S.D	**0.801**				

Source: Own survey & SPSS output (2021)

The study also sought to establish the view of the respondents regarding the project planning practice of power transmission projects at EEP. To do so the study asked respondents questions related with project planning practice. The results are presented in table 4.3 below.

Table 4.3; Respondents opinion about of Project Planning

	Percent (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Project Management Plan (for power transmission projects) is developed during the planning phase.	2.7	21.6	48.6	27.1	
Key stakeholders are actively involved in planning stage.	1.4	27.1	38.6	31.4	1.4
Top level management actively is involved during transmission project planning	1.4	18.6	58.6	21.4	
The project scope is well defined in the planning phase		17.1	62.9	20.0	-
Project activity schedule of power transmission projects are determined in the planning phase.	1.9	18.1	48.6	30.0	1.4
Project planning activities are completed prior to project execution	1.6	17.1	50.0	31.4	-
Project cost is well estimated in the planning phase	1.6	17.1	50.0	31.4	-
There is strong integration between project planning department and construction supervision unite in power transmission projects	1.4	22.9	45.7	25.7	4.3
Item Mean	**3.02**				
Item S.D	**.721**				

Source: Own survey & SPSS output (2021)

Table 4.3 above shows opinions of employees about the project planning aspects at EPP. As presented in the above table, most respondents felt neutral about all the statements related to project planning at the organization. The average mean score of the above statements was 3.02. This result

reflects employees feel neutral towards the over all aspects of power transmission project planning at EPP. Furthermore, items the standard deviation of the above items was less than one. This shows responses gathered from respondents were similar.

The study also sought to establish the view of the respondents regarding the project monitoring practice of power transmission projects at EEP. To do so the study asked respondents questions related with project monitoring practice. The results are presented in table 4.4 below.

Table 4.4; Respondents opinion about of Project Monitoring

	Percent (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Progress of transmission projects are monitored comparing the planned activities with actual accomplishment	2.9	24.3	52.9	20.0	
Financial performance of the projects monitored comparing the planned budget with actual expenditure.	2.9	22.9	54.3	20.0	-
The organization have a written Monitoring and Evaluation plan that guide power transmission projects execution	1.4	28.6	51.4	17.1	1.4
Evaluation plan that guide power transmission projects execution.	2.9	35.7	48.6	12.9	-
The organization regularly analyzes monitoring reports of its projects in order to assess achievements and challenges.		44.3	40.0	15.7	-
The organization monitors how project resources of the organization like equipment are effectively employed to the project.	7.1	51.4	31.4	10.0	-
Quality activities are monitored and results are recorded to assess performance and to recommend necessary changes	5.7	18.6	45.7	27.1	2.9
Item Mean	**2.80**				
Item S.D	**.803**				

Source: Own survey & SPSS output (2021)

As presented in table 4.4 above, the first item presented to the respondents was about the presence of projects monitoring practices that compare planned activities with actual accomplishment. Most respondents felt neutral about this statement (52.9%). Similarly, most of respondents also felt neutral that financial performance of the projects are monitored comparing the planned budget with actual expenditure (54.3%); the organization have a written monitoring and evaluation plan that guide project execution (51.3%) and Quality activities are monitored and results are recorded to assess performance and to recommend necessary changes (45.7%).

In contrast, most respondents disagreed (in Cumulative term) regarding; the organization regularly analyzes monitoring reports of its projects in order to assess achievements (44.3%) and the organization monitors how project resources of the organization like equipment are effectively employed to the project (51.4%). In addition, the overall mean of the above set of items was 2.80. This result indicates project monitoring practice of power transmission projects at EPP is below average. The standard deviation of the responses above was less than 1.00, suggesting that the respondents' perceptions were similar.

Table 4.5; Respondents opinion about of Project Leadership

	Percent (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Project team leaders have a good working relationship with others	1.4	31.4	31.4	28.6	7.1
Project Team leaders have motivating skills of the project staffs	2.9	27.1	24.3	45.7	--
Project team leaders have sufficient experience	-	28.6	20.0	45.7	5.7
Project managers of have sufficient knowledge & skill in modern project management for effective implementation of Power transmission projects	1.4	21.4	48.6	25.7	2.9
Project Managers/Team leaders are often capable of managing projects	1.4	17.1	50.0	31.4	-
Item Mean	**3.14**				
Item S.D	**.803**				

Source: Own survey & SPSS output (2021)

Employee views on project leadership aspects of power transmission projects at EPP are shown in Table 4.5 above. As indicated in table 4.5 above the overall mean for the statements which ask about different aspects of project leadership, was 3.14. This result reflects employees feel neutral towards the over all aspects of project leadership of power transmission projects at EPP. As indicated in the above table 4.5 the standard deviation of the responses is less than 1.00, suggesting that the respondents' perceptions of project leadership at EPP is identical or similar.

