Assessment of Key Success Factors in Construction Projects: The case of power transmission construction projects in Ethiopian Electric Power

Yonas Abadi

A Research Paper Submitted to

Postgraduate Distance Education Program

Presented in partial fulfillment of the requirements for Masters of Arts degree in Project Management

Advisor: Wubshet B. (PhD)

Addis Ababa University School of Commerce

Addis Ababa, Ethiopia

May 2022

Addis Ababa University
School of Graduate Studies

This is to Certify that the thesis prepared by *Yonas Abadi*, entitled: *Assessment of Key Success Factors in Construction Projects: The case of power transmission construction projects in Ethiopian Electric Power* submitted in partial fulfillment of the requirements for the degree of Degree of Master of Arts *in Project Management* complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Examiner: Solomon M. (PhD) Signature: _____ Date: _____

Examiner: Maru S. (PhD) Signature: _____ Date: _____

Advisor: Wubshet B. (PhD) Signature: _____ Date: _____

_____

Chair of Department or Graduate Program Coordinator

Statement of Declaration

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted at any university for a degree.

Signature: _____ Date: _____

ABSTRACT

There is a plan by the government of Ethiopia to put Ethiopia under the list of middle-income countries by 2025. This is planned to be achieved by working on the development of industries. The key for development of industries availability of infrastructures. Thus, along with other the development of vital physical infrastructures, the energy sector is one of the key enablers to transform the country in to a middle-income country by the planned year. Thus, this has prompted Ethiopian Electric Power to initiate construction of new generation and associated transmission infrastructures. Even though employers/clients, engineers, contractors, project managers and other project stakeholders regard a project executed on schedule, within budget, and according to scope and quality to be successful, construction of such mega projects are intricate and perplexing in nature and performance related issues such as schedule overruns, cost overruns, deficiency in funding, poor quality, poor awareness of safety issues, poor planning, deprived project management practices and problem during design and many other factors have variously contributed against the success of construction of power transmission (PT) infrastructures in the energy sector. This study surveyed factors influencing the success of power transmission construction projects in Ethiopia focusing on the case of Ethiopian Electric Power. The study had the following objectives: To evaluate the influence of regulatory frameworks on the success of power transmission infrastructure construction projects in EEP; To examine the impact of project funding on the success of power transmission infrastructure construction projects in EEP; To analyze the impact of involvement of stakeholders on success of power transmission infrastructure construction projects in EEP and Study the impact of project management capability on the success of power transmission infrastructure construction projects in EEP . The study adopted a descriptive research survey design with a target group from the Ethiopian Electric Power (EEP) and contractors working in PT projects in EEP. The total number of individuals in the target group was 98. Since the population was not too much, the whole population was selected as sample. The primary data gathering instrument was self-administered questionnaire. The data collected was analyzed, applying SPSS data analysis software, quantitatively, using descriptive statistics; frequency distributions, mean and percentages. Findings revealed that 83.7% of respondents indicated that there was very high and high influence of regulatory framework on success of construction of PT infrastructure projects at EEP; project funding was indicated to have very highly and highly influenced success of construction of PT infrastructure projects by 90.5% of the respondent; 82.7% of respondents agreed that project management organizational structure had very high influence and high influence on the success of construction of PT infrastructure projects at EEP and involvement of stakeholders was rated to have a very high influence and high influence on the success of construction of PT infrastructure projects at EEP by 85.7% of the respondents. Thus, in conclusion, the research illustrated that the impact of the identified factors on the success of PT infrastructure projects at EEP was at least high or very high as most of the respondents have agreed on it. The study, hence, recommended mindful consideration and management of these studied factors from inception to implementation of PT infrastructure projects at EEP. Making sure that laws, regulation & policies are available, ensuring the enforcement of these laws, regulation & policies, ensuring adequate funding and cash flows, building project management capacity of clients, consultants and contractors, and involvement and proper management of stakeholders at each phase of a project would be of paramount importance for success of projects.

ACKNOWLEDGEMENT

First of all, I would like to thank God for blessing this date by giving me all the patience and strength that the study needed.

I would like to thank my advisor, Dr. Wubshet B., who tremendously guiding me all the way in conducting the study and advised till finalizing it. It is also worthy to thank all the instructors who taught me all the courses that I attended under this postgraduate program as I wouldn’t be able to be here without the knowledge they shared me and my mates.

I must also thank my families and friends for the immense support and help during this study. Without their help, completing this project would have been very difficult.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Page №

ABBREVIATIONS AND ACRONYMS

CSF	Critical Success Factors
ECIDP	Ethiopian Construction Industry Development Policy
EEP	Ethiopian Electric Power
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross domestic product
GERD	Grand Ethiopian Renaissance Dam
GF	General Factors
GW	Giga Watt
GWH	Giga Watt Hour
kV	Kilo Volt
KWH	Kilo Watt Hour
MUDC	Ethiopian Ministry of Urban Development and Construction
PDC	Plan and Development Commission
PT	Power Transmission
SSF	Sector-Specific Factors
SPSS	Statistical Package for Social Scientists
UNDP	United Nations Development Program

1 INTRODUCTIOIN

1.1 Background of the study

The construction industry includes all companies primarily engaged in construction such as general contractors, operator builders, heavy construction (airports, highways, and utility systems), and construction by specialty trades. Also included are companies that are engaged in the preparation of sites for new construction and in subdividing land for building sites. Construction work may include new work, additions, alterations, or maintenance and repairs. Construction work is often described by either type, residential (home building) versus non-residential (commercial and government buildings and infrastructure projects), or by funding source, public versus private (Dr. Conway, H., Dr. Crandall, M., Capt Ryan, K. and COL Khalil, G, 2005). This industry provides the setting for modern human activity, ranging from buildings to neighborhoods to cities, and includes supporting infrastructure such as transport, water supply, telecommunications and energy networks. It is typically the greatest asset of a nation (Hampson, K., Kraatz, J. and Sanchez, X. 2014).

The Construction sector, which is expected to account for almost 13.5% of the globe's output by 2025, is one of the largest industrial sectors in the world (Betts, Robinson, Burton, Leonard, & Sharda, 2013).

Rising populations, urbanization, and much-needed infrastructural developments are predicted to fuel high construction growth rates in Sub-Saharan Africa (The Big 5,2017). Throughout 2016 and 2017, there was a 65.1 % increase in the number of construction projects in East Africa, with a 20.7 % increase in the overall value of projects (Andiva, 2018).

Ethiopia is the fastest-growing, non-oil driven economy among African countries. The country has showed a remarkable growth over the past ten years, from 2002, with average annual growth GDP of 11% (UNDP, 2014). Ethiopia, being one of the countries with an inferior infrastructure facility, presents a huge potential in the development of infrastructures. Recently, the contribution of the industry sector (which is 21.2%) and particularly that of the construction sector to the national economy is given high prominence and is mainly driven by the energetic performance of the construction sub-sector (UNDP, 2014).

In an attempt to develop these industries, infrastructures such as road, water supply systems, energy supply, housing facilities are highly important to operate the industries once matured. Consequently, Ethiopia is now battling to deliver the economy with industries as well as infrastructures by undertaking megaprojects that would need large sums of money and political considerations. And one of the most critical infrastructure sectors that Ethiopian is engaged in developing is the energy sector. Potential wise, Ethiopia is endowed with various renewable energy resources. The estimated potential for hydropower is 45 GW, wind is 10 GW, geothermal is 5 GW, and solar irradiation ranges from 4.5 kWh/m2/day to 7.5 kWh/m2/day (Benti et al., 2021). In light of this, the Government of Ethiopia's strategic priorities in the energy sector are: universal electrification access, energy efficiency improvement, decentralized off-grid power generation through the development of renewable energy technologies, and exporting electricity to neighboring countries. Thus, the government of Ethiopia is building large-scale hydropower projects in particular with the goal of boosting the supply of renewable energy sources and one of these hydropower plants is The Grand Ethiopian Renaissance Dam (GERD) which is under construction and expected to be completed soon. The GERD hydropower plant would add 6000 MW to the existing

national grid. Concurrent to the development of large-scale electricity production plants, the construction of related transmission lines as well as substations, that are required to transmit the generated electricity to the required destination, reinforce the national grid and distribute the same, is underway.

Nevertheless, as it is the case with other sectors of the construction industries, development of important infrastructure projects in the electricity sector confronts several obstacles. Performance issues in the construction of power generation plants, construction of power transmission infrastructures and construction of distribution networks have been noticed to be mostly delayed and over budget (Alemayehu M., 2015). When it refers to the fundamental elements that contribute to the effective completion of these projects, the industry has had a poor track record, some of which are quite complicated.

In this regard, in order to resourcefully run these industries and cop up with growing demands of energy along with upcoming industrialization plans, Ethiopian Electric Power (EEP) is heavily investing on construction projects of new power generation plants, power transmission lines and substations as well us upgrading and rehabilitating existing ones. Thus, timely completion of these infrastructure projects plays a vital role in achieving the plans set forth in the growth and transformation plan of the country. Apparently, delay in timely completion of these power transmission line projects, without which power generations are of no use, has a serious consequence on the overall economy of the country. Although a lot of factors have been identified as the causes of delay on power transmission projects, including the success of the power transmission construction projects, factors influencing the success and performance of the same transmission line infrastructures is not well studied.

The classic criterion from practice, for a project success, is a measure of the immediate performance of a project against its main design parameters which are as schedule (time), budget (cost) and quality (PMI, 2008). In a more contemporary study, Nyangwara & Datche (2015) stipulated that the purpose of Key success indicators (KPIs) is to ensure that projects are delivered as per scope, on time, on budget, free from defects, efficiently, effectively right first time, safely and to the satisfaction of customers. In order to fulfill these and other success criteria studied in other literatures, a study on factors affecting them will be of paramount importance. Different researchers have identified different success factors in construction projects. Training the human resource in the skill demanded by project, prior project management experience, knowledge of construction project organization, contractor's cash flow, project manager's authority to take decision, project manager's competence and availability of skilled project professionals are some of the many success factors (Al-Ageeli, et al., 2016).Based on a grouping, factors that are key success factors for construction projects, construction permits and construction regulations were categorized under key factors related to institutions; adequacy of funds/resources were categorized under project related factors; relevant past experience, competency and personnel issues were categorized under project management /team members related factors wherea, competency and delegation of authority were categorized under project management related factors (Gudiene, et al., 2013)Given the critical role that the construction industry plays in the implementation of power generation infrastructure projects and the industry's poor performance, improving the construction industry's scuccess should be a top priority for the power sector if it is to realize its potential in delivering high-quality infrastructure for its power projects. Because consultants and contractors are some of the most important participants in the industry and the ones that

create the end result, any construction industry growth and improvement projects should look into methods to increase their ability and skills (Nyangawara & Datche, 2015). Thus, the study tried to assess the success factors from the perspective of these parties.

1.2 Background of the organization/project

Rising populations, urbanization, and much-needed infrastructural developments are predicted to fuel high construction growth. These constructions include roads, housing facilities, power and water supply systems, telecom infrastructures and others that have to be developed in order to meet the increasing demand for the respective basic needs. Consequently, Ethiopia is now battling to deliver the economy with industries as well as infrastructures by undertaking megaprojects that would need large sums of money and political considerations. As stated earlier, one of the most critical infrastructure sectors that Ethiopia is engaged in developing is the energy sector. Potential wise, Ethiopia is endowed with various renewable energy resources. The estimated potential for hydropower is 45 GW, wind is 10 GW, geothermal is 5 GW, and solar radiation ranges from 4.5 kWh/m2/day to 7.5 kWh/m2/day (Benti et al., 2021). Consequently, an effort to exploit these resources is underway and the whole responsibility of exploiting and using these resources falls under the responsibility of the Ethiopian Electric Power.

The current Ethiopian Electric Power was formed in 1956 as the Ethiopian Electric Light & Power Authority (EELPA), which bundled all Ethiopian activities around electricity in a single organization. In 1996, EELPA was split into the Ethiopia Electric Authority (EEA), taking over all regulating activities and a company, Ethiopian Electric Power Corporation (EEPCo), bundling all activities from power generation to household delivery. In 2013, EEPCo was again split up into two companies, Ethiopian

Electric Utility and Ethiopian Electric Power. Ethiopian Electric Power was formed by Council of Ministers Regulation No.302/2013 to solely generate, transmit and distribute electric power to high voltage customers.

In light of this, being the sole high voltage electric power provider in the Ethiopia, the Ethiopian Electric Power (EEP) has been given the following strategic priorities, in the energy sector, by government of Ethiopia: universal electrification access, energy efficiency improvement, decentralized off-grid power generation through the development of renewable energy technologies, and exporting electricity to neighboring countries. In order to achieve these strategic plans, construction of hydro power plants, solar power plants, geothermal power plants, wind power plants and other kinds of power plants are underway. Along with this generation plants, there is also construction of power transmission infrastructures which are compulsory to connect the power plants to the national grid. As a generation plant without the associated infrastructure is worthless, timely completion of power transmission infrastructures is of a paramount importance. Thus, studying the success / performance factors of power transmission infrastructure construction projects is vital as its result would help in mitigating delays on projects of similar nature and complexity.

1.3 Problem Statement

It is well understood that industrialization has been considered as a strategy that would enable Ethiopia to meet the growth plans set forth. Since most of these industries have a noteworthy demand of energy, it is the role of the Ethiopian Electric Power, the sole electric power provider in the country, to construct new power generation plants so as to accommodate those energy demands. Along with these power generation plants, it is a must to construct power transmission lines and substations that are required to deliver

the generated power to the national grid; from which the energy management is done.

Thus, to provide quality power services, the Ethiopian government has planned to boost the energy infrastructure by setting the following main for the coming ten years (2020/21-2029/30): to raise power generation capacity from 4,478 megawatts to 19,900 megawatts, to increase power transmission lines from 18,400 km to 29,900, to increase electricity export from 2,803 GWH to 7,184 GWH, to increase the number of electricity customer from 5.8 million to 24.3 million, to increase the coverage of grid-based electricity from 33% to 96% and that of off-grid from 11% to 4% and to reduce electric power wastage (loss) from 19.6% to 12.5% (EEP, 2020).

