



ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

**Assessment of Fourth Generation LTE Layering Project Performance in Ethio Telecom:
The Case of Sites in Addis Ababa**

By

Biruk Temtem Belachew

**A Project Work Submitted to Addis Ababa University College of Business and Economics,
School of Commerce in Partial Fulfillment of the Requirement for the Degree of Master of
Arts in Project Management**

Advisor: Wubshet Bekalu (PhD)

June 2022

Addis Ababa, Ethiopia

Addis Ababa University

School of Commerce

An Assessment of 4G LTE Layering Project Performance in Ethio Telecom: Case study for Sites
in Addis Ababa

By: Biruk Temtem

Approved By Board of Examiners

_____	_____	_____
Advisor	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

DECLARATION

I declare that this MA thesis is my original work, has never been presented for a degree in this or any other university. All source of materials used and cited within this paper have been duly acknowledged and listed in the reference section.

Name

Signature

Date

Biruk Temtem Belachew

ID:- GSD/2178/11

LETTER OF CERTIFICATION

This is to certify that the project work presented in in this report, entitled “Assessment of Fourth Generation LTE Layering Project Performance in Ethio Telecom: The Case of Sites in Addis Ababa” is conducted by Biruk Temtem Belachew under my supervision and guidance. This work is original in nature and, in my opinion, suitable for submission in partial fulfillment of the requirement for the award of Master of Arts Degree in Project Management.

Advisor - Wubshet Bekalu (PhD)

Signature: _____ Date: _____

ACKNOWLEDGMENTS

This project work would not have been possible without the support of many individuals. Many thanks to my advisor, Dr. Wubshet Bekalu, who gave me revisions and feedback on the paper. In addition, I would like to thank my family and colleagues who supported me during my studies and enable me to finish the project work on time. Finally, I would like to thank Ethio Telecom project roll out staffs who gave me their precious time to respond to the online questionnaire.

Biruk Temtem

June 2022

Contents

Approval Sheet	ii
Declaration.....	iii
Letter of Certification.....	iv
Acknowledgements.....	v
List of Figures.....	ix
List of Tables	x
Acronyms	xi
Abstract	xii
Chapter One. Introduction	1
1.1 Background of the organization	2
1.2 Statement of the problem	3
1.3 Research questions	4
1.4 Objectives of the study.....	4
1.4.1 General Objectives.....	4
1.4.2 Specific Objectives.....	4
1.5 Significance of the study.....	4
1.6 Scope of the study	5
1.7 Limitation of the study	5
1.8 Definition of terms	5
1.9 Organization of the study	6
Chapter Two. Literature Review	7
2.1 Introduction.....	7
2.2 Theoretical Literature	7

2.2.1 What is Project?	7
2.2.2 What is Project Management?	7
2.2.3 Project Life cycles	8
2.2.3.1 Initiation Process Group.....	9
2.2.3.2 Planning Process Group.....	9
2.2.3.3 Execution Process Group.....	9
2.2.3.4 Monitoring and Controlling Process Group.....	9
2.2.3.5 Closing Process Group.....	9
2.3 Empirical Literature	12
2.4 Conceptual Framework of the study.....	15
Chapter Three. Research Methodology	16
3.1 Research design	16
3.2 Description of study variables.....	16
3.3 Description of study area and target population.....	16
3.4 Sampling technique	16
3.5 Data Collection.....	17
3.6 Data Analysis – Model, Techniques, Software.....	19
3.7 Validity and Reliability.....	20
3.5 Ethical considerations.....	20
Chapter Four. Data Analysis and Presentation.....	22
4.1 Introduction.....	22
4.2 Response rate.....	22
4.3 Background information of the respondents.....	22
4.4 Reliability Analysis.....	23

4.5 4G LTE project performance practices assessment through the project phases.....	24
4.5.1 Initiation phase practice	24
4.5.2 Planning phase practice	25
4.5.3 Execution phase practice	27
4.5.4 Monitoring and Control phase practice.....	28
4.5.5 Closing phase practice	29
4.6 Challenges.....	30
4.7 Project Performance.....	31
4.8 Correlation between variables.....	31
4.9 Regression Analysis.....	33
Chapter Five: Conclusions and Recommendations.....	37
5.1 Summary of findings and Conclusion.....	37
5.2 Recommendations.....	40
5.3 Future research recommendation.....	41
References.....	42
Appendices.....	45

List of Figures	Page
Figure 2.1 Project Management Components	8
Figure 2.2 Generic depiction of a project life cycle	9
Figure 2.3 Example of Process Group Interactions Within a Project or Phase	10
Figure 2.4 The five phases and 25 action steps of the project management life cycle	11
Figure 2.5 Conceptual framework.....	15
Figure 3.1 Mind map representation for qualitative and quantitative methodologies	18

List of Tables	page
Table 3.1 Sample size rule of thumb.....	17
Table 4.1 Respondents demographic characteristics.....	23
Table 4.2 Reliability Statistics.....	24
Table 4.3 Descriptive Statistics.....	24
Table 4.4 Initiation phase practice.....	25
Table 4.5 Planning phase practice.....	26
Table 4.6 Execution phase practice.....	27
Table 4.7 Monitoring and control phase practice.....	28
Table 4.8 Closing phase practice.....	29
Table 4.9 Challenges.....	30
Table 4.10 Project performance.....	31
Table 4.11 Conventional approach to interpreting a correlation coefficient.....	32
Table 4.12 Correlation Statistics.....	32
Table 4.13 Multiple Linear Regression Result.....	34
Table 4.14 Model Summary.....	34
Table 4.15 ANOVA Table.....	35
Table 5.1 Summary of the Project phases, challenges, and project performance Assessment Findings.....	40

Acronyms

1G – First Generation

2G – Second Generation

3G – Third Generation

3GPP - Third Generation Partnership Project

4G – Fourth Generation

5G – Fifth Generation

CSF – Critical Success Factor

ETC – Ethiopian Telecommunication Corporation

ETA – Ethiopian Telecommunication Authority

GSM - Global System for Mobile Communications

GTP – Growth and Transformation Plan

HSPA – High Speed Packet Access

IBTE - The Imperial Board of Telecommunications of Ethiopia

IDU – Indoor Unit

IP – Internet Protocol

ITU – International Telecommunications Union

LLD – Low Level Design

LTE – Long Term Evolution

PAT – Preliminary Acceptance Test

PM – Project Management

PMBOK – Project Management Body of Knowledge

PMO – Project Management Office

SPSS – Statistical Package for the Social Sciences

TD-SCDMA – Time Division Synchronous Code Division Multiple Access

TEP – Telecom Expansion Project

UMTS – Universal Mobile Telecommunication System

VIF – Variance Inflation Factor

WBS – Work Breakdown Structure

WCDMA – Wideband Code Division Multiple Access

ZTE – Zhongxing Telecom Enterprise

Abstract

The purpose of this study was to assess the performance of the Fourth Generation LTE layering project in Addis Ababa through the project phase practices, challenges, and opportunities. Moreover, the study also assessed the strength and weakness of the project in the project life cycle phase practices. Descriptive type of study is applied to address the specific objectives of the study. Quantitative data type is used for the analysis and to reach to a conclusion. Primary data has been collected by sending structured electronically administered questionnaires for respondents. Moreover, Secondary data has been collected from the Ethio Telecom project documents. The total population who participated on the project were 61 and all population was used for the study. The survey tool used was questionnaire with five-point Likert scale. For the analysis of the descriptive data SPSS version 25 was used after the questionnaire with the five-point Likert scale response was coded into the SPSS software. Results from the descriptive analysis shows that except the closing phase practice, the initiation, planning, execution and monitoring and control phase showed satisfactory practice. There was no severe challenge faced during the project deployment but there were some challenges like lack of adequate training, and knowledge sharing for the project staffs, communication gap between project staffs and vendor, bureaucracy in public offices and political instability in the country which hindered the project implementation. From the regression analysis, except the execution and closing phase practices, all practices are found to be significant predictors for the project performance. The overall performance of the project was good with the project completed within the planned schedule, scope, and deliverables. Having large customer base, project team exposure for new technologies which will make them to do mini projects by themselves and hence minimization of cost, Implementing the 4G layering project in Addis Ababa within short period of time were found out to be an opportunity for Ethio Telecom, employees, and customers. The findings of this study are of great importance for future projects in and fill the gap of empirical evidence in the company. The researcher recommends similar studies to be conducted in other projects in Ethio Telecom so that the efficiency of project implementation practices will increase.

Key Words: - Project Performance, Project Management, Project Life Cycle, 4G LTE, Ethio Telecom

CHAPTER ONE

INTRODUCTION

Dahlman et.al (2014), Mobile communication technologies are often divided into generations with 1G being the analog mobile radio systems of the 1980s, 2G the first digital mobile systems, and 3G the first mobile systems handling broadband data. The next generation, 4G or Long-Term Evolution (LTE), provides even better support for mobile broadband.

Bhandarkar et.al (2016), Third Generation (3G) mobile networks faces a new rival, so called 4G. An astonishingly new network may be even more profitable. The goal of 4G is to replace the current proliferation of core networks, with a single worldwide cellular core network based on standard IP for control and media.

Wireless technologies have transformed our lives greatly. Until a few years back, we needed a wired computer connected to telephonic ports to get internet access. Nowadays, mobile phones are used for super-fast internet, with applications ranging from banking to movie ticketing. This wireless technology helps reduce cost and increases mobility. Devices are shrinking in terms of their size and are growing in processing speeds. 4G is the fourth generation of broadband mobile technology after 3G. All 4G technologies and other future technologies will serve the same expectation, i.e. to provide enormously high data transfer rates to excessive number of users at the same time.

Dahlman et.al (2011) Discussed that the work on LTE was initiated in late 2004 with the overall aim of providing a new radio-access technology focusing on packet-switched data only. The first phase of the 3GPP work on LTE was to define a set of performance and capability targets for LTE. This included targets on peak data rates, user/system throughput, spectral efficiency, and control/user-plane latency. In addition, requirements were also set on spectrum flexibility, as well as on interaction/compatibility with other 3GPP radio-access technologies (GSM, WCDMA/HSPA, and TD-SCDMA).

Cox (2014), LTE was designed by a collaboration of national and regional telecommunications standards bodies known as the Third Generation Partnership Project (3GPP) and is known in full as 3GPP Long-Term Evolution. LTE is evolved from an earlier 3GPP system known as the Universal Mobile Telecommunication System (UMTS), which in turn evolved from the Global System for Mobile Communications (GSM).

This chapter covers background of the study, the problem statement, research questions research objectives, the significance of the study, the scope of the study, limitations of the study, organization of the study and definition of terms.

Ethio Telecom has been undergoing a 4G LTE layering project which included LTE and LTE-Advanced technologies to meet the demand of data service for its customers throughout the country. After the Telecom Expansion Project (TEP) was deployed eight years ago, 4G LTE layering project was implemented for the high demand of data service throughout the country. The project was carried out by the Chinese company Huawei technologies Ethiopia PLC and Ethio Telecom's project team after they signed an agreement in December 2020. The project included survey, design, planning, project management, installation, commissioning, optimization and testing, training package and acceptance procedures for LTE layering and small cell deployment.

The project also included site survey and LLD, network planning and design, upgrade microwave link capacity, microwave IDU swap, microwave hardware upgrade and link swap, microwave link dismantle and LTE layering.

This study focuses on the assessment of the performance for the 4G LTE layering project for sites in Addis Ababa.

1.1 Background of the Organization

Telecommunication service was introduced in Ethiopia by Emperor Menelik II in 1894 when the construction of telephone line from Harar to the capital city, Addis Ababa, was commenced. Then the interurban network was continued to expand satisfactorily in all other directions from the capital. Many important centers in the Empire were interconnected by lines, thus facilitating long distance communication with the assistants or operators at intermediate stations frequently acting as verbal human repeaters between the distance calling parties.

After the independence from the Italian occupation, the re-established Ministry of PT and T took over the running of Telephone, Telegraph and Radio Communication.

The Imperial Board of Telecommunications of Ethiopia (IBTE) was established by the proclamation No. 131 on October 15, 1952. The main purpose of the Board was to rehabilitate, extend, repair, and maintain the telecommunication facilities of Ethiopia and to engage in the business of telecommunication for profit. In 1960, IBTE looked after the operational matters of central Ethiopia, and a dedicated regional office was created in Addis Ababa.

In October 1975, the organization was renamed the provisional military government of socialist Ethiopia, Telecommunication Service. It was renamed again as Ethiopian Telecommunications Authority (ETA) in January 1981. It retained its name as ETA up to November 1996. At this period, the telecommunication services have made a major change of technology ranging from Automatic to Digital technology.

Under the Federal Democratic Republic of Ethiopia, the telecommunications sector was restructured and two separate independent entities namely the Ethiopian Telecommunications Authority (ETA) and the Ethiopian telecommunications Corporation (ETC) were established by Proclamation No 49/1996 on November 1996. As a continuation of the 2005/06 – 2009/10 five-year plan and after concentrating its efforts on education, health and agriculture, the Ethiopian government has decided to focus on the improvement of telecommunication services, considering them as a key lever in the development of Ethiopia, Ethio telecom was born on Monday 29th November 2010. From this ambition of supporting the steady growth of the country, within the Growth and Transformation Plan (GTP), with ambition objectives for 2015.

