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SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF PROJECT MANAGEMENT

**ANALYSIS OF SUCCESS FACTORS FOR ENTERPRISE RESOURCE
PLANNING PROJECT IMPLEMENTATION:**

THE CASE OF ETHIO TELECOM

BY: TSEGAYE BEKELE TEKLE

ADVISOR: WUBSHET BEKALU (PhD)

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTER OF ART IN
PROJECT MANAGEMENT.**

JANUARY, 2019

ADDIS ABABA, ETHIOPIA

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Approval/Certificate

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This is to certify that, the thesis worked by Tsegaye Bekele Tekle, entitled: “Analysis of Success Factors for Enterprise Resource Planning Project Implementation: The Case of ethio telecom” was carried out under strict supervision and has been approved for submission to St, Mary’s University School of Graduate Studies Program of Project Management in Partial Fulfilment of the Requirements for the Award of Master of Art in Project Management assembles with the regulation of university and meets the accepted standards with respect to originality and quality.

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Acknowledgement

First and foremost, I would like to thank my God for giving me the strength and resource to undertake this study. Secondly, I wish to express my heartfelt gratitude to my advisor, Wubshat Bekalu (PhD) for his invaluable aid and supervision throughout the period I wrote this thesis. His guidance and constructive criticism made this thesis possible. Third I would also like to express my gratitude to my good friends critiqued my work and therefore helped me to refine it. Fourth, I would also like to thank my families for standing by me all along. Their drive and enthusiasm greatly motivated me. Lastly, I am grateful to ethio telecom for allowing me to distribute questionnaire via company email to employee of ethio telecom who helped me by completing the survey. Without them, this thesis would not have been possible to complete.

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Abstract

Enterprise Resource Planning is one the latest technologies that many organizations have undertaken. Typically, enterprise resource planning systems are software packages composed of several modules, such as human resources, sales, finance and supply chain to provide cross-organizational integration of transaction-based data management throughout embedded business processes. The modern companies are utilizing an enterprise resource planning to coordinate the information flows both internally and externally. But implementing enterprise resource planning is complex and costly. Understanding success factors is hence vital. There are many factors came in to play in the course of implementing enterprise resource planning implementation. In this study seven mostly cited factors and viable from ethio telecom point of views are selected. They are, Effective Project Management, Top Management Support, Training & Education, Vendor Support, Teamwork & Composition, User Involvement and Business Process Reengineering. The main objective of the study is to identify success factor of enterprise resource planning implementation and investigate degree of their significance. The hypothesis that consists seven independent variables and one dependent variable was developed in parallel with basic research questions to meet research objective. The representatives of the study were taken from ethio telecom enterprise resource planning implementation project team members by using census. Due to smallness of target population the whole one hundred five project team members were taken. A total of one hundred five questionnaires were distributed via email and one hundred two questionnaires filled and returned were used for analyses. Due to the nature of study undertaken, both description and explanatory research designs were used. Correlation and regression analysis were used to investigate the relationship between success factors and enterprise resource planning implementation success. The finding of the study shows that Effective Project Management, Top Management Support, Training & Education, Vendor Support and Teamwork and composition, User Involvement and Business Process Reengineering have positive and significant effect on enterprise resource planning implementation success at different degree of significance. The regression analysis for this study depicted that the independent variables under the study are predictors of enterprise resource planning implementation success which is confirmed by R square 0.769.

Key Words: Enterprise Resource Planning, Success Factors, Implementation

Chapter One

Introduction

This chapter deals with the background of the study, background of the company, statement of the problems, research questions, objective of the study, research hypothesis, significance of the study, scope of the study and organization of the thesis.

1.1 Background of the Study

M.Garg (2004) the rapid development of technology in 21st century drives the competitive advantage of enterprise transfer from the tangible resource to the intangible assets such as information technology. As an example of application of information technology in the field of business management Enterprise Resource Planning system has gained popularity among many organizations these seek to increase their efficiency and productivity as well as to streamline their operations. The system was designed as a platform for greater innovation, enabling companies to adopt real time automation and knowing that the process could tightly integrated to operate at full capacity.

Enterprise Resource Planning helps different departments of an organization to move information among different processes, reduce operation costs, increase operational efficiency, improve business process management, facilitate communication, share information and knowledge across organization units, and improve decision making capability. Because of these improved features and thought the development of business and administrative procedures, many organizations around the world have implemented or updated their current management with an Enterprise Resource Planning system or are in the process of implementing a system (Aamir Ijaz, 2014).

Despite its benefits, it has been observed that the Enterprise Resource Planning implementation project experienced failure in my organizations adopted the system so far. It can be considered as a high-risk project since it almost affects the whole performance and functioning of the organization.

According to (Garg, 2004) the cost, complexity, and implementation complication of an Enterprise Resource Planning system imply that organizations must seriously consider the planning, selection

and implementation process. However, costly the planning process maybe, making the wrong choice could be far more expensive. Understanding the risk and finding ways to mitigate them is a necessary part of the process.

Switching from a traditional business process to a new way of conducting business through implementing a new information system such as Enterprise Resource Planning system and therefore abandoning the legacy system to run the new business process, is considered a difficult task and may cause a system failure, which in turn may lead to insolvency. Although, there are success stories with Enterprise Resource Planning systems, there are also cases of failure for some companies (Farmer et al, 2001; Chen, 2001). Owing to this failure, many companies are still indecisive on making an enormous investment, paying a large sum of money, and investing in a lengthy period for implementing such new system.

In fact, these cases of failure deter many from implementing Enterprise Resource Planning system because they are frightened of having the same experience of prospect of bankruptcy (Huang & Palvia, 2001). Consequently, technology diffusion between companies may be decreasing which may adversely affect the growth of new technology innovations. These were the result of reluctance from many companies to invest huge amounts of time and money in the implementation of Enterprise Resource Planning system which could potentially fail or cause undesirable outcomes. (Rajapaksa & Seddon, 2006). Therefore, it is important to improve the implementation success of Enterprise Resource Planning system, identify critical success factors, and understand critical success factors these contribute for successful Enterprise Resource Planning implementation. Thus, the critical factors involved in Enterprise Resource Planning implementation can be given more, and proactive approaches can be developed to counter the high failure rate of implementation project failure. (Yu, 2005).

The success of the Enterprise Resource Planning implementation is subjected to many success factors. Hence, to cope up with the challenges of Enterprise Resource Planning implementation and carryout successful project, companies should identify critical success factors and manage factors properly (Trunick P, 2005).

According to Sarker and Lee (2000) differences exist between ERP critical success factors in developed and developing countries. Few factors like ERP vendor and Top management support

seem more important for developing countries. They recognized, Top Management Support, Effective Project Management, User Training and Education, Teamwork and Composition, Clear Goal and Objectives and Change readiness and culture as most cited critical factors for ERP implementation project success.

1.2 Background of the Organization

ethio telecom is the oldest public telecommunications operator in Africa which dated back to 1894. Since this year, the technological scheme contributed to the integration of the Ethiopian society when the extensive open wire line system was laid linking the capital city with all important administrative cities of the country.

After the end of the war with Italy, during which telecommunication network was destroyed, the country reorganized the telephone, telegraph and postal service in 1941. In 1952 the Empirical Board of Telecommunications (IBTE) was established by proclamation No. 131/52. The board had full financial and administrative autonomy and oversaw the provision and expansion of telecommunications services in Ethiopia. The Empirical Board of Telecommunications of Ethiopia, which became the Ethiopian Telecommunications Authority in 1981, placed in charge of both the operation and regulation of telecommunication services in the wake of the market reforms.

In 1996, the government established a separate regulatory body, the Ethiopian Telecommunication Agency (ETA) by proclamation No. 49/1996, and during the same year, by regulation 10/1996, the council of minister set up the Ethiopian Telecommunication Corporation (ETC). Under the supervision of ETA, the principal duty of ETC is maintaining and expanding telecommunication services in the country and providing domestic and international telephone, telex and other telecommunication services (Worku Bogale, 2005).

In 2008, the company (ETC) signed a huge telecommunication infrastructure expansion project all over the country with Chines Company named ZTE mainly to expand fixed line, mobile and internet services.

In 2010 the company restructured and renamed itself as ethio telecom and the company was signed management contract with France telecom for two years and the contract is closed in 2012. Now, it is named ethio telecom, which state owned company and only telecom services provider of the

country, having many prospects and more than 61 million customers throughout the country (ethio telecom annual report 2018).

Telecommunications sector operates at a hectic pace to stay competing with international rules, increase profitability, appeal to their clients' demands and provide state-of-the-art communication technology. Hence, to cope up with such global telecom sectors' challenges, ethio telecom has kept pace by continuously improving its internal business process. One of the important reform tools is Enterprise Resource Planning which a researcher investigated in this study.

1.3 Statements of the Problem

Enterprise Resource Planning systems implementation project is a complex project in technology innovation and organizational change management (Kumar et al, 2002; Markus & Tanis, 2000) and it is not an easy task. It requires the coordination of many activities of an organization and a close cooperation of employees, managers, IT specialists, business analysts, consultants, and Vendor Company. Furthermore, the Enterprise resource planning systems implementation differs from the traditional systems implementation in scale, complexity, organizational impact, user's participation, cost, and business impact.

The implementation of ERP systems in organizations is an enormously complex undertaking. It is a high-risk project that needs to be managed and planned properly because it can affect nearly every aspect of organizational performance and functioning.

There is a lack of proven scientific theories and experiences on the implementation of ERP. The complexity and versatility enterprise resource planning systems mean that success in their implementation requires referring to a solid methodical foundation and proven scientific theories.

Another challenge is to identify the factors that determine the success of the implementation of ERP system. Success factors are these areas and operations which should be focused on primarily to achieve the most satisfying results of the ERP systems implementation project. It seems that the theory of success factors gives good basis for stating what criteria should be followed during implementation project.

A study conducted by Nah and Delgado (2006) identified seven critical factors for ERP implementation. These factors are: business plan and vision, change management, ERP Team

composition, management support, project management and system analysis. Since this study was based on a developed country which is significantly different from a developing country like Ethiopia.

Aldammas & Al-Mudimigh (2005) classified eleven factors affecting ERP implementation. These factors are: ERP team work and composition, top management support, effective communication, project management, business plan and vision, project champion, appropriate business and legacy systems, business process reengineering and customization, change management program and culture, software development testing and trouble shooting and monitoring and evaluation. This study was also conducted in Saudi Arabia which is a far more developed country compared to Ethiopia.

ERP is emerging technology and getting popularity in Ethiopia. However, the challenge facing many organizations implementing ERP in Ethiopia is ensuring that the ERP projects are implemented successfully, and the benefits of the system are realized. ERP implementation projects in Ethiopia are recent phenomena and there are knowledge gaps in the area. So far ethio telecom, Sur Construction, Mesobo Cement and other few companies implemented ERP. ERP implementation in these companies have been marred by delay of completion time beyond scheduled time frame, completion of projects with excessive over budget and functionality problem of ERP system as showed by finding of research conducted by Mesfin Belachew and Mesfin Kifle, (2015).