Some of projects under construction are the 2160MW Koyisha hydroelectric power plant, Aysha 120MW wind power plant, the GERD, the largest in Africa, which generates 6,450 MW, Gibe III – Gibe IV (Koyisha) 400kV power transmission line, Bahir Dar – Woldiya – Combolcha 400kV power transmission line, Akaki – Koye Abo – Kilinto – Bole Lemi 400kV&230kV power transmission, Metu – Masha, Shambu-Fincha & Azezo – Chilga 230kV power transmission lines, Hawassa – Yirgalem 230kV power transmission lines, Mekelle – Dalol 230kV power transmission lines, Semera – Afdera 230kV power transmission lines, Ethiopia – Kenya 500Kv DC power interconnection project, Dejen - Debremarkos 230kV power transmission lines, line and construction of operators' dwelling house at Gilgel Gibe II hydroelectric power station (EEP,2020).

The construction of these power transmission lines and substation infrastructures is so vital in providing the required energy to the industries and other customers. Likewise, the success of power generation, transmission line and substation projects highly impact the delivery of energy for those in need resulting in a significant effect on investment,

manufacturing, employment and other economic factors. Thus, the success of power transmission projects in Ethiopian Electric Power is very vital for individuals, organizations and industries; from small ones to those that are very large and complex. The construction of these power transmission infrastructure projects are huge in nature and are affected and are dependent on many factors for project's success. Some of the performance problems the energy sector might face includes cost overruns, delays, poor safety culture, poor quality, poor design and planning, inferior working conditions, lack of finances, abandonment or even termination, among other factors (Nyangawara, P. and Datche, E., 2015).

Yet, even though success of construction projects is identified, factor related to contractors, as one of the factors that affect the success of projects (Gadisa, B. and Zhou, H., 2020) factors influencing success of construction projects are not sufficiently addressed. Alemayehu, M. (2015) identified poor planning, poor site management practices and inadequate experience as causes of delays attributable to contractors. These factors related to planning, scheduling and implementation (site construction) can be generalized to construction project management practices. Poor communication and coordination by owner and other parties or generally management of stakeholders has also been identified as one of the factors affecting construction projects (Alemayehu, 2015). Moreover, factors related to funds such as financial difficulties (funding problems) and delay in contractors' payments have also been identified as factors in many researches. Laws and regulations are also one of the factors identified as impactful on the performance of construction projects (Omenya, 2018).

According to the International Labour Organization (2001), there are a number of issues that laws, policies, and regulations attempt to address in the construction industry globally. According to Wairimu (2014), the creation and enforcement of these laws,

policies, and regulations are extremely important. Issues in the construction sector that lead to subpar project performance could be caused by a lack of examining and/or enforcing current rules, policies, and regulations as well as a lack of a competent authority to do so. Wairimu (2014) studied that a very high influence of regulatory framework on performance of construction of power generation infrastructure projects at Kenya Electricity Generating Company has been observed.

It was also studied that organizational knowledge of construction project organization, contractor's cash flow, project manager's authority to take decision, project manager's competence and availability of skilled project professionals are some of the many success factors that impacted the construction projects (Al-Ageeli, et al., 2016).

In addition to identification of key success factors by different researchers, during an annual conference on evaluation of performance of energy infrastructure construction projects under the Ethiopian Electric Power, mostly project managers and other project related employees of the organization have indicated their observation that, considering project success criteria as schedule, cost and quality, most projects success issues that have been reported as encountered were mostly related to regulatory framework, project funding & cash flows, construction inputs, involvement & management of stakeholders and project management capability, political involvements, procurement procedure, geography & environment, and land acquisition issues. A thorough study of the factors has also been recommended so as to measure the influence of these key success factors and means to mitigate their impact.

Even though these factors are identified in the studies and observed by project personnel in the EEP, detailed assessment of the factors, which are not well assessed in the aforementioned literatures, in regard to success of construction of power transmission

construction projects will be very important. Hence, assessment of some of these factors (Project Management capability, project funds, involvement of stakeholders management and regulatory laws/frameworks) would be a reinforcement to the previous studies. Thus, this research deals with the Assessment of these and other Key Success Factors in Construction Projects: The case of power transmission construction projects in Ethiopian Electric Power Enterprise.

1.4 Research Objectives

1.4.1 General Objective

The general objective of the study is to examine critical factors affecting the success of construction of power transmission line infrastructures in the Ethiopian Electric Power.

1.4.2 Specific objectives

The study has the following more specific objectives: -

- To evaluate the influence of regulatory frameworks on the success of power transmission infrastructure construction projects in EEP
- To examine the impact of project funding on the success of power transmission infrastructure construction projects in EEP
- To analyze the impact of stakeholders' involvement on success of power transmission infrastructure construction projects in EEP
- Study the impact of project management capacity of client, contractors and consultants on the success of power transmission infrastructure construction projects in EEP

1.5 Research Questions

This research attempts to answer the following research questions.

- To what extent does regulatory frameworks influence the success of construction of power transmission infrastructure projects in Ethiopian Electric Power?
- What is the impact of project funding on the success of construction of power transmission infrastructure projects in Ethiopian Electric Power?
- How is the project management capacity of stakeholders impacting the success of construction of power transmission infrastructure projects in Ethiopian Electric Power?
- What is the impact of stakeholders' relationships on the success of construction of power transmission infrastructure projects in Ethiopian Electric Power?

1.6 Significance of the Study

It is dared to hope that the findings of this paper will play a part to knowledge about factors influencing the success of construction projects in Ethiopia, and that they will be used as a reference for developers and people in the industry to make better decisions about how to incorporate better performance into construction projects. The findings of this study will as well contribute, specifically, to the understanding of factors that influence the success of power transmission construction projects in Ethiopian Electric Power (EEP). Elements impacting the success of these projects will be studied and evaluated, and recommendations on how to approach each of the factors affecting construction project performance will be developed. This research will also aid in raising awareness about the need of ensuring improved project performance at

all times.

1.7 Scope of the Study

Since studying all the success issues of all power transmission construction projects will be too broad and complex for this, the scope of this study will be limited to the assessing factors influencing success of construction of power transmission projects that the Ethiopian Electric Power has encountered on the implementation of power transmission infrastructure projects. Moreover, the study will be delimited to the studying factors influencing the performance of power transmission infrastructure construction projects of the case organization (EEP) and project delaying factors, other than those impacting success of the construction, are not included in the study. The sample population includes key project stakeholders such as contractors, subcontractors, consultants, quality inspection engineers, project managers, and other technical employer's staffs.

1.8 Limitation of the study

Because the research will be conducted on active power transmission infrastructure projects under Ethiopian Electric Power's ownership, the findings may not be representative of Ethiopia's entire construction sector, and so generalization is not applicable. Because the researcher is self-funded, budget and budgetary constraints are more likely to impact his findings.

Even though descriptive design was not best for this study objective, it has been applied to the study.

For the purpose of this study, the researcher has weighed the three success criteria (i.e time, cost and quality) equally and data analysis of the study was conducted

accordingly.

1.9 Definition of terms

Performance of construction projects: The determination of how well a construction project performed in terms of attaining its specified goals versus defined targets and objectives is known as project performance.

Project funding: is the means by which the money required to undertake a **project**, program or portfolio is secured and then made available as required.

Regulatory Framework: All applicable and appropriate laws, regulations, rules, policies, and regulatory bodies that control the day-to-day operations of organizations, enterprises, and other endeavors in an effective and logical manner.

Stakeholder: is a party that has an interest in a company and can either affect or be affected by the business.

Stakeholder relations: the practice of forging mutually beneficial connections with third-party groups and individuals that have a "stake" in common interest. These relationships build networks that develop credible, united voices about issues, products, and/or services that are important to your organization (Omenya,2018).

Project Management Capability (Organizational): is total organization's ability to consistently define, plan and implement projects such that strategy execution becomes a significant strength in your business.

Stakeholder involvement: refers to participation of interest groups (i.e. representatives of locally affected communities, national or local government

authorities, politicians, civil society organizations and businesses) in a planning or decision-making process.

Stakeholder Management: involves identification of stakeholders, analysis of their expectations and influences, development of appropriate strategies to work with the stakeholders and executing the process.

Project management organizational structure: is a structure that facilitates the coordination and implementation of project activities. Its main reason is to create an environment that fosters interactions among the team members with a minimum amount of disruptions, overlaps and conflict

1.10 Organization of the study

This research will be divided into five chapters. The first chapter addresses the introduction, which introduces the study's concept and background. It also includes the issue description, purpose of the study, research objectives, and research questions. It also includes the study's significance, scope, limitations, and definitions of important terminology, as well as the study's organization. The second chapter addresses the literature review, which includes prior research that are related to the study's goals. These include a literature on the construction sector in Ethiopia, regulatory framework, project management capability as well as the stakeholder relations in construction projects. The conceptual framework for independent and dependent variables. The third chapter will cover research methodology, including research design, target population, sample size and sampling processes, data collecting instruments, instrument pilot testing, data collection procedures, data processing methodologies, ethical concerns, and variable operationalization. Data processing, presentation, and interpretation will be covered in Chapter four. Summary of findings, discussion of findings, conclusions,

recommendations, and proposals for additional research will all be presented in Chapter five.

2 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter analyzes and evaluates the literature that is relevant to this research. The focus of the discussion was on the study's aims, as investigated, published, and written about by other researchers. This chapter also looked at hypotheses that tried to explain the study's goals. A diagrammatic connection between independent and dependent variables was used to create the study's conceptual framework.

2.2 Success of construction projects

Since there is a similarity between influencing factors of success of power transmission construction projects and other infrastructure construction projects, few literatures on performance and success of construction of other infrastructure projects will be reviewed and as much literatures as possible will be reviewed in regard to projects in Ethiopia.

The construction sector is confronted with problems that have an impact on project performance. Identifying elements that impact construction project success and ensuring that emergent problems are managed and project quality is assured upon completion will ensure client and customer satisfaction at the project's closure (Oke et al. 2017).

Both governmental and private sector clients are concerned about the poor performance in regard to success of projects. Poor construction project performance frequently results in a loss of productivity and an increase in project cost as a result of additional expenditures incurred from rework, redo, and maintenance of parts or the entire project condemned as not satisfying quality requirements (Jha and Iyer, 2006).

Construction projects are often carried out under time, cost, and scope constraints, which are referred to as "the triple constraints" of a construction project, with quality as the dominant focus (Haughey, 2011).

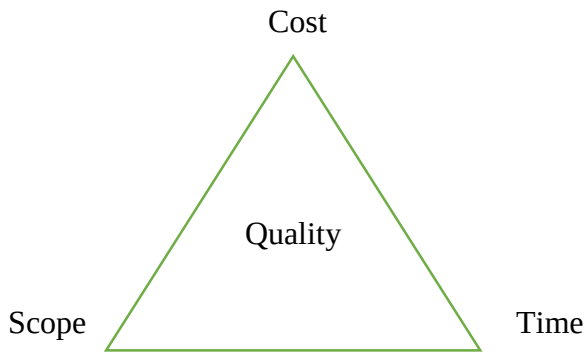

Figure 2. 1: The Triple Constraint of a construction project *(Haughey, 2011)*

Projects must be completed on schedule, within budget, and to scope, with acceptable high quality. To guarantee that these three key aspects of construction are integrated properly, projects must strike a balance between time, cost, and quality (Haughey, 2011). Thus, as most literatures on construction projects suggested that the common criteria for project success are generally considered to be cost, time and quality along with satisfaction of project teams and clients.

Performance problems in the construction industry be attributed due to problems of shortages on inadequacies in industry infrastructure (mainly supply of resources), problem caused by clients, consultants, contractors and other stakeholders and, problems caused by incompetence/inadequacies on the part of the project implementation team, contractors and consultants (Kaniaru, 2014). Poor budgetary planning, cost overruns, time control during execution and lack of proper scheduling of projects, incompetency of project managers, designers and planners, incorrect estimation of costs and project qualities, social problems with the construction industry, technological challenges, improper techniques and tools, limited and poorly workforce,

disregard of laws and policies governing, construction projects, project variations are also included among other performance related factors (Kaniaru, 2014).

The most significant aspects of a project's life cycle that impact the success of construction projects are planning, design, and implementation. Project errors are most common throughout the planning, design, and implementation phases, and they can be quite costly. Rework of faulty components occurs during the implementation phase for 6-15 percent of the construction cost, and rework of defective components occurs during the operation and maintenance phase for 5% of the construction cost (Mallawaarachchi, & Senaratne, 2015).

When it comes to the power or energy industry, the power transmission (PT) system is at the very heart of the power industry and which is vital to the development of a country. Delays in PT projects have a significant adverse effect on the economic development of a country and although billions of dollars are invested globally in PT projects, costly delays are common (Pall et al., 2019). In their study to identify the causes of delay in power transmission projects, 63 potential delay factors are identified and divided into ten major groups. These include two new groups of delay attributes, comprising sector-specific factors (SSF) and general factors (GF), where SSF pertains solely to PT projects and GF contributes to minimizing the bias of project participants. The results indicate that SSF, GF, 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. (Pall et al., 2019). Late advance payment, poor financial management by the contractor, and irregular payments to sub-contractors are also identified as major causes of delay during execution stage of power transmission construction projects in Zambia (Nundwea and Mulengab, 2017).

In the assessment of Critical Success Factors and Success Criteria of Construction projects in EEP, ten factors critically affect the success of construction projects: (1) Selecting inappropriate contractors, (2) Right of Way Problems, (3) Lack of top management support, (4) Absence of Sufficient or well allocated resources, (5) Poor site management and supervision, (6) Ineffective project planning and scheduling, (7) Organizational culture (decision making), (8) Lack of commitment to project goals and objectives, (9) Delay in design approval and (10) Delay in progress payments were identified (Yemane, W., 2017). Most of the factors can be considered as factors that can impact the project during construction periods. However, the study has a gap of not thoroughly going through this factor as the main objective of the research is focused on identifying the CSF and success criteria. Thus, this study will identify the knowledge gap on the factors influencing the success of power transmission projects from literatures available and will try to investigate more on the factors influencing success of construction of power transmission projects at Ethiopian Electric Power, in to some selected factors.