1.2 Statement of the problem

Most projects fail because of numerous factors. Some of the reasons are, a change in organizational priorities, failing setting a clearer goals and objectives, scope creep, lack of communication, team conflict, lack of accountability, impractical deadlines, poor risk management, etc. Moreover, projects do not assess their project implementation practice and it is hard to know if they have achieved their goals.

In addition, projects fail because of incomplete practice in the planning phase. For example, lack of resource planning. What human resources are required? Which people and for how long? What facilities are required? What outside vendors will we rely on? What are their turnaround times and limitations? What knowledge resources might we be lacking? The other reason of failure is due to unrealistic expectation. The project manager needs to gain a clear picture of what the team can accomplish and in what time frame.

Too often, businesses undertake projects believing they will be beneficial for the organization, only to see them fail to deliver what was expected. According to PMI, 9.9% of every dollar is wasted on poor project management and execution. As a result, organizations waste an enormous amount of resources, including time, money, and personnel – executing tasks that won't produce a return on investment.

Atsbha (2018) found out in his study that Telecom Expansion Project in Ethio Telecom, (TEP, 2016; TEP-3 PIP, 2014) assessment showed that it faced up with schedule and cost variances that affected the overall

performance of the project. From project closure documents, there was a variance between contract agreement and actual in the starting date (to about greater than a year) and finishing date of the implementation in the Northern and Eastern (N&E) Regions of the backbone transmission phase of the project. Similarly, the whole project had about one-year delay. This indicates there are some problems in time management during the project implementation that influences the time management performance of the project. As telecom technologies are changing at breakneck speed, it is necessary to assess time management practices on the actual implementation of the project. There was about -14% cost variance between contract agreement and actual budget on the N&E (Northern and Eastern) Region backbone transmission phase implementation of the project.

Therefore, it is crucial to assess the project implementation practices throughout the project phase practices to have a successful project. The researcher is motivated to conduct this study to assess these problems in the project life cycle phases, challenges, and opportunities in the project implementation of the 4G LTE layering project in Addis Ababa.

1.3 Research Questions

- How does the project performance of 4G LTE Layering project in Addis Ababa assessed through the project life cycle phase practices?
- What were the challenges during the project deployment?
- What were the opportunities during the project implementation?

1.4 Objective of the study

1.4.1 General Objective

The general objective of the study is to assess the performance of the 4G LTE layering project in Addis Ababa.

1.4.2 Specific Objectives

- To assess the performance of the 4G LTE layering project in the initiation, planning, execution, monitoring and controlling, and closing phases.
- To assess the challenges during the project deployment.
- To assess the best practices and opportunities in the deployment of the project.

1.5 Significance of the study

Ethio Telecom has been spending huge investment on the telecom infrastructure to satisfy the telecom needs of its customers.

This study has a huge importance for future projects by providing information through identifying the strength and weakness of project implementations carried out by Ethio Telecom in each project phases,

challenges, and opportunities. It will also contribute for future research in the field of project management implementation practices.

1.6 Scope of the study

The scope of this study is limited to the performance of 4G LTE Layering project carried out by Ethio Telecom in cooperation with Huawei company in Addis Ababa and does not include other 4G LTE layering projects in regions. Moreover, the study does not include other related projects implemented in the company.

1.7 Limitation of the study

Since projects are unique, the generalization of one project from the literature review might not work for the other. Furthermore, due to time and resource constraints few data collection instruments are used. Moreover, due to the data confidentiality of the company, there was limited access to the company's data.

1.8 Definition of Terms

Project: A project can be any series of activities and tasks that has a specific objective to be completed within certain specifications, that has a defined start and end dates, that has a funding limit (if applicable), that consume human and nonhuman resources (i.e., money, people, equipment), that is multifunctional (i.e., cut across several functional lines) (Kerzner 2009).

Project Management: Project management is a discipline of combining systems, techniques, and people to complete a project within established goals of time, budget, and quality. (Sunny & Baker 2000). Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMBOK 2017).

Project Life Cycle: A project life cycle is the series of phases that a project passes through from its start to its completion. A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. (PMBOK 2017).

Project Phase: A collection of logically related project activities that culminates in the completion of one or more deliverables (PMBOK 2017).

Project Management Process Group: A Project Management Process Group is a logical grouping of project management processes to achieve specific project objectives. Process Groups are independent of project phases. (PMBOK 2017).

Project charter: A project charter is a document issued by the project initiator or sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities (PMBOK 2017).

Project Scope: The work performed to deliver a product, service, or result with the specified features and functions (PMBOK 2017).

Lessons Learned: The knowledge gained during a project, which shows how project events were addressed or should be addressed in the future, for the purpose of improving future performance (PMBOK 2017).

Risk: An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives (PMBOK 2017).

4G: - Fourth Generation – is a specification given by the International Telecommunications Union (ITU) which is known primarily for its broadband capabilities and significantly faster speeds than the former 3G.

LTE: Long Term Evolution – A marketing phrase to signify progression toward true 4G.

1.9 Organization of the study

This study comprises of five chapters, and it also includes references and appendices. The first chapter is the introduction part where it discusses on the background of the study, background of the Ethio Telecom, statement of the problem, research questions, the objectives of the study, the significance of the study, the scope of the study, the organization of the study and definition of terms.

Chapter two discusses about the theoretical literature about project, project management and project life cycles. Moreover, it discusses on empirical literature and conceptual framework of the study.

Chapter three focuses on the research methodology like the research approach, design, data sources and types, population and sample, the data collection procedure, ethical considerations, and validity and reliability.

Chapter four discusses about data analysis and presentation. It discusses about the 4G implementation practice in Addis Ababa with the five project phases. It discusses the project phases performance and the regression analysis.

Chapter five discusses about summary of findings of the study, the conclusion, and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Boote et.al (2005) highlighted the point that before conducting research scholars need to understand what had been done before. They also identified the importance of researchers being able to cite previous work related to their research to support the scientific process of cumulative research that builds upon prior research. Boote and Beile identified the following key objectives that a literature review should provide to research:

- It sets the broad context of the study.
- It clearly demarcates what is and what is not within the scope of the investigation.
- It situates an existing literature in a broader scholarly and historical context.

In this section theoretical literature, empirical literature and conceptual framework of the study will be discussed.

2.2 Theoretical Literature

2.2.1 What is Project?

Westland (2006) explained that a project is a unique endeavor to produce a set of deliverables within clearly specified time, cost, and quality constraints. Projects are different from standard business operational activities as they are unique in nature, have a defined timescale, have an approved budget, have limited resources, it involves an element of risk, and achieve beneficial change.

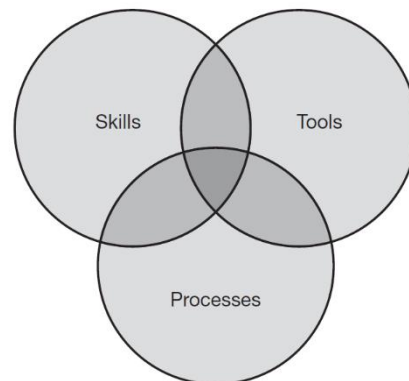
2.2.2 What is Project Management?

Westland (2006) also defined Project Management to be the skills, tools and management processes required to undertake a project successfully. He said it incorporates:

- **A set of skills** - Specialist knowledge, skills and experience are required to reduce the level of risk within a project and thereby enhance its likelihood of success.
- **A suite of tools** - Various types of tools are used by project managers to improve their chances of success. Examples include document templates, registers, planning software, modelling software, audit checklists and review forms.
- **A series of processes** - Various processes and techniques are required to monitor and control time, cost, quality, and scope on projects. Examples include time management, cost management, quality management, change management, risk management and issue management.

Richman (2002) stated that Project management is a set of principles, methods, and techniques that people use to effectively plan and control project work. It establishes a sound basis for effective planning, scheduling, resourcing, decision-making, controlling, and replanning. The objective of project management is to optimize project cost, time, and quality.

Fig. 2.1 Project Management Component



Source: Jason Westland (2006)

2.2.3 Project Life Cycle

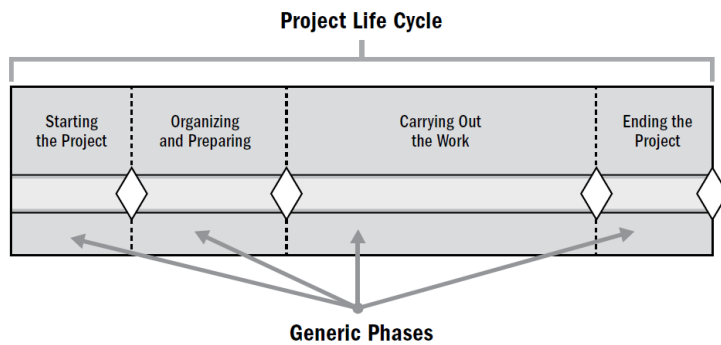
PMBOK Guide (2017) states that a project life cycle is the series of phases that a project passes through from its start to its completion. A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. The phases can be sequential, iterative, or overlapping. The names, number, and duration of the project phases are determined by the management and control needs of the organization involved in the project, the nature of the project itself, and its area of application. Phases are time bound, with a start and end or control point (sometimes referred to as a phase review, phase gate, control gate, or other similar term).

The project life cycle can be influenced by the unique aspects of the organization, industry, development method, or technology employed. While every project has a start and end, the specific deliverables and work that take place vary widely depending on the project. The life cycle provides the basic framework for managing the project, regardless of the specific work involved.

Though projects vary in size and the amount of complexity they contain, a typical project can be mapped to the following project life cycle structure.

- Starting the project,
- Organizing and preparing,
- Carrying out the work, and
- Closing the project. (PMBOK Guide, 2017).

Fig. 2.2 Generic depiction of a project life cycle



Source: PMBOK (2017)

Project Management Process Groups

2.2.3.1 Initiation Process Group

The process(es) performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase.

2.2.3.2 Planning Process Group

The process(es) required to establish the scope of the project, refine the objectives, and define the course of action required to attain the objectives that the project was undertaken to achieve.

2.2.3.3 Execution Process Group

The process(es) performed to complete the work defined in the project management plan to satisfy the project requirements.

2.2.3.4 Monitoring and Controlling Process Group

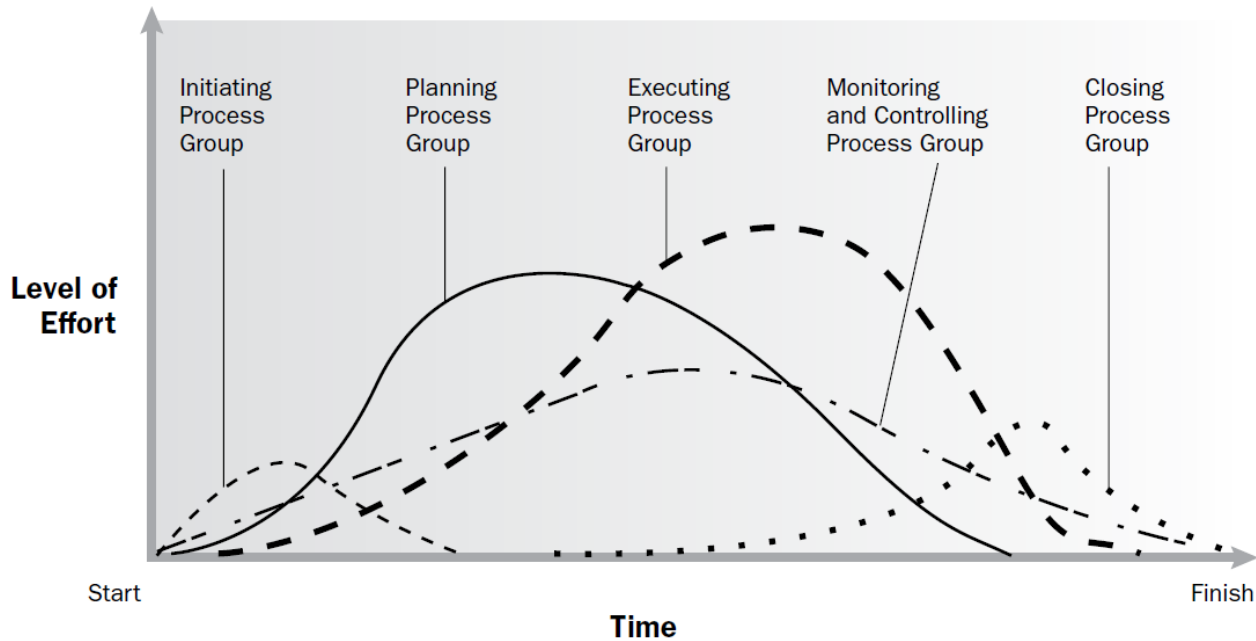
The process(es) required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes.