Ethio telecom begin ERP implementation in 2012. Ethio telecom implemented ERP project phase by phase and comprehensive ERP interface completed by 2017. Based on the internal company report, at the completion of ERP implementation, it run over budget, delayed beyond project time schedule and performed below company's expectation.

Therefore, the aim of this research is to explore success factors for ERP implementation in ethio telecom and analyze how success factors affect ERP implementation success. To the best of the researcher's knowledge, no study had been conducted in telecom sector regarding success factors for ERP implementation. This study therefore sought to bridge this knowledge gap by identifying the success factors influencing ERP implementation in telecom sector. Thus, the purpose of this

paper is to analyze success factors affecting implementation success of ERP implementation project to bridge knowledge gap in area.

1.4 Research Questions

The study aimed to analyses critical success factors in ERP implementation and their impact on implementation success to find out.

- What are the major success factors for ERP implementation project?
- What is the impact of each factor on ERP implementation success?
- To what extent each factor is critical?

1.5 Research Objective

1.5.1 General Objective

The general objective of the study is to find out success factors of ERP implementation project and their impact on implementation success in ethio telecom.

1.5.2 Specific Objectives

In the light of the above-mentioned major objective, the specific objectives of the study are:

- ❖ To identify and analyses major critical success factors in ERP implementation project.
- ❖ To analyze impact of each factor on ERP implementation project success.
- ❖ To analyze degree of significance of each factor.

1.6 Research Hypothesis

H1 There is a positive and significant relationship between effective project management and ERP implementation success.

H2 There is a positive and significant relationship between top management support and ERP implementation success.

H3 There is a positive and significant relationship between education & training and ERP implementation success.

H4 There is positive and significant relationship between vendor support and ERP implementation success.

H5 There is a positive and significant relationship between teamwork & composition and ERP implementation success.

H6 There is a positive and significant relationship between user involvement and ERP implementation success.

H7 There is a positive and significant relationship between business process reengineering and ERP implementation success.

1.7 Definition of key Terms

Project: A project is a temporary endeavor undertaken to create a unique product, service, or result. A Guide to the Project Management Body of Knowledge (MPBOK Guide) Fourth Edition.

Enterprise Resource Planning (ERP): Is cross function enterprise system driven by an integrated suite of software modules that supports the basic internal business process of a company. <https://www.slideshare.net/mobile/siddharthModi1/complete-knowledge>.

Success Factors (SF): Success factors, are elements necessary for an organization or project to achieve its mission. <https://flevy.com/seller/learnptt>.

Project Implementation: the process whereby project inputs are converted to project outputs, maybe looked at as: put in action the activities of the project, putting in to practice what was

proposed in the project proposal into the actual project, management of project or executing the project intention. (Ernesto A. Franco 2010.)

Vendor: vendor means a person (or company) who sells and supplies his (or its) products. <https://www.slideshare.net/mobile/parmadharPD/vendor-development>.

1.8 Significance of the Study

Successful implementation of ERP systems is important to ensure that the resources invested are not wasted. Implementing an ERP system is an expensive and time-consuming venture, companies therefore need to ensure that the implementation process is properly executed. The findings from this study can be helpful to companies that want to implement ERP systems as it will give an in-depth insight on factors affecting ERP implementation especially in the telecom sector. The study also contributes in technology diffusion by motivating other companies to adopt ERP system given them awareness on the importance of critical success factors (CSFs) seeks special attention of management and project managers for successful implementation of the project.

The study finds are of great importance to the researchers and practitioners as it may contribute both theoretical and practically knowledge on the effect of critical success factors in ERP implementation project in telecom sectors. It is hoped that the knowledge gained from the study mainly serve as base for planning and a reference for further study in the knowledge area of critical success factors for ERP implementation project. Hence, annotated finding of the research might help as a reference for researchers in conducting further study on the same area.

1.9 Scope of the Study

The research has delimited area to focus on. Despite high tech nature of the ERP system, the researcher tried to identify critical success factors from managerial and organizational perspective only. No technical part of ERP application was discussed in this study. As a source of information, the study used only employees and managers of ethio telecom those were team members of ERP implementation project. Due to the nature of the study and a type of information needed to conduct the study only project team members are potential and viable source of information needed for a subject area. The study focuses only on seven, most commonly cited critical success factors these are key and important and their impact on ERP implementation success based on literature and ethio telecom point of view.

1.10 Organization of the Study

The research organized in to five chapters. Chapter one contains; Introduction, background the study, background of the organization, statement of the problem, research questions and objectives, significance and scope of the study.

The next chapter, chapter two mainly focus on existing literature which covers theoretical framework work related to the study, empirical study related to topic of the study and conceptual framework.

Chapter three discuss the methodology employed in the study including research design, sampling techniques, data source and collection method, procedures of data collection and method of data analysis.

Chapter four is data analysis and interpretation of the results.

Finally, chapter five contain summary, conclusion and recommendation.

Chapter Two

Review of Related Literature

2.1 Introduction

This chapters deals with theoretical review, empirical review and conceptual framework of the study.

Theoretical review of the research: This part is deals with definition of concepts on Enterprise Resource Planning, historical development of ERP, Benefits of ERP, and implementation project of ERP, challenges of ERP implementation project and critical success factors of ERP implementation.

Empirical review of the research: it summarizes major research findings in relation to the research area.

Conceptual framework: based on the literature review part of theoretical and empirical review, it shows the nature of relationships between research variables.

2.2 Theoretical Review

2.2.1 Enterprise Resource Planning Overview

ERP stands for Enterprise Resource Planning. Enterprise Resource Planning system is “commercial software packages that enable the integration of transaction-oriented data and business process throughout an organization” (Markus and Tanis, 2000). Typically, ERP systems are software packages composed of several modules, such as human resources, sales, finance and production providing cross-organization integration of transaction-based data throughout embedded business processes. These software packages can be customized to the specific needs of each organization up to certain limits (Esteves and Pastor, 1999).

Concept in terms of its historical evolution, relating it with manufacturing and supply chain management. It is unlikely that a broadly agreed upon definition can be achieved.

In the literature there is a consensus that ERP are indeed expected to support the enterprise's operations and provide its various levels of management with information in a highly integrated

manner. When integrated beyond the confines of the individual enterprise with the systems of its business partners, such extended ERP systems engender a vision of a network of value-creating processes cutting across organizational boundaries. ERP can form a fundamental platform for the informational infrastructure of an enterprise.

Nowadays, new terms have been proposed, such as ERP II, and Enterprise Resource Management (ERM). The term ERP II was created by Gartner Group and it is defined as “a business strategy and a set of industry domain specific applications that build customer and shareholder value by enabling and optimizing enterprise and inter-enterprise, collaborative operational and financial processes” (Bond et al. 2000).

The roots of ERP systems can be traced back to the material requirements planning systems (MRP) in the 70's. These systems evolved to the manufacturing resource planning systems (MRPII). (Shankarnarayanan 1999) identifies four phases in the ERP systems history:

- The 1960's: Most of the software packages (then usually bespoke developed) were designed to handle inventory based on traditional inventory concepts.
- The 1970's: The focus shifted to MRP systems which translated the master schedule built for the end items into time phased net requirements for the sub-assemblies, components and raw materials planning and procurement.
- The 1980's: The concept of MRP-II systems evolved, as an extension of MRP to shop floor and distribution management activities.
- The early 1990's: MRP-II was further extended to cover areas like engineering, finance, human resources, project management, i.e. the almost complete gamut of activities within any business enterprise. Hence, the term ERP (enterprise resource planning) was coined.

2.2.2 ERP Functional Modules and Benefits

The ERP functional capabilities are generally grouped into functional modules. This perspective gives the organization implementing an ERP system the possibility to choose only the modules that serve the interest of its business. The functionality may be expanded in the future by implementing additional modules by optimization of already ERP functional in use. According to (Anderegg, 2000,) “in many cases ERP vendors use terminology specific to their own product in describing an ERP functional module be careful in comparing ERP systems based on terminology, for it is better to compare them based on functional capabilities”.

According to (Ross and Vitale, 1998) the six common benefits of ERP implementations are: The need for a common platform, process improvement, data visibility, operating cost reductions, increased customer responsiveness, and improved strategic decision making. Another study by (Deloitte Consulting, 1998) of selected individuals from 62 organizations found that motivations for an ERP implementation fell into two broad categories: a solution of technological problems and a vehicle for solving operational problems such as in competitive business performance and ineffective business processes.

Prior research has reported mixed results regarding the effect of ERP systems adoption on a firm’s long-term financial performance (Nicolaou, 2004). There are plenty of articles about ERP benefits and costs. For instance, (Appleton, 1997) estimated that half of the ERP implementations failed to meet expectations. Other recent studies show that more than 70% of ERP implementations fail to achieve their estimated benefits (Al-Mashari, 2000). Other survey from (Themistocleous et al. 2001) shows that organizations acquire benefits such as an increase in suppliers and customers’ satisfaction and an increase in productivity but the level of the return on investment (ROI) is rather low.

Lately, different ERP benefits and costs models have been published by researchers such as, (Shang and Seddon, 2000). The most cited a list of business benefits categorized in five dimensions. They are: Operational, Managerial, Strategic, IT infrastructure and Organizational. However, lately this study has been criticized. The two main reasons for the criticisms are the lack of relationship between benefits and ERP goals and the time frame to realize these benefits. (Markus and Tanis, 2000) note that the benefits of ERP systems implementation should be assessed in relation to the organization’s unique goals for the system. They also state that the measures of

ERP success (the benefits attained) are relative to the period during which they are assessed. (Davenport, 2000) states that there are different types of benefits and that some types are likely to arise before others e.g. benefits from improved transaction processes and common data appear to precede benefits associated with improvements in management and decision making. Therefore, according to (O’Grady, 2002) a framework for assessing the benefits of ERP systems should therefore reflect both the objectives for implementing the system and the timing differences for the realization of each type of benefit”.

Rashid et al (2002) companies must identify a significant financial benefit that will be generated by the ERP system, to justify the money they will spend on it. The only way companies can save money with ERP systems is by using them to support more efficient and effective business processes.

Finally, companies must manage the transfer of data from their old computer systems to the new ERP system. In addition to managing master data such as materials data, customer data, vendor data, and so on, a company must also transfer transaction, which includes sales orders and purchase orders, many of which are in various stages of processing a challenging task.

2.2.3 Cost of ERP Implementation

ERP implementation is expensive, it needs high investment cost depending on company size and modules to be implemented Umble et al. (2003). Among its costs are:

Software licensing fees: ERP software is quite expensive, and most ERP vendors charge annual license fees based on the number of users.