2.3 Regulatory framework and success of construction projects

Similar to other sectors, the construction sector is governed by laws and rules that describe the standards and processes to be followed during project planning, design, execution, monitoring, and assessment. These regulations, as well as norms and policies, have been formed over time in order to standardize all of the industry's practices. Furthermore, each government agency is given a position that allows it to have control over the industry, regulate it, inspect it, and report on it as well.

The construction industry faces different kinds of challenges that could be alleviated through development of policies and regulations. In Ethiopia, performance constraints include inadequate capacity of local contractors and consultants, inadequate public sector delivery capacity, corruption, erratic work opportunities, use of outdated technologies and practices, lack of effective supporting policies and poor state of the economy (MUDC, 2012). Even in the presence of policies and regulations, the current institutional arrangement in the construction industry is fragmented and characterized by overlapping functions. There are also roles, for example, enforcement of some of the non-compulsory standards, for which no one is responsible. There is no effective collaboration among the promotional and regulatory bodies and some of their functions do overlap (MUDC, 2012). Thus in 2005, the then Ethiopian Ministry of Urban Development and Construction (MUDC) drafted a construction industry policy that aims at creating and enabling environment for the development of a vibrant, efficient and sustainable local industry that meets the demand for its services to support sustainable economic and social development objectives given the goal of the construction industry development was to develop an internationally competitive industry that will be able to undertake most of the construction projects in Ethiopia and export its services and products and ensure value for money to industry clients as well as environmental responsibility in the implementation of Construction projects. Yet, however, the implementation of these policies and regulations is far behind what it has to be at due to the avaricious nature of consultants, contractors and other stakeholder that trade-off these policies over a possible cost reduction in their engagement.

2.4 Project funding and success of construction projects

Although there is no stage specifically labeled "funding" in the traditional project delivery process, funding challenges affect every aspect of the process right-of-way (ROW) that cannot be purchased due to a lack of funds to a project that accomplishes the environmental process only to have the chosen source of funding turned down by policymakers. (Sullivan ,2017). Funding challenges affect project delivery for many reasons (Sullivan, 2017). It is critical to keep track of total project expenditures as well as costs for different work packages (Guo-li, 2010). A professionally developed budget does not only control the project costs, but also creates good conditions for development of a well-functioning cash flow in the project. The consequence of insufficient cash flow in a project is often connected to large extra costs and delays as there is a high risk for a temporary suspension of the whole project (Antvik & Sjöholm, 2007).

According to Harris and McCaffer (2005), The contractor's or owner's cash position or finance is the resource he needs to keep the construction work on site moving along smoothly. It is made up of money at hand, bank credit, overdraft, credit purchases, and work-in-progress and invoiced amount. According to Rahman (2013), contractor financial soundness and enough cash flow are crucial in maintaining construction on schedule. Inadequate funds lead to time overrun and sufficient funding guarantees reasonable cash flow (Ameh, 2011).

In the event that a contractor or a subcontractor faces cash problems to finance the project, it hinders contractors/subcontractors from employing capable labor and acquiring resources of the right quality as well as quantity. It hinders also the procurement of good quality machinery, which in turn will contribute to success issues in the construction industry. Consequently, contractors use low-cost, low-quality materials instead of high-cost materials to save money on construction projects, while

others use low-cost, unqualified labor to save money on project expenditures impacting performance of projects negatively (Obuya, 2012).

2.5 Project management capability and success of construction projects

Project management practices are known to affect the success of a construction projects. The achievement of project time, cost, quality, and stakeholder satisfaction are all indicators of project success in construction. While some degree of cost and time schedule risks are inevitable in construction projects, it is possible to improve the project management practices to minimize their negative impacts (Kamau & Paul, 2018). Zulu (2007) stipulates that the aim of project management on a construction project is to add value by delivering successful projects that meet agreed-upon project objectives. The literature on project management argues that project management techniques are aimed toward delivering successful projects in general. Individual traits like as skills, knowledge, and attitudes that accomplish tasks are frequently researched in the context of competencies (Rainsbury et al., 2002). Individual characteristics can be divided into two categories: cognitive and behavioral. Technical abilities, which usually involve technical knowledge and expertise, are among the cognitive qualities. Personal qualities that explain how one responds to a situation are included in behavioral attributes, as are interpersonal skills that describe how relationships are managed and organizational skills that describe how to secure organizational results through organizational networks. (Rainsbury et al., 2002). Skills are hence considered one of the important attributes of competencies.

Of the individuals in an organization that is engaged in projects is the influence of the project manager on the success of the construction project, which is a paramount. It is stated by Ali & Chileshe, (2009) that the success and failure of any project depends

upon many factors, the Project Manager is considered to be the key contributor to the success of any project, as well as a guide to the team members to achieve the client satisfaction (Cost, Time and Quality).The work of Neuhauser (2007) commences with the assertion that the project manager's responsibilities include (a) managing the technical aspects of the project, such as planning, scheduling, budgeting, statistically analyzing, monitoring, and controlling, and (b) managing the project's people-related aspects, such as motivating the project team to complete the project successfully.

pm4dev (2016) stipulated that one of the important decisions of project management is the form of organizational structure that will be used for the project. The main purpose of the project management organizational structure is to create an environment that fosters interactions among the team members with a minimum amount of disruptions, overlaps and conflict. It contributes to the project performance by reducing uncertainty and confusion that typically occurs at the project initiation phase. The structure defines the relationships among members of the project management and the relationships with the external environment (pm4dev, 2016). This will help in avoiding conflicts and speeding up decision making processes that are decisive in promoting project success in regard to schedule, scope and quality.

2.6 Involvement of Stakeholder and success of construction projects

Clients, developers, contractors, consultants, the government and connected entities, public stakeholders, and other professionals within the construction industry are all entwined in the construction industry (Wairimu, 2014). Freeman (1984) defines a project stakeholder as a person or a group of persons, who are influenced by or able to influence the project. Stakeholders can be divided into internal and external, internal stakeholders being those individuals or groups directly involved in an organization’s

decision-making process and are within the business (e.g. owners, customers, suppliers, employees) and external stakeholders being those affected by the organization's activities in a significant way (e.g. neighbors, local community, general public, local authorities) (study.com,2022). In the construction industry, there has traditionally been a major emphasis on internal stakeholder connections such as procurement and site management, while external stakeholder relationships have been viewed as a duty for public officials via facility development guidelines and legislation (Prabhu, 2016). Internal stakeholder management is, if anything, more difficult because internal stakeholders are often closer to the issues and will be more affected. If we want to avoid large-scale changes to the project as it goes, we need to make sure it's set up correctly from the start, with the necessary forms of participation and consultation. The most important thing is to incorporate as many internal stakeholders as feasible as soon as possible (Vogwell, 2003).

The interactions and interrelationships between stakeholders largely determine the overall success of a construction project, and have the crucial responsibility for delivering a project to successful completion (Prabhu, 2016). Kivitis (2013) stipulated that effective stakeholder engagement benefits project success by eliminating conflicts and reducing costs through increased stakeholder participation in projects decision making. The findings were also echoed by Dacha and Juma (2018) who observed that, stakeholders need to be effectively engaged in construction projects procurement processes in order to avoid cost overruns which may come in form of delays. In Cambodia, Durdyev (2017) reported that aside from poor project management skills, poor planning, and poor resource allocation, inadequate involvement of key stakeholders, such as contractors, consultants, and clients, has been identified as the primary cause of increased construction cost overruns. Likewise, Rajeev and Kothari

(2014) mentioned that, in construction projects where the interactions and interrelationships among stakeholders were not strong, it was observed that projects were not executed within the budgeted cost. Thus, considering the fact that cost is one of the critical success factors of construction projects, it can be inferred that stakeholder management issues highly impact success of projects.

According to Omenya (2018), 72.4 percent of respondents indicated that stakeholder involvement had a very high impact on the performance of power generation infrastructure projects at KenGen and Olkaria. Thus, studying and considering this factor for the case of EEP power transmission infrastructure construction projects will contribute to the success of projects. .

Missed deadlines, scope creep, confusion, disagreement, and churning are all indications that stakeholder management is failing. This is frequently the result of competing goals, a lack of focus, or a lack of commitment, and it necessitates a communication-based approach (Kihoro & Waiganjo, 2015).

2.7 Conceptual Framework

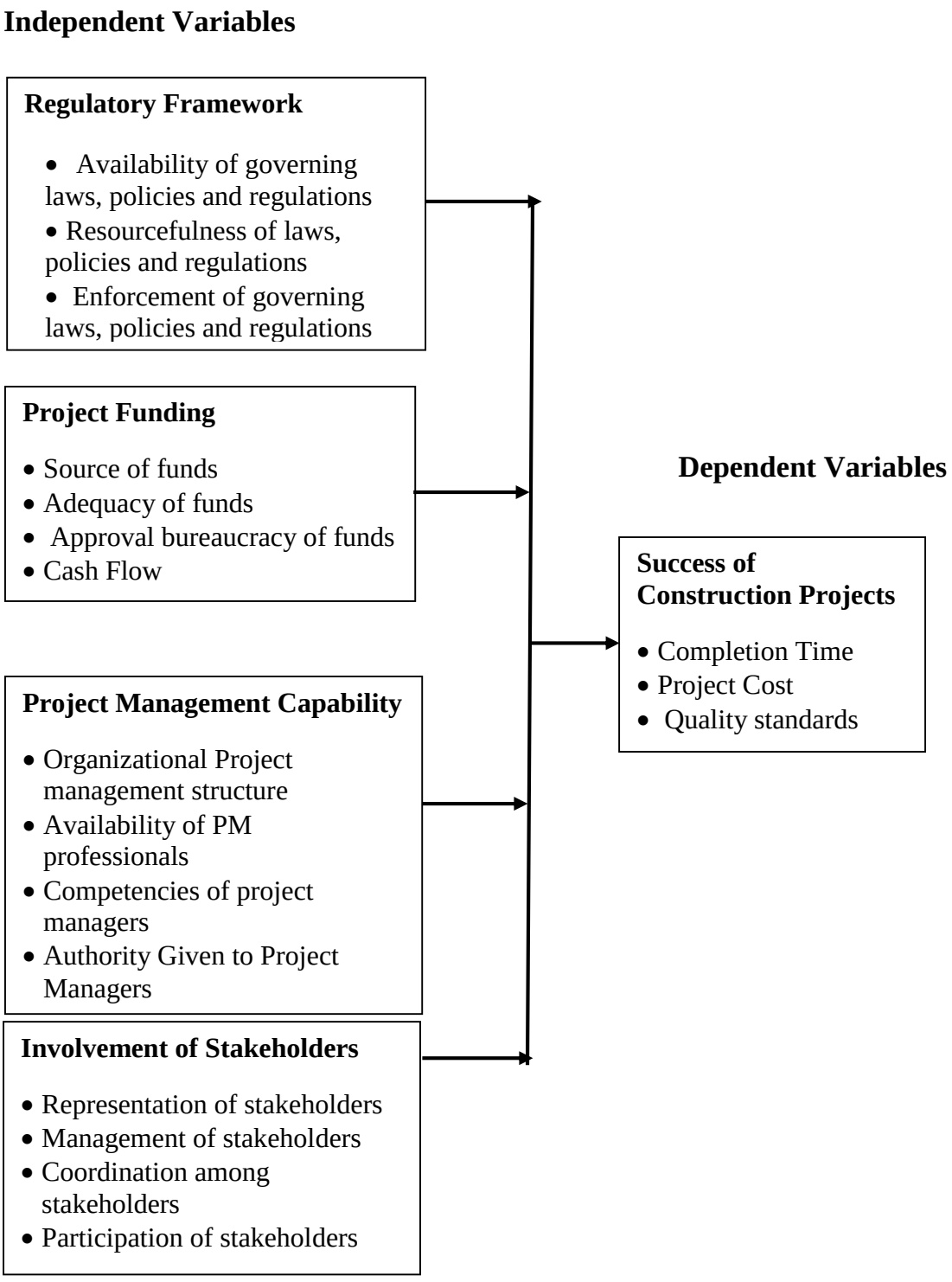

Figure 2.2: Conceptual Framework for key factors affecting success of power transmission construction projects at Ethiopia Electric Power Enterprise

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology utilized in this study, as well as the methods and techniques used in data collecting, processing, analysis, and presentation. It includes information on the research design to be utilized, the target population, sample size and sampling processes, research protocols, data collecting instruments, research analysis methodologies, and instrument pre-testing. It also covers instrument validity and reliability, as well as ethical problems and operational definitions.

3.2 Research Approach

Research approaches are plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation (Creswell, J. and Creswell. J, 2014). There are two broad techniques to approach a research topic: deductive and inductive approaches. The deductive method is based on logical reasoning, and the theory's conclusion is drawn from it. Thus, the deductive method, research begins with pre-existing theories and models, from which hypotheses are generated and then evaluated through empirical studies. The inductive method denotes that the research begins with empirical findings that are then related to pre-existing beliefs. The two most popular types of research methodologies are quantitative and qualitative. The former entails the collection of quantitative data that may then be submitted to rigorous quantitative analysis in a formal and rigid manner. Whereas, qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behavior. In this scenario, the researcher's observations and impressions are used to do study. This type of research produces results that are either non-quantitative or have not been subjected to a thorough quantitative analysis. Focus group interviews, projective approaches, and depth interviews are commonly utilized

methodologies. Whereas, according to Creswell (2018), there are three types of research methodologies: qualitative, quantitative, and mixed methods. Without a doubt, the three methods are not as distinct as they look. Instead of being considered as polar opposites or dichotomies, qualitative and quantitative approaches should be viewed as distinct ends of a continuum. A study is more likely to be qualitative than a quantitative study, or vice versa. Mixed methods research resides in the middle of this continuum because it incorporates elements of both qualitative and quantitative approaches (Creswell, 2018).