2.2.3.5 Closing Process Group

PMBOK Guide (2017) The process(es) performed to formally complete or close a project, phase, or contract. The output of one process generally becomes an input to another process or is a deliverable of the project or project phase. For example, the project management plan and project documents (e.g., risk register, responsibility assignment matrix, etc.) produced in the Planning Process Group are provided to the Executing Process Group where updates are made.

Process Groups are not project phases. If the project is divided into phases, the processes in the Process Groups interact within each phase. It is possible that all Process Groups could be represented within a phase, as illustrated in Figure 2.3. (PMBOK, 2017).

Fig. 2.3 Example of Process Group Interactions Within a Project or Phase



Source: PMBOK (2017)

As projects are separated into distinct phases, such as concept development, feasibility study, design, prototype, build, or test, etc., processes in each of the Process Groups are repeated as necessary in each phase until the completion criteria for that phase have been satisfied. (PMBOK, 2017).

Weiss et.al. (1997) under their study stated that project management is seen as a method and a set of techniques based on the accepted principles of management used for planning, estimating, and controlling work activities to reach a desired result on time, within budget, and according to specification. They stated that to plan and execute a project using these principles they have utilized a 5-phase method. Each method contains specific steps that expand the general process into a detailed set of procedures. Their study also states the ten major causes of project failure like lack of structure and detail for the project plan, underbudgeted project, insufficient allocation of resources, not tracking the project against its plan, lack of communication among the project team, and the project straying from its original goal.

Fig. 2.4 - The five phases and 25 action steps of the project management life cycle



Source: Weiss et.al (1992)

Jackson (2020) states that Project performance management is the process of creating, implementing, and managing projects that contribute to the performance of an organization and its strategy. He states that it focuses on linking projects to strategy, tracking the performance of the project overtime, reviewing the project completion for improvements.

PMH INTERACT (2018) describes that to implement a project means to carry out activities proposed in the application form with the aim to achieve project objectives and deliver results and outputs. Its success depends on many internal and external factors. Some of the most important ones are a very well-organized project team and effective monitoring of project progress and related expenditures.

Airiodion (2021) points out that Project Assessment is an end-to-end analysis of a project's scope, scale, deliverables, objectives, and impacts. He says it also involves assessing the project's stakeholders, risks, timeline, and impacted groups and processes.

2.3 Empirical Literature

Ankrah et.al (2005) stated that project performance can be considered as an evaluation of how well individuals, groups of individuals or organizations have done in pursuit of a specific objective. These objectives vary significantly, but from an industry or organizational perspective, they generally revolve around satisfying the key stakeholders such as customers, employees, shareholders, the various suppliers, government, and society.

Mullins (1993) described performance as relating to such factors as increasing profitability, improved service delivery or obtaining the best results in important areas of organizational activities.

Atsbha (2018), in his study “Assessment of Telecom Project Implementation Practices in Ethiopia: The case of Telecom Expansion Project” discussed how project management knowledge area related practices are applied in project implementation. He also studied the management support practices of the project implementation. Moreover, the readiness processes such as people, process and system readiness are studied to determine how the readiness processes are practiced in the project implementation. From his studies he found out that In the TEP project implementation the scope management, resources such as team, material, and equipment planning, estimating, monitoring of the planned versus actual use of resources, and stakeholder management were practiced properly. Moreover, the project implementation plans including activity definition and sequencing, identifying quality requirements, planning and timely communicating, developing project charter and integrated planning, procurement processes including the identification of potential vendors, contract awarding and relationships with vendors were properly managed and practiced. However, activity durations were not well estimated and initial schedule not maintained, cost estimation not appropriate, planned quality not properly implemented, problems in monitoring the different information need of stakeholders, problems in individual risk identification, risk analysis, risk monitoring and risk addressing are also weak performances in the project implementation. In addition, project activities are not finalized, and procurement contracts not closed properly as he stated in his study.

He further stated that in the management support practices, government and senior management were committed in following-up the project implementation, in making quick decisions and committing resource requirements. However, he said staff training and incentive managements were not appropriately managed. Regarding to the readiness practices of project implementation in terms of the people, process, and system readiness, he stated that the findings reveal that some processes are well practiced and put that there are also readiness practices not properly practiced that lead to failure in the project long run operation. Furthermore, he said that in the people’s readiness, the personnel hired for the project implementation were

adequate, but were not adequately trained and oriented for the implementation. In addition, he mentioned that although standard operating procedures were developed for operating areas, there were awareness creation problems for all staffs.

For future project implementations he recommended that the project management practices related to the knowledge areas, Ethio Telecom need to do thorough study of available resources before estimating the schedule and budgets of the project. He stated that planned quality need to be implemented effectively; stakeholders' information requirements satisfaction must be monitored timely.

Merine (2021), in his research “The correlation between project management effectiveness and project success for LTE advanced project in ethio-telecom” tried to assess the effectiveness and success of LTE project implementation practice; and study the relationship between project management effectiveness and project success as determined by a case study of LTE Advanced project. His study empirically investigated the relationship of project effectiveness and project success. The success of the project was found to have been significantly related to the project effectiveness measures. The researcher noted that the high-level effectiveness in the LTE project was found to have contributed to the project's overall success. He found out that each of the project effectiveness dimensions found highly related and significantly contributed to the overall project success.

Woldemariam (2019) under “Critical success factors of leading IS projects (the case of Ethio Telecom information system projects)” studied the critical success factors and challenges that hinder successful project performance in Ethio Telecom IS projects. The findings of her study shows that there were gaps in acquiring technical trainings in the IS field. Moreover, Ethio Telecom's senior managements acted highly upon the existence and implementation of the critical success factors (CSF) “clear and realistic goals and scope”, “management support”, “user involvements”, “change management process”, and “project team”. However, the CSFs such as “project leadership”, “Proper planning and monitoring” were not given the needed attention. Although there was a master plan, milestone, and feedback channels, well prepared and agreed upon by stakeholders, there was no effective progress tracking method to monitor project progress. In addition, project deviation from the plan was not well addressed and led to project delay. Her findings also indicated that there were gaps in leading projects. She pointed out that the project leaders having lack of project management skill.

Haftom (2019), by his study entitled “Assessment of Project Management Practices and Challenges: The Case of Telecom Expansion Project (TEP) In Ethio Telecom” studied how the basic project phases were

practiced in the Ethio Telecom Expansion Project. Moreover, he assessed the main challenges to successfully implement the TEP project. In addition, he studied the effect of these practices and challenges on TEP performance. He found out that most of the project phases starting from initiation to closing in TEP were good in practicing the major activities, but he found that some improvements were required in most of these phases. Setting high level project schedule milestones (initiation phase), properly identifying possible risks of the project and detail scope statement preparation (planning phase), team problem escalation and regularly updating project schedules (execution phase), risk response control (controlling phase) and Lessons learned documentation (closing phase) are not well managed. He also found out that there were some challenges for implementing TEP successfully. These are lack of proper coordination with stakeholders, Lack of proper fund management in the project, Government Policy challenges, Project communication and integration management problems were the main challenges of the TEP project.

Abbasi et.al (2000) under the title “Project management practice by the public sector in a developing country” explored the PM tools and techniques used by the public sector in Jordan. The PM phases and tools were presented. They conducted a survey and statistically analyzed to identify the use of PM tools and techniques. The obstacles to proper implementation of such tools were presented. Benefits and drawbacks of the use of these techniques were discussed. They concluded, more effort to be spent on training, planning, resource leveling, cost estimation, corrective plans, and standardization. Their analysis shows that a significant amount of time and money is wasted in project planning, but not enough effort is spent in reporting and controlling. They said the public sector should focus more on developing and implementing corrective plans.

Sharew (2018), In his research “The Practice of Project Management Tools and Techniques in NGO’s: The Case of Selected International NGO’s Based in Addis Ababa” found out that most of the tools and techniques adopted by project managers are often used in project redesign, planning and monitoring phases despite their variation in use.

Alotaibi (2019) under the title “Project Management: The Implication of Project Management Practices on Project Success in Saudi Arabia” studied the extent of project management practices implemented by project managers in Saudi Contractor companies and the relationship between project managers self-reported use of project management practices and their perception of the project success. The researcher found out that although there are a variety of reasons for cost overrun and project failure, the acceptance

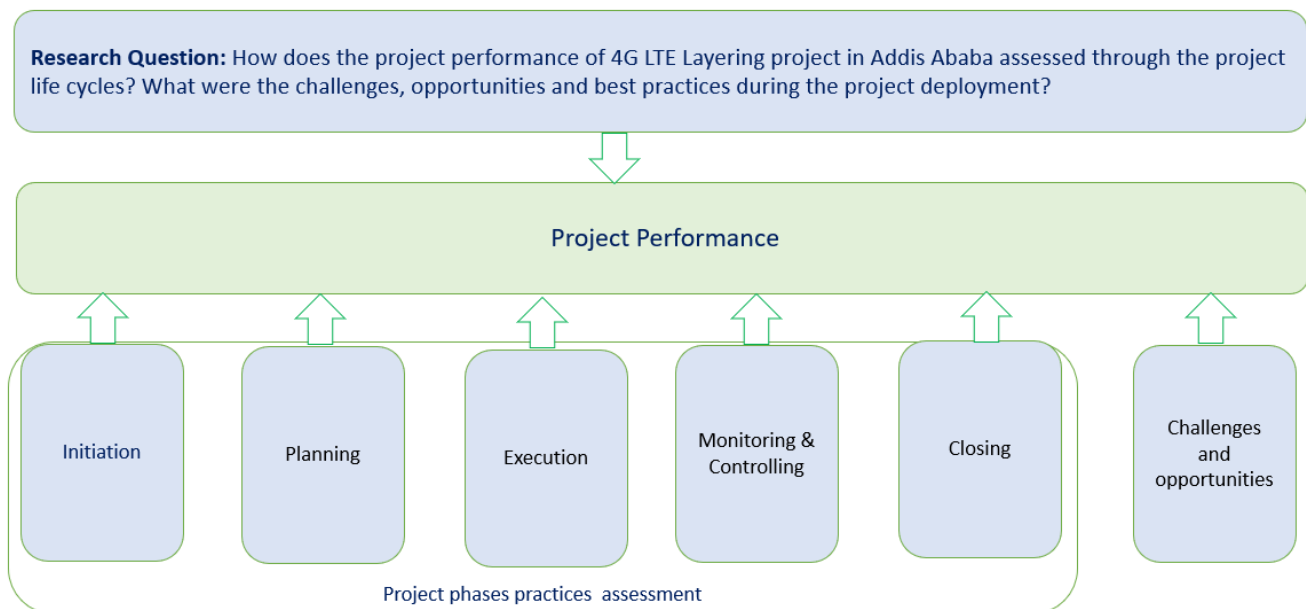
and use of Project Management Practices should improve perceived project success, reduce project failures, and generally improve the industry.

Birhanu (2017) in her study entitled “Assessment of Project Implementation Practice of Entrepreneur and Business Growth Project implemented By Digital Opportunity Trust Organization in Addis Ababa” studied the project implementation practice used in DOT Ethiopia, the project identification and planning process of DOT Ethiopia and the challenges that hinder the successful implementation of the project. From her study project implementation practices were properly adopted by DOT, in Addis Ababa region. Moreover, the study showed that the project implementation processes of initiation, planning and execution were adopted and various activities under each phase were adhered by the organization. Her study found out that several factors accounted for challenging of the project such as: unrealistic expectations from the project by the beneficiaries, lack of user’s, lack of resources, unrealistic project time frames, frequent change of project requirements and specifications, and challenges from government regulations and rules were found to account as challenging factors.

2.4 Conceptual Framework of the Study

This study focuses on the assessment of the project performance in the 4G LTE Layering Project in Addis Ababa, the challenges, and opportunities. The independent variables are practices in the initiation, planning, execution, monitoring, and control, closing phases and challenges. The dependent variable is project performance.

Fig 2.5 Conceptual Framework



Source: Author’s concept based on Literature Review

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

Burns et.al (2007), Research design is defined as the blueprint of an empirical study. Research design also provides an opportunity for researchers to control potential factors that may affect the reliability and validity of the study results.

Kothari (2004), sampling design deals with the method of selecting items to be observed for the given study. The important features of a research design are:-

- (i) It is a plan that specifies the sources and types of information relevant to the research problem.
- (ii) It is a strategy specifying which approach will be used for gathering and analyzing the data.
- (iii) It also includes the time and cost budgets since most studies are done under these two constraints.

In brief, research design must, at least, contain

- (a) A clear statement of the research problem.
- (b) Procedures and techniques to be used for gathering information.
- (c) The population to be studied; and
- (d) Methods to be used in processing and analyzing data.

The research design applied in this study is descriptive research type. Descriptive data is used to analyze demographic, accurate profile of the respondents, and data on the structured questionnaire.

3.2 Description of study variables

The independent variables of this study are initiation, planning, execution, monitoring and control and closing phase practices and challenges. The dependent variable is project performance.

3.3 Description of study area and target population

The study area of this study is on 4G LTE layering project in Addis Ababa and the target population is those who participated on this project. The data obtained from the Ethio Telecom project roll out department the total population who participated in the project is 61.