Consulting fees: ERP implementations require the use of consultants with detailed knowledge of how to configure the software to support the company’s business processes. Good consultants have extensive experience in the way ERP systems function in practice, and they can help companies make decisions that avoid excessive data input, while capturing the needed information to make managerial decisions

Project team member time: ERP projects require key people in the company to guide the implementation. These team members have detailed knowledge of the company’s business, and they work with the consultants to make sure that the configuration of the ERP software will support

the company's needs. This means that these workers are frequently removed from their daily responsibilities to work on the implementation project.

Employee training: Project team members need training in the ERP software so that they can work successfully with the consultants in the implementation. The team members frequently work with training consultants to develop and deliver company specific training programs for all employees.

Productivity losses: No matter how smooth the ERP implementation, companies normally lose productivity during the first weeks and months after switching to the new ERP system.

2.2.4 ERP Implementation Project Tools

Many tools are available to help manage implementation projects. For an ERP implementation to go smoothly and provide value, it is critical that a company understand both its current processes and the state of the process after implementation.

(Deloitte Consulting, 1998) oracle provides solution manager, a tool that helps companies manage the implementation of Oracle ERP. In solution manager, the ERP implementation project is presented in a five-phase Implementation Road map. The five phases are:

1. Project Preparation.
2. Business Blueprint.
3. Realization.
4. Final Preparation.
5. Go Live and Support.

Solution manager tools to support each phase in the road map, including documents, reports, white papers, and planning tools.

Project Preparation: Some of the tasks in project preparation include organizing the technical team, defining the system landscape (including servers and network), selecting the hardware and database vendors and most importantly, defining the project's scope, what the project is to accomplish. A common problem in ERP implementations is scope creep, which is the unplanned expansion of the project's goals and objectives. Scope creep causes the project to go over time and

over budget and increases the risk of an unsuccessful implementation. Defining the project's scope ahead of time helps prevent this problem.

Business Blueprint: The second phase the business blueprint, produces detailed documentation of the business process requirements of the company. The Business blueprint provides a detailed description of how the company intends to run its business with the Oracle ERP system. Process mapping is critical in the business blueprint phase. The business blueprint guides consultants and project team members in configuring the Oracle ERP system (which occurs in the third phase). During the business blueprint phase, technical team members determine the method of data transfer from the firm's existing computer systems (called legacy systems), which will either be replaced by the ERP system or will continue to function with the ERP system through an interface.

Realization: In the Realization phase (the third phase), the project team members work with consultants to configure the ERP software in the development system. The team also develops any necessary code or other tools (such as third-party software packages) and creates the required connections to the legacy systems.

Final Preparation: The fourth phase, final preparation, is critical to the success of the implementation project. Tasks in this phase include:

- testing the system throughput for critical business processes (determining whether it can handle the volume of transactions.)
- setting up the help desk where end-users can get support.
- setting up operation of the production system transferring data from legacy systems.
- conducting end user training.
- setting the go live date.

When scope creep occurs in a project, it is commonly not discovered until well into the realization phase, when the team begins to miss deadlines, and the costs begin to exceed the budget. By the time the scope creep is discovered, and its impact is understood, there is little management can do to correct the problem, as most of the time and budget have been spent (Wallace & Kremzar,2001). Management can choose to shorten or omit the final preparation phase, which means that testing of the system and training of employees are reduced or eliminated. Unfortunately, with reduced

testing, errors in configuring the system are not discovered until it is put into use. Likewise, with reduced training, employees do not know how to use the system properly, which can create a complicated chain of problems, due to the integrated nature of the system. Any cost savings gained by shortening the final preparation phase are overshadowed by productivity losses and consulting fees in the go live and support phase.

Go Live and Support: In the fifth and final phase, go live and support, the company begins using the new ERP system. Wise managers try to schedule the go live date for a period when the company is least busy. Setting up a properly staffed help desk is critical for the success of the go live phase, because users have the most question during the first few weeks of operating with the new system. The Oracle ERP project team members and consultants should be scheduled to work the help desk during the first few weeks of the go live period.

Parijat & Pranab (2009) although significant testing of the system and settings should have been done throughout the project, it is not possible to test all the settings and thoroughly evaluate the through out of the system. Therefore, monitoring of the system is critical so that changes can be made quickly if the performance of the system is not satisfactory. Finally, it is important to set a date at which the project will be complete.

2.2.5 ERP Implementation

ERP is integrated system designed to create a seamless software applications link between all the processes of an organization (Hendrickson, 2000) and they support many, even most, aspects of organization's information needs. Due to its business-oriented vision, ERP systems are categorized as business applications. Technically, they are categorized as Commercial Off-The-Shelf (COTS) products.

ERP implementation has been a topic of considerable interest to practitioners as well as academic researchers for over two decades (Sarker, 2000) stated that a better understanding of the ERP implementation process and the factors contributing to this process would enable organizations to develop a more effective implementation strategy. This view supports the earlier argument by (Ginzberg, 1979) who suggested that the better the handling of the implementation process, the greater the chances of successful implementation.

One might question the value of studying ERP as a special IS and not treat them as a typical IS. (Sandoe et al, 2001), describe the reasons why ERP systems are special IS:

ERP systems by their very design have the broadest reach of all organizational IS and package software they are used by every major functional area and at all levels of the (Skok and Legge, 2001), mention that ERP systems are often viewed as a new paradigm for IS development, because of the following differentiating factors:

- The number and variety of stakeholders in any implementation project.
- The high cost of implementation and consultancy.
- The integration of business functions.
- The consequent configuration of software representing core processes.
- The management of change and political issues associated with ERP projects.
- The enhanced training and familiarization requirement.

Furthermore, they mention that “historically, software package was seen to fulfill specific functional roles in an organization. Although current packaged applications, in the form of ERP systems, consist of standard multi-functional, multi-language, multi-legislative software modules, and can offer integration across an entire organization”. With regard to the implementation process, there is also the issue of implementing these complex and functionally diverse system in a specific period, with little knowledge about them (Legare, 2002).

There is an immediate need for any company to assess whether an ERP implementation will be successful or not and if a specific ERP system will justify the costs that have to be poured into the project along with the risks that will be taken; indeed, the decision to invest in an ERP system can make or break an organization (Ehie & Madsen, 2005).

In addition to that, the importance of the human factor while implementing an ERP system is not to be underestimated. (Legare, 2002), found that individuals, groups, and organizational characteristics could influence the success of ERP implementation. Individual characteristics being knowledge, cognitive abilities and motivation, group characteristics goals, roles, norms, diversity and problem solving, and organizational characteristics strategy, resources, rewards, culture and structure.

There are many reasons that could result in an ERP implementations' failure. (Kumar and Gupta, 2012) outline nine reasons; changes, coordination issues, budget issues, customization issue, lack of experience, unfriendly user interface, poor ERP selection and absence of consultant. (Umble,2001) also considered poor top management involvement, poor project management, lack of education and training, people not wanting a new system to succeed, unrealistic expectations about the implementation project, inaccurate data and mismatch between the business and ERP system selected to be reasons of failure.

2.2.6 ERP Implementation Success

Through the implementation of ERP systems, organizations can reap enormous benefits, but the project can also be disastrous for organizations that fail to manage the implementation process (Davenport, 1998; Holland et al. 1999). The first thing to ask is: what characteristics define a successful ERP implementation? What factors contribute to the success or failure of ERP implementations?

Nowadays, in the emerging ERP research area, the definition and measurement of ERP implementation success is a thorny issue. Some authors (Markus and Tanis 2000; Harwood, 2003) state that success means different things depending on who defines it. Thus, for instance, project managers and implementation consultants “often define success in terms of completing the project on time and within budget. But people whose job is to adopt ERP systems and use them to achieve business results tend to emphasize having a smooth transition to stable operations with the new system, achieving intended business improvements like inventory reductions, and gaining improved decision support capabilities” (Markus and Tanis 2000, p.22). This relative point of view for success can also be applied to failure, and people may also qualify an implementation as a failure according to their goals. As (Harwood 2003, p. 94) explains “a project that goes on time and within budget can be construed as a success from a project manager’s viewpoint but if the benefits fail to materialize and there are subsequent problems, then, from a business manager’s viewpoint, the implementation is a failure”.

According to (Markus and Tanis, 2000) optimal success refers “to the best outcomes the organization could possibly achieve with enterprise systems, given its business situation, measured against a portfolio of project, early operational, and longer-term business results metrics”. (Markus and Tanis, 2000) argued that a minimum set of success metrics includes project metrics, early

operational metrics, and long-term business results. De Wit (1998) distinguished between project success (measuring against the objectives of a project) and project management success (measured against the traditional measures of performance against cost, time and quality).

A second distinction is also important it is the difference between success criteria (measures by which success of a project will be judged) and critical success factors.

2.2.7 Phases of the ERP Life Cycle

Nyagah (2006), the phases of the ERP life cycle consist in the several stages that an ERP system goes through during its whole life within the hosting organization. They are: adoption decision phase, acquisition phase, implementation phase, use and maintenance phase, evolution phase and retirement phase. Next, each phase will be described.

Adoption decision phase: This phase is the one during which managers must question the need for a new ERP system while selecting the general information system approach that will best address the critical business challenges and improve the organizational strategy. This decision phase includes the definition of system requirements, its goals and benefits, and an analysis of the impact of adoption at a business and organizational level.

Acquisition phase: This phase consists of the product selection that best fits the requirements of the organization. Thus, minimizing the need for customization. A consulting company is also selected to help in the next phases of the ERP life cycle especially in the implementation phase. Factors such as price, training and maintenance services are analyzed and, the contractual agreement is defined. In this phase, it is also important to make an analysis of the return on investment of the selected product.

Implementation phase: This phase consists of the customization or parameterization and adaptation of the ERP package acquired according to the needs of the organization. Usually this task is made with the help of consultants who provide implementation methodologies, know-how and training.

Use and maintenance phase: This phase consists of the use of the product in a way that returns expected benefits and minimizes disruption. During this phase, one must be aware of the aspects related to functionality, usability and adequacy to the organizational and business processes. Once

a system is implemented, it must be maintained, because malfunctions must be corrected, special optimization requests must be met, and general systems improvements have to be made.

Evolution phase: This phase corresponds to the integration of more capabilities into the ERP system, providing new benefits, such as advanced planning and scheduling, supply-chain management, customer relationship management, work flow, and expanding the frontiers to external collaboration with other partners.

Retirement phase: This phase corresponds to the stage when with the appearance of new technologies or the inadequacy of the ERP system or approach to the business needs, managers decide if they will substitute the ERP software with other information system approach more adequate to the organizational needs of the moment.