4.2.2 Correlation Analysis

Correlations are used to evaluate the path and relationship between two variables. A correlation coefficient of +1 describes a perfect positive relationship in which every change of +1 in one variable is correlated with a change of +1 in the other variable.

A correlation of -1 refers to a perfect negative relationship in which every change of -1 in one variable is related to a change of -1 in the other variable. A correlation of 0 denotes a condition in which a change in one variable is unrelated to any change in the other variable. The results of the analysis between the four independent variables (project resource allocation, project preparation, project monitoring, and project leadership) and project completion timeliness are presented in this section.

Accordingly, in order to determine the relationship the four independent variables (project resource allocation, project planning, and project monitoring and project leadership) and timely completion of projects, Pearson's Correlation coefficient was used. The results of the correlation study using the correlation data analysis method are shown in Table 4.6. The Field (2005) guidelines are used to interpret the intensity of relationships between variables. His classification of the correlation coefficient (rho) is as follows: a weak correlation exists if rho is between 0.1 and 0.29, a moderate correlation exists if rho is between 0.3 and 0.49, and a strong correlation exists if rho is greater than 0.5.

Table 4.6; Pearson's rho correlation coefficient

		TIMELY COMPLETION
RESOURCE ALLOCATION	Pearson Correlation	.718**
	Sig. (2-tailed)	.000
	N	70
PROJECT PLANNING	Pearson Correlation	.757**
	Sig. (2-tailed)	.000
	N	70
PROJECT MONITORING	Pearson Correlation	.608**
	Sig. (2-tailed)	.000
	N	70
PROJECT LEADERSHIP	Pearson Correlation	.700**
	Sig. (2-tailed)	.000
	N	70
**. Correlation is significant at the 0.01 level (2-tailed).		

Source: Own survey & SPSS output (2021)

To evaluate the relationship between variables (independent and dependent variables), the Pearson Product-Moment Correlation Coefficient was used As can be seen from the above table, project planning formed the highest Pearson Correlation value of r = 0 .743, indicating that project planning has positive, strong and significant correlation with marked relationship toward the timely completion of power transmission projects followed by Resource allocation (r = 0. 718) also interpreted to have positive and high correlation with marked relationship toward the timely completion of power transmission projects. Project leadership has a correlation value of r = 700 and Project monitoring has a correlation value of r = 608, both depicting a positive, strong and significant association with timely completion of power transmission projects. Moreover, the result

the above table indicates that independent variables are statically significant with the p-value of 0.000 at 0.01 (2-tailed) significant levels. This implies there is significant association between the four independent variables (project resource allocation, project planning, project monitoring and project leadership) and timely completion of power transmission projects.

4.2.3 Regression Analysis

The output produced by regression analysis contains a great deal of useful information. The first information displayed is a count of the observations included in this analysis. The number of observations "used" in calculating the coefficients is included because missing values for either the dependent or independent variables are excluded from the analysis. Next is an "Analysis of Variance", including degrees of freedom, sum of squares, and the f value ("Pr> F" shows the probability that all coefficients of the independent variables are equal to zero). Also of interest in this section is the R-square and adjusted R-square values. These values represent the percentage of variation that is being captured by the regression model. Finally, the parameter estimates are presented. Along with an estimate of the value, t values are included to test significance ("Pr> |t|" is the probability that a given coefficient is not statistically significant). This section deals with the multicollinearity test, regression assessment of the effect of the four independent variables (project resource allocation, project planning, project monitoring and project leadership) on timely completion of projects.