3.4 Sampling technique

Martin et.al (2012), A study population may be defined as the total number of individuals from whom data is collected. In quantitative research, the data can be quantified. Because the samples are generally large and considered representative of the population, the results are taken as if they constituted a general and sufficiently comprehensive view of the entire population.

Strategies for determining sample size:

- Using census for small populations,

- Imitating a sample size of similar studies,
- Using published tables, and
- Applying formulas

Sample size and rule of thumb: Curry (1984) provided his research on the rule of thumb on sample size.

Table 3.1 Sample Size Rule of Thumb

Size of Population	Sampling Percent
10-100	100%
101-1,000	10%
1,001-5,000	5%
5,001-10,000	3%
10,000+	1%

Source Curry (1984)

Since the total population for this study is 61, all the population is taken for the study using this rule.

3.5 Data Collection

Data Sources and Types

Bryman et.al (2015), Quantitative methods are those methods which aim to collect data on numbers, or data which can be quantified to enable researchers use statistical techniques and compare different groups in the study.

Ali (2021) citing Farnsworth, (2019), quantitative research tools consist of different types of questionnaires, surveys, structured interviews, and behavioral observation which are based upon explicit coding and categorization schemes. Kothari (2004), before adopting specific research tools, a researcher is first supposed to identify the type of data (primary or secondary) which the researcher wants to collect.

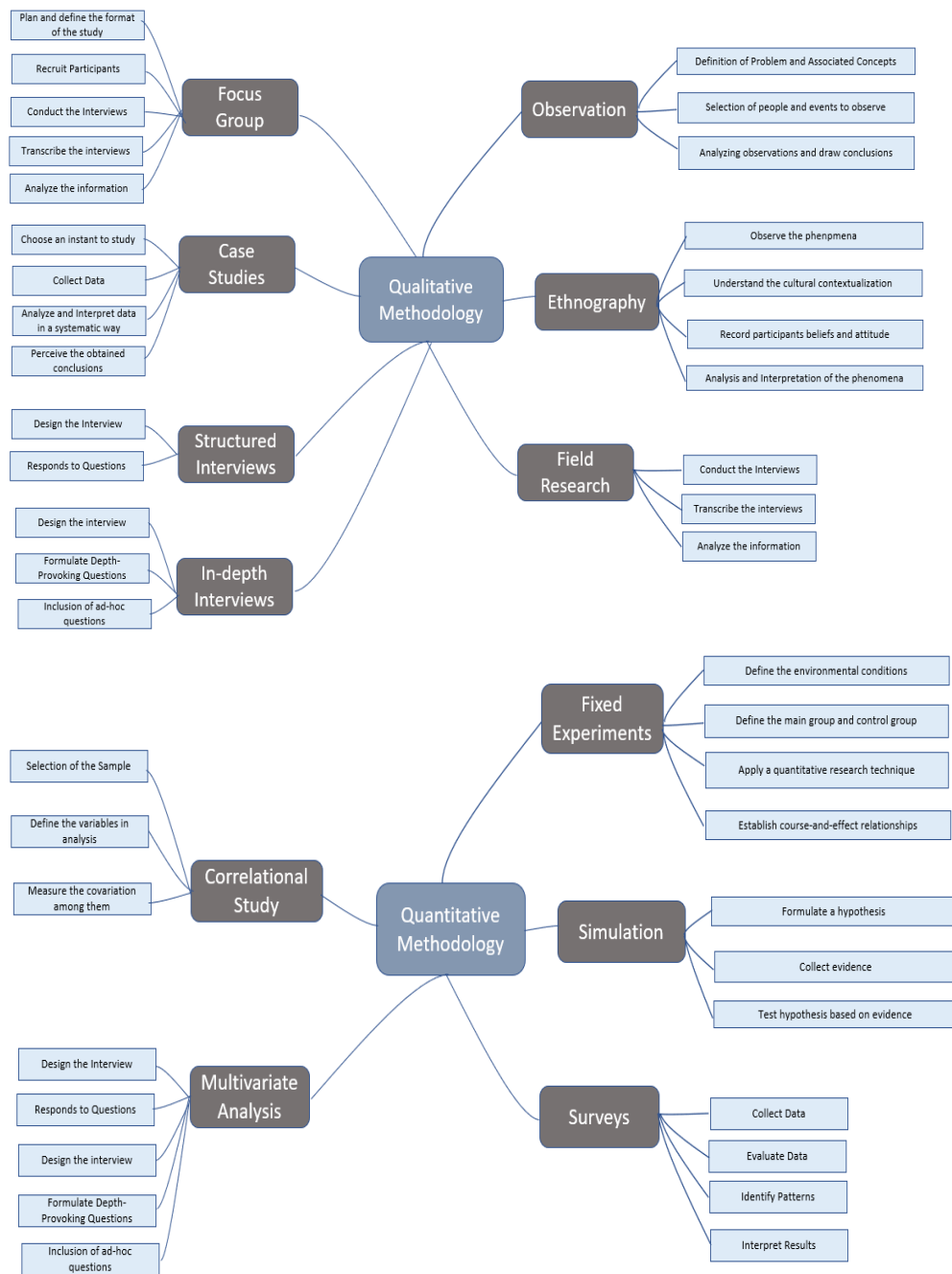
Cohen et.al (2008), Qualitative methods enable researchers to understand new phenomena through exploration and understanding the social world surrounding these phenomena.

Bryman et.al (2015), Qualitative research methods focus on the data that relate individuals to their experience, judgment, and feelings, which, to a large extent, may not be quantified. Some scholars and researchers believe that the primary differences between the two research methods are not serious since the two methods produce and generate data.

Schulze (2003), Quantitative research is suited to theory testing and developing universal statements. It provides a "general" picture of a situation. Quantitative studies thus produce results that are generalizable across contexts, although they neglect the reality of situations. Qualitative inquiry, on the other hand, provides the researcher with in-depth knowledge, although this is usually not generalizable.

Davies (2011), mind mapping is a very useful tool for understanding a complex reality and it also promotes creative thinking and encourages brainstorming. After that, we synthesize the main characteristics and properties of each of the identified methods, both for qualitative and quantitative methodologies.

Fig: 3.1 Mind map representation for qualitative and quantitative methodologies



Source: Queiros et.al (2017)

Creswell (2007) stated that Questionnaire is a popularly used method of collecting primary data, particularly when a researcher wants to carry out a comprehensive investigation of a phenomenon or a

variable. Kothari (2004) stated that Questionnaire is mostly adopted by both experienced and novice researchers who work either independently or dependently under the sponsorship of a firm, an organization, a state, etc. The researchers send the questionnaire to enlisted respondents and ask the respondents to fill the questionnaire and send back to the researchers' overtime. It can be sent through different media, such as mail, email, or through other means. Moreover, the respondents are ethically bound to provide original answers without any attempt at copying the already given answers from the net.

In this study, primary data was collected through survey for the targeted population. The type of survey instrument selected was questionnaire which were electronically administered using Google Forms platform. This type of tool was selected for the survey because of its efficiency for data collection, cost benefits and time limitation. A five-point Likert type scale was used to indicate the extent to which the five project life cycles, the challenges and opportunities, and project performance were assessed. The survey consists of closed ended questions and open-ended questions that follow a logical progression. Moreover, secondary data is collected from Ethio Telecom publications and project documents. SPSS version 25 is used for the data analysis.

In the study, the type of data used is quantitative data. For the data sources, both primary and secondary sources are used for generating valuable and relevant data to arrive at reliable conclusions for the research questions. To collect primary data a survey is carried out using an online questionnaire using Google Form which is developed and distributed through e-mail to those who participated on the project. The questionnaire is designed in line with the objective of the study and the analysis of the data is based on a general weight of 1 to 5 (1 for the least and 5 for maximum). Secondary data is collected from Ethio Telecom's publications, books, project reports and website.

3.6 Data Analysis – Model, Techniques, Software

The technique used for the data analysis is encoding the response obtained from the five-point Likert Scale questionnaire into the SPSS Version 25 statistical software analysis tool.

The codes given for the five point Likert scale are:-

Strongly Disagree (SD) = 1, Disagree (D) = 2, Neutral (N) = 3, Agree (A) = 4, Strongly Agree (SA) = 5.

Open ended questions are also included to have the respondent's general opinion about the project.

The analysis is based on statistical analysis which includes descriptive statistics, correlation among variables and multiple regression analysis.

3.7 Validity and Reliability

Cronbach's alpha is a reliability coefficient that indicates how well the items in a set are positively correlated to one another. Cronbach's alpha is computed in terms of the average intercorrelations among the items measuring the concept. The closer Cronbach's alpha is to 1, the higher the internal consistency reliability.

In this research a standardized questionnaire is used that is considered reliable and valid. From SPSS statistical tool the reliability is tested using Cronbach's alpha test. The questionnaire is developed based on established theory or findings of previous studies. Furthermore, enough questions were placed to assess the project performance and the questions are carefully and precisely worded. The researcher designed a familiar user interface of the questionnaire so that the participants were able to respond easily and quickly. Before the participants fill the questionnaire, the researcher oriented the respondents about the objectives of the study and encouraged them to respond freely and frankly. Enough time was given to respond to the questionnaire. Moreover, the researcher made sure to have a consistent environment for the participants and they were treated with full respect.

3.8 Ethical Considerations

Sekaran (2003) discusses that Ethics in business research refers to a code of conduct or expected societal norm of behavior while conducting research. He says Ethical conduct applies to the organization and the members that sponsor the research, the researchers who undertake the research, and the respondents who provide them with the necessary data.

He further explained that the observance of ethics begins with the person instituting the research, who should do so in good faith, pay attention to what the results indicate, and surrendering the ego, pursue organizational rather than self-interests. Ethical conduct should also be reflected in the behavior of the researchers who conduct the investigation, the participants who provide the data, the analysts who provide the results, and the entire research team that presents the interpretation of the results and suggests alternative solutions.

Beauchamp et.al (2001) stated that there are four 'clusters' of moral principles which provide a framework for making decisions about the ethical aspects of a study. These are:-

Respect for autonomy - refers to the requirement to ensure that research participants are entirely free to make a choice about their participation in a research study. To be in a position to make such a choice they must be given sufficient information about the research and what participation involves, they have to be sufficiently competent to understand this information and to understand it to their own satisfaction. They must also be free from influence or coercion.

Non-maleficence - researchers have an obligation not to inflict harm on their study participants.

Beneficence - The principle of beneficence has two elements – positive beneficence and utility beneficence. Positive beneficence means doing positive good in the sense that the research has some value scientifically, practically or educationally i.e. it must address an important question. Utility beneficence refers to the requirement that the researcher ‘balances benefits and drawbacks’ to produce the best overall results. In other words, an assessment has to be made about whether the benefits of the research justify the level of effort, resources, costs or risk of harm to the research participants and the community.

Justice - The principle of justice means treating people equally and fairly and ensuring that they are accorded their full rights.

In this study, the confidentiality and privacy of the respondents is respected. Moreover, the intellectual property is discussed frankly, and the citing are included in the reference list.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

The research was conducted to assess the performance of the 4G LTE layering project in Addis Ababa through the project phases, challenges, and opportunities. This chapter presents the data analysis results conducted to address the objective of the project work and answer the research questions.

From the primary data collected through the survey instrument, all respondents responded to the survey which was an online questionnaire sent using Google Form. A discussion on the result of the analysis is also included. SPSS version 25 software tool is used for the statistical analysis of the data.

4.2 Response Rate

The survey instrument selected was a questionnaire. After distributing an electronically administered questionnaire using Google Forms for the targeted respondents, all the 61 respondents have responded to the questionnaire after a couple of reminders through e-mail.

The respondents were asked to respond to the items to score each statement of closed-ended questions on the 5-point Likert Scale. Open ended questions are also included to forward their general opinion about the project.

4.3 Background information of the respondents

This section summarizes the respondents background and global characteristics. The respondents in the survey have participated on the project and have different background like education level, job experience and job role. All 61 respondents have filled and replied to the online questionnaire.

The gender composition was mostly of male with 93.4% and female 6.6%.

When we see the age category most of the respondents were in the age category of 31-40 years which is 68.9%. Secondly, the education background data is as follows. 72.1% have first degree, 26.2% have Master's degree and 1.6% have Certificate/ Diploma. Thirdly, work experience, having 6-10 years' experience are 39.3% and 11-15 years are 32.8%. The job role of most of the respondents was specialists with 42.6% and technicians 36.1%.