Wallace & Kremzar (2001) there are four areas of concern or viewpoints by which the different phases of the life cycle should be analyzed: product, process, people and change management:

Product: This dimension focuses on aspects related to the ERP product in consideration, such as functionality, and on related technical aspects, such as hardware and base software needs. A thorough understanding of the software tool's capabilities must exist in order to make an alignment with the business strategy in order to determine whether the software is being used effectively, in accordance with the needs of the organization, and how it can best be applied to further the goals of the organization.

Process: Each organization has its own core capabilities and functionality that must be supported by an ERP system. Also, an ERP system must help the decision-making required to manage the resources and functions of the organization. Usually, the main ERP investment focus is on re-engineering processes to enable the organization to adapt to the new business models and functional requirements of the ERP system in order to achieve better performance.

People: This dimension refers to the human resources and their skills and roles in an ERP system life cycle. These skills and roles must be developed to minimize the impact of the introduction and diffusion of an ERP system, in order to reduce risk and manage complexity, while facilitating organizational change. Dealing with contingencies, changing practices, and adapting to a new organizational structure and culture are some aspects that must be learned.

Change management: This dimension refers to the body of knowledge that is used to ensure that a complex change, like that associated with a big system, gets the right results, in the right time frame, at the right costs (Holland and Davis 1998). The change management approach tries to ensure the acceptance and readiness of the new system, allowing the organization to get the benefits of its use.

2.2.8 Success Factors in ERP Implementation

In this section, the proposed success factors in ERP implementation described using the content of the literature reviews and the sources from which they draw their conclusions. The success factors have been chosen after examining the frequency of which they are used in the literature reviews. The researcher chosen to use the success factors that are mentioned in many reviews and practical from ethio telecom's context. This is to ensure that the success factors that the researcher choose indeed can be considered accepted as critical. After exploring the chosen reviews, the researcher could see that several success factors could be combined since they represented the same factor. Therefore, the researcher categorized the factors which resulted in 7 critical success factors. They are:

Top Management Support

The number one cited success factors and considered the most relevant and critical factor by prior researchers is "Top management commitment and support". This concept is referred to the need of having committed leadership at the top management level (Finney & Corbert, 2007).

Successful ERP implementation very much depends upon active and persistent top management involvement, and the importance of top management support in each step in all company levels is crucial.

Harrison (2004) argues that when some companies hand over their ERP implementation responsibility to the technical departments, they make a vital mistake resulting in a failed project. The use and success of IT in organizations should include participation from the top management, as that reflects that the top management works actively together with the rest of the company towards a successful IT implementation.

Motwani, Madan, and Gunasekaran (2002) conclude that not only should the top management be active in the implementation process, but to ensure progress and ultimately success. They should also be able to anticipate glitches that might occur; this naturally puts a great demand on their knowledge regarding ERP systems and the implementation process. This is what Yusuf, Gunasekaran (2004) stress in their contribution; they argue that the commitment must be solidified by a knowledge base, not only built on strategic planning and leadership but also of technical expertise. This knowledge can express itself in understanding the importance of delegating enough resources to the project in order to it to be successful.

Effective Project Management

Nah et al. (2001) state that a good project management is essential in an ERP implementation project. The project management activities span the first four stages of the ERP life cycle from beginning the project until closing it. The approach to project management suggests that the project planning and control is in correlation with the project's characteristics such as project size, experiences with technology and project structure. An individual or group of employees should be given the responsibility to drive success in the project management. When the project team is formally established, the team must subsequently be defined in terms of its milestones. It is determining the critical paths of the project, deciding on the timeliness of the project and managing the force of timely decision making (Nah et al., 2001). Hence, the scope should be established, clearly defined and be limited. As ERP projects tend to be huge and inherently complex, due to the extensive combination of hardware and software as well as the countless organizational, human and political issues (Somers & Nelson, 2004). A project scope that is too broad or ambitious can cause problems.

Business Process Reengineering

Francoise et al., (2009) state that BPR and customization is crucial in the different stages of the project. An ERP project pushes organization to revisit their business processes and scrutinizes the ways of doing things relative to the best practices already embedded in the system.

Bhatti (2005) uses the definition to BPR as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed”.

According to (Dezdar and Sulaiman, 2009) it also involves alignment of the business with the new system; process adoption, new process standards, business process skills and job redesign. There are special considerations to be undertaken during this phase, such as enhancing the ERP interface quality as well as the need to plan the infrastructure of the technology. An issue with packaged software is the risk for conflict between the organization's needs and the pre-existing business processes (Somers & Nelson, 2004).

Responsibilities of individual business processes are deployed among the boundaries in the organization, therefore, to identify the core business processes is important and a necessary step before re-engineering. Since it is quite often that these processes are invisible, as they have never been documented (Zabjek et al, 2009). Indeed, BPR plays a crucial role when implementing a new system and particularly at the earliest stages, from introduction through adoption; however, it tends to be less important when the technology has become a routine and embedded in the business processes (Somers & Nelson, 2004).

User Involvement

In relation to change management and as a result of the frequently cited failures, companies often encounter user resistance. The users are in many cases, often afraid that the ERP implementation will change their role, job status, importance, responsibilities and the access of valuable information (Shaul & Tauber, 2013).

The user involvement can, hence, be referred to a psychological state of the individual as the importance and personal relevance of the system to the user (Bhatti, 2005). User involvement is important to get users involved during the development of the system, get a hold of the existing knowledge from the user in areas where the team have insufficient expertise (Francoise et al. 2009). Moreover, emphasize the activity of nominate user delegates that contain solid knowledge of the organizational processes, thus, be in charge of the cross-functional requirements in the redesigns of the processes, activities and functional areas both during the initial implementation and over time.

Therefore, the user involvement and participation are considered critical success factors as they will result in a better fit of user requirements and enhancing a better system quality, use and acceptance.

Soh, Kien and Yap (2000) emphasize the fact that the users must grow from being just complacent and passive to delving deeper into the implementation process; this is particularly true for the project team. The management has to take into account how the staff may need to be redesigned or restructured. Bhatti (2005) argues that there are two areas for user involvement when the company decides to implement an ERP system: (1) user involvement in the phase when the company defines the ERP system needs and (2) user participation in the implementation phase of the ERP systems.

Teamwork and composition

For an implementation to run smoothly, the need for a strong, competent core team of dedicated and capable employees is also important, especially at the very start of the implementation (Cliffe, 1999). This team is meant to lead the way, using their talents to probe for details when carrying out the planning phase of the implementation.

Balakrishnan (2009) also argue that the use of smaller task forces consisting of a few talented employees is a way to reach success when implementing an ERP system. He argued that smaller teams more often seek guidance when problems that they cannot solve by themselves arise, and by doing so, they got the input from outside parties more often which both increased their knowledge and also made sure that the implementation was on the right track. Larger groups of experts tend to base their decisions solely on their prior experience which, case study showed to be inefficient.

The competence of the team must be high; the team must be able to understand both the technical aspects of the process as well as be able to lead the project in an effective manner (Dezdar & Ainin, 2011). The project team members should be selected from all cross functional units and competent employees with good job competence. Shaul and Tauber (2013) also draw conclusions to the project team competence from several studies to emphasize team members' knowledge; how well the team is building morale and motivation. Somers and Nelson (2001) describe the project champion as owning the role of change for the life of the project and that they should understand the whole organization throughout. The project team should consist of a main system user in order to the team to understand the practical implications of the implementation process.

These individual employees should facilitate strong leadership skills together with knowledge of business, technology and personnel management (Mandal & Gunasekaran, 2003). Somers and Nelson (2001) describe the project champion as

owning the role of change for the life of the project and that they should understand the whole organization throughout. They continue explaining the benefits of having an executive level individual with extensive knowledge of the organization and its processes, agree with; through this executive, senior management can monitor the ERP system implementation since the project champion is directly responsible for the project outcome (Somers & Nelson, 2001).

Vendor Support

A successful ERP implementation relies on many stake holders but the involvement of ERP vendors in project management is critical.

Summer (1999) suggests that the project management team should always include the ERP vendor in order to have technical skills for design and implementation. In many organization implementing ERP, the project managers have been mainly internally drawn with not incorporation of the ERP vendor. This factor, when overlooked in the constitution of a project management team was shown to have high correlation for failure (Al-Mudimigh et al. 2000).

The success of technological innovation has often been attributed to a strong project management team. The incorporation of ERP vendor in to project team to achieve the balance between internal members of the team with external members.

In study of (Somer and Nelson, 1999) they emphasized on the skills, abilities, and experience of the project managers. In the project as pervasive as ERP project, they urge on the importance of having vendors who are both skilled in the software and capabilities and dealing with peoples to be part the project managers.

The finding is reiterated by (Al-Mahari, 2003) who found that the vendors should not only skilled in the software but should also have the abilities to communicate clearly with stake holders, engage people and operate with style that build trust. ERP implementation is about people and having a strong project management team is a key ingredient for the successful implementation of the project.

Training and Education

Somers and Nelson (2004) describe training and education to be crucial when implementing an ERP system. Lack of user training and misunderstanding the enterprise applications appear to be two large reasons responsible for many ERP implementation failures.

ERP implementations require a vast amount of knowledge to enable people to solve problems that may occur within the framework of the system. Umble et al. (2003) argue that if the employees do not understand how the system works, they will invent their own processes, by excerpting parts of the system that they can manipulate. To make system user training successful, the training should preferably start well before the implementation process begins.

One of the key variables when planning for a new system is to plan for education and training programs, which in conjunction with other variables are important ingredients to a successful implementation (Mabert et al., 2003). Executives often underrate the level of education and training necessary to implement an ERP system and the additional costs, thus, as already mentioned, top management involvement is of high priority.

However, the executives must be able to predict the amount of training and education to reap the full benefits of the implemented system. Cobert and Finney (2007) argue that in order to build user acceptance with regards to the project and nurture a positive employee attitude, training and education can be used as a tool to achieve those goals. Nah et al. (2007) continues this argument and entails that education should be a priority from the beginning of the project, and both money and time should be spent on various forms of education and training. By doing that, the company helps the system users to see the benefits and need for the new ERP system, and to furthermore understand how the system will change business processes (Somers & Nelson, 2007; Motiwalla & Thompson, 2012). All too often employees are expected to be able to effectively run and use the new system based only on the education. However, Umble et al. (2003) stress the importance that much of the learning process comes from hands-on use under common operating conditions.

2.2.9 Challenges of ERP Implementation

Although implementing an ERP system has significant benefits, doing so successfully is a challenging. ERP systems are highly complex and require a comprehensive risk strategy; moreover, they are very costly and have a high failure rate even under ideal circumstances. They

often require long implementation times and significant resources. According to (Zhang et al. 2003). Most of ERP implementation projects go over budget, took times longer than scheduled, and delivered less than planned benefits. In addition, many barriers appear that affect successful implementation, including substantial organizational problems such as employee resistance to change. Thus, the decision to implement an ERP system is a difficult undertaking for any organization.