Linearity Test

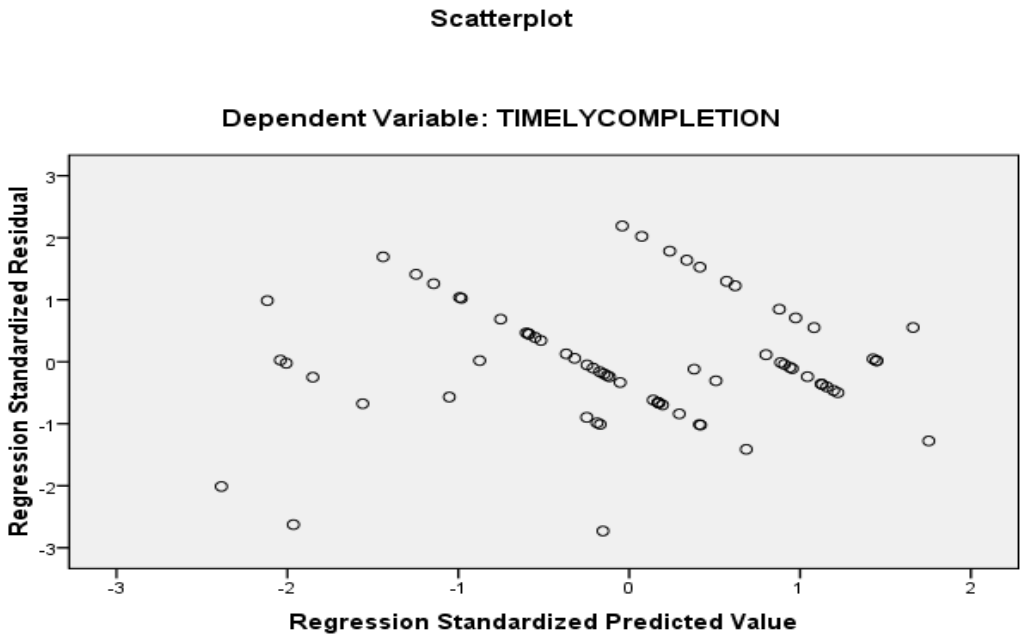
Relationships between variables are considered linear when they are consistent and directly proportional to each other. Violations of this assumption may result in the estimates obtained from the analysis, such as R2, regression coefficients, standard errors, and statistical significance, being biased; therefore, not portraying the accurate or true population values (Tabachnick & Fidell, 2006).

The results from the analysis will underestimate the true relationship between the independent variables (predictor variables) and dependent variable if the relationship is not linear. The linearity assumption can be tested through the visual examination of residual plots (Stevens, 2009).

A residual scatter plot is a figure that depicts one axis for the standardized residuals and the other axis for the predicted values. If the linearity assumption is met, the standardized residuals will scatter randomly around a horizontal line which represents the standardized residuals equaling

zero (Stevens, 2009).As can be seen from the figure 4.1 the data in this research met linearity assumption.

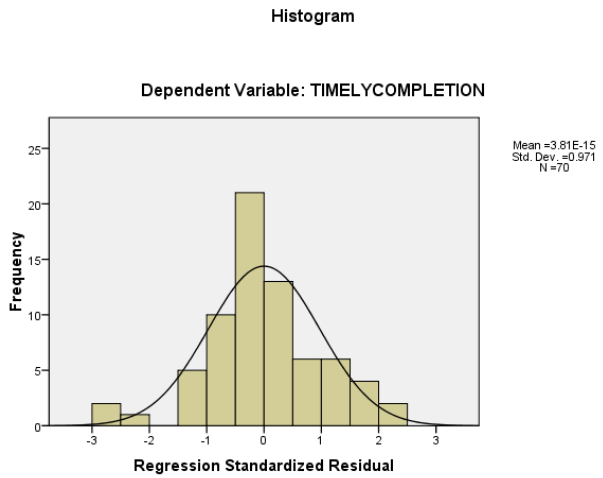
Figure 4.1; Linearity Test



Normality test

According to (Park, 2006), Statistical methods are based on various underlying assumptions. One common assumption is that a random variable is normally distributed. In many statistical analyses, normality is often conveniently assumed without any empirical evidence or test. But normality is critical in many statistical methods. Normality distribution tends to fall closely along the straight line. Visual analysis of the histogram in figure 4.1 below supports this study. And the figure below points that the model is free from normality problem.

Figure 4.1; Normality Test



SPSS output (2021)

Test of Multicollinearity

Multicollinearity means that there is a linear relationship between explanatory variables which may cause the regression model biased (Gujarati, 2003). It is used to check whether there is a linear relationship between explanatory variables included in the model. If such relationship is there, the regression model could be biased.