Table 4.1 Respondents demographic characteristics

Respondents Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Gender Information	Female	4	6.6	6.6	6.6
	Male	57	93.4	93.4	100
	Total	61	100.0	100.0	
Age Category (Years)	18-30	6	9.8	9.8	9.8
	31-40	42	68.9	68.9	78.7
	41-50	10	16.4	16.4	95.1
	Above 50	3	4.9	4.9	100.0
	Total	61	100	100	
Education Background	Certificate/ Diploma	1	1.6	1.6	1.6
	First Degree	44	72.1	72.1	73.8
	Master's Degree	16	26.2	26.2	100
	Doctoral Degree	0	0	0	
	Total	61	100.0	100.0	
Work Experience (Years)	Above 15	11	18.0	18.0	18.0
	11-15	20	32.8	32.8	50.8
	6-10	24	39.3	39.3	90.2
	0-5	6	9.8	9.8	100.0
	Total	61	100.0	100.0	
Job Role During the Project	Technician	22	36.1	36.1	100.0
	Professional	4	6.6	6.6	11.5
	Specialist	26	42.6	42.6	54.1
	Supervisor	6	9.8	9.8	63.9
	Expert	1	1.6	1.6	1.6
	Managerial	2	3.3	3.3	4.9
	Total	61	100.0	100.0	

Source: Own Survey data (2022)

4.4 Reliability Analysis

Reliability analysis was done using the SPSS software. Cronbach's alpha was used to check the internal consistency of the data. The Cronbach's alpha reliability coefficient ranges between zero and one. The closer Cronbach's alpha to zero, the lesser the internal consistency and the closer to one, the more internal consistency of the items.

George et.al (2003) provide the following rule of thumb. $\alpha > 0.9$ (Excellent), > 0.8 (Good), > 0.7 (Acceptable), > 0.6 (Questionable), > 0.5 (Poor), and < 0.5 (Unacceptable).

From the SPSS result we can see from table 4.2 below that the Cronbach's alpha result from the data for all the variables is greater than 0.771 which indicates that the internal consistency is acceptable.

Table 4.2 Reliability Statistics

Variables	Number of Items	Cronbach's Alpha value
Initiation	7	0.880
Planning	12	0.921
Execution	8	0.895
Monitoring and Control	5	0.845
Closing	8	0.880
Challenges	5	0.771
Project Performance	5	0.898

Source: Own Survey (2022)

4.5 4G LTE project performance practices assessment through the project phases, challenges, and project performance

Summary of the descriptive statistics is presented below on table 4.3 which contains the mean and standard deviation for the five project phases, for the challenges and project performance items.

Table 4.3 Descriptive statistics summary for the mean, standard deviation, and variance

Descriptive Statistics				
	N	Mean	Std. Deviation	Variance
Initiation_Phase	61	3.72356	.622613	.388
Planning_Phase	61	3.73905	.591713	.350
Monitoring_Control_Phase	61	3.61311	.607584	.369
Execution_Phase	61	3.79918	.578377	.335
Closing_Phase	61	3.43443	.699928	.490
Challenges	61	2.97705	.703419	.495
Project_Performance	61	3.58033	.621509	.386
Valid N (listwise)	61			

Source: Own Survey (2022)

4.5.1 Initiation Phase practice

In the initiation phase there were 7 items. Most of the respondents were in the agree scale for the 5 items in which the mean ranges from 3.67 to 3.95 or from 62.3% to 86.9% agreeing to strongly agreeing. But for High Level Project risks, assumptions, constraints and priorities item and Obtaining Project Charter Approval item the means are 3.39 and 3.38 respectively. The standard deviation ranges from 0.693 to 0.922. The overall mean of the initiation phase was 3.72 which is nearer to the agree level (4.0). Table 4.4 below shows the mean, the standard deviation, and the percentages of the response for each scale in the initiation phase.

Table 4.4 Initiation phase practice

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Feasibility Study: Project assessment was performed based upon available information, lessons learned from previous projects, and meetings with relevant stakeholders to support the evaluation of the feasibility within the given assumptions and/or constraints.	3.87	0.922	3.3	4.9	14.8	55.7	21.3
Identifying Key Deliverables: Key deliverables were identified based on the business requirements to manage customer expectations and direct the achievement of project goals.	3.95	0.693	0	6.6	6.6	72.1	14.8
High-level project schedule milestones: High-level project schedule milestones were properly identified.	3.8	0.771	0	4.9	26.2	52.5	16.4
Benefit Analysis: Benefit analysis was conducted with relevant stakeholders to validate project alignment with organizational strategy and expected business value.	4.00	0.771	0	4.9	9.8	65.6	19.7
Stakeholders Analysis: Stakeholder analysis was performed using appropriate tools and techniques to align expectations and gain support for the project.	3.67	0.769	0	6.6	31.1	50.8	11.5
High Level Project risks, assumptions, constraints, and priorities: High level risks, assumptions, and constraints were identified based on the current environment, organizational factors, historical data, and expert judgement, to propose an implementation strategy.	3.39	0.900	1.6	13.1	39.3	36.1	9.8
Obtaining Project Charter Approval: Project charter approval was obtained from the sponsor, to formalize the authority assigned to the project manager and gain commitment and acceptance for the project.	3.38	0.916	1.6	13.1	42.6	31.1	11.5
Overall Mean	3.72						

Source: Own survey data (2022)

4.5.2 Planning Phase practice

In planning phase there were 12 items. For the 9 items the response was around the agree scale with a mean which ranges 3.67 to 3.95. (64% to 81.9%). The remaining 3 items had a mean which ranges from 3.26 to 3.51. (44.2% to 49.2% agreeing or strongly agreeing). The standard deviation ranges from 0.591 to 0.998. The overall mean of the planning phase is 3.74 which is also nearer to the Agree level. Table 4.5 below shows the details of the mean, standard deviation, and the percentages of the response given for each scale in the planning phase.

Table 4.5 Planning phase practice

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Project Requirements, Constraints and Assumptions: Detailed project requirements, constraints and assumptions were reviewed and assessed with stakeholders based on the project charter, lessons learnt and using requirements gathering techniques.	3.72	0.756	0	8.2	21.3	60.7	9.8
Scope Management Plan: A scope management plan was developed based on the approved project scope and using scope management techniques, to define, maintain and manage the scope of the project.	3.9	0.79	0	6.6	16.4	57.4	19.7
Cost Management Plan: Cost management plan was developed based on the project scope, schedule, resources, approved project charter and other information, using estimation techniques, to manage project costs.	3.8	0.749	0	6.6	19.7	60.7	13.1
Schedule Management Plan: Project schedule was developed based on the approved project deliverables and milestones, scope, and resource management plans to manager timely completion of the project.	3.97	0.816	0	8.2	9.8	59.0	23.0
Human Resource Management Plan: Human resource management plan was developed by defining the roles and responsibilities of the project team member.	3.9	0.870	0	9.8	13.1	54.1	23.0
Communication Management Plan: Communications management plan was developed based on the project organizational structure and stakeholder requirements, to define and manage the flow of project information.	3.89	0.819	0	9.8	9.8	62.3	18.0
Work Breakdown Structure: A high-level Work Breakdown Structure which included a hierarchical set of phases, activities, and tasks to be undertaken to complete the project was identified and documented in the project plan.	3.51	0.868	0	11.5	39.3	36.1	13.1
Project Tasks and Resource Requirements: The project's tasks and resource requirements were identified, along with the strategy for producing them.	3.87	0.591	0	3.3	14.8	73.8	8.2
Risk Management Plan: Risk management plan was developed; identifying, analyzing, and prioritizing project risk; creating the risk register; and defining risk response strategies to manage uncertainty and opportunity thought the project life cycle.	3.43	0.884	3.3	8.2	39.3	41.0	8.2
Stakeholders Management Plan: Stakeholder management plan was developed by analyzing needs, interests, and potential impact to effectively manage	3.67	0.790	0	8.2	27.9	52.5	11.5

stakeholders' expectations and engage them in project decisions.							
Quality Management Plan: Quality management plan was developed, and the quality standards were defined for the project and its products, based on the project scope, risks, and requirements, to prevent the occurrence of defects and control the cost of quality.	3.95	0.717	0	4.9	13.1	63.9	18.0
Change Management Plan: Change management plan was developed by defining how changes will be addressed and controlled to track and manage change.	3.26	0.998	1.6	24.6	29.5	34.4	9.8
Overall Mean	3.74						

Source: Own survey data (2022)

4.5.3 Execution Phase practice

There are 8 items in the execution phase with the overall mean of 3.8 and the standard deviation which ranges from 0.601 to 0.901. Except implementing the approved changes with the mean of 3.59 (60.6% agreeing or strongly agreeing) and implementing risk management plan with a mean of 3.51 (52.5% agreeing or strongly agreeing), all the other items have a mean between 3.8 (73.8% agreeing or strongly agreeing) and 3.97 (80% agreeing or strongly agreeing) This phase has the overall mean of 3.8 which is much nearer to the Agree scale as can be seen on table 4.6 below.

Table 4.6 Execution phase practice

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Acquire and Manage Project Resources: Project resources were acquired and managed by following human resource procurement management plans to meet project requirements.	3.87	0.618	0	1.6	21.3	65.6	11.5
Leading and Developing the Project Team: The project manager executed based on the project management plan by leading and developing the project team to achieve project deliverables.	3.85	0.853	0	6.6	24.6	45.9	23.0
Implementing the Quality Management Plan: The quality management plan was implemented using the appropriate tools and techniques.	3.89	0.858	1.6	4.9	18.0	54.1	21.3
Implementing the Approved Changes: The approved changes were implemented, and corrective actions taken by following the change management plan to meet project requirements.	3.59	0.901	0	14.8	24.6	47.5	13.1
Manage the flow of information by following the communication plan: The flow of information was managed by following the communications plan to keep stakeholders engage and informed.	3.92	0.759	0	8.2	8.2	67.2	16.4

Implementing Risk Management Plan: The approved actions were implemented by following the risk management plan to minimize the impact of the risk and take advantage of opportunities on the project.	3.51	0.809	1.6	6.6	39.3	44.3	8.2
Maintain Stakeholders Relationship: Stakeholder relationship was maintained by following the stakeholder management plan in order to receive continued support and manage expectations.	3.8	0.601	0	3.3	19.7	70.5	6.6
Implement the Quality Management Plan: Quality targets, assurance, and control measures, along with an acceptance plan, listing the criteria to be met was set.	3.97	0.632	0	1.6	16.4	65.6	16.4
Overall Mean	3.8						

Source: Own survey data (2022)

4.5.4 Monitoring and Control Phase practice

This phase has 5 items with the overall mean of 3.62 and standard deviation which ranges from 0.635 to 0.946. Except the items reviewing the issue log with a mean of 3.2 (41% agreeing or strongly agreeing) and monitoring and assessing risk with a mean of 3.38 (47.6% agreeing or disagreeing), the other items have a mean above 3.79 (73.8% agreeing or strongly agreeing). The overall mean of this phase is 3.62 which indicates it is much in between the Neutral scale (3.0) and the Agree scale (4.0) as can be seen from table 4.7 below.

Table 4.7 Monitoring and Control phase practice

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Measuring Project Performance: Project performance was measured using appropriate tools and techniques in order to identify and quantify any variances and corrective actions.	3.82	0.742	1.6	3.3	18.0	65.6	11.5
Verifying the Project Deliverables Conform to Quality Standards: Project deliverables were verified to conform to the quality standards established in the quality management plan by using appropriate tools and techniques.	3.89	0.661	0	4.9	13.1	70.5	11.5
Monitoring and Assessing Risk: Risk was monitored and assessed by determining whether exposure has changed and evaluating the effectiveness of response strategies in order to manage the impact of risks and opportunities.	3.38	0.840	0	16.4	36.1	41.0	6.6
Reviewing the Issue Log: The issue log was reviewed and updated, and corrective actions were determined by using	3.20	0.946	1.6	24.6	32.8	34.4	6.6

appropriate tools and techniques in order to minimize the impact on the project.							
Monitoring Procurement Activities: Procurement activities were monitored according to the procurement plan in order to verify compliance with project objectives.	3.79	0.635	0	3.3	23.0	65.6	8.2
Overall Mean	3.62						

Source: Own survey data (2022)

4.5.5 Closing Phase practice

The closing phase has 8 items with the overall mean of 3.44 which is the lowest from the project phases. The standard deviation ranges from 0.53 to 1.27 which is the largest range from the phases. The items which have good performance are final acceptance of the project deliverables, financial, legal and administrative closure and releasing resources with a mean from 3.77 to 4.05. (64% - 91.8% agreeing or strongly agreeing). The remaining items have weak performance with a mean which ranges from 3.05 to 3.51 (37.7% - 54.1% agreeing or strongly agreeing). The overall mean of this phase is 3.44 which is nearer to the Neutral scale (3.0) than the Agree scale (4.0) as can be seen from table 4.8 below.