Companies that have implemented ERP systems in Ethiopia have faced several challenges. One is incompatibility between the ERP embedded business practices and organization work practices. The difficulty in ERP implementation in Ethiopia is exacerbated by the claim that ERP embodies established ways of doing business thereby requiring organizations adopting ERP systems to change their business processes to conform to business practice. (Mesfin A. 2015. High cost escalated by extensive customization, poor project management and failure to realize ERP benefits, unreliability of vendors, poor technology knowledge, lack of skills by both users and consultants and complexity of ERP system are a major challenges of ERP implementation project in Ethiopia.

Otieno (2010) chief executive officers and senior executive teams must be deeply involved and have a strong commitment to the ERP project to achieve successful implementation. An understanding of the main reasons why many ERP implementation projects have failed could be a recipe for success in a new project. The reasons of ERP implementation project failure are: lack of clearly defined strategic goals, lack of commitment of top management, poor project management, resistance to change in the organization, poor selection of an implementation team, lack of data accuracy, inadequate education and training such that users cannot run the ERP system, lack of adaptation of performance measures to ensure that the organization changes, lack of resolution of multi-site issues, and technical complications, system disintegration between the ERP system and other systems in the institution to smoothly share and transfer information and unable to modify of the ERP package according to the institution's needs to fit its existing business process.

2.3 Empirical Review

The empirical review of the study summarizes and rounds on critical success factors for ERP implementation issues that undertaken by different researcher and authors on the area.

2.3.1 ERP Implementation Project

Many companies around the world began implementing ERP system in 1990s. The main reason behind the implementation of ERP system is to re-engineer business processes through a uniform information system (Rajagopal, 2002). During the mid to late 1990s, around 30,000 companies worldwide implemented ERP system (Mabert et al. 2003). Companies worldwide have spent \$10 billion per annual on ERP systems (Yusuf et al. 2004). Between 1996 and 2003 there was a tremendous upward growth in the number of ERP systems. However, in the last few years, ERP systems seem to have been forgotten and this has led to a significant decline in the ERP market.

Many leading international companies have successfully implemented ERP systems. These companies have experienced the expected benefits of ERP system. An order with Autodesk Software Company that used to take two weeks is now completed within four hours. Cisco's ERP system enabled it to cut costs and substantially increase its revenue. ChevronTexaco improved its supply chain management through the implementation of an ERP system. It achieves an annual net profit of \$100 million. IBM's R/3 implementation was one of the most successful implementations (Chen, 2001).

However, there have been some significant failures. Dell felt that ERP system would fail to cope with their sales volume. Thus, it canceled the ERP project and lost \$115 million. Another case in point was FoxMeyer. The pharmaceutical giant suffered a loss of \$100 million and made bankrupt after unsuccessful implementation (Chen, 2001; Davenport, 1998).

Implementation of ERP system is very costly and takes a long time to be implemented. This reason prevents many companies from implementing ERP system and limits the market share of ERP systems. However, in order to solve this problem, top ERP vendors need to develop special ERP packages to meet the need of small size companies to increase the market share of ERP systems. With this solution, small and medium sized companies can also benefit from ERP system. This solution also enables the global proliferation of ERP systems (Zheng et al., 2000; Rashid et al., 2002).

Implementing technological solutions and techniques such as ERP system could improve and integrate the internal and external flow of information within an organization. Such innovations would also improve Supply Chain Management performance, enhance decision-making based on

accurate information and improve the relationship, collaboration, and exchange of information. It would improve the movement of goods and services to outsource suppliers, customers, and other partners in the supply chain and finally achieve a competitive advantage and increase profitability (Wieder & Wallace, 2001).

There is no agreement between researchers about the definition and duration of implementation phase. Walsham (1995, p. 210) mentions that the term implementation “is sometimes used to mean technical implementation, namely ensuring that system development is completed and that the system functions adequately in a technical sense. At other times, it is used to refer to the human and social aspects of implementation, such as that the system is used frequently by organizational members or that it is considered valuable to them in their personal work activities or coordination with others”.

These two streams of thought have been used in ERP research. In ERP field the term implementation is used sometimes to refer to the implementation phase exclusively or to represent to whole ERP life cycle. Somers and Nelson (2001) referred to the whole process of adopting, selecting, implementing and using the ERP system. Somers and Nelson (2001) and other researcher, Rajagopal (2002) have used Kwon and Zmud ’s innovation-diffusion stage model as their ERP implementation stage model (Kwon and Zmud 1987) which follows six stages or phases: initiation, adoption, acceptance, reutilization and infusion. Another example is the implementation life cycle model proposed by Harwood (2003). He proposes an ERP implementation life cycle where implementation term refers to the whole process of identifying, selecting, implementing and improving the ERP systems, and then he used the term implementation project or stage to refer to specific part of customization of the ERP according to the organization needs.

This diversity on ERP implementation term has originated some misunderstandings on ERP research field and maybe it is one of the explanations for some contradictory findings. In some cases, it may affect the evaluation of a successful or a failed ERP implementation since in most cases researchers use indistinctly implementation word to refer to ERP implementation project and product and/or ERP usage.

Krammergaard and Moller (2000, p. 200) mention that the definition of ‘ERP implementation’ is different according to consultants and vendor’s view or organizations’ view. They state that “in

the world of ERP systems, the implementation is often used as a term to describe a well-defined project spanning from the choice of the systems through the configuration and the training until going live, where the system is becoming operative. In the companies' view implementation means a continuous learning cycle where the organizational processes supported by the ERP systems are gradually aligned with the business objectives. Concurrently the business objectives are taken even further, driven by the market dynamics but also by the new internal opportunities. ERP implementation is "an ongoing process of integration and transformation of the business using an ERP system".

(Al-Mudimigh et al., 2001, p. 216) define 'ERP implementation' as "a socio technical challenge that requires a fundamentally different outlook from technologically driven innovation and will depend on a balanced perspective where the organization as a total system is considered". This thesis considered ERP implementation project as the phase that consists of project spanning from the choice of the systems through the configuration and the training until going live.

2.3.2 Success Factors of ERP Implementation Project

According to Yu (2005) most of the literature on ERP system focused on two main domains. The first one evaluates the suitability of ERP systems' software, vendors, and consultants. The second domain looked at the CSFs that affect ERP system's implementation success, such as ERP Teamwork & Composition, Top Management Support, Vendor Support, Effective Communication, Project Management, Project Champion, Business Process Reengineering and User Involvement.

An ERP implementation is typically a large new project, the likes of which companies will have never experience before. Consequently, prior to ERP implementation, companies need to understand their own competency such as their ability to use the system effectively, provide maintenance, and to take advantage of system opportunities in terms of development and innovation (Bendoly & Schoenherr, 2005).

Therefore, companies need to start with necessary changes in their own business processes required in the implementation of ERP processes, and may eventually improve the entire supply chain thus, gaining a competitive advantage in the marketplace. Implementation was one of the most critical issues for industrial companies in literature (Moon, 2007). According to (Nah and

Lau, 2001) critical factors for successful implementation of ERP system include ERP Teamwork & Composition, Top Management Support, Vendor Support, Effective Communication, Project Management, Project Champion, User Involvement, Change Management Program & Culture, Business Process Reengineering (BPR) & Minimum Customization, Software Development, and Monitoring & Evaluation of Performance.

Critical Success Factors Studies

CSFs in literature	Citation Degree	References
Top Management Support	High	Ang et al., (2002); Al-Mashari et al., (2003); Yusuf et al., (2004)
Effective Project Management	High	Umble. (2003), Yusuf (2004); Al-Mashari et al.,(2003)
User Training & Education	High	Mandal and Gunasekaran (2002); Umble (2003).
Business Process Reengineering	High	Bingi et al., (1999); Burns and Turnipseed (1991).
Change Readiness & Culture	Medium	Hong and Kim (2002)
Clear Goals & Objectives	Medium	Umble et al., (2003); Yusuf et al., (2004)
Minimal Customization	Medium	Somers and Nelsons (2001)
Monitoring & Evaluation of Performance	Medium	Holland et al., (1999)
Teamwork & Composition	Medium	Akkermans et al., (2000)
Project Champion	Medium	Loh and Koh (2004); Remus (2006)
Vendor Support	Medium	Motwani et al., (2002); Yusuf et al. (2004)
User Involvement	Low	Holland et al., (1999)
Data Analysis & version	Low	Zhang et al., (2002)
Education on new Business Processes	Low	Woo (2007)

Table 2.1 Main factors and the degree of citation for each factor in literature.

2.4 Conceptual Framework

A conceptual framework is a structure that represents the research being done. This conceptual framework has been conceived from principles taken from relevant literature review. In this study the independent variables; critical success factors are influencing dependent variable; ERP implementation success.