According to Wyse (2011), quantitative research is oriented in gathering information, it focuses on describing a phenomenon across a large number of participants thereby providing the possibility of summarizing characteristics across groups of relationships an approach quantifying problem by generating numerical data or information that can be transformed in to usable statistics. Thus, since we are studying groups of relationships between dependent and independent variables and Considering the nature of the research problem, purpose of the project, resource at disposal and audience of the research (Grover, V. 2015), this research study incorporated quantitative approach to assess the key success factors in construction projects taking the case of power transmission construction projects in Ethiopian Electric Power Enterprise and made conclusion on it. Whereas, a qualitative method was applied so as to collect other key success factors from respondents in regard to construction projects taking the case of power transmission construction projects in EEP and suggest those factors for further studies. Thus, a mixed approach was applied in the study.

3.3 Research Design

The type of research design that was applied in this study is descriptive research design

so as to gather information on assessment of key success factors in construction projects taking the case of power transmission construction projects in Ethiopian Electric Power Enterprise. The descriptive design technique was chosen because it carefully describes facts and characteristics of a certain population or area of interest in order to find connections and/or relationships between or among selected independent and dependent variables (Dulock, 2013). This study used a research design to explore the factors that influence the success of power transmission infrastructure projects.

3.4 Population and Sampling

The whole set of items, things, and people under consideration in a research study is referred to as the study population, or target group. According to Creswell (2014), the target population is the total number of all units, individuals, or the entire environment of interest that have certain defined features and from which a sample tries to draw conclusions.

The target population of this study for which the findings were generalized are key players and stakeholders of the power transmission projects in the Ethiopian Electric Power, which is the sole power service provider in Ethiopia. The target population included EEP's project management staffs, project managers of active contractors, subcontractors, quality inspection engineers (supervisors) and design Engineers. The target population was summarized as showed in table 3.1 below.

Table 3.1 Target Population

Category	Frequency	Percentage
Power Transmission Project Managers of EEP	4	4%
Project Managers of Active Contractors	10	10%
Technical project management office staff of EEP	41	42%
Construction Site supervisors	72	44%

Source: Ethiopian Electric Power (January 2021)

The population was chosen to get historical and present information from individuals who have directly engaged in and had an influence on the execution of transmission line infrastructure construction projects at EEP, and who have often expected to encountered complexities that have impacted project successes.

3.4.1 Sample Design

Having identified the target population, design and determination of samples was carried out. A sample is a portion of a population that is representative (Creswell, 2014). The determination of a sample from a given population is known as sample design. It refers to the methods that should be used when selecting a sample. It's used to figure out what the best sample size is. The most efficient, representative, reliable, and flexible sample size is one that meets all of the standards for efficiency, representativeness, and flexibility (Kothari, 2004). When the target population is small, according to (Kothari, 2004), the entire population might be deemed the sample. Kothari (2004) went on to say that a census inquiry is a comprehensive enumeration of all objects in the population. Thus, the target population was considered as the

sample in this study.

3.4.2 Sample size

As explained in the previous sub-chapter, the whole population was considered as sample. The sample size by census, which is the whole population, is tabulated as shown below in table 3.2.

Table 3.2 Sample size by census

Category	Target Population (N)	Sample (n)	Percentage (%)
Power Transmission Project Managers of EEP	4	4	4%
Project Managers of Active Contractors	10	10	10%
Technical project management office staff of EEP	41	41	42%
Construction Site supervisors	43	43	44%

3.4.3 Sampling Procedure

Purposive sampling method involves deliberate selection of particular units of the universe for constituting a sample which represents the universe (Kothari, R. 2004). The researcher deems that there is a certain population that on his judgment represents the sample to be studied. Consequently, a purposive sampling was applied to this study as the purpose of the study was pre-determined as well as the population considered was restricted to people with knowledge in the studied area.

3.5 Data Collection

After a study problem has been defined and a research design/plan has been sketched out, the work of data gathering begins. When choosing on the data gathering approach for a study, a researcher should consider two sorts of data: primary and secondary data (Kothari, 2004). Primary data are those that are obtained for the first time and hence are original in character. Secondary data, on the other hand, is information that has already been gathered by someone else and has gone through the statistical process. (Kothari, 2004). Primary data is collected during the course of doing experiments in an experimental research but in case research of the descriptive type is conducted and perform surveys, whether sample surveys or census surveys, then primary data can be obtained either through observation or through direct communication with respondents in one form or another or through personal interviews (Kothari, 2004). Thus, as this research was chosen to be a descriptive type, the researcher used primary data sources. Of the available methods of collecting primary data, a collection method through questionnaires was selected.

The necessary verbal permissions were received from the appropriate managers and directors in order to conduct this study. Hard copies of self-administered questionnaires were managed by hard copies. College educated respondents, including Power Transmission Project Managers of EEP, Project Managers of Active Contractors, Project management office technical staff of EEP and Construction Site supervisors were the target groups to be considered; those who could read, comprehend, and reply to questions.

3.6 Scale Reliability and Validity

(Kothari, 2004) postulates, before using the questionnaires method, it is always

advisable to conduct ‘pilot study’ (Pilot Survey) for testing the questionnaires. The importance of a pilot survey in a large probe is felt strongly. The pilot survey is essentially a practice run for the main survey. The shortcomings (if any) of the questionnaires, as well as the survey procedures, are brought to light by such a survey, which is done by professionals. Improvement can be accomplished as a result of the experience obtained in this manner. Thus, a pilot test involving Eight (8) senior staff of the Transmission & substation construction division of EEP were carried out and project manager relationships which was one of the indicators under the factor project management capability was modified to given authority of project managers, based on the feedback from the pilot survey. These respondents didn’t make it to the final sample of the study so as to avoid any chance of bias.

Validity and reliability are crucial considerations in quantitative data analysis. Quantitative researchers strive to demonstrate that the methodologies they use are effective in measuring what they claim to measure. They want to ensure that their measurements are steady and consistent, with no errors or bias from the respondents or the researcher (Dawson, 2002).

Validity, according to Kothari (2004), is the most important criterion for determining whether or not an instrument measures what it is designed to measure. Validity is sometimes referred to as usefulness. To put it another way, validity refers to the degree to which differences detected by a measuring instrument represent genuine differences among people being examined. Consequently, instruments which were used in the study were subjected to judgment of senior project managers of the Ethiopian Electric Power.

The other major consideration in evaluating the measurement tool of a study is

reliability. A measuring instrument is reliable if it provides consistent results (Kothari, 2004). Stability and equivalence, two components of reliability, demand special attention. The stability component is focused with obtaining consistent results while measuring the same person with the same device over and over again. The degree of stability is usually determined by comparing the results of multiple measurements. The equivalence component considers how much error may get introduced by different investigators or different samples of the items being studied. A good way to test for the equivalence of measurements by two investigators is to compare their observations of the same events. The reliability of this study was improved by standardizing the conditions wherein the measurement was to take effect and considering careful measurement without any variation from group to group, as well as by using trained and motivated people to carry out the research and by expanding the sample of items used (Kothari, 2004).

In the pilot study, a test re-test method was used to examine the consistency of response between the two tests in the same categories of respondents over a carefully determined period of time.

3.7 Data analysis techniques

Having collected the primary data, it was processed further by organizing, editing, coding, classifying and tabulating the data. All the data measuring instruments were verified for completeness, accuracy and to determine the required number is submitted for analysis; as a means of data validation process. Special attention was given to avoid any errors and/or omissions in the process of organizing and editing of the collected data. Adequateness of the responses as well as readability of the collected data will also be checked. Then, as explained up herein, the data that had been organized was

coded for as required for further analysis.

The research has both qualitative as well as quantitative data. Descriptive statistics will be used to analyze the quantitative data. Descriptive statistics such as frequency, Percentage and mean scores were used to more analyze the quantitative data using SPSS. Results of data analysis will be presented in tables. Content analysis will be applied in analyzing the qualitative data. Emerging themes were utilized to categorize responses to open-ended questions, which were used to provide recommendations only.

3.8 Ethical Considerations

The study was conducted in strict accordance to noble ethical standards of a research. The study was carried out with due honesty, with no fraud, distortion or misrepresenting of data in any aspect of the research. The conclusions made were solely based on the results of the collected and analyzed data. One of the standard data collecting instruments, questionnaire, was employed in the study and respondent bias was attempted to be avoided by designing it in a way that questions are not leading by using neutrally worded questions.

Respondents were made aware of the purpose of the study and all the participants of the research were made to be involved on a voluntary basis. All respondents were informed about the confidentiality of their participation in the study along with a guarantee to their anonymity. All publications, materials, literatures, books, websites and other materials used in the research were properly quoted.

4 DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter of the study comprehends the findings of data collected, data organized, data analysis and explanation of the results. The study had an objective of evaluating the regulatory frameworks' influence on success of power transmission line construction projects in Ethiopian Electric Power, identify the impact of project funds on success of power transmission construction projects in the Ethiopian Electric Power, analyzing the impact of stakeholders' involvement on construction of power transmission projects in the Ethiopian Electric Power, analyzing, the impact of project management capability on construction of power transmission projects in the Ethiopian Electric Power.

Respondents' characteristics had been explained using a descriptive statistics method as already explained in the previous chapter of the study.

4.2 Response rate and demographic characteristics of the data

Prior to presentation of the findings of the data analysis, the response rate of the questionnaires as well as the demographic information, in regard to the population from which the data was collected, is presented herein the subsequent sub-chapters.

4.2.1 Questionnaire return rate

Of the 98 questionnaires managed to be delivered to the sample size of 98 respondents, 84 were returned yielding in a return rate of 85.71%. This higher return rate was achieved by delivering the questionnaires in person to the respondents and via social media networks such as telegram, WeChat and WhatsApp. The progress was followed

up through phone calls and text messages and again collecting the questionnaires once respondents confirm the completion of the same.

4.2.2 Demographic characteristics of the respondents

The demographic information of the respondents is examined here, as they were chosen from a variety of groups. Gender, age, general work experience, highest degree of education, present designation/role and years of experience in that role were all considered. These social characteristics were important to the study in terms of delivering accurate and trustworthy data.

4.2.2.1 Role of respondents in implementation of power transmission construction projects at Ethiopian Electric Power

In order to comprehend the varied responsibilities that the respondents play at Ethiopian Electric Power (EEP) in regard to implementation of power transmission system construction projects, respondents were queried to describe their roles in the implementation of the projects.

Table 4. 1: Role in implementation of power transmission construction projects at Ethiopian Electric Power (EEP)

Role in implementation of projects at EEP	Frequency	Percentage
Power Transmission Project Managers of EEP	4	5%
Project Managers of Active Contractors	10	12%
Technical project management office staff of EEP	33	39%
Construction Site supervisors	37	44%

All in all, four (4) project managers from Ethiopian Electric Power, ten (10) managers from various contractors, thirty-three (33) technical staff of the project management office and thirty-seven (37) construction site supervisors were involved in this survey.

4.2.2.2 Gender of respondents

Tabulated herein below is the gender distribution of the respondents who were involved in the survey.

Table 4.2: Gender distribution of respondents

Gender of respondents	Frequency	Percentage
Female	8	10%
Male	76	90%
Total	**84**	**100%**

Thus, study findings showed that out of the 84 respondents, 8 were females whereas the remaining 76 were males, with a percentage of 10% and 90%, respectively.

4.2.2.3 Educational level of respondents

The study did let respondents to mark the highest academic qualification that they possess by providing listing known academic statuses in the questionnaires provided.

Table 4.3: Educational level of respondents

Educational level of respondents	Frequency	Percentage
Diploma	8	10%
Bachelor's Degree	54	64%
Master's Degree	22	26%
Doctorate Degree	0	0%
Total	**84**	**100%**

All of the respondents claimed that they had completed at least a diploma program at a college. Bachelor's degree is the educational level with the largest representation, with 54 respondents accounting for 64% of the total number of respondents. Those possessing a Master's degree were counted to be 22 accounting to 26% of the respondents. The remaining 8 had a Diploma and their share is 10% of the overall respondents. No respondent was found to have a Doctorate degree at all. The findings revealed that all of the respondents have completed higher education, inferring that the respondents have a considerable level of academic mastery.

4.2.2.4 Age distribution of respondents

The other demographic information that was included in the questionnaires is the age of the respondents. The age distribution of all the respondents is tabulated as showed below.

Table 4.4: Age distribution of respondents

Age of respondents	Frequency	Percentage
20 - 29	12	14%
30 - 39	49	58%
40 - 49	16	19%
50 and above	7	8%
Total	**84**	**100%**

According to the study's findings, 12 respondents, or 14 % of all respondents, were between the ages of 20 and 29 years; 49 respondents, or 58 % of all respondents, were between the ages of 30 and 39 years; 16 respondents, or 19 % of all respondents, were between the ages of 40 and 49 years; and 7 respondents, or 8 % of all respondents, were over 50 years old. The study has yielded a result that showed the majority of the respondents were aged between 30-39 years. Respondent in the age group between 40-49 years, 20-29 years and those 50 or above, consecutively follow the order of majority respondent age groups.

4.2.2.5 General working experience of respondents

The general working experience of the respondents were also requested in the questionnaires provided to them for the survey.

Table 4.5: General working experience of respondents

General Work Experience	Frequency	Percentage
Less than 2 years	2	2%
2 – 5 years	5	6%
6 – 10 years	51	61%
11 – 20 years	17	20%
21 – 30 years	6	7%
More than 30 years	3	4%
Total	**84**	**100%**

The findings of the study signposted that 51 respondents (61%) had experience between 6-10 years. 17 (20%) of the respondents had an experience between 11-20 years. Respondents having 2-5, 21-30 & more than 30 years of experience have been found to be 6%, 7% and 4% respectively.