Table 4.8 Closing phase practice

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Final Acceptance of the Project Deliverables: Final acceptance of the project deliverables were obtained from relevant stakeholder to confirm that project scope and deliverable were achieved.	4.05	0.530	0	1.6	6.6	77.0	14.8
Financial, Legal and Administrative Closure: Financial, legal, and administrative closure were obtained using generally accepted practices and policies in order to communicate formal project closure and ensure transfer of liability.	3.77	0.716	0	1.6	34.4	49.2	14.8
Final Project Report: The final project report was prepared and shared according to the communications management plan in order to document and convey project performance and assist in project evaluation	3.51	0.924	0	16.4	29.5	41.0	13.1
Documenting Lessons Learnt: Lessons learnt were documented throughout the project and conduct a comprehensive project review in order to update the organization's knowledge base.	3.02	1.088	3.3	36.1	27.9	21.3	11.5
Archiving project documents and materials: Project documents are well archived in order to retain organizational knowledge, for future projects and audit.	3.10	1.06	3.3	29.5	32.8	23.0	11.5
Obtaining Feedback from Relevant Stakeholders: Feedback from relevant	3.05	1.07	1.6	39.3	21.3	27.9	9.8

stakeholders was obtained using appropriate tools and techniques and based on the stakeholder management plan in order to evaluate their satisfaction.							
Releasing Resources: Human and other resources were released to operation on time.	3.93	0.704	0	6.6	8.2	70.5	14.8
Project Closing Celebration: The project closing was celebrated to provide visibility and recognition to main stakeholders and professionals involved in the success of the project.	3.05	1.27	4.9	44.3	9.8	23.0	18.0
Overall Mean	3.44						

Source: Own survey data (2022)

4.6 Challenges

The challenges item has a total of five items and the overall mean of 2.98. Since this item negatively correlates, as we will see in section 4.8.6, except lack of training with a mean of 3.84 (80.3% agreeing or strongly agreeing), the remaining items have good performance with a mean which ranges from 2.74 to 2.79 (19.7% - 21.4% agreeing or strongly agreeing). The standard deviation ranges from 0.997 to 1.14. The overall mean of 2.98 indicates that it is much nearer to the Neutral scale (3.0).

Table 4.9 Challenges

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Lack of Training: Adequate training is not given.	3.84	1.14	8.2	6.6	4.9	54.1	26.2
Lack of Executive Management Support: Executive Management Support was poor.	2.79	0.897	4.9	34.4	41.0	16.4	3.3
Communication gap: There was communication gap among stakeholders.	2.74	0.982	3.3	47.5	27.9	14.8	6.6
Integration Problem: The coordination of the project elements like tasks, resource, stakeholders and deliverables were poor.	2.75	0.925	4.9	41.0	29.5	23.0	1.6
Procurement Delay: There was procurement delay on the project.	2.77	0.902	4.9	34.4	44.3	11.5	4.9
Overall Mean	2.98						

Source: Own survey data (2022)

4.7 Project Performance

The project performance item, which is a dependent variable, has 5 items with the overall mean of 3.58 and standard deviation which ranges from 0.68 to 0.906. The objective of the project item has a good performance with a mean of 3.84 (80.3% agreeing or strongly agreeing) and the remaining items have average performance which ranges from 3.31 to 3.66 (39.3% - 70.5%) agreeing or strongly agreeing). The overall mean of 3.58 indicates that it is a little bit nearer to the Agree scale (4.0). Table 4.10 below shows the details of the mean, standard deviation, and percentages of the response for each item in the project performance phase.

Table 4.10 Project performance

Items	Mean	Std. Deviation	SD	D	N	A	SA
			%	%	%	%	%
Objectives of the project: The objectives of the project are fully met.	3.84	0.688	0	6.6	13.1	70.5	9.8
Schedule: The project is completed within the planned schedule.	3.49	0.906	3.3	13.1	19.7	59.0	4.9
Budget: The project is completed within the planned budget.	3.31	0.807	3.3	6.6	50.8	34.4	4.9
Scope: The project is completed within the planned scope.	3.61	0.842	1.6	9.8	23.0	57.4	8.2
Deliverables: All the deliverables were handed over with the planned quality of standard.	3.66	0.680	0	8.2	21.3	67.2	3.3
Overall Mean	3.58						

Source: Own survey data (2022)

4.8 Correlation between variables

This section describes the correlation between the dependent variable, project performance with the independent variables, in the initiation, planning, execution, monitoring and control, closing phases and challenges using bivariate Pearson correlation to understand their strengths, significance and relationships. Somekh et.al (2005) stated that the most used method of calculating correlation is the Pearson product-moment correlation coefficient called Pearson's r. We use this method when both variables are to interpret a correlation, we use a minimum of three pieces of information: r (the correlation coefficient indicating the strength of the relationship, the statistical significance of r (the probability value); and the size of the sample. To interpret correlations all these factors can be considered. Clearly, statistical significance is relevant but so is the strength of the relationship. Correlation is greatly affected by sample size. With very large samples weak correlation coefficients may be statistically significant; with small samples only very strong correlations will reach statistical significance.

Table: 4.11 Conventional approach to interpreting a correlation coefficient

Absolute magnitude of the observed correlation coefficient (r).	Interpretation
0.00-0.10	Negligible Correlation
0.10-0.39	Weak Correlation
0.40-0.69	Moderate Correlation
0.70-0.89	Strong Correlation
0.90-1.00	Very Strong Correlation

Source: Anesthesia and Analgesia (2018).

Table: 4.12 Correlation statistics

		Correlations						
		Project_	Initiation_	Planning_	Execution_	Monitoring	Closing_	
		Performance	Phase	Phase	Phase	& Control	Phase	Challenges
						Phase		
Project Performance	Pearson Correlation	1						
	Sig. (2-tailed)	.000						
	N	61						
Initiation_Phase	Pearson Correlation	.498**	1					
	Sig. (2-tailed)	.000						
	N	61	61					
Planning_Phase	Pearson Correlation	.592**	.814**	1				
	Sig. (2-tailed)	.000	.000					
	N	61	61	61				
Execution_Phase	Pearson Correlation	.521**	.792**	.905**	1			
	Sig. (2-tailed)	.000	.000	.000				
	N	61	61	61				
Monitoring_Control_Phase	Pearson Correlation	.560**	.722**	.832**	.861**	1		
	Sig. (2-tailed)	.000	.000	.000	.000			
	N	61	61	61	61	61		
Closing_Phase	Pearson Correlation	.359**	.713**	.739**	.793**	.771**	1	
	Sig. (2-tailed)	.004	.000	.000	.000	.000		
	N	61	61	61	61	61	61	
Challenges	Pearson Correlation	-.471**	-.312*	-.420**	-.368**	-.377**	-.155	1
	Sig. (2-tailed)	.000	.015	.001	.004	.003	.234	
	N	61	61	61	61	61	61	61

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

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

Source: Own survey data (2022)

The relationship between the initiation phase practice and project performance is tested using bivariate Pearson 2-tailed correlation. The SPSS result output shows that $r=0.498$ for $p=0.01$ which means the two variables have a moderate correlation.

The relationship between planning phase and project performance is similarly tested with bivariate Pearson 2-tailed correlation analysis and the result shows that $r=0.592$, for $p=0.01$ which indicates that the two variables have also a moderate correlation as well.

From the SPSS output the correlation between the execution phase and the project performance is found out that $r=0.521$ for $p=0.01$ which indicates that from table 4.11, the two variables correlate moderately as well.

The correlation between the monitoring and control phase practice and project performance shows that $r=0.56$ for $p=0.01$ level which shows that the two variables correlate moderately.

For the closing phase and project performance relationship, the two variables also correlate moderately with $r=0.359$ and for $p=0.01$.

For the challenges and project performance phases, $r=-0.471$, for $p=0.01$ which indicate that the two variables correlate moderately. The coefficient of correlation has negative sign which shows that the two variables correlate negatively, or they go in opposite direction.

4.9 Regression Analysis

Regression analysis describes the relationship between a dependent variable and several independent variables. In this study the dependent variable is project performance, and the independent variables are initiation, planning, execution, monitoring, and control, closing and challenges. Multiple regression analysis is used for modeling and analyzing variables.

Multiple Regression Analysis

The main purpose of this analysis is to know to what extent is the project performance is influenced by the independent variables. After presenting the necessary data for the analysis, the regression equation is obtained. After that, the coefficient of determination R^2 is calculated which had the aim of indicating the percent of how much of the total variance is explained by the independent variables. Next, F-test and t-test are analyzed to see which hypothesis can be accepted.

The table below shows the regression coefficients for each variable.

Table 4.13 Multiple Linear Regression Result

		Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.697	.551		1.265	.003	-.412	1.807
	Initiation_Phase	-.261	.239	-.262	-1.094	.042	-.742	.219
	Planning_Phase	.511	.238	.486	2.147	.010	.032	.990
	Execution_Phase	.003	.239	.003	.014	.547	-.477	.483
	Monitoring_Control_Phase	-.326	.230	-.319	-1.421	.018	-.788	.135
	Closing_Phase	.062	.133	.069	.463	.300	-.206	.329
	Challenges	-.079	.103	-.089	-.765	.022	-.286	.128

a. Dependent Variable: Project_Performance

Source: Own Survey data from SPSS (2022)

Based on the unstandardized coefficients we get the regression equation:

$$y = 0.697 - 2.61x_1 + 0.511x_2 + 0.003x_3 - 0.326x_4 + 0.062x_5 - 0.079x_6$$

Where x_1 is initiation phase practice, x_2 is planning phase practice, x_3 is execution phase practice, x_4 is monitoring & control phase practice, x_5 is closing phase practice and x_6 is challenges in units.

Table: 4.14 Model Summary

		Model Summary							
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. Change
1	.872 ^a	.760	.694	.343804	.760	11.467	6	54	.000

a. Predictors: (Constant), Initiation_Phase, Planning_Phase, Challenges, Execution_Phase, Monitoring_Control_Phase, Closing_Phase

Source: Own Survey data from SPSS (2022)

From Table 4.14, the coefficient of determination R^2 indicating the percent of how much of the total variance is explained by the independent variables is 76%.

The analysis of variance for multiple regression is made starting from the below result shown in table 4.15 below.

Table : 4.15 ANOVA Table

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.621	6	1.355	11.467	.000 ^b
	Residual	5.555	54	.118		
	Total	23.176	60			

a. Dependent Variable: Project_Performance

b. Predictors: (Constant), Initiation_Phase, Planning_Phase, Challenges, Execution_Phase, Monitoring_Control_Phase, Closing_Phase

In order to test the validity of multiple regression model a global test is used that shows whether all the independent variables have regression coefficients equal to zero, meaning that if the explained variance is not due to a random. The regression coefficients of the sample have regression coefficients marked as β_1 , β_2 , β_3 , β_4 , β_5 and β_6 .

The alternative and null hypotheses are formulated as:-

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$$

H_1 : Not all β Coefficients are equal to zero.

In order to test the null hypothesis F test is checked which requires an analysis of variance identified in the ANOVA table 4.15 above. From the table it can be seen that the value of the calculated F is 11.467 for the variance generated by the regression. The critical value at the significance level of 0.05 with 6 degrees of freedom at numerator and 54 degrees of freedom at denominator is 2.27. By comparing the value of F, it results that it is compulsory to accept the alternative hypothesis, meaning that not all the regression coefficients are equal to zero. This means that a significant influence of multiple regression model occurs over dependent variable.

To check which regression coefficients may be zero and which are not imposed to achieve an individual evaluation of regression coefficients it is needed to make an assessment the realization of a statistical test for each under the conditions where the null hypothesis implies that each coefficient of β is equal to zero and the alternative hypothesis states that it is different from zero. The test used is t-test with t with n-(k+1) degree of freedom. For each of the six variables from the SPSS result, we get the calculated t values on table 4.13. In order to define the decision rule concerning the null hypothesis, the calculated t-values will be compared with the critical value of t at the significance level of 0.05 in the case of a two-tailed test with 60-(6+1), with 53 degree of freedom. This value is ± 2.006 from Critical values of t distribution with degree of freedom table. In the cases when Initiation phase practice calculated t (-1.094) is higher than the critical t (-2.006). The level of significance indicated through this test which is 0.042 is lower than the

chosen significance of 0.05. Therefore, the null hypothesis is rejected, and it is accepted that β_1 is different from zero. For the planning phase practice t (2.147) is higher than the critical t (2.006), and the level of significance 0.01 is lower than 0.05, therefore, the null hypothesis is also rejected. Similarly, for β_4 and β_6 the null hypothesis is rejected with the level of significance of 0.018 and 0.022 respectively, are lower than 0.05, which indicates that the initiation, planning, and monitoring and control phase practices are significant predictors for the dependent variable project performance. For β_3 and β_5 , the null hypothesis is accepted with the level of significance of 0.547 and 0.300 respectively, are higher than 0.05, so that β_3 and β_5 are equal to zero. Therefore, it is considered that the variables execution phase practice and closing phase practice are not significant predictors for the dependent variable project performance.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the key findings of the study and forwards recommendations for future projects.

5.1 Summary of Findings and Conclusions

The objective of this study was to assess the performance of the 4G LTE layering project in Addis Ababa carried out by Ethio Telecom and Huawei companies. The assessment covered the deployment practice of the five project phases, the challenges, opportunities, and best practices.

In the introductory chapter of this paper three research questions were raised. These were:-

- How does the project performance of 4G LTE Layering project in Addis Ababa assessed through the project life cycles?
- What were the challenges during the project deployment?
- What were the opportunities during the project implementation?

From the findings of this study these questions are addressed as follows.

How does the project performance of 4G LTE Layering project in Addis Ababa assessed through the project life cycles?