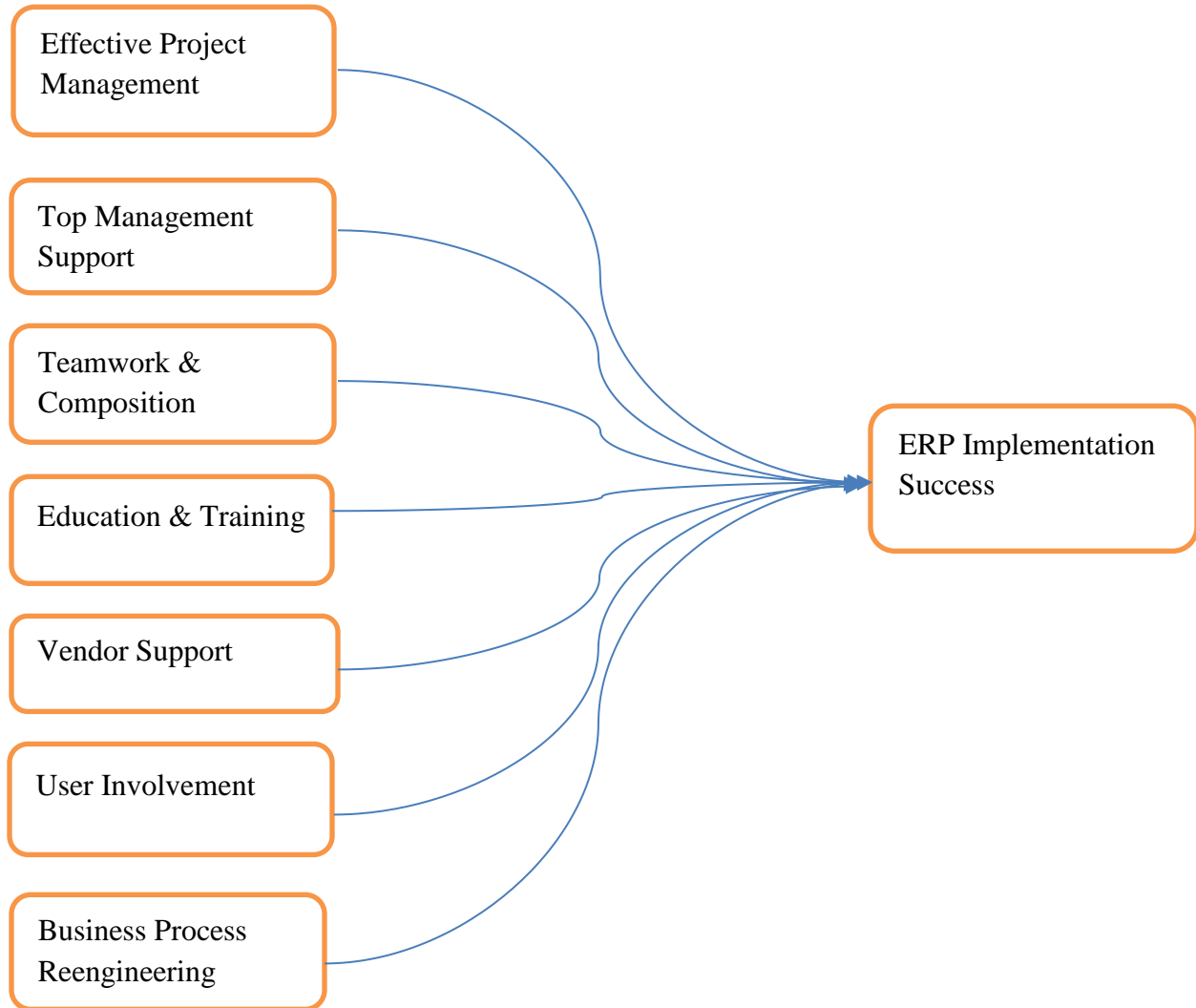


Fig 2.1 Conceptual Framework adopted from article of (Loonam & Mc Donagh, 2015, p. 234)

Chapter Three

Research Design and Methodology

This study is about success factors for ERP implementation. To achieve the objective of the study, this chapter presents the research approach that was used to carry out the study, research design, and sampling technique, type of data source, technique of data collection and method of data analysis.

3.1 Research Approach

There are quantitative and qualitative approach in research. The quantitative approach involves the collection of quantitative data, which are put to rigorous quantitative analysis in a formal and rigid manner while as the qualitative approach uses the method of subjective assessment of opinions, behavior, factors and attitudes. Quantitative research engages in systematic and scientific investigation of quantitative properties and phenomena and their relationships.

Due to the nature the study under the investigation both qualitative and quantitative data have been collected. Therefore, mix research approach has been taken as appropriate to conduct this study. This study started with hypothesis and the end with the result of conformation or rejection of the developed hypothesis in parallel with basic research questions.

3.1 Research Design

Research design is a mapping strategy. It is essentially a statement of the object of the inquiry and the strategies for collecting the evidences, analyzing the evidences and reporting the findings. Singh (2006) research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research design.

Explanatory research is conducted to identify the extent and nature of cause-and-effect relationships. Explanatory studies are studies that show relationships between variables to explain certain problems or events (Saunders, et al., 2007). The objective of explanatory research is to identify any casual links between the factors or variable that pertain the research problem.

Kothari (2004) describe descriptive research design as one concerned with finding out who, what, where, when and how much. It also allows the researcher to collect information from sample and use finding to generalize the inference to validate the study.

To identify success factors in an ERP system implementation, an extensive literature review success factors from managerial perspective was required, which suggested that this study has a descriptive research design. It has also shared confirmatory research attribute since it tried to confirm or reject constructed hypothesis. Notwithstanding, the research study aimed to provide valuable insights from managerial perspective with the objective critical success factors in hand through an ERP implementation, thus, empirical data was needed to investigate impact of the factors on ERP implementation success. Hence, the research's nature combined both descriptive and explanatory attributes leading to a nature of the research being both descriptive and explanatory.

3.2 Population and Sampling Techniques

Population or universe means, the entire mass of observations, the parent group from which a sample is to be formed. In research methodology population means the characteristics of a specific group (Singh, 2006). Based on this, target population is the collection of elements or objects that possess the information sought by the researcher and about which inferences are to be made.

To conduct this study, the subject or target population are employees of ethio telecom those were members of project team during ERP implementation projects. They are one hundred three (103) project team members staffs, one project team supervisor (1) and a project manager (1). Totally one hundred five (105) population, those took part in ERP implementation project and are currently available in the company was used as a source of primary information.

The reason behind selecting only project team is that they are only key informant of the subject matter with viable exposure. Due to smallness of viable target population the researcher used census to take the whole one hundred five (105) employees of ethio telecom engaged in ERP implementation project at different phases and are currently available in the company as a target population of the study.

3.3 Source of Data

The data is the accumulation of specific evidence that enable researcher to properly analyze the results of all activities by his/her research design and procedures (Singh, 2006). To conduct this study both primary and secondary sources of data were used.

Primary data were collected via questionnaire and observation while secondary data were collected review of company file, prior research study and different international journals related to subject matter under study.

3.4 Data Collection Instrument

The study used questionnaire and observation were used to collect primary data. Questionnaires were distributed to all respondents via email. As explained under population and sampling techniques above, the target populations were employees of ethio telecom, specifically ERP implementation project team members. The respondents had reached via company email address to attach questionnaire via their email address and recollect filled questionnaires. The secondary data was collected by reviewing project progress report and project history from company file. Since researcher is employee of ethio telecom observation was helpful to collect qualitative data. Researcher's observation used to explain the events during implementation project. The researcher used questionnaire to measure significance of success factors and impact of each success factors on implementation project success.

The questionnaire has two sections. The first section related with respondents' general demographic information (age, gender, year of service and education qualification). The second part was about success factors and implementation project success. It assesses the impact of each critical success factors (independent variables). In this section, responses were measured on a 5-point Likert scale, ranging from one (strongly disagree) to five (strongly agree).

Secondary data, specifically books on subject area of ERP implementation and critical success factors, prior researches and articles were used to identify major critical success factors in ERP implementation. Different ethio telecom's internal project progressive report document and ERP project evaluation report were also used to get comprehensive data.

3.5 Techniques of Data Analysis

The data collected from questionnaire were carefully checked for completeness and accuracy then cleaned for consistency. The data collected from questionnaire coded with code numbers assigned to each answer of the question to generate a coding frame which was then fed into the computer SPSS software.

The data analyzed using descriptive statistics to investigate the mean score, frequency and standard deviation. To process and analyze the collected demographic related data, percentage and frequency were used. Mean and standard deviation were used to calculate the degree of agreement or disagreement of respondent for each question statement.

Regression analysis is concerned with the study of how one or more variables affect changes in another variable. It is thus a study of functional relationships existing between two or more variables (Kothari, 2004).

To check the significance and importance level of each success factors for ERP implementation, correlation and regression analysis were used. Correlation analysis was used to test association of variables for determining the amount of correlation between variables. To investigate impact of each success factors on ERP implementation success, regression analysis was used. Regression used to examine how multiple independent variable are related to dependent variable.

Data collected via observation and company's document review are interpreted using narrative analysis method. The researcher sort-out data and reflect up on them.

3.7 Validity and Reliability

3.7.1 Validity

Validity method is given when a logical link is established between the questions and objectives. To reduce subjectivity, the questionnaires were revised many times after repeatedly discussed with advisor and other external researchers. Then, developed questionnaire sent to the advisor and the correction was made based on comments. The questionnaire was evaluated and commented by different research experts and professionals. The different research professionals and classmates were asked to give comments and opinion on statements used in the questionnaire in terms of clarity and completeness. After carrying out the pilot survey, revisions were made to questions that are not clear to solve all ambiguities. This is important to increase the validities of the questionnaires before applying it on the full-scale survey.

3.7.2 Reliability

Calculating Cronbach's alpha (α) is common practice when multiple-item of measurement concepts or constructs are employed, because it is easier to use in comparison another estimates (Willson, 2003). Cronbach's alphas combined with inter- item correlation to determine the internal reliability of measurement instrument was used. Cronbach alpha (α) of 0.70 coefficient indicates sound and reliable measures with a Cronbach alpha close to 1 indicates greater consistency.

Cronbach's alpha was calculated to study the reliability of all the items (34) each variable of the study. The seven independent variables in the study were; effective project management, top management support, education & training, vendor support, teamwork & composition, user involvement and business process reengineering.

Dimensions	Cronbach's Alpha	N of Items
Effective project management	.831	6
Top management support	.790	6
Education and Training	.776	4
Vendor support	.733	5
Teamwork and Composition	.696	5
User involvement	.719	5
Business process reengineering	.693	3
Overall scale Reliability	.826	34

Table 3.1 Reliability statistics result (Source: Survey Result, 2018)

3.8 Ethical Consideration

Ethics is conducting oneself in accordance to the principles of conduct which are considered correct especially in certain profession r group (Kumer, 2005). Ethical issues concerning research subjects are confidentiality, anonymity, voluntary and informed consent. The researcher provide anonymity by separating identity of individuals from the information collected. The researcher also liaised with the human resource function of ethio telecom to seek permission to conduct survey using company's email/outlook. This allowed facilitation of data collection process based on clear rule, guidance and ethical consideration of the organization under the study.

Chapter Four

Data Analysis and Interpretation

The purpose of this study is to investigate success factors for ERP implementation project success. Questionnaires were distributed to target population of the study. They are employees of ethio telecom those were ERP implementation project team members. From one hundred five total respondents, one hundred two respondents filled and returned questionnaires. So, the data has been used for statistical analysis. Responses to items of the questionnaires were compiled into tables according to the main variables being studied. Descriptive analysis like percentage and frequency where used to analysis demographic statistics while mean and standard deviation were used in examining variables, (effective project management, tom management support, education and training, teamwork and composition, user involvement, vendor support and business process reengineering). The inferential statistics used in analyzing the collected data were Correlation and regression analysis.

4.1. Demographic characteristics of respondents

4.1.1 Gender of Respondents

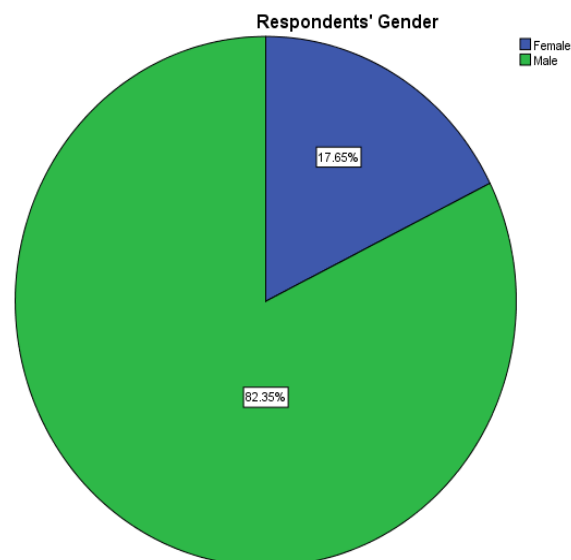


Figure 4.1 Respondents' Gender (Source: Survey Result, 2018)

The descriptive analysis from figure 4.1 indicates that 82.33 percent of the respondents were males while the rest, 17.65 percent were females. The figure depicted that the project team was dominated by male employees.