4.2.2.6 Current post/designation of respondents

A set of choices of job title/designations were listed in the questionnaire so that respondent could select their current designation from.

Table 4.6: Current post/designation of respondents

Current Post/Designation	Frequency	Percentage
Project Managers	14	17%
Construction Supervision Engineers	29	35%
Supervision Engineer Technician	8	10%
Project Engineers	21	25%
Contract Administrators	2	2%
Site managers	10	12%
Total	**84**	**100%**

The respondents' current post/designation was included in the questionnaire so as to determine their active role in the implementation of power transmission line construction projects. Findings revealed that 29 Construction Supervision Engineers were the vast majority with 35%. There were also 21 (25%) respondents with the designation of Project Engineer. Fourteen project managers (17%) were also the third majority of the respondents. 10 Site Manager respondents were also found to had been surveyed accounting to 12% of the population. Supervision Engineer Technicians (8) and Contract Administrators (2) which accounted to 10% and 2%, respectively of the correspondents, were also found to had contributed for the study. Since the study had focused more on the factors influencing the construction part of power infrastructure projects, it was so fortunate that the majority of the respondents (i.e., Construction Supervision Engineers (30%) were those who had a designation directly related to the construction part of the projects as it would help in collecting a dependable data.

4.2.2.7 Work Experience of respondents in their current position/designation

Respondents were made to choose their work experience on their current position/designation, in their respective organizations, from a list of choices made available in the questionnaire.

Table 4.7: Work Experience of respondents in their current position/designation

Work Experience of respondents in their current position/designation	Frequency	Percentage
Less than 2 Years	7	8%
2 – 10 Years	50	60%
10 – 15 years	19	23%
More than 15 years	8	10%
Total	**84**	**100%**

The other demographic characteristic that was important to the study is the experience, in years, of the respondents in their current position/designation. This had the aim of judging if the respondents have played a major role in shaping the outcomes projects from which it would be possible to figure out a noticeable pattern which would help in deducing a research opinion. It was figured out from the research that 50 out of the surveyed 84 respondents had been in their current position/designation for a duration between 2-10 years, making this group a majority at about 60%. Respondent who had been in their current post for a period of 10-15 years follow at about 23%. Respondents who had experience in the current position for 15 plus years account to 10% with 8 out

of 84 respondents. Only 7 (8%) of the surveyed population had an experience of less than 2 years. Thus, it can be deduced here that most of respondents have a sound experience in relation to power transmission infrastructure projects.

4.3 Regulatory framework and success of power transmission infrastructure construction projects

Every project is supposed to be implemented under laws, policies and regulations that the regulatory body needs every stakeholder to adhere to. Questions related to these regulatory frameworks were designed and respondents were made to answer questions related to the influence of the regulatory frame work on the success of construction of power transmission infrastructure projects in Ethiopian Electric Power.

4.3.1 Familiarity with laws, policies and regulations

Familiarity with laws, policies and regulations was one of the questions asked to respondents; in regard to the overall construction industry in Ethiopia.

Table 4.8: Familiarity with laws, policies and regulations

Familiarity with laws, policies and regulations	Frequency	Percentage
Yes	79	94%
No	5	6%
Total	**84**	**100%**

As it can be noted from table 4.8, 79 of the respondents which account to 94% responded that they were familiar with laws, policies and regulations that govern the construction industry of Ethiopia. The remaining 5 (6%) respondents responded that they were not familiar with laws, policies and regulations that govern the construction industry in Ethiopia.

4.3.2 Using and referring of the laws, policies and regulations

Respondents were also requested to what extent they were using/referring the laws, policies and regulations in regard to the overall construction industry in Ethiopia.

Table 4.9: Using and referring of the laws, policies and regulations

Do you refer/use these laws, policies and regulations during implementation of projects?	Frequency	Percentage
Strictly Use/Refer	49	58%
Limited Use/Refer	31	37%
Do not use/refer	4	5%
Total	**84**	**100%**

What has been presented in Table 4.9, 49 (58%) of the respondents were found to strictly use/refer the available laws, policies and regulations; 31 (37%) of the respondents were found to use/refer laws, policies and regulations in a limited manner making the number of respondents which use the laws, policies and regulations strictly/in a limited manner to be 80 (95%). The remaining 4 (5%) respondents were found not to use laws, policies and regulations available.

4.3.3 Enforcement of laws, policies and regulations

Respondents were asked how often they enforced the laws, policies and regulations in regard to construction industry in Ethiopia. The respondents' responses are summarized as shown in table 4.10 below.

Table 4.10: Enforcement of laws, policies and regulations

Do you often enforce obedience of these laws, policies and regulations?	Frequency	Percentage
Yes	50	59.5%
Sometimes	29	34.5%
Never	5	6%
Total	**84**	**100%**

The collected data shows that 50 respondents (59.5%) confirmed that they often enforce the laws, policies and regulations during implementation of power infrastructure projects at Ethiopian Electric Power. Similarly,29 respondents (34.5%) indicated that they sometimes enforce the laws, policies and regulations during implementation of power infrastructure projects at Ethiopian Electric Power. Thus, 94% of the respondents enforce the laws, policies and regulations either often or sometimes. Three out of the remaining 5 respondents had indicated that they didn't have refer/use the laws, policies and regulations, as indicated in the second question.

4.3.4 Availability of governing laws, policies and regulations

Respondents were requested to indicate their understanding of the influence of availability of laws, policies and regulations on the success of construction of power transmission infrastructure at the Ethiopian Electric Power. Their understanding of the extent of influence was recorded on a Likert scale of 1 to 5 where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence.

Table 4.11: Influence of availability of governing laws, policies and regulations

How do you rate the influence of availability of governing laws, policies and regulations?	Frequency	Percentage
Very low influence	3	4%
Low influence	4	5%
Moderate influence	8	10%
High influence	32	38%
Very high influence	37	44%
Total	**84**	**100%**

Findings revealed that 37 respondents (44%) indicated that availability of governing laws, policies and regulations had a very high influence on the success of power transmission infrastructure construction projects in the Ethiopian Electric Power. Likewise, 32 respondents (38%) had responded that availability of governing laws, policies and regulations had highly influenced the success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Thus, 82% of the respondents had deduced that availability of governing laws, policies and regulations had influenced the success of construction of power transmission infrastructure projects at the Ethiopian Electric Power at very highly or highly. Whereas, 8 respondents (10%) indicated moderate influence; 4 respondents (5%) indicated low influence and 3 respondents accounting to 4% forwarded their opinion of very low influence.

The mean value to the respondents' reply for this critical factor was calculated to be 4.14. Thus, considering an interval length of 0.8, it is reasonable to assume that the

majority of respondents had rated the influence of availability of governing laws, policies and regulations as high.

4.3.5 Resourcefulness of laws, policies and regulations

Respondents were requested to rate the resourcefulness of laws, policies and regulations influence on the success of construction of power transmission infrastructure at the Ethiopian Electric Power. Likert scale of 1 to 5, similar to the preceded request, was applied with 5 indicating very high influence while 1 indicates very low influence.

Table 4.12: Influence of resourcefulness laws, policies and regulations

How do you rate the influence of the resourcefulness laws, policies and regulations	Frequency	Percentage
Very low influence	4	5%
Low influence	7	8%
Moderate influence	9	11%
High influence	30	36%
Very high influence	34	40%
Total	**84**	**100%**

As per the findings of the influence of resourcefulness of laws, policies and regulations on the success of construction of power transmission infrastructure at the Ethiopian Electric Power, 34 respondents (40%) responded very high influence. Thirty other respondents (36%) responded high influence. Thus, collectively, 76% of the respondents rated the influence of resourcefulness of laws, policies and regulations on the success of construction of power transmission infrastructure to be very high or high. The influence of resourcefulness of laws, policies and regulations on success of power

transmission infrastructure projects of Ethiopian Electric Power had been rated to be moderately influenced, low influenced and very low influenced by 9 (11%), 7 (8%) and 4 (5%) respondents, respectively.

The mean value to the respondents' reply for this critical factor was calculated to be 3.99. Thus, considering an interval length of 0.8, it can be presumed that the majority of respondents had indicated the influence of resourcefulness laws, policies and regulations to be high.

4.3.6 Enforcement of governing laws, policies and regulations

Respondents were also requested to indicate their understanding of the influence of enforcement of governing laws, policies and regulations on the success of construction of power transmission infrastructure at the Ethiopian Electric Power. Their understanding of the extent of influence was recorded on a Likert scale of 1 to 5 where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence.

Table 4.13: Influence of Enforcement of governing laws, policies and regulations

How do you rate the influence of Enforcement of governing laws, policies and regulations?	Frequency	Percentage
Very low influence	1	1%
Low influence	2	2%
Moderate influence	3	4%
High influence	41	49%
Very high influence	37	44%
Total	**84**	**100%**

Findings revealed that 37 of the respondents (44%) rated the influence of enforcement of the governing laws, policies and regulations on power transmission line infrastructure projects' success in Ethiopian Electric Power as very high. Besides, 41 respondents (49%) rated the influence of the same factor to be high. Moderate influence of enforcement of the governing laws, policies and regulations on power transmission line infrastructure projects' success in Ethiopian Electric Power had been indicated by 3 respondents which accounted to 4%. Two respondents rated the influence of the factor to be low and only one respondent expressed a very low influence opinion.

The mean value to the respondents' reply for this critical factor was calculated to be 4.32. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence to be very high.

4.4 Project funding and success of power transmission infrastructure construction projects

Indicators related to project a critical factor, funding, and that influence the success of power transmission infrastructure construction projects in Ethiopian Electric Power; were presented to respondents.

4.4.1 Source of funds

In regard to source of funds, respondents were made to indicate the influence of this factor on the success of power transmission infrastructure construction projects in Ethiopian Electric Power on Likert scale of 1 to 5 where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence.

Table 4.14: Influence of source of funds

Source of funds	Frequency	Percentage
Very low influence	1	1%
Low influence	3	4%
Moderate influence	7	8%
High influence	38	45%
Very high influence	35	42%
Total	**84**	**100%**

Findings showed that of the 84 respondents, 35 (42%) rated the influence of source of funds on the success of power transmission infrastructure construction projects in Ethiopian Electric Power to be very high. High influence of the same factor on the success of power transmission infrastructure construction projects in Ethiopian Electric Power had been showed by 38 respondents (45%). Seven respondents had expressed their opinion that the influence of source of funds on the success of power transmission infrastructure construction projects in Ethiopian Electric Power was moderate. Whereas, 3 and 1 respondents indicated low influence and very low influence, respectively. A total of 87% of the respondents indicated that high and very high influence had been opinioned on the influence of source of funds on project success. This indicates source of funds is a critical factor that influences the success of power transmission construction infrastructure projects in EEP.

The mean value to the respondents' reply for this critical factor was calculated to be 4.23. Thus, considering an interval length of 0.8, it can be deduced that the majority of

respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP.

4.4.2 Adequacy of funds

In addition to source of funds, adequacy of funds had also been considered as a factor for which respondents were supposed to put their opinion its influence on the success of power transmission infrastructure construction projects in Ethiopian Electric Power. Similar to the previous factor (source of funds), Likert scale of 1 to 5 was applied in collecting respondents' opinions where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence.

Table 4.15: Influence of adequacy of funds

Adequacy of funds	**Frequency**	**Percentage**
Very low influence	2	2%
Low influence	4	5%
Moderate influence	6	7%
High influence	38	45%
Very high influence	34	40%
Total	**84**	**100%**

The study verdicts reveal that 34 respondents (40%) indicated their opinion that the adequacy of funds' influence on the success of power transmission infrastructure construction projects in Ethiopian Electric Power is very high. Additional 38 respondents, that accounted for 45%, had also indicated the same factor had high influence on the success the projects. Six respondents (7%) had rated the influence of adequacy of funds as moderate. Whereas, 4(5%) and 2 (2%) respondents had expressed

their opinion that the impact of the factor on projects' success to be both low and very low, respectively.

The mean value to the respondents' reply for this critical factor was calculated to be 4.17. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP.

4.4.3 Approval bureaucracy of funds

The third factor that respondents forwarded their opinion over its impact on the success of power transmission infrastructure construction projects in Ethiopian Electric Power is approval bureaucracy of funds. Here again respondents were requested to indicate their understanding of influence of approval bureaucracy of funds on the on the success of power transmission infrastructure construction projects in Ethiopian Electric Power using the Likert scale of 1 to 5 where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence.

Table 4.16: Influence of Approval bureaucracy of funds

Approval bureaucracy of funds	**Frequency**	**Percentage**
Very low influence	1	1%
Low influence	1	1%
Moderate influence	3	4%
High influence	39	46%
Very high influence	40	48%
Total	**84**	**100%**

Findings revealed that 40 respondents (48%) and 39 respondents (46%) indicated their opinion that the influence of approval bureaucracy of funds on the success of power transmission infrastructure construction projects in Ethiopian Electric Power to be very high and high, respectively. Moderate influence had been indicated by 3 respondents (4%); low influence and very low influence had been indicated by 1 respondent (1%) each. As 94% of the respondents had indicated either high or very high influence of the factor considered, it would be reasonable to deduce that approval bureaucracy of funds had considerably high influence on the success of power transmission infrastructure construction projects in Ethiopian Electric Power.

The mean value to the respondents' reply for bureaucracy of funds was calculated to be 4.38. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP

4.4.4 Cash flow

The last indicator that was considered under the identified critical factor, project funding, is cash flow. The impact of cash flow on the success of power transmission infrastructure construction projects in Ethiopian Electric Power was rated by respondents using the Likert scale of 1 to 5 where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.17: Influence of Cash flow

Cash flow	Frequency	Percentage
Very low influence	0	0%
Low influence	3	4%
Moderate influence	1	1%
High influence	29	35%
Very high influence	51	61%
Total	**84**	**100%**

As per the Findings, 51 respondents (61%) and 29 respondents (35%) indicated their opinion that the influence of cash flow on the success of power transmission infrastructure construction projects in Ethiopian Electric Power to be very high and high, respectively. Moderate influence had been indicated by 1 respondent (1%); low influence by 3 respondents (3%). No respondent had indicated the influence to be very low. Since 94% of the respondents had indicated either high or very high influence of cash flow, it would be rational to validate that cash flow influenced the success of construction of power transmission infrastructure projects in Ethiopian Electric Power to a very high extent.