This can be done by checking the value of Pearson correlation coefficient among predictor's variables. If Pearson correlation coefficient (r) value among predictors are below <0.9, there is no substantial correlation between predictor variables so there is no multi-collinearity problem (Field, 2006).

As shown in table 4.8 below, all the Pearson correlation coefficient values (r) between predictors are below 0.90. Therefore, this study is free from multi co linearity problem.

Table 4.8; Result of Multicollinearity Test

		RESOURCE ALLOCATION	PROJECT PLANNING	PROJECT MONITORING	PROJECT LEADERSHIP
RESOURCE ALLOCATION	Pearson Correlation	1	.665**	.404**	.712**
	Sig. (2-tailed)		.000	.001	.000
PROJECT PLANNING	Pearson Correlation	.665**	1	.693**	.667**
	Sig. (2-tailed)	.000		.000	.000
PROJECT MONITORING	Pearson Correlation	.404**	.693**	1	.477**
	Sig. (2-tailed)	.001	.000		.000
PROJECT LEADERSHIP	Pearson Correlation	.712**	.667**	.477**	1
	Sig. (2-tailed)	.000	.000	.000	
**. Correlation is significant at the 0.01 level (2-tailed).					

Source; SPSS output (2021)

Regression Results

1. Determination of the Model goodness of fitness

Table 4.9; Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833[a]	.694	.675	.393

a. Predictors: (Constant), PROJECT LEADERSHIP, PROJECT MONITORING, RESOURCE ALLOCATION, PROJECT PLANNING

b. Dependent Variable: TIMELYCOMPLETION

Source; SPSS output (2021)

The above table 4.9 shows, the R2 value of 0.694. It means that of the four independent variables (project resource allocation, project planning, project monitoring and project leadership) contribute 69.4% of the variation of the dependent variable (Timely completion of power transmission projects) and remaining 30.6 % can be attributed by other factors which are not studied, because they are beyond the scope of study.

1. Testing for Model Fit

ANOVA (analysis of variance) is used to test how well the regression model fits the data, the analysis gives an F value where F equals to mean square of explained data divided by mean square of residual data, Sekaran, (2003).

Table 4.10; ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.773	4	5.693	36.790	.000[a]
	Residual	10.059	65	.155		
	Total	32.832	69			

a. Predictors: (Constant), PROJECTLEADERSHIP, PROJECTMONITORING, RESOURCEALLOCATION, PROJECTPLANNING

b. Dependent Variable: TIMELYCOMPLETION

To determine whether the regression model is good fit for the data the F-ration in the ANOVA (table 4.10) is used. As indicated in the table the independent variables can highly predict the dependent variable. F (4, 65) = 36.790, p (.000) < .05 (i.e., the regression model is a good fit for the data).

2. Determination of Coefficients

Table 4.10; Coefficients

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.542	.318		-1.704	.093
	RESOURCE ALLOCATION	.369	.127	.309	2.912	.005
	PROJECT PLANNING	.379	.158	.291	2.397	.019
	PROJECT MONITORING	.259	.133	.188	1.950	.055
	PROJECT LEADERSHIP	.213	.114	.197	1.865	.067

a. Dependent Variable: TIMELYCOMPLETION

Source; SPSS output (2021)

The relative importance of the significant predictors is determined by looking at the standardized coefficients. Resource allocation has the highest standardized coefficient (.309) and the lowest significance (.005), which makes it the best predictor. Followed by project planning which has a standardized coefficient .291 and significance of p= 0.019. From this result it can be implied that both resource allocation and project planning have a positive and significant effect on timely completion of power transmission projects.

When it comes to the other two independent variables, project monitoring has a standardized coefficient B=0.188 and significance of p= 0.055. And project leadership has a standardized coefficient B=0.197 and significance of p= 0.067. From this result it can be implied that both

project monitoring and project leadership have a positive and insignificant effect on timely completion of power transmission projects.

4.2.4 Discussions of Results

The overall findings of the analysis are presented in the section above in this chapter. The researcher elaborates on each of the signs and the important relationship between the dependent variable and the explanatory variables in this section.