4.1.2 Age of Respondents

	Frequency	Percent
Below 25 years	9	8.8
25-35 years	33	32.4
35-45 years	46	45.1
above 45 years	14	13.7
Total	102	100.0

Table 4.1 Respondents' Age (Source: Survey Result, 2018)

As indicated in figure 4.1, near to half (45.1%) of the respondents were found in the age range of 35 to 45 years which followed by 25-35 years of age (32.4%). In other words, 77.5 percent of respondents found in age range of 25-45 years. The least age of respondents is below 25 years, which cover only 8.8 percent of the total respondents.

4.1.3 Respondents' Educational Background

	Frequency	Percent
Degree	60	58.8
Postgraduate and above	42	41.2
Total	102	100.0

Table 4.2 Respondents' Educational Background (Source: Survey Result, 2018)

In terms of educational back ground, more of the respondents were degree holders with 58.8 percent and followed by post graduate or master's degree holder with 41.2 percent. First degree and postgraduate degree holders have covered 100 percent of respondents. The data depicted no one below first-degree holder selected in to project team. The percentage of the respondents

implies that employees with better educational background selected for ERP implementation project. The survey results implied that educational back ground was among criteria to incorporate high performer in to project team.

4.1.4 Respondents' Years of Service

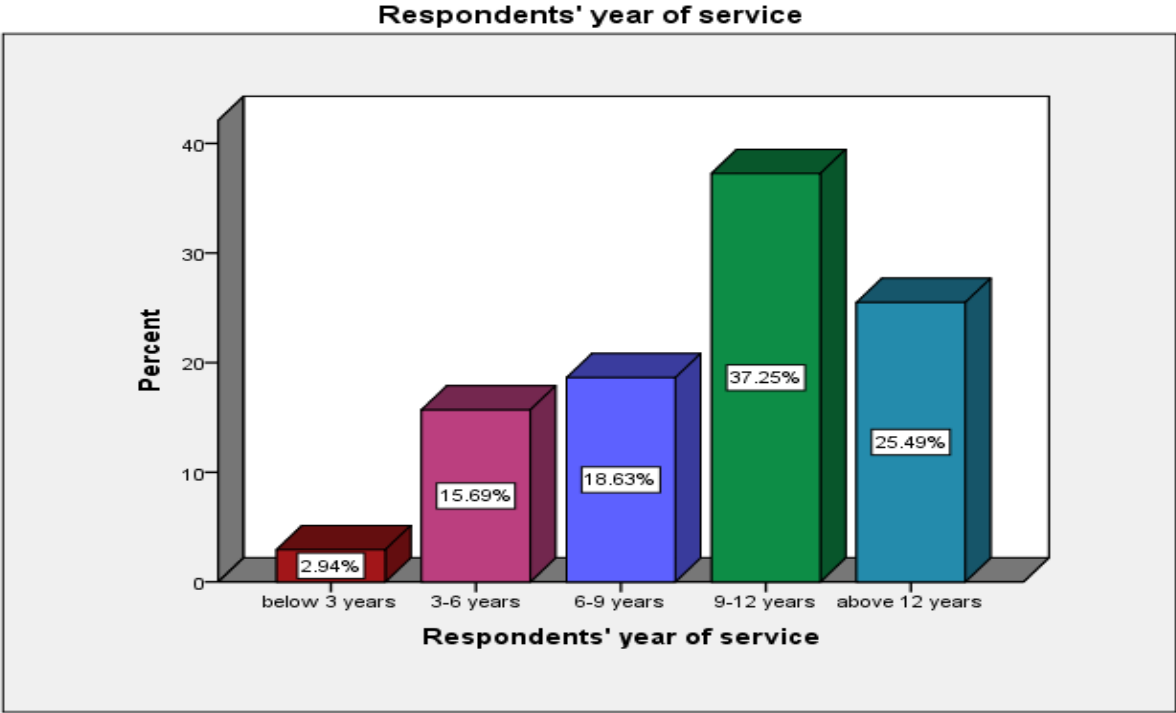


Figure 4.2 Respondents’ years of service or experience (Source: Survey Result, 2018)

The largest number, 37.25% of the respondents have in-between 9-12 years of experience followed by above 12 years of work experience (25.49) while the least years of service is below three years which cover 2.94% of total respondents. The percentage of experience of respondents indicate that employees those who have high company experience where selected as project team. The percentage indicates, employees with high exposure were purposely selected for their expected better performance.

4.2 Success Factors for ERP Implementation

To analyze success factors for ERP implementation, seven factors were used, namely; effective project management, tom management support, education & training, teamwork & composition, vendor support, user involvement and business process reengineering. Each variable was represented by specific statements and total numbers 34 questions distributed to 102 respondents and got replay were analyzed and results are obtained: To analyze success factors for ERP implementation project, descriptive statistics of mean and standard deviation were used. The mean indicates to what extent the respondents in average agrees or disagrees with the different statements. The higher the mean the more the respondents agree with the statement while the lower the mean the more the respondents disagree with the statements.

Effective Project Management

	Effective project management is the most significant factor in ERP implementation.	Project scope was effectively managed by project manager.	ethio telecom has made effective project planning and control.	Key stakeholders in the organization were alerted when ERP was being implemented.	ERP system implementation was easy to implement and did not cause disruption.	Modules and functions were implemented as per the project scope.
N	102	102	102	102	102	102
Mean	4.14	3.44	3.74	3.84	3.29	3.64
Std. Deviation	.802	.743	.543	.443	.859	.643
Minimum	1	1	1	1	1	1
Maximum	5	5	5	5	5	5

Table 4.3 Mean analysis related to effective project management (Source: Survey Result, 2018)

Mean, which is descriptive statistics was used to evaluate the impact of effective project management on ERP implementation project success. As shown on table 4.3 effective project management contains six statements which each statement is all about the variable. Based on respondents' replay, all statements are taken in to account to analysis impact of effective project management on ERP implementation success. Significance of effective project management is considered as a relevant factor with mean 4.14. The most significant consideration among effective project management are key account notification before system implementation and project planning and scope control with mean 3.84 and 3.74 respectively. Modules implementation as per

plan and scope control scored a mean value of 3.64 and 3.44 respectively. Easiness of ERP implementation scored the least mean 3.29. The mean values of statements from table 4.3 depicted that respondents agreed with criticality of effective project management for ERP implementation project success.

Top Management Support

	Top management is the most significant factor in ERP implementation.	Top management was familiar with ERP system functionalities.	Top management provided good leadership for ERP implementation	Our organizational culture supported ERP implementation success.	Our organization's management style was supportive for ERP implementation success.	Top Management created awareness on benefit of ERP implementing system.
N	102	102	102	102	102	102
Mean	3.94	3.65	3.02	3.82	3.59	3.42
Std. Deviation	1.43	.693	0.815	.755	1.005	1.013
Minimum	1	1	2	1	1	1
Maximum	5	5	5	5	5	5

Table 4.4 Mean analysis related to Top Management support (Source: Survey Result, 2018)

Top management support factor represented by six statements. Based on the data collected from respondents that developed in Likert scale, they have placed their level of agreements. “Top management support is rated as very significant factor” scored the highest mean value (3.94), followed by ethio telecom organizational culture compatibility with ERP implementation (3.82) and top management awareness recorded 3.59 mean value. Respondents less agreed about top management they gained during ERP implementation (3.02), which is the least mean value from the statement associated with top management support.

Education and Training

	Education & training is the most significant factor for ERP implementation success.	I acquired technical knowledge and skills which contributed to successful ERP implementation from training.	Training and education enhanced my proficiency and level of knowledge.	Continual training during implementation was more effective than training for limited period.
N	102	102	102	102
Mean	3.90	3.09	3.24	3.68
Std. Deviation	1.020	.947	.443	1.259
Minimum	1	1	1	1
Maximum	5	5	3	5

Table 4.5 Mean analysis related to Education and Training (Source: Survey Result, 2018)

Training and Education factor contains four statements. Respondents were asked to express their level of agreements with the given parameters. The overall relevancy of Training and Education scores 3.90 values and contribution of technical knowledge and skills acquired for successful implementation with 3.68 mean value. Respondent's shows their high level of agreements for effect of continual training during implementation with mean value 3.68. Impact of training and education for proficiency and technique knowledge project team acquired from training recorded 3.24 and 3.09, respectively. The survey results realized criticality of training & education for ERP implementation success.

Vendor Support

	Vendor support is the most significant factor in ERP implementation.	Major conflict was created between vendor and our company during ERP implementation.	ERP vendor (Oracle) was very supportive.	There was dedicated support team from vendor during ERP implementation.	I am satisfied with overall vendor support.
N	102	102	102	102	102
Mean	3.89	3.25	3.01	3.74	2.84
Std. Deviation	1.157	.443	1.125	1.173	.421
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5

Table 4.6 Mean analysis related to Vendor support (Source: Survey Result, 2018)

As indicated in table 4.6 the highest and lowest mean score were 3.89 (Significance of vendor support for ERP implementation success) and 2.84 (The overall satisfaction of respondents with vendor support) respectively. This shows respondents expressed their agreement to the statements of the significance of vendor support for implementation success and disagreed with support the gained from vendor.

Teamwork and Composition

	Teamwork & composition is the most significant factor in ERP implementation.	ERP implementation team consisted of all functional units of our company.	Project team composed of competent and capable staffs.	Our company has a work culture that favours teamwork and collaboration.	The composition of the implementation team highly helpful for ERP implementation success.
N	102	102	102	102	102
Mean	3.56	3.30	3.34	2.98	3.05
Std. Deviation	.755	.771	.970	.443	.443
Minimum	1	1	1	1	1
Maximum	5	5	5	3	3

Table 4.7 Mean analysis related to Teamwork and Composition (Source: Survey Result, 2018)

Teamwork and composition contain five statements. Respondents were asked to express their level of agreements with the given parameters. Significance of training and education for ERP implementation success with mean (3.56) followed by incorporation of competent employees to implementation team with mean value (3.34). Statements like benefits of team composition, incorporation of all functional units in project team and teamwork culture of ethio telecom score a mean of 3.05, 3.30 and 2.98 respectively. Therefore, the survey result depicted that teamwork & composition is critical factor in ERP implementation in ethio telecom.