The mean value to the respondents' reply for this critical factor was calculated to be 4.52. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP

4.5 Project management capability and success of power transmission infrastructure construction projects

Critical factors indicators related to project management capability and that influence success of power transmission infrastructure projects were also presented to the respondents.

4.5.1 Project management structure

Respondents were made to mark their opinion on the influence of project management structure on the success of construction of power transmission infrastructure projects in Ethiopian Electric Power. Respondents were directed to use the Likert scale of 1 to 5 where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.18: Influence of organizational project management structure

Project management structure	Frequency	Percentage
Very low influence	3	4%
Low influence	5	6%
Moderate influence	6	7%
High influence	18	21%
Very high influence	52	62%
Total	**84**	**100%**

Findings showed that 52 respondents (62%) indicated very high influence of project management structure on the of success of power transmission projects in Ethiopian Electric Power. Eighteen respondents (21%) expressed their opinion of high influence;

6 respondents (7%) indicated moderate influence; 5 and 3 respondents rated the influence to be low and very low.

The mean value to the respondents' reply for this critical factor was calculated to be 4.32. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP

4.5.2 Availability of project management professionals

Respondents' opinion regarding the influence of Availability of project management professionals on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power had also been assessed through the questionnaire. Respondents' opinion was collected using the Likert scale of 1 to 5 where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.19: Influence of availability of project management professionals

Availability of project management professionals	Frequency	Percentage
Very low influence	2	2%
Low influence	6	7%
Moderate influence	7	8%
High influence	33	39%
Very high influence	36	43%
Total	**84**	**100%**

Study findings indicated that 36 respondents (43%) expressed their opinion that the influence of availability of project management professional on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. High influence had been reported by 33 respondents (39%). Whereas, 7 respondents (8%) responded with moderate influence; 6 respondents (7%) with low influence and 2 respondents (2%) with very low influence. An aggregate of 82% of the respondents expressed their opinion that availability of project management professionals had a high and very high influence on success of power transmission infrastructure construction projects in the Ethiopian Electric Power. This demonstrated that availability of project management professionals had high influence on the success of construction of power transmission infrastructures at EEP.

The mean value to the respondents' reply for this critical factor was calculated to be 4.13. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP

4.5.3 Competency of project managers

In regard to competency of project managers, respondents were requested to indicate, in their kind opinion, on a Likert scale of 1 to 5, where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence, the extent to which this factor influences success of power transmission infrastructure construction projects in the Ethiopian Electric Power.

Table 4.20: Influence of competency of project managers

Competency of project managers	Frequency	Percentage
Very low influence	2	2%
Low influence	4	5%
Moderate influence	5	6%
High influence	35	42%
Very high influence	38	45%
Total	**84**	**100%**

Findings indicated that 38 respondents (45%) stated their opinion that the influence of competency of project managers on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. High influence had been reported by 35 respondents (42%). Whereas, 5 respondents (6%) responded with moderate influence; 4 respondents (5%) with low influence and 2 respondents (2%) with very low influence. A collective of 87% of the respondents indicated their opinion that competency of project managers had a very high and high influence on success of construction of power transmission infrastructure projects in the Ethiopian Electric Power. Thus, this demonstrated that competency of project managers had a critical influence on the success of construction of power transmission infrastructures in the Ethiopian Electric Power.

The mean value to the respondents' reply for this critical factor was calculated to be 4.23. Thus, considering an interval length of 0.8, it can be deduced that the majority of

respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP

4.5.4 Authority given to project managers

The judgment of respondents was requested in regard to the influence of Authority given to project managers, under the critical factor organizational project management structure, on the success of construction of power transmission infrastructure in the Ethiopian Electric Power, under the questionnaires provided to them. The respondents were requested to indicate their understanding of the degree of influence using Likert scale of 1 to 5, where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.21: Influence of Authority given to project managers

Authority given to project managers	**Frequency**	**Percentage**
Very low influence	3	4%
Low influence	5	6%
Moderate influence	10	12%
High influence	23	27%
Very high influence	43	51%
Total	**84**	**100%**

Findings revealed that 43 respondents (51 %) stated their opinion that the influence of Authority given to project managers on the success of power transmission infrastructure construction projects in the Ethiopian Electric Power was very high. High influence had

been reported by 23 respondents (27%). Whereas, 10 respondents (12%) responded with moderate influence; 5 respondents (6%) with low influence and 3 respondents (4%) with very low influence. A total of 78 % of the respondents indicated their opinion that Authority given to project managers had either a very high or high influence on success of power transmission infrastructure construction projects in the Ethiopian Electric Power. Thus, the data implied that Authority given to project managers had a very high influence on the success of power transmission infrastructure construction projects in the Ethiopian Electric Power. All the project managers who involved in responding the questionnaires have implied either very high or high influence of the same factor on success of power transmission infrastructures projects in EEP. This can be considered as a concrete evidence that Authority given to project managers critically influences the success of transmission infrastructures projects in EEP.

All in all, the mean value to the respondents' reply for this critical factor was calculated to be 4.17. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP

4.6 Stakeholders and success of construction projects

List of factors related to stakeholder involvement, that supposedly influence the success of construction of power transmission infrastructure in the Ethiopian Electric Power, were included in the questionnaire provided to the respondents.

4.6.1 Representation of stakeholders

In regard to representation of stakeholders, respondents were requested to provide their verdict on its influence over the success of construction of power transmission infrastructure in the Ethiopian Electric Power. The respondents were requested to

indicate their understanding of the degree of influence that representation of stakeholders, an indicator under the critical factor involvement of stakeholders, had on the success of power transmission infrastructure construction projects in the Ethiopian Electric Power using Likert scale of 1 to 5, where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.22: Influence of representation of stakeholders

Representation of stakeholders	**Frequency**	**Percentage**
Very low influence	2	2%
Low influence	4	5%
Moderate influence	7	8%
High influence	34	40%
Very high influence	37	44%
Total	**84**	**100%**

Study findings indicated that 37 respondents (44%) expressed their opinion that the influence of representation of stakeholders on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. High influence of the same factor had been reported by 34 respondents (40%). Whereas, 7 respondents (8%) responded with moderate influence; 4 respondents (5%) with low influence and 2 respondents (2%) with very low influence. A cumulative of 84% of the respondents expressed their opinion that representation of stakeholders had a very high and high influence on success of power transmission infrastructure construction projects in the Ethiopian Electric Power. This demonstrated that representation of

stakeholders had a very high influence on the success of power transmission infrastructure construction projects.

The mean value to the respondents' reply for this critical factor was calculated to be 4.19. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP

4.6.2 Management of stakeholders

Respondents were requested to provide their judgement on the extent to which management of stakeholders influences the success of power transmission infrastructure construction in the Ethiopian Electric Power, under the questionnaires provided to them. The respondents were requested to indicate their understanding of the level of influence the management of stakeholders had on the success of construction of power transmission infrastructure in the Ethiopian Electric Power using Likert scale of 1 to 5, where 5 represents very high influence and 1 represent very low influence.

Table 4.23: Influence of management of stakeholders

Management of stakeholders	**Frequency**	**Percentage**
Very low influence	2	2%
Low influence	5	6%
Moderate influence	4	5%
High influence	38	45%
Very high influence	35	42%
Total	**84**	**100%**

Findings showed that 35 respondents (42%) stated their opinion that the influence of management of stakeholders on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. High influence had been reported by 38 respondents (45%). Whereas, 4 respondents (5%) responded with moderate influence; 5 respondents (6%) with low influence and 2 respondents (2%) with very low influence. A total of 87% of the respondents indicated their opinion that management of stakeholders had either a high or very high influence on the success of power transmission infrastructure construction projects in the Ethiopian Electric Power. Thus, the study indicated that management of stakeholders had a high influence on the success of construction of power transmission infrastructure in the Ethiopian Electric Power.

The mean value to the respondents' reply for this critical factor was calculated to be 4.18. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP

4.6.3 Coordination among stakeholders

Similar to other indicating factors related to involvement of stakeholders, coordination among stakeholders was assessed, via questionnaire, in regard to its influence on the success of construction of power transmission infrastructure in the Ethiopian Electric Power. Respondents rated the influence of this factor using the Likert scale of 1 to 5, where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.24: Influence of Coordination among stakeholders

Coordination among stakeholders	Frequency	Percentage
Very low influence	1	1%
Low influence	2	2%
Moderate influence	4	5%
High influence	35	42%
Very high influence	42	50%
Total	**84**	**100%**

Findings indicated that 42 respondents (50%) stated their opinion that the influence of coordination among stakeholders on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. High influence had been expressed by 35 respondents (42%). Whereas, 4 respondents (5%) responded with moderate influence; 2 respondents (2%) with low influence and 1 respondent (1%) with very low influence. A collective of 92% of the respondents indicated their opinion that coordination among stakeholders had a high and very high influence on success of power transmission infrastructure construction projects in the Ethiopian Electric Power. This, again, demonstrated that coordination among stakeholders could be considered a critical factor and had a significant influence on the success of construction of power transmission infrastructure in the Ethiopian Electric Power.

The mean value to the respondents' reply for this critical factor was calculated to be 4.37. Thus, considering an interval length of 0.8, it can be deduced that the majority of

respondents had indicated the influence of this factor to be very high on the success of power transmission projects in EEP

4.6.4 Participation of stakeholders

The other factor that constitutes the stakeholder involvement is participations of stakeholders. Respondents were requested to provide their judgement on the influence of participations of stakeholders on the success of construction of power transmission infrastructure in the Ethiopian Electric Power, under the questionnaires provided to them. The respondents were requested to indicate their understanding of the level of influence participations of stakeholders had on the success of construction of power transmission infrastructure in the Ethiopian Electric Power using Likert scale of 1 to 5, where 5 represents very high influence, 4 represents high influence, 3 represents moderate influence, 2 represents low influence and 1 represent very low influence.

Table 4.25: Influence of participations of stakeholders

Participations of stakeholders	**Frequency**	**Percentage**
Very low influence	2	2%
Low influence	3	4%
Moderate influence	12	14%
High influence	42	50%
Very high influence	25	30%
Total	**84**	**100%**

Results indicated that 25 respondents (30%) stated their opinion that the influence of participations of stakeholders on the success of construction of power transmission infrastructure projects in the Ethiopian Electric Power was very high. Forty-two respondents (50%) indicated High influence. Whereas, 12 respondents (14%) responded with moderate influence; 3 respondents (4%) with low influence and 2 respondents (2%) with very low influence. A total of 80% of the respondents indicated their opinion that participations of stakeholders had either a high or very high influence on success of power transmission infrastructure construction in the Ethiopian Electric Power. Thus, the result was implicant that participations of stakeholders had a high influence on the success of power transmission infrastructure construction in the Ethiopian Electric Power.

The mean value to the respondents' reply for this critical factor was calculated to be 4.01. Thus, considering an interval length of 0.8, it can be deduced that the majority of respondents had indicated the influence of this factor to be high on the success of power transmission projects in EEP.

5 SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

Herein this chapter, findings of the study, conclusions made and recommendations have been presented. Recommendations for further studies, that would be important if studied in the future, are also included in this chapter.

5.2 Summary

The finding of this study which was focused on assessing critical factors that influence the success of construction of power transmission line infrastructure projects: The case of Ethiopian Electric Power is summarized as followed herein under. The summary was made in accordance with the objective set out in previous chapters of this study.

With regard to the first objective of evaluating the influence of regulatory frameworks on the success of power transmission infrastructure construction projects in EEP, the study investigated three critical factors. These were availability, resourcefulness and enforcement of governing laws, policies and regulations. Pertaining to availability of governing laws, policies and regulations, 44% of the respondents indicated that the availability of governing laws, policies and regulations had very highly influenced the success of power transmission infrastructure construction projects at Ethiopian Electric Power; 38% of the respondents stated that the influence was high; 10% expressed that this factor had influenced moderately; 5% of respondents opinioned that the influence was low followed by other 4% of respondents that rated the influence of availability of governing laws, policies and regulations to be very low. In connection with resourcefulness of governing laws, policies and regulations, 40% of the respondents indicated that the resourcefulness of governing laws, policies and regulations had very highly influenced the success of power transmission infrastructure construction projects

at Ethiopian Electric Power; 36% of the respondents stated that the influence was high; 11% expressed that this factor had influenced moderately; 8% of respondents opinioned that the influence was low followed by other 5% of respondents that rated the influence to be very low. As far as the other critical factor, the enforcement of governing laws, policies and regulations is concerned, 44% of the respondents rated its influence on the success of construction of power transmission line infrastructure projects at Ethiopian Electric Power to be very high; 49% stated their opinion that the influence was high, followed by 4% of the respondents expressed an opinion of moderate influence; 2% of the respondents stated low influence and remaining 1% expressed an opinion of very low influence.

The second objective of the study was to examine the impact of project funding on the success of power transmission infrastructure construction projects in EEP. In regard to project funding, four critical factors, namely, source of funds, adequacy of funds, approval bureaucracy of funds and cash flow were investigated for the purpose of this study. On source of funds,42% of the respondents rated the influence of source of funds on the success of construction of power transmission line infrastructure projects at Ethiopian Electric Power to be very high; 45% of the respondents indicated influence of the same factor to be high; 8% of the respondents expressed an opinion of moderate influence; 4% of the respondents stated an opinion of low influence and 1% expressed an opinion of very low influence. On the subject of adequacy of funds, 40% of the respondents rated the influence of adequacy of funds on the success of construction of power transmission line infrastructure projects at Ethiopian Electric Power to be very high; 45% of the respondents indicated influence of the same factor to be high; 7% of the respondents expressed an opinion of moderate influence; 5% of the respondents stated an opinion of low influence and 2% expressed an opinion of very low influence.