A. Project Phases Assessment.

i. Initiation phase Assessment

The initiation phase has the overall mean of 3.72 which indicates that it was in good status. The highest is having benefit analysis with stakeholders with a mean of 4.00 and 85.3% agree (4.0) or strongly agree (5.0) level, and the minimum item is obtaining project charter approval with a mean of 3.38 and 42.6% of respondents agree or strongly agree level, and which needs some improvement. The other one which needs improvement is identification of high-level project risks, assumptions, and constraints which has a mean of 3.39 and 45.9% agree or strongly agree level. The overall assessment of the initiation phase is good.

ii. Planning phase Assessment

The planning phase assessment has the overall mean of 3.74 which shows that it was in good performance as well. The change management plan which has a mean of 3.26 with 44.2% agree or strongly agree level, the risk management plan item which has a mean of 3.43 with 49.2% agree or

strongly agree level, identification of work breakdown structure plan item which has a mean of 3.51 with 49.2% agree or strongly agree level all need improvement. The overall assessment of the planning phase is also good.

iii. Execution phase Assessment

The execution phase assessment has the overall mean of 3.8 which also shows that it is also in the good category. What needs to be improved in this phase is implementing risk management plan which has a mean of 3.51 with 52.2% respondents in agree or strongly agree level and implementing the approved changes which has a mean of 3.59 and 60.6% respondents in agree or strongly agree. The overall assessment of the execution phase is also good.

iv. Monitoring and Control phase Assessment

Monitoring and control phase has the overall of mean of 3.62 which was also in a good status. Verifying project deliverables conform to quality standards item has the highest performance with a mean of 3.89 and 82.0% respondents in agree or strongly agree level. Only Monitoring and assessing risk with a mean of 3.38 with 47.6% respondents in agree or strongly agree level and reviewing the issue log having a mean of 3.2 with 41.0% respondents in agree or strongly agree level were not satisfactory. The other three items have a good performance.

v. Closing phase Assessment

The closing phase assessment has the overall mean of 3.44 which is the least from the five project phases and need attention. Final acceptance of project deliverables with a mean of 4.05 and 91.8% respondents in agree or strongly agree, and releasing resources which has a mean of 3.93 with 85.3% respondents in agree or strongly agree level have a good implementation practice while project closing celebration has a mean of 3.05 and with 41.0% respondents agree or strongly agree level, Obtaining feedback from relevant stakeholders with a mean of 3.05 and with 37.7% agree or strongly agree level, Archiving project documents and materials which has a mean of 3.10 and with 34.5% respondents agree or strongly agree level, documenting lessons learnt which has a mean of 3.02 and with 32.8% agree or strongly agree level, and final project report which has a mean of 3.51 with 54.1% respondents agree or strongly agree level need improvement.

B. Challenges Assessment

Most of the respondents agreed to the item having lack of training with a mean of 3.84 with 80.3% respondents in agree or strongly agree level, while for the remaining four items the respondents responded with a mean of around 2.7 and with Neutral (3.0), Disagree (2.0) or Strongly Disagree (1.0)

level ranging from 75.4% to 83.6% which shows that the only significant challenge from the given scale is lack of training. The challenge item has the overall mean of 2.98 which is nearer to the Neutral (3.0) level. From the open-ended answers, the respondents mentioned other challenges like communication gap between vendors and Ethio Telecom, Lack of proper knowledge after releasing the service traffic, bureaucracy in public offices and political instability in the country.

C. Project Performance Assessment

The overall project performance assessment has a mean of 3.58 which is between Neutral (3.0) and Agree (4.0) level but more to the Agree (4.0) level. Most respondents agreed to the objectives of the project fully met item with a mean of 3.84, with 80.3% response given to agree or strongly agree level. The item having the least mean is the project completion with the planned budget with a mean of 3.31 and with 39.3% response given to agree or strongly agree level. The overall project performance assessment practice item is also good.

D. Opportunities Assessment

Having large customer base, Project teams' exposure for new technologies which initiates them to do mini projects by themselves and hence minimization of cost, Implementing the 4G layering project within short period of time are mentioned for best practice and opportunities for Ethio Telecom, employees, and customers.

The overall project performance was good with the Initiation, Planning and Execution phases having the highest performance. The closing phase practices has weak performance which need attention for future projects.

Table 5.1 Summary of the Project phases, challenges, and project performance Assessment Findings

Items	Mean	Disagree or Strongly Disagree (%)	Neutral (%)	Agree or Strongly Agree (%)	Items Assessment
Initiation Phase	3.72	14.4%	19%	67%	Having Benefit Analysis with Stakeholders with mean 4.00 & 85.3% Agree or Strongly Agree has good performance Obtaining Project Charter Approval with mean 3.38 & 42.6% Agree or Strongly Agree has a weak performance.
Planning Phase	3.74	8.6%	21%	70.4%	Change Management Plan, Risk Management Plan, Identification of WBS Plan have weak performance with a mean which ranges from 3.26-3.51 & 44.2% - 49.2% Agree or Strongly Agree response given.
Execution Phase	3.8	6.6%	28.5%	64.9%	Implementing Risk Management Plan and Implementing the Approved Changes have weak performance with a mean of 3.51 & 3.59 with 52.5% & 60.6% Agree or Strongly Agree respectively.
Monitoring & Control Phase	3.61	11.1%	24.6%	64.3%	Verifying project deliverables conform to quality standards item has the highest performance Monitoring and Assessing Risk (mean 3.38 ,47.6%) & Reviewing the Issue Log (mean 3.2 ,41% Agree or Strongly Agree) need improvement.
Closing Phase	3.43	23.5%	21.3%	55.2%	Final Acceptance of Project Deliverables, Financial, Legal and Administrative closure and Releasing resources with a mean from 3.77 to 4.05. & 64% - 91.8% Agree or Strongly Agree have a good performance. All the rest Items have a weak performance with a mean from 3.05 to 3.51 & 37.7% -54.1% Agree or Strongly Agree.
Challenges	2.98	38.2%	29.5%	32.3%	Only the item Lack of Training is a significant challenge with a mean of 3.84 & 80.3% Agree or Strongly Agree All the rest items are not found to be a significant challenge.
Project Performance	3.58	10.5%	25.6%	63.9%	From the five items, four items have satisfactory performance except the project completion with the planned budget item in which 50.8% respondents responded with Neutral.

Source: Own Survey Data (2022)

5.3 Recommendations

Based on the findings of this paper, the researcher recommends the following.

- Approving the project charter is needed to formalize the authority assigned to the project manager and to have commitment and acceptance for the project.
- Identification of high-level risks, assumptions, constraints, and priorities is needed for future projects.

- Developing, identifying, analyzing, prioritizing, and implementing risk management plan is important to reduce the impact of the risk. Moreover, assessing and monitoring risk is needed to evaluate the response strategies.
- Identification and documentation of work breakdown structure is needed in the project plan.
- Developing Change management plan by defining how changes will be addressed and controlled and implementing and taking corrective action for the approved changes is needed following the change management plan.
- Reviewing and updating the issue log is important by using appropriate tools and techniques.
- The final project report needs to be prepared and shared according to the communication management plan.
- Documenting lessons learnt and conducting project review in order to update the organizations knowledge base is needed.
- Archiving project documents and materials for future projects and for audit is important.
- Obtaining feedback from relevant stakeholders is needed for evaluating their satisfaction.
- Project closing celebration is needed to provide visibility and to recognize main stakeholders and professionals.
- Delivering adequate training is needed for project staffs.
- Controlling and efficiently using the project budget is important.
- Efficient communication is needed between vendors and Ethio Telecom staffs.

5.4 Future Research Recommendation

The scope of this research is on the 4G LTE layering project performance assessment in Addis Ababa. The researcher recommends similar studies to be conducted which includes assessments on the 4G LTE layering projects in regions throughout the country and other projects with other divisions in Ethio Telecom. Moreover, future studies can be performed by taking into consideration other variables which affects the project performance. Doing so, will improve future projects implementation practice.

REFERENCES

- Abbasi, et.al (2000). Project management practice by the public sector in a developing country, *International Journal of Project Management* PERGAMON. pp. 106-108.
- Ali (2021). *Quantitative research tools*. University of Sindh.
- Alotaibi (2019) *Project Management: The Implication of Project Management Practices on Project Success in Saudi Arabia*. PhD thesis. University of Portsmouth.
- Altheide et.al (1994). *Criteria for assessing interpretive validity in qualitative research*. *Handbook of qualitative research*. Sage Publications, Inc.
- Anesthesia et.al (2018). *Correlation Coefficients: Appropriate Use and Interpretation*. pp.1765
- Airiodion et al. (2021). *Best Project Assessment Guide: Change and Project Management*.
- Atsbha (2018). *Assessment of Telecom Project Implementation Practices in Ethiopia: The case of Telecom Expansion Project*, MA Thesis, Addis Ababa University.
- Bashir (2008). *Reliability and Validity of Qualitative and Operational Research Paradigm*. Division of Education, University of Education Lahore, Pakistan. pp. 36.
- Beauchamp et.al (2013), *Principles of Biomedical Ethics*. Seventh Edition. Oxford University Press. pp. 13.
- Bhandarkar et.al (2016). *4G Technology*. *International Journal of Scientific Research & Modern Education*, pp. 96-97
- Birhanu (2017). *Assessment of Project Implementation Practice of Entrepreneur and Business Growth Project implemented By Digital Opportunity Trust Organization In Addis Ababa*.
- Boote et.al (2005). *Scholars Before Researchers: On the Centrality of the Dissertation Literature Review in Research Preparation*. University of Central Florida.
- Bryman et.al (2015). *Business research methods*. Fourth Edition. Oxford University Press.
- Burns et.al (2007), *Understanding nursing research. Building an evidence-based practice*. 4th Edition, Saunders Elsevier, St. Louis.
- Cochran (1963), *Sampling Techniques*, Second Edition. New York. John Wiley & Sons, Inc.
- Cohen et.al (2008). *Evaluative Criteria for Qualitative Research in Health Care*:

Controversies and Recommendations.

Cox (2014). LTE, LTE-Advanced, SAE, VoLTE and 4G Mobile Communications.

Second Edition. John Wiley & Sons Ltd, pp. 1

Creswell (2007), Research design: Qualitative, Quantitative and mixed methods approaches, fifth edition. Thousand Oaks, CA: SAGE publications.

Curry (1984) Sample Size Rule of Thumb; Populations and Sampling, 7-4.

North Texas State University.

Dahlman et.al (2014) 4G: LTE/LTE-Advanced for Mobile Broadband,

Second Edition, ELSEVIER, ISBN: 978-0-12-419985-9. pp. 1-2

Davies (2011). Concept Mapping, Mind Mapping and Argument Mapping: What are the Differences and Do They Matter? University of Melbourne.

Ethio Telecom Website, <https://www.ethiotelecom.et/history/>

George et.al (2016). IBM SPSS Statistics 23 Step by Step. A simple guide and reference.

Thirteenth edition. Routledge pp. 240.

Haftom (2019). Assessment of Project Management Practices and Challenges: The Case of Telecom Expansion Project (TEP) In Ethio Telecom. MA Thesis, Addis Ababa University

Kerzner (2009). Project management: A systems approach to planning, scheduling, and control.

John Wiley & Sons, Inc., Hoboken, New Jersey.

Kothari (2004). Research Methodology: Methods and Techniques. Second revised edition.

New International Publishers. ISBN (13) : 978-81-224-2488-1.

Kutner et.al (2005). Applied Linear Statistical Models. Fifth Edition.

McGraw-Hill/Irwin. pp 408-409.

Martin et.al (2012), Quantitative and Statistical Research methods: From Hypothesis to

Results. John Wiley & Sons. New Jersey, USA: Jossey-Bass.

PMI (2017). A Guide to Project Management Body of Knowledge (PMBOK).

PMH (2018). Project Management Handbook. European Union Interact, Sharing Expertise, pp. 1.

Queiros et.al (2017). Strengths and limitations of qualitative and quantitative research methods.

European Journal of Education Studies. pp. 373-374

Richman (2002). Project Management: Step-by-step. AMACOM. pp. 4.

Saba Woldemariam (2019). Critical Success Factors of Leading IS Projects, The case of Ethio

- Telecom Information System Projects. MA Thesis, Addis Ababa University.
- Schulze (2003). Views on the combination of quantitative and qualitative research approaches. University of South Africa. pp. 12.
- Sekaran (2003). Research methods for business: A skill building approach, Fourth Edition. Southern Illinois University at Carbondale. pp. 17-18, pp. 394-395
- Sharew (2018). The practice of project management tools and techniques in NGO's: The case of selected international NGOs based in Addis Ababa. MA thesis, St. Mary's University.
- Shrestha (2020). Detecting Multicollinearity in Regression Analysis. Department of Mathematics and Statistics, P. K. Campus, Tribhuvan University, Kathmandu, Nepal. American Journal of Applied Mathematics and Statistics pp. 40.
- Silverman (2000), Doing Qualitative Research. Fifth Edition. SAGE Publications Inc.
- Somekh et.al (2005). Research methods in the social sciences – Sage publications Ltd. Sally Barnes University of Bristol, Cathy Lewin, Manchester Metropolitan University. pp. 231.
- Sunny et.al (2000). The complete guide to project management. Second edition. Alpha Books.
- Weiss et.al (1992). 5-phase project management: A practical planning and implementation guide Cambridge, Massachusetts. pp 5.
- Westland (2006). The project management life cycle. A complete step-by-step methodology for initiating, planning, executing, and closing a project successfully. Kogan Page Limited.
- Wondwossen et.al (2021). The correlation between project management effectiveness and project success for LTE advanced project in Ethio-Telecom. MBA thesis, St. Mary's University
- Yamane (1967). Statistics, An introductory Analysis, Second Edition. New York. Harper & Row. pp.1-4
- Yount (2006), Research design and statistical analysis for Christian ministry. Fourth Edition. Fort Worth, Tex.