Based on the regression results, resource allocation is positively (Beta = .309) associated with completion of power transmission projects and it is statistically significant (P=.005). This result implies that a one percent increase on the resource allocation of a project would increase the timely completion of a project by 0.309 keeping the others constant. Due to this reason the absence of proper resource allocation practice has direct and significant effect on the timely completion of a project. Hence, relying on the findings of the regression analysis, the resource allocation practice at projects is one of the major reasons that affect time performance of a project.

Based on the regression results, the project planning has positive (B= .291) effect on the timely completion of a project and was statistically significant (P=.019). Since it has positive relation with timely completion of a project, is a determining factor. This shows project planning has significant effect on for time performance of a construction project. This result is consistent with the findings of Wambungu (2013) that found planning in a project positively and significantly affect timely completion of the project.

In addition, as the regression results indicates that there was a positive (Beta =.188) and insignificant (P =.055) association between project monitoring and time performance of a project. Even if the correlation analysis and ANOVA results shows significant, the effect of project monitoring on the timely completion of a project in coefficient results of the regression analysis was found to be insignificant. This result is inconsistent with the findings of Wambungu (2013) and Menasi (2007) who both found positive and significant effect of project monitoring on the timely completion of a project.

Finally the regression results indicates that there was a positive (Beta =.197) and insignificant (P =.067) association between project leadership and time performance of a project. This also means that project leadership is not that effective on the time performance of a project.

Chapter Five

Conclusion and Recommendations

5.1 Summary of the Major findings

The main goal of this study was to evaluate the factors affecting timely completion of power transmission projects in the case of EEP. The study used questionnaires distributed to the sampled employees of the organization as a means of gathering data. The study conducted the analysis using SPSS and then presented the results using tables.

The findings in the study revealed that the respondent employees' opinion was close to neutral regarding the practices of resource allocation at EPP (Mean=3.15). This results in the study showed that employees feel neutral about the availability of human, financial and material resources needed to carryout project work. Similarly, results showed employees at the organization opinion is close to neutral regarding project planning (Mean=3.02), project monitoring (Mean=2.80) and project leadership (Mean=3.15) aspects at the organization. This result reflects employees feel neutral towards the overall practices of project planning, project monitoring and the quality of project leadership at EPP.

The study also undertook correlation analysis to find the correlation between the independent variables (resource allocation, project planning, project monitoring and project leadership) and timely completion of projects at EPP. The correlation results showed that all the independent variables have positive, strong and significant correlation with at EPP. In addition, out of the independent variables, project planning (rho=0.757) and resource allocation (rho=0.718) have higher positive values in correlation with timely completion of projects.

Furthermore, the study conducted regression analysis to learn the impacts of each independent variable on timely completion of projects. Based on the result of regression analysis, resource allocation has the highest positive (B=0.309) and significant effect on timely completion of projects. Project planning was also found to have positive (B=0.291) and significant effect on timely completion of projects. However, results presented in the study showed that project

monitoring and project leadership to have positive but insignificant effect on timely completion of projects.

5.2 Conclusions

The study determined that project resource allocation has a positive and significant effect on timely project completion (B = 0.309), (P < 0.05). This indicated that, if resource allocation is high then timely project completion is also high and therefore public construction project with good resource allocation index are completed on time. The study also found out that, project planning has a positive and significant effect on timely project completion of the projects (B= 0.291) (P<0.05) and therefore, if the project planning is high then public construction project are completed on time. However, project mentioning's and project leadership's impact on timely completion of projects was statistically insignificant. This implies that even if project mentioning and project leadership was in place this alone could not lead to timely project delivery.

From the results of the study, the conclusion is that adequate resource allocation improves timely project completion and should be given the necessary attention it requires from the stakeholders. Effective resource utilization and use of new construction technologies can improve project implementation. The results of the study show that although project planning is an essential element in timely project delivery the people charged with that responsibility at EEP have not shown the required level of performance that could steer project delivery to best practice. Comprehensive planning of the project details could therefore improve the schedule performance of the project. According to the study's model, the most important predictor for timely completion of a project is resource allocation. It is therefore of essence that project resource allocation is streamlined in accordance with the needs of the projects to ensure timely and successful completion of projects.

5.2 Recommendations

As results of the study indicates resource allocation is the most determinants of project time performance, any project initiators should ensure adequate resource allocation for all the projects they are undertaking. In addition, it should develop and implement avenues for ensuring the right amount and quality of materials are provided for the projects.