In regard to approval bureaucracy of funds, 48% of correspondents expressed it had a very high influence on success of power transmission infrastructure construction projects at Ethiopian Electric Power; 46% of them also expressed a high influence of the same factor; 4% indicated moderate; 1% indicated low influence and 1% indicated very low influence. Regarding cash flow, 61% of respondents expressed that this factor had a very high influence on success of power transmission infrastructure construction projects at Ethiopian Electric Power; 35% indicated high influence of the same factor,1% expressed moderate influence and 2% expressed an opinion of low influence and 1% expressed an opinion of very low influence.

In relation to the third objective to analyze the impact of involvement of stakeholders on success of power transmission infrastructure construction projects in EEP, the critical factors considered were representation of stakeholders, management of stakeholders, coordination among stakeholders and participation of stakeholders. In regard to representation of stakeholders' influence on success of success of power transmission infrastructure construction projects at Ethiopian Electric Power, 44% of the respondents expressed their opinion that the influence was very high; 40% expressed the influence was high; 8% expressed the influence was moderate; 5% expressed influence was low and 2% expressed the influence was very low. Similarly, in regard to the influence of stakeholders' management on the success of power transmission infrastructure construction projects at Ethiopian Electric Power, 42% of the respondents indicated their opinion that the influence was very high; 45% indicated that the influence was high; 5% indicated that the influence was moderate; 6% indicated that the influence was low and remaining 2% of the respondents expressed the influence was very low. The findings of the study on the influence of coordination among stakeholders on the success of construction of power transmission line infrastructure

projects at Ethiopian Electric Power showed that 50% of the respondents expressed the influence of the factor on the success of the projects was very high; 42% of the respondents indicated high influence; moderate and low influence were indicated by 5% of the respondents; 2% of respondents rated it to be low; very low influence was indicated by 1% of the respondents. Stakeholders' participation influence on success of power transmission infrastructure construction projects at Ethiopian Electric Power had been evaluated by the 30% respondents as very high; 50% of the respondents rated its influence high; 14% rated the influence of the same factor as moderate; 4% rated its influence as low and other 2% expressed their opinion that influence was very low.

In regard to the fourth objective of studying the impact of project management capacity on the success of power transmission infrastructure construction projects in EEP, findings are explained as followed. Regarding project management capability, four factors critically indicating the condition are identified, namely, project management structure, availability of project management professionals, competency of project managers and Authority given to project managers were investigated for the purpose of this study. On project management structure,62% of the respondents rated the influence of project management structure on the success of power transmission infrastructure construction projects at Ethiopian Electric Power to be very high; 21% of the respondents indicated influence of the same to be high; 7% of the respondents expressed an opinion of moderate influence; 6% of the respondents stated an opinion of low influence and very low influence; 4% of the respondents indicated a very low influence. Regarding availability of project management professionals, 43% of the respondents rated the influence of availability of project management professionals on the success of construction of power transmission line infrastructure projects at Ethiopian Electric Power to be very high; 39% of the respondents indicated influence of the same to be

high; 8% of the respondents expressed an opinion of moderate influence; 7% of the respondents stated an opinion of low influence and 2% expressed an opinion of very low influence. On competency of project managers, 45% of respondents expressed it had a very high influence on the success of power transmission infrastructure construction projects at Ethiopian Electric Power; 42% of them also expressed a high influence of the same factor; 6% indicated moderate influence; 5% indicated low influence and 2% indicated very low influence. Regarding Authority given to project managers, 51% of respondents expressed that this factor had a very high influence on success of power transmission infrastructure construction projects at Ethiopian Electric Power; 27% indicated high influence of the same factor on the success of the said construction projects,12% expressed moderate influence, 6% expressed an opinion of low influence and 4% expressed an opinion of very low influence.

5.3 Discussion of Findings

The study demonstrated that an average of 83.73% of respondents stated that there was either high or very high influence of regulatory framework on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. This was represented by 82.1%, 76% and 93% of respondents who stated that availability, resourcefulness and enforcement of governing laws, policies and regulations, respectively, highly or very highly success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. This conforms to a report by MUDC (2012) which mentioned that performance constraints include inadequate capacity of local contractors and consultants, inadequate public sector delivery capacity, corruption, erratic work opportunities, use of outdated technologies and practices performance constraints include inadequate capacity of local contractors and consultants, inadequate public sector delivery capacity, corruption, erratic work

opportunities, use of outdated technologies and practices, lack of effective supporting policies and poor state of the economy lack of effective supporting policies.

Enforcement of these laws, policies and regulations were determined to be factors of high or very high influence by 93% of the respondents. According to Wairimu (2014), issues in the construction sector that lead to poor project performance could be caused by a lack of examining and/or enforcing current rules, policies, and regulations as well as a lack of a competent authority to do so.

In regard to project funding, an average of 90.5% of the respondent indicated that project funding very highly or highly influenced success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Cumulatively, 87% of respondents indicated that source of funds had high or very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power.

Cumulatively, 86% of the respondents opinioned that adequacy of funds had high influence success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Inadequate funds lead to time overrun and sufficient funding guarantees reasonable cash flow (Ameh, 2011).

On cash flows, a cumulative of 95% of respondents indicated that cash flow had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. According to Obuya, (2012), in the event that a contractor or a subcontractor faces cash problems to finance the project, it hinders contractors/subcontractors from employing capable labor and acquiring resources of

the right quality as well as quantity. It hinders also the procurement of good quality machinery, which in turn will contribute to success issues in the construction industry. Consequently, contractors use low-cost, low-quality materials instead of high-cost materials to save money on construction projects, while others use low-cost, unqualified labor to save money on project expenditures impacting performance of projects negatively.

The study sought to determine the influence of project management capability on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. In overall, 73.8% of respondents indicated that project management capability had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Whereas, 8.3% indicated moderate influence while 6% and 3% indicated love and very low influence respectively.

Asked on the specific inputs, 62% of the respondents stated that organizational project management structure had the very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 21% stated that the same factor had high influence. This means, 83% of the respondents agreed that organizational project management structure had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. The findings are in line with pm4dev (2016) which stipulated that one of the important decisions of project management is the form of organizational structure that will be used for the project. The main purpose of the project management organizational structure is to create an environment that fosters interactions among the team members with a minimum amount of disruptions, overlaps and conflict. It

contributes to the project performance by reducing uncertainty and confusion that typically occurs at the project initiation phase.

The respondents were asked on the influence of availability of project management professionals on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 43% believed that availability of project management professionals had very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 39% agreed that same factor had high influence. Therefore, 82% of respondents indicated that availability of project management professionals had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. The literature on project management argues that project management techniques includes individual traits like as skills, knowledge, and attitudes that accomplish tasks are aimed toward delivering successful projects in general (Rainsbury et al., 2002).

The respondents were also asked on the influence of competency of project managers influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 45% believed that competency of project managers had very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 42% agreed that it had high influence. Overall, 87% of the respondents agreed that competency of project managers had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. This is in line with study result by Ali & Chileshe, (2009) which stated that the success and failure of any project depends upon many factors, the Project Manager is considered to be the key contributor to the success of any project, as well as a guide to the team members to achieve the client satisfaction (Cost, Time and Quality).

The study finally sought to determine the influence involvement of stakeholder on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. An average of 85.7% of the respondents agreed that involvement of stakeholder had high or very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 8% indicated moderate influence, while 4.2% and 2.1% responded that involvement of stakeholder had low and very low influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power.

Overall, 85% agreed that representation of stakeholder had high and very on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. 87% of the respondents stated that management of stakeholder had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Moreover, overall 92% of the respondents believed that coordination among stakeholders had high and very high influence on success of construction of power transmission infrastructure projects at the Ethiopian Electric Power. Finally, overall 92% of the respondents believed that participation of stakeholders had high and very high influence on success of construction 12

success of a construction project, and have the crucial responsibility for delivering a project to successful completion. Likewise, Rajeev and Kothari (2014) mentioned that, in construction projects where the interactions and interrelationships among stakeholders were not strong, it was observed that projects were not executed within the budgeted cost. The finding of this study is also reinforced by Kihoro & Waiganjo (2015) who sated that missed deadlines, scope creep, confusion, disagreement, and churning are all indications that stakeholder management is failing. This is frequently

the result of competing goals, a lack of focus, or a lack of commitment, and it necessitates a communication-based approach.

5.4 Conclusion

The success of power transmission infrastructure projects should be taken into account when formulating a power system project. Projects that are finished on time and within scope, with costs correctly controlled to avoid cost overruns, and quality assurance are all examples of a project success. Thus, project managers and other project stakeholders must insure that factors influencing the success of power transmission infrastructure projects are systematically considered from the initial phase of a project to ensure that non-performance factors have their impact well and positive performance factors are heightened.

The study figured out that there is a considerable relationship between success of power transmission infrastructure projects construction and influence of regulatory framework, project funding, project management capability and involvement of stakeholders in the Ethiopian Electric Power. This relation implies that when any factor influencing the success of power transmission infrastructure in Ethiopian Electric Power is impacted, there will be an impact on the project success as well.

5.5 Recommendation

Centered on the findings of the study, the following recommendations were made: -

i. It is highly recommended that project developing bodies in EEP shall avail laws, policies and regulations which will be used during implementation of projects. Besides, a systematic approach should be used to assure that these laws, policies and regulations are being enforced during implementation of construction projects.

ii. Project developers at EEP are recommended to arrange source of funds so as to avoid any non-performance issue in the project that may arise from cash impoverishment. Since adequacy of the funds, as well, matters a lot during implementation of the projects, accurate and systematic approach is recommended to be followed while estimating the budget needed to implement a project. Inaccurate estimate results in securing inadequate funds which in return will impact the success of project implementation.

iii. It is recommended that project developers in EEP shall design a working system that enables a swift decision making in regard to approval of funds. Unnecessary and repeated funding approval processes shall be checked and the necessary reduction or elimination of these process has to be done. A structure that allows dedicated team has is also recommended to be part of a project team so as to closely follow the project fund and cash flow issues from inception to closing of projects.

iv. Project implementers are recommended to establish a project management structure that includes organizational project management capacity improvement program so as to enhance the project management capability of the developing organization. It is also recommended to engage project managers, consultants, supervisors and other technical staff in a regular training on principles of project management, essential communication skills and, state of the art project management tools. This will help in improving the success rate of construction projects by establishing a capable project management team. Issuing maximum authority to project managers in regard to every decision on projects they are in charge is also highly recommended as it would enable the project managers to use all available resources of the organization so as to avoid

any impact on the project due to conflict, confusion and communication breakdowns.

v. Project developers and project managers in EEP are supposed to engage all the project stakeholders from the inception phase of the project so that all stakeholders' concerns would be well addressed prior to the start of project implementation. Regular evaluation of project milestones is needed to be conducted in the attendance of all project stakeholders so that bottlenecks of projects shall be identified, discussed and solved before influencing the project success in regard to scope, time and quality.

5.6 Suggestion for further study

The Ethiopian Electric Power has the mandate to generate, transmit and distribute, to high voltage customers, electric power as a sole provider in Ethiopia. This study had focused more on factors that influence the success of construction power transmission infrastructure projects. Yet, as mentioned up herein, the sole electric energy provider in Ethiopia, the Ethiopian Electric Power, is also involved in carrying out construction of huge hydro, solar, wind and geothermal power generation plants that cost a way more than the associated power transmission infrastructure projects. Thus, conducting a similar study on the factors influencing the construction of these kinds of power generation plants will be a good research area for further study since it would very of paramount importance in improving the performance of these multi-million-dollar infrastructures.

In addition to this, respondents, under open ended questions, indicated factors influencing success of construction projects other than those considered in this study.

The factors that respondents indicated included land acquisition, politics, project procurement, role ambiguity among stakeholders, contract administration, supply of construction inputs, project scheduling, project performance evaluation & rewarding system and project planning. Thus, these factors could also be studied further to evaluate and/or analyze their impact on the success of construction of power transmission line infrastructure projects at the Ethiopian Electric Power. Impact of pandemics, such as Corona, on construction projects has also been suggested by a respondent.

REFERENCES

- Alam, H., Elizabeth, B., Claudia, R., Dawit, M., and Mark, R.(2018). Ethiopian energy status and demand scenarios: Prospects to improve energy efficiency and mitigate GHG emissions. Journal of Science [online] Volume (149), 15 April 2018, Pages 161-172, available at http://www.sciencedirect.com/science/article/pii/S0360544218302950 [Accessed 8 Apr. 2021].
- Al-Ageeli, H and Alzobaee, A. Critical Success Factors in Construction Projects (Governmental Projects as a Case Study). Journal of Engineering, 2016, Volume 22, Issue 3, Pages 129-147
- Alemayehu, M. (2015). Causes of Project Implementation Delay in the Ethiopian Electric Utility Enterprise: The Case of Construction Projects in Universal Electric Access Program. Journal of business and administrative studies (JBAS), Vol. 7, No. 2, ISSN-2077-3420, pp: (30-71)
- Ali, M. & Chileshe, N. (2009). The influence of the project manager on the success of the construction project.
- Ameh, O. & Osegbo, E. (2011). Study of Relationship between Time Overrun and Productivity on Construction Sites. International Journal of Construction Supply Chain management, 67(1), 56-67.
- Andiva, Y. (2018). Continuous growth in building and construction industry in East Africa. Available at: https://constructionreviewonline.com/news/continuous-growth-in-building-and-construction-industry-in-east-africa/ (Accessed: 14 December 2021)

- Antvik, S., & Sjöholm, H. (2007). Project management and methods. Stockholm: Elanders Sverige AB.
- Arditi, D., Koksal A., and Kale, S. (2000). “Business Failures in the Construction Industry.” Engineering, Construction and Architectural Management 7 (2): 120–132
- Benti, N., Gurmesa, G., Argaw, T., Aneseyee, A., Gunta, S., Kassahun, G., Aga, G., and Asfaw, A. (2021). The current status, challenges and prospects of using biomass energy in Ethiopia. Journal on Biotechnology for Biofuels [online], 14(2021), 209. Available at: https://biotechnologyforbiofuels.biomedcentral.com/articles/10.1186/s13068-021-02060-3#article-info
- Creswell, J. and Creswell, J. (2018) Research design: Qualitative, quantitative and mixed method approach. California: SAG Publication Ltd. (5th ed), pp.40-41
- Dacha, V. & Juma, D. (2018). ‘Effect of Stakeholder Participation On the Efficiency of the Procurement Process in The Public Effect of Stakeholder Participation On the Efficiency of the Procurement Process in The Public’. Strategic Journal, 5(2), pp. 1206-1230.
- Dawson, C. (2002). Practical Research Methods: A user-friendly guide to mastering research techniques and projects. Oxford: How To Books Ltd,
- Conway, H., Dr Crandall, M., Capt Ryan, K. and COL Khalil, G, (2005). Construction A report on the industry. Washington D.C: National Defense University
- Durdyev, S. (2017). Significant contributors to cost overruns in construction projects of Cambodia’. Cogent Engineering, 4(1), pp. 1-10.