APPENDICES

I. Questionnaire

Dear Respondent,

This questionnaire has purely academic purpose as I am conducting a study at Addis Ababa University, College of Business and Economics for partial fulfillment of MA Degree in Project Management. This questionnaire is designed to collect data for a research paper entitled “Assessment on implementation Practices on the 4G-LTE expansion project: Case study for sites in Addis Ababa”.

The questionnaire is intended to assess the implementation practice during the five project phases: initiation, planning, implementation, monitoring and controlling, and closing phases. Please try to select your appropriate response from best of your knowledge.

Thank you in advance for your time and effort for responding to this questionnaire.

My Contact Information:

Name: Biruk Temtem

E-mail: biruktemtem@gmail.com

Phone: 0911152527

Instructions:

1. Please respond to all questions.
2. For the given options check the box with your choice.

Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA)

3. For the open questions, write your answer on the blank space provided.

Section 1: Respondent's Profile

1.1 Gender Information:

Male Female

1.2 Age Group:

18-30 31-40 41-50 50+

1.3 Education Background:

Certificate/ Diploma First Degree Masters Degree Doctoral Degree

1.4 Work Experience in Years:

0-5 6-10 11-15 Above 15

1.5 Job Role during the project:

Technician Professional Specialist Supervisor Expert Managerial

Section 2. Project performance Practice in the five Project Phases

2.1 Initiation Phase:

2.1.1 Feasibility Study: Project assessment was performed based upon available information, lessons learned from previous projects, and meetings with relevant stakeholders to support the evaluation of the feasibility within the given assumptions and/or constraints. *Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA)*

SD D N A SA

2.1.2 Identifying Key Deliverables: Key deliverables were identified based on the business requirements to manage customer expectations and direct the achievement of project goals.

SD D N A SA

2.1.3 High-level project schedule milestones: High-level project schedule milestones were properly identified.

SD D N A SA

2.1.4 Benefit Analysis: Benefit analysis was conducted with relevant stakeholders to validate project alignment with organizational strategy and expected business value.

SD D N A SA

2.1.5 Stakeholders Analysis: Stakeholder analysis was performed using appropriate tools and techniques to align expectations and gain support for the project.

SD D N A SA

2.1.6 High Level Project risks, assumptions, constraints, and priorities: High level risks, assumptions, and constraints were identified based on the current environment, organizational factors, historical data, and expert judgement, to propose an implementation strategy.

SD D N A SA

2.1.7 Obtaining Project Charter Approval: Project charter approval was obtained from the sponsor, to formalize the authority assigned to the project manager and gain commitment and acceptance for the project.

SD D N A SA

2.2 Planning Phase:

2.2.1 Project Requirements, Constraints and Assumptions: Detailed project requirements, constraints and assumptions were reviewed and assessed with stakeholders based on the project charter, lessons learnt and using requirements gathering techniques.

SD D N A SA

2.2.2 Scope Management Plan: A scope management plan was developed based on the approved project scope and using scope management techniques, to define, maintain and manage the scope of the project.

SD D N A SA

2.2.3 Cost Management Plan: Cost management plan was developed based on the project scope, schedule, resources, approved project charter and other information, using estimation techniques, in order to manage project costs.

SD D N A SA

2.2.4 Schedule Management Plan: Project schedule was developed based on the approved project deliverables and milestones, scope, and resource management plans in order to manager timely completion of the project.

SD D N A SA

2.2.5 Human Resource Management Plan: Human resource management plan was developed by defining the roles and responsibilities of the project team member.

SD D N A SA

2.2.6 Communication Management Plan: Communications management plan was developed based on the project organizational structure and stakeholder requirements, in order to define and manage the flow of project information.

SD D N A SA

2.2.7 Work Breakdown Structure: A high-level Work Breakdown Structure which included a hierarchical set of phases, activities, and tasks to be undertaken to complete the project was identified and documented in the project plan.

SD D N A SA

2.2.8 Project Tasks and Resource Requirements: The project's tasks and resource requirements were identified, along with the strategy for producing them.

SD D N A SA

2.2.9 Risk Management Plan: Risk management plan was developed; identifying, analyzing, and prioritizing project risk; creating the risk register; and defining risk response strategies to manage uncertainty and opportunity thought the project life cycle.

SD D N A SA

2.2.10 Stakeholders Management Plan: Stakeholder management plan was developed by analyzing needs, interests, and potential impact in order to effectively manage stakeholders' expectations and engage them in project decisions.

SD D N A SA

2.2.11 Quality Management Plan: Quality management plan was developed, and the quality standards were defined for the project and its products, based on the project scope, risks, and requirements, in order to prevent the occurrence of defects and control the cost of quality.

SD D N A SA

2.2.12 Change Management Plan: Change management plan was developed by defining how changes will be addressed and controlled to track and manage change.

SD D N A SA

2.3 Execution Phase:

2.3.1 Acquire and Manage Project Resources: Project resources were acquired and managed by following human resource procurement management plans in order to meet project requirements.

SD D N A SA

2.3.2 Leading and Developing the Project Team: The project manager executed based on the project management plan by leading and developing the project team in order to achieve project deliverables.

SD D N A SA

2.3.3 Implementing the Quality Management Plan: The quality management plan was implemented using the appropriate tools and techniques.

SD D N A SA

2.3.4 Implementing the Approved Changes: The approved changes were implemented, and corrective actions taken by following the change management plan in order to meet project requirements.

SD D N A SA

2.3.5 Manage the flow of information by following the communication plan: The flow of information was managed by following the communications plan to keep stakeholders engaged and informed.

SD D N A SA

2.3.6 Implementing Risk Management Plan: The approved actions were implemented by following the risk management plan to minimize the impact of the risk and take advantage of opportunities on the project.

SD D N A SA

2.3.7 Maintain Stakeholders Relationship: Stakeholder relationship was maintained by following the stakeholder management plan in order to receive continued support and manage expectations.

SD D N A SA

2.3.8 Implement the Quality Management Plan: Quality targets, assurance, and control measures, along with an acceptance plan, listing the criteria to be met was set.

SD D N A SA

2.4 Monitoring and Control Phase:

2.4.1 Measuring Project Performance: Project performance was measured using appropriate tools and techniques in order to identify and quantify any variances and corrective actions.

SD D N A SA

2.4.2 Verifying the Project Deliverables Conform to Quality Standards: Project deliverables were verified to conform to the quality standards established in the quality management plan by using appropriate tools and techniques.

SD D N A SA

2.4.3 Monitoring and Assessing Risk: Risk was monitored and assessed by determining whether exposure has changed and evaluating the effectiveness of response strategies in order to manage the impact of risks and opportunities.

SD D N A SA

2.4.4 Reviewing the Issue Log: The issue log was reviewed and updated, and corrective actions were determined by using appropriate tools and techniques in order to minimize the impact on the project.

SD D N A SA

2.4.5 Monitoring Procurement Activities: Procurement activities were monitored according to the procurement plan in order to verify compliance with project objectives.

SD D N A SA

2.5 Closing Phase:

2.5.1 Final Acceptance of the Project Deliverables: Final acceptance of the project deliverables were obtained from relevant stakeholder in order to confirm that project scope and deliverable were achieved.

SD D N A SA

2.5.2 Financial, Legal and Administrative Closure: Financial, legal and administrative closure were obtained using generally accepted practices and policies in order to communicate formal project closure and ensure transfer of liability.

SD D N A SA

2.5.3 Final Project Report: The final project report was prepared and shared according to the communications management plan in order to document and convey project performance and assist in project evaluation.

SD D N A SA

2.5.4 Documenting Lessons Learnt: Lessons learnt were documented throughout the project and conduct a comprehensive project review in order to update the organization's knowledge base.

SD D N A SA

2.5.5 Archiving project documents and materials: Project documents are well archived in order to retain organizational knowledge, for future projects and audit.

SD D N A SA

2.5.6 Obtaining Feedback from Relevant Stakeholders: Feedback from relevant stakeholders was obtained using appropriate tools and techniques and based on the stakeholder management plan to evaluate their satisfaction.

SD D N A SA

2.5.7 Releasing Resources: Human and other resources were released to operation on time.

SD D N A SA

2.5.8 Project Closing Celebration: The project closing was celebrated to provide visibility and recognition to main stakeholders and professionals involved in the success of the project.

SD D N A SA

4. Challenges

4.1 Lack of Training: Adequate training is not given.

SD D N A SA

4.2 Lack of Executive Management Support: Executive Management Support was poor.

SD D N A SA

4.3 Communication gap: There was communication gap among stakeholders.

SD D N A SA

4.4 Integration Problem: The coordination of the project elements like tasks, resource, stakeholders and deliverables were poor.

SD D N A SA

4.5 Procurement Delay: There was procurement delay on the project.

SD D N A SA

If there is any other challenge write below

5. Project Performance

5.1 Objective of the project: The objectives of the project are fully met.

SD D N A SA

5.2 Schedule: The project is completed within the planned schedule.

SD D N A SA

5.3 Budget: The project is completed within the planned budget.

SD D N A SA

5.4 Scope: The project is completed within the planned scope.

SD D N A SA

5.5 Deliverables: All the deliverables were handed over with the planned quality of standard.

SD D N A SA

6. General Opinion Question

6.1 What were opportunities and best practice in the deployment of the project?

6.2 If you have any additional comment on the project please write below

Thank you very much for spending your precious time.

April, 2022

II. SPSS Output

Items statistics

Item Statistics

	Mean	Std. Deviation	N
Feasibility_Study	3.86885	.921510	61
Identifying_Key_Deliverables	3.95082	.693451	61
High_level_project_schedule_milestones	3.80328	.770707	61
Benefit_Analysis	4.00000	.707107	61
Stakeholders_Analysis	3.67213	.768577	61
High_Level_Project_Risks_assumptions_constraints_priorities	3.39344	.899605	61
Obtaining_Project_Charter_Approval	3.37705	.915859	61
Project_Requirements_Constraints_and_Assumptions	3.72131	.755671	61
Scope_Management_Plan	3.90164	.789618	61
Cost_Management_Plan	3.80328	.748769	61
Schedule_Management_Plan	3.96721	.815827	61
Human_Resource_Management_Plan	3.90164	.869960	61
Communication_Management_Plan	3.88525	.818502	61
Work_Breakdown_Structure	3.50820	.868388	61
Project_Tasks_and_Resource_Requirements	3.86885	.590915	61
Risk_Management_Plan	3.42623	.884289	61
Stakeholders_Management_Plan	3.67213	.789964	61
Quality_Management_Plan	3.95082	.717083	61
Change_Management_Plan	3.26230	.998359	61
Acquire_and_Manage_Project_Resources	3.86885	.618477	61
Leading_and_Developing_the_Project_Team	3.85246	.853152	61
Implementing_the_Quality_Management_Plan	3.88525	.858261	61
Implementing_the_approved_changes	3.59016	.901426	61

Manage_the_flow_of_information	3.91803	.759278	61
Implementing_Risk_Management_Plan	3.50820	.808763	61
Maintain_Stakeholders_Relationship	3.80328	.600546	61
Implement_the_quality_Management_Plan	3.96721	.631591	61
Measuring_Project_Performance	3.81967	.741804	61
Verify_project_deliverables_conform_quality_standards	3.88525	.660766	61
Monitor_and_assess_Risk	3.37705	.839919	61
Review_the_Issue_Log	3.19672	.945510	61
Monitor_Procurement_Activities	3.78689	.635472	61
Final_Acceptance_of_Deliverables	4.04918	.529976	61
Financial_Legal_Administrative_Closure	3.77049	.716320	61
Final_Project_Report	3.50820	.924174	61
Documenting_Lessons_Learnt	3.01639	1.087686	61
Archiving_project_documents	3.09836	1.059952	61
Obtaining_feedback_from_stakeholders	3.04918	1.071233	61
Releasing_Resources	3.93443	.704009	61
Project_Closing_Celebration	3.04918	1.270515	61
Lack_of_Training	3.83607	1.142808	61
Lack_of_Executive_Management_Support	2.78689	.896563	61
Communication_Gap	2.73770	.981523	61
Integration_Problem	2.75410	.924766	61
Procurement_Delay	2.77049	.901729	61
Challenges	2.97705	.703419	61
Objectives_of_the_Project	3.83607	.687516	61
Schedule	3.49180	.905961	61
Budget	3.31148	.807073	61
Scope	3.60656	.842193	61
Deliverables	3.65574	.680325	61
Project_Performance	3.58033	.621509	61

Bar graph plots