In terms of project planning, business owners should choose projects that are more familiar and interesting to them, and the scope of the project should be identified, clearly specified, and be limited before the project is implemented. This includes the amount of the systems needed to be implemented and amount of projects process reengineering needed.

5.3 Suggested further research

The focus of this research was on the main institutional factors that affect project completion time at the case organization Ethiopian Electric Power (EPP). Since the study was unable to cover all of the factors that influence project timeliness, further research is needed in this area. The study suggests the inclusion of additional factors such as external factors and a weighted factor for unknowns in project execution. This will enable a project's execution to be properly managed with more certainty and expected outcomes.

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Appendix 1

Addis Ababa University

School of Commerce

(Questionnaire to be filled by employees of Ethiopian Electric Power (EPP))

Dear Respondent,

My name is Dawit G/Egziabiher, I am a postgraduate student in the School of Commerce at Addis Ababa University. This questionnaire was created in order to conduct a study in partial fulfillment of the University's requirements for a Master's Degree in Project Management. "*Assessment of Factors That Cause Delay in Construction Projects in The Case of Ethiopian Electric Power Transmission and Substations Projects*.'' As a consequence, in order to collect the required data for the thesis, I respectfully request your assistance in answering the following questions. Any details you provide will be kept fully private and used exclusively for academic purposes. Your promptness and cooperation will be greatly appreciated.

NB

- Writing your name is not necessary
- Please put **"X"** for your choice in the box

Part I. General background of the employee

1. Sex/Gender/: Male (_____) Female (_____)

2. What is Your Position in the Organization?

Project Manager (_____) Team Leader (_____) Technical Expert (_____) Support staff (_____)

3. Number of years you have been working in the organization

<2 years (_____) 2-5 years (_____) More than 5 years (_____)

4. The highest level of education you have accomplished

Diploma (_____) BA/BSc. (_____) MA/MSc. (_____) PHD (_____)

5. Your educational Background /Field of study ----------

6. Total number of projects you have been involved in your Organization during the past three years?

<3(_____) 3-5 (_____) 5-7 (_____) >7 (_____)

Part 2 Questions related to the study

Answer the following questions and put "X" in the box that is given in each of the cell below

The values of scales are

5= strongly agree, 4= Agree, 3= Neutral, 2= Disagree, 1= strongly disagree

No	Question	1	2	3	4	5
	Statements related to Project Resource Allocation					
1	Skillful workers are available to carry out power transmission project related tasks					
2	There is proper Quality control of materials needed for power transmission projects					
3	There is sufficient supply of materials needed for power transmission projects					
4	There is sufficient Numbers of equipment needed for power transmission projects					
5	Financial resources needed for power transmission projects are provided without delay.					
6	Sufficient time is given for transmission project design and quantity preparation/ development					
	Statements related to Project Planning					
7	Project Management Plan (for power transmission projects) is developed during the planning phase.					
8	Key stakeholders are actively involved in planning stage.					
9	Top level management actively is involved during transmission project planning					
10	The project scope is well defined in the planning phase					
11	Project activity schedule of power transmission projects are determined in the planning phase.					
12	Project planning activities are completed prior to project execution					

13	Project cost is well estimated in the planning phase					
14	There is strong integration between project planning department and construction supervision unite in power transmission projects					
	Statements related to Project Monitoring					
15	Progress of transmission projects are monitored comparing the planned activities with actual accomplishment					
16	Financial performance of the projects monitored comparing the planned budget with actual expenditure.					
17	The organization have a written Monitoring and Evaluation plan that guide power transmission projects execution.					
18	The organization regularly analyzes monitoring reports of its projects in order to assess achievements and challenges.	.				
19	The organization monitors how project resources of the organization like equipment are effectively employed to the project.					
20	Quality activities are monitored and results are recorded to assess performance and to recommend necessary changes					
21	There is adequate communication, including progress tracking and reporting of power transmission projects at EEP.					
	Statements related to Project Leadership					
22	Project team leaders have a good working relationship with others					
23	Project Team leaders have motivating skills of the project staffs					
24	Project team leaders have sufficient experience					

25	Project managers of have sufficient knowledge & skill in modern project management for effective implementation of Power transmission projects					
26	Project Managers/Team leaders are often capable of managing projects					
Overall time Performance of Power Transmission Projects						
27	In general, power transmission projects at EPP are completed in time.					