- Freeman, R. (1984). Strategic management: A stakeholder approach. Boston: Pitman/Ballinger,
- Gadisa, B. and Zhou, H. (2020). Exploring influential factors leading to the poor performance of public construction project in Ethiopia using structural equation modelling, Engineering, Construction and Architectural Management, Vol. ahead-of-print No. ahead-of-print. Available at: https://doi.org/10.1108/ECAM-12-2019-0689
- Grover, V. (2015). Research Approach: An Overview: Golden Research Thoughts. International Multidisciplinary Research Journal [online] Volume 4 | Issue 8 | Feb 2015, Pages 6-7, available at https://www.researchgate.net/publication/256053334_Qualitative_and_Quantitative_Research_How_to_Choose_the_Best_Design [Accessed 6 June. 2021].
- Gudiene, N., Banaitis, A., Banaitiene, N., Lopes, J.,(2013)) 'Development of a conceptual critical success factors model for construction projects: A case of lithuania', Procedia Engineering, 57, pp. 392–397. doi: 10.1016/j.proeng.2013.04.051.
- Guo-li, Y. (2010). Project Time and Budget Monitor and Control. Management Science and Engineering, 56-61.
- Hampson, K., Kraatz, J. and Sanchez, X. (2014). The Global Construction Industry and R&D. Queensland. Queensland University of Technology
- Harris, F. & McCaffer, R. (2005). Modern Construction Management (5th ed.). London: Blackwell Publishing
- Haughey, D. (2011). Understanding the project management triple constraint
- Ipdc.gov.et (2015) Available at: http/www.ipdc/gov.et/index.php/en/

- International Lab our Organization. (2001). The construction industry in the twenty first century: Its image, employment prospects and skill requirements: Tripartite Meeting on the Construction Industry in the Twenty-first Century: Its Image, Employment Prospects and Skill Requirements. Geneva.
- Jha, K. N., & Iyer, K. C. (2006). Critical Factors Affecting Quality Performance in Construction Projects. New Delhi: Indian Institute of Technology
- Kamau, W. & Paul N. A. (2018). Effect of Project Management Practices on Performance of Construction Projects in Laikipia County, Kenya. International Journal of Recent Research in Social Sciences and Humanities (IJRRSSH), Vol. 5, Issue 2, pp: (7-13)
- Kivitis, R. (2013). Multi-Dimensional stakeholder analysis: A methodology applied to Australian capital city airports, Lismore: Southern Cross Univeristy.
- Kothari, R. (2004) Research Methodology: Methods and Techniques. New Delhi: New Age International (P) Limited, Publishers. (2nd ed).
- MacManus, J. (2011). Managing Projects in software development projects. New York: Routledge, Taylor and Francis group. (2nd ed)
- Mallawaarachchi, H., & Senaratne, S. (2016). Importance of Quality for Construction Project Success.
- Ministry of Finance and Economic Development (2013). Brief Note on the 2005 (EFY)* GDP Estimates series, http://www.mofed.gov.et/English/Resources/Documents/THE percent202005percent20EFYpercent20GDPpercent20andperc ent20OTHERpercent20RELATEDpercent20MACROECONO MICpercent20INDICATORS.PDF

- Ministry of Urban Development and Construction (2012). Construction Industry Policy (First Draft)
- Neuhauser, C. (2007). Project manager leadership behaviors and frequency of use by female project managers. Project Management Journal, 38(1): 55-67
- Nundwea, M. and Mulengab, N., (2017). Delays in Construction of Electrical Power Transmission Lines in Zambia. Lusaka: University of Zambia
- Obuya, V. M. (2012). Causes of Collapse of Buildings in Mombasa County. A case of Mombasa Island -Kenya.
- Oke, A. E., Aigbavboa, C., & Dlamini, E. (2017). Factors Affecting Quality of Construction Projects in Swaziland. Conference: Conference: 9th International Conference on Construction in the 21st Century, At Dubai, UAE.
- Omenya, N. (2018). Factors Influencing Performance of Construction Of Power generation Infrastructure Projects In Kenya: A Case Of Kenya Electricity Generating Company, Olkaria, Naivasha. Nairobi: University of Nairobi.
- Orero, P. and Datche, E. (2015). Factors Affecting the Performance of Construction Projects: A Survey of Construction Projects in the Coastal Region of Kenya. International Journal of Scientific and Research Publications, Volume 5, Issue 10, 2250-3153
- Pall, G., Bridge, A. Gray, J. and Skitmore, M., (2019). Causes of Delay in Power Transmission Projects: An Empirical Study. Queensland: Queensland University of Technology
- PM4DEV. (2016). Project Management for Development Organizations: A methodology to manage development projects for international humanitarian assistance and relief organizations

- Project management institute (PMI). (2008). Defining project_ success a multilevel framework Home page. [online] https://www.researchgate.net/publication/242331546_Defining_ project_success_ a_ multi-level_framework [Accessed 6 June. 2021]
- Prabhu, P. (2016). Study on the Influence of Stakeholders in Construction Industry. International Journal of Engineering Technology, Management and Applied Sciences, Volume 4, Issue 6, ISSN 2349-4476, pp: (31-32)
- Rahman, A. (2013). Significant Factors Causing Cost Overruns in Large Construction Projects in Malaysia, Journal of Applied Sciences, 13(2), 286-293. Publisher: Asian Network for Scientific Information.
- Rainsbury, E., Hodges, D. L., Burchell, N., & Lay, M. C. (2002). Ranking workplace competencies: Student and graduate perceptions.
- Rajeev, S. & Kothai, P. (2014). Study on the Influence of Stakeholders in Construction Projects. Journal of Construction Engineering and Project Management, 4(2), pp. 8-11
- Sammy, K. (2014). Factors Affecting the Performance of Construction Projects in Mombasa County, Kenya. Nairobi: University of Nairobi.
- Sullivan, M. (2017). The Impact of Funding Issues on Project Delivery. USDOT Federal Highway Administration
- Study.com. (2022). Internal & External Stakeholders: Definition & Examples. Available at:https://study.com/academy/lesson/internal-external-stakeholders-definition-examples.html (Accessed: 07 December 2021)
- The Big 5. (2017). Construction East Africa: - The Emerging West Africa Construction Market.

- UNDP (2014). Country Economic Brief. Available at: https://www.et.undp.org/content/ethiopia/en/home/library/UNDPEthiopia/UNDP_Ethiopia_EconomicBrief_Feb_2014.html (Accessed: 07 December 2021)
- Vogwell, D. (2003). Stakeholder management. Paper presented at PMI® Global Congress 2003—EMEA, The Hague, South Holland, The Netherlands. Newtown Square, PA: Project Management Institute
- Wairimu, I. (2014). Daily Nation : Laws should be updated to put Kenya at par with other states. Nairobi, Kenya.
- Wyse, S. (2011). Explaining the difference between qualitative and quantitative research. https://gradesfixer.com/ (2019) Home page. [online] Available at: https://gradesfixer.com/free-essay-examples/qualitative-vs-quantitative-research/
- Yemane, W., (2017). Critical Success Factors and Success Criteria of Construction Projects: the case of Ethiopian Electric Power. Addis Ababa: Addis Ababa University
- Zulu, S. (2007) Impact of project management on project performance: a structural equation modelling approach. In: Boyd, D (Ed) Procs 23rd Annual ARCOM Conference, 3-5 September 2007, Belfast, UK, Association of Researchers in Construction Management, 651-660

APPENDICES

Appendix I: Questionnaire for respondents

Questionnaire for Respondents

Introductory Remarks

I am a postgraduate student at the university of Addis Ababa, School of commerce, Department of project management attending an assisted distance program. I am conducting a research study titled "Assessment of Key Success Factors in Construction Projects: The case of power transmission construction projects in Ethiopian Electric Power". This is to kindly request you to provide me your honest views and responses to this questionnaire by ticking and/or explaining in the spaces provided for the same. I would like to guarantee you that whatever data provided shall be processed anonymously with utmost confidentiality. The contribution you made to the success of this study will be highly appreciated.

SECTION I: GENERAL INFORMATION

(Tick (✓) where *applicable)*

1. What is your role in power transmission construction projects' implementation at the Ethiopian Electric Power (EEP)?

   Power Transmission Project Managers of EEP ( )
   Project Manager of a Contractor ( )
   Technical project management office staff of EEP ( )
   Construction site supervision staff ( )

2. Gender

Female ( )

Male ( )

3. Educational Level

Diploma ( )

Bachelor's Degree ( )

Master's Degree ( )

Doctorate Degree ( )

4. Age

20 – 29 Years ( )

30 – 39 Years ( )

40 – 49 Years ( )

50 Years and above ( )

5. General Work experience

Less than 2 Years ( )

2 – 5 Years ( )

6 – 10 Years ( )

11 – 20 Years ( )

21 – 30 Years ( )

More than 30 Years ( )

6. What is your current post/title?

Project Manager ( )

Construction Supervision Engineer ( )

Supervision Engineer Technician ( )

Project Engineer ( )

Contract Administrator ( )

Site manager ( )

7. For how many years have you been working in your organization in the current position/designation?

Less than 2 Years ( )
2 – 10 Years ( )
10 – 15 years ( )
More than 15 years ( )

SECTION II: REGULATORY FRAMEWORK

(Tick (✓) to indicate your answers among the choices provided)

8. Are you familiar with the construction industry's laws, policies, and regulations?

Yes ( )
No ( )

9. Do you apply and/or refer to these laws, policies and regulations during implementation of power transmission infrastructure projects at Ethiopian Electric Power?

Strictly apply/refer ( )
Limited apply /refer ( )
Never ( )

10. How often do you enforce obedience to these laws, policies and regulations while implementing power transmission infrastructure projects at Ethiopian Electric Power?

Always ( )
Sometimes ( )
Never ( )

11. What is the extent to which the below listed factors influence success of construction of power transmission system infrastructure projects at Ethiopian Electric Power? Rate on a scale of 1 to 5 *where 5 represents very high influence,*

4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence. [Tick (✓) to indicate your answers amongst the choices]

Regulatory Framework	**1**	**2**	**3**	**4**	**5**
How do you rate the influence of availability of governing laws, policies and regulations?					
How do you rate the influence of the resourcefulness of these laws, policies and regulations					
How do you rate the influence of enforcement of governing laws, policies and regulations?					

SECTION III: PROJECT FUNDING

12. What is the extent to which the below listed factors influence success of construction of power transmission system infrastructure projects at Ethiopian Electric Power? Rate on a scale of 1 to 5 *where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence. [Tick (✓) to indicate your answers among the choices provided]*

Project Funding	**1**	**2**	**3**	**4**	**5**
Source of funds					
Adequacy of funds					
Approval bureaucracy of funds					
Cash Flow					

SECTION IV: PROJECT MANAGEMENT CAPABILITY

13. What is the extent to which the below listed factors, that are related project management capability, influence success of construction of power transmission system infrastructure projects at Ethiopian Electric Power influence? Rate on a scale of 1 to 5 *where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence. [Tick (✓) to indicate your answers among the choices provided]*

Project Management Capability	**1**	**2**	**3**	**4**	**5**
Organizational project management structure					
Availability of project management professionals					
Competency of project managers					
Authority given to PMs					

SECTION V: INVOLVEMENT OF STAKEHOLDER

14. In your kind opinion, do project stakeholders have an influence on success of construction of power transmission system infrastructure projects at Ethiopian Electric Power?

Yes ( )

No ( )

15. What is the extent to which the below listed factors, related to project stakeholders, influence success of construction of power transmission system infrastructure projects at Ethiopian Electric Power? Rate on a scale of 1 to 5 *where 5 represents very high influence, 4 high influence, 3 moderate influence,2 low influence and 1 represent very low influence*. *[Tick (✓) to indicate your answers among the choices provided]*

Involvement of Stakeholder	**1**	**2**	**3**	**4**	**5**
Representation of stakeholders					
Management of stakeholders					
Coordination among stakeholders					
Participation of stakeholders					

SECTION VI: **PROJECTS SUCCESS**

16. Indicate you're your degree of agreement/disagreement on the below listed statements on success of projects on a scale of 1 to 5 *where 5 represents strongly agree, 4 agree, 3 neutral, 2 disagree and 1 represent strongly disagree. [Tick (✓) to indicate your answers among the choices provided]*

Success of projects	**1**	**2**	**3**	**4**	**5**
Projects shall be completed timely					
Cost of Projects must be within budget					
Projects must be completed in compliance to agreed quality standards					

17. Please list factors that you think, from your experience on the sector, have contributed to and most substantially affected the success and performance of construction of power transmission system infrastructure projects at Ethiopian Electric Power.

Thank you for your feedback. We really appreciate your time!