User Involvement

	User involvement is the most significant factor in ERP implementation.	As a user all work units participated in ERP implementation process from early stage	ethio telecom were given opportunity to test functionalities of Oracle before ERP implementation.	As a user feedbacks from ethio telecom was considered by vendor.	I noticed resistance to the new system.
N	102	102	102	102	102
Mean	3.49	3.05	3.25	3.32	3.01
Std. Deviation	1.060	.443	.783	1.308	1.426
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5

Table 4.8 Mean analysis related to User Involvement (Source: Survey Result, 2018)

The above table shows user involvement as critical factor for ERP implementation. From the mean value one can deduce that user involvement can be considered as critical success factor for implementation success of ERP system which score mean value 3.49. The respondents also agreed with user feedback for vendor with mean value 3.32. The responses prove the importance of user readiness and participation of all functional units from the beginning of implementation processes user test of ERP functionalities of vendor's software before implementation with mean value of 3.05 and 3.25 respectively. From the table, mean value shows that there was resistance to new system from users. The mean value of survey result indicated Involving user has a positive impact on ERP implementation success.

Business Process Reengineering

	BPR is the most significant factor in ERP implementation success.	Oracle ERP system is easily compatible with existing process of the organization.	Migration of data from older system to ERP was easy and accurate.
N	102	102	102
Mean	3.44	3.32	3.44
Std. Deviation	1.254	0.981	1.182
Minimum	1	1	1
Maximum	4	5	5

Table 4.9 Mean analysis related to Business Process Reengineering (Source: Survey Result, 2018)

The BPR factor constitutes of three statements. The respondents asked the significance of BPR on ERP implementation. It scores 3.44 mean value. The second and third questions, compatibility of ERP system and accuracy of data migration from old system to ERP system on implementation success score 3.32 and 3.41 mean value respectively. The mean value of survey result shows BPR is insignificant factor for ERP implementation success in ethio telecom.

CSFs Summary

	Effective Project Management	Top Management Support	Education & Training	Vendor Support	Teamwork & composition	User Involvement	Business Process Reengineering
N	102	102	102	102	102	102	102
Mean	3.68	3.57	3.48	3.35	3.25	3.18	3.08
Std. Deviation	.559	.572	.705	.646	.798	.646	.675
Minimum	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5

Table 4.10 Mean values of variables (Source: Survey Result, 2018)

The summary of mean values of success factors; effective project management, top management support, education & training, vendor support, teamwork & composition, user involvement and business process reengineering were calculated and presented in Table 4.10. The table shows that, the mean value of all variables that are effective project management (M=3.68), top management support (M=3.57), education & training (M=3.48), vendor support (3.35), teamwork & composition (M=3.25) and user involvement (M=3.18) and Business process reengineering (M=3.08). All are above the borderline mean value (3). The highest mean score recorded is effective project management related factor (M=3.68) while the lowest score was recorded by business process reengineering related variable (M=3.08). The summary of mean showed all the success factors under study are factor for ERP implementation project success in ethio telecom.

4.2.1 Correlation Analysis

The value of the coefficient (r) ranges from -1 up to +1. The value of coefficient of correlation (r) indicates the strength and direction of the relationship. The implication of coefficient (r) value is as follows:

- Exactly -1. A perfect downhill (negative) linear relationship.
- -0.70. A strong downhill (negative) linear relationship.
- -0.50. A moderate downhill (negative) relationship.
- -0.30. A weak downhill (negative) linear relationship.
- 0. No linear relationship.
- +0.30. A weak uphill (positive) linear relationship.
- +0.50. A moderate uphill (positive) relationship.
- +0.70. A strong uphill (positive) linear relationship.
- Exactly +1. A perfect uphill (positive) linear relationship.

		ERP Implementation success	EPM	TMS	T & E	VS	T & C	UI	BPR
ERP Implementation Success	Pearson Correlation Sig. (2-tailed) N	1 102							
EPM	Pearson Correlation Sig. (2-tailed) N	.732** .000 102	1 102						
TMS	Pearson Correlation Sig. (2-tailed) N	.635** .000 102	.591** .000 102	1 102					
T & E	Pearson Correlation Sig. (2-tailed) N	.528** .000 102	.301** .002 102	.494** .000 102	1 102				
VS	Pearson Correlation Sig. (2-tailed) N	.408** .000 102	.372** .000 102	.249** .012 102	.604** .000 102	1 102			
T & C	Pearson Correlation Sig. (2-tailed) N	.391** .000 102	.372** .003 102	.017** .012 102	.261** .003 102	.317** .001 102	1 102		
UI	Pearson Correlation Sig. (2-tailed) N	.364** .000 102	.365** .020 102	.373 .000 102	.330** .020 102	.365** .000 102	.374** .003 102	1 102	
BPR	Pearson Correlation Sig. (2-tailed) N	.350** .001 102	.298** .025 102	.141** .008 102	.182** .027 102	.213** .032 102	.109** .034 102	.103** .002 102	1 102

Table 4.12 Relationship among Variables (Source: Survey Result, 2018)

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

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

ERP= Enterprise Resource Planning, EMP=Effective Project Management, TMS=Top Management Support, T & E= Training & Education, VS= Vendor Support, T & C= Teamwork & Composition, UI=User Involvement, BPR= Business Process Reengineering.

Pearson correlation analysis was used to provide evidence of convergent validity. As per the correlation matrix indicated above, six of the independent variables associated positively with ERP implementation success as shown in table 4.12. The result depicted there is a positive and significant relationship between all independent variables and dependent variable at different degree of significance level for ERP implementation success. The result showed the strength and significance at (effective project management $r= 0.733$, $p< 0.01$, top management support $r=0.635$, $p<0.01$, education and training, $r=0.528$, $p<0.01$, vendor support $r=0.408$, $p<0.01$, teamwork and composition, $r=0.391$, $p<0.01$), user involvement, $r=0.364$, $p<0.01$ and business process reengineering, $r=.350$ at $p<0.01$).

Variables	Directions	Strength
Effective Project Management	+Ve	Strong near to high
Top Management Support	+Ve	Moderate near to high
Education and Training	+Ve	Moderate
Vendor Support	+Ve	Weak near to moderate
Teamwork and composition	+Ve	Weak
User Involvement	+Ve	Weak near to zero
Business Process Reengineering	+Ve	Weak near to zero

Table 4.13 Summary of correlation analysis

4.2.2 Multiple Linear Regression Analysis

Correlation between two variables does not imply that one event causes the second to occur. Multiple regression is a statistical technique through which one can analyze the relationship and effect between a dependent or criterion variable and a set of independent or predictor variable.

Assumptions Testing in Multiple Regression

Multicollinearity

Multicollinearity occurs when the independent variables are too highly correlated with each other.

Multicollinearity may be checked multiple ways:

1) Correlation matrix – When computing a matrix of Pearson’s bivariate correlations among all independent variables, the magnitude of the correlation coefficients should be less than 0.80. In this study this is satisfied condition since the maximum correlation magnitude is $r=0.591$.

2) Variance Inflation Factor (VIF) – The VIFs of the linear regression indicate the degree that the variances in the regression estimates are increased due to multicollinearity. VIF values higher than 10 indicate that multicollinearity is a problem. This condition is also satisfied from table 4.14, the maximum VIF result is 1.893.

Model Summary^b

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
1		.877 ^a	.769	.752	.285

a. Predictors: (Constant), Effective Project Management, Top Management Support, Education and Training, Vendor support, Teamwork and Composition, User Involvement, Business Process Reengineering

b. Dependent Variable: ERP Implementation Success

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.387	.246		1.576	.118					
	Effective Project Management	.571	.062	.559	9.195	.000	.733	.688	.456	.664	1.505
	Top Management Support	.258	.067	.259	3.826	.000	.635	.367	.190	.537	1.861
	Training& Education	.144	.055	.178	2.613	.010	.538	.260	.129	.528	1.893
	Vendor Support	.057	.051	.165	2.132	.020	.408	.116	.056	.751	1.332
	Teamwork& Composition	.098	.039	.137	2.551	.012	.391	.254	.126	.848	1.180
	User Involvement	.068	.051	.128	2.326	.018	.364	.136	.066	.671	1.491
	Business Process Reengineering	.059	.031	.105	2.831	.040	.025	1.186	.091	.743	1.347

Table 4.14 Coefficient of variables of regression analysis (Source: Survey Result, 2018)

Coefficient for the constant and independent variable helps to predict the dependent variable using independent variables. As shown in Table 4.14, five elements were positive significant independent variables in the regression model. They are: effective project management, top management support, education & training, vendor support and teamwork & composition, user involvement and business process reengineering with significance p value less than 0.05. All independent variables are statistically significant factors for ERP implementation success.

The results provide support for all; **H1, H2, H3, H4, H5, H6** and **H7** in this study.

It is demonstrated that the independent variables are strong predictors of ERP implementation success. It is confirmed by R square 0.769. This tells us that the independent variables estimate 76.9% of the variability of the dependent in the study or it is to mean that, effective project management, top management support, training and education, vendor support, teamwork & composition, user involvement and business process reengineering determines ERP

implementation success by 76.9% and the remaining, 23.1% are other factors these didn't included in this study.

The model was;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$$

Where,

Y- Dependent Variable

β_0 - Constant (Coefficient of Intercept)

X1 ... X7 - Independent Variables

$\beta_1 \dots \beta_7$ - Regression Coefficient of Independent Variables

ε - Random Error

For this study the model was,

$$Y = 0.387 + 0.559(\text{EPM}) + 0.259(\text{TMS}) + 0.178(\text{E \& T}) + 0.165(\text{VS}) + 0.137(\text{T \& C}) + 0.128(\text{UI}) + 0.105(\text{BPR}) + \varepsilon$$

Where,

Y=ERP Implementation success

EPM=Effective Project Management

TMS= Top Management Support

E & T=Training and Education

VS=Vendor Support

T & C=Teamwork & Composition

UI= User Involvement

BPR= Business Process Reengineering

From the above regression model, unit increase in each independent variable would yield increase in ERP implementation success by their respective coefficients. For example, a unit increase in effective project management would yield 0.559 increase in ERP implementation success. At the same time unit increase in business process reengineering would yield 0.105 increase in ERP implementation success, which imply that all independent variables have positive and statistically significant impact on ERP implementation success.

4.2.3 Discussion of Findings

H1 There is a positive and significant relationship between effective project management and ERP implementation success.

The first hypothesis tested impact of effective project management on ERP implementation success. Beta coefficient regression analysis scored 0.559 at a significance level of 0.000 when $p < 0.05$ (See table 4.14), which means the hypothesis is proved with its positive effect and high significance on ERP implementation success according to ranking of survey result filled by ethio telecom ERP implementation project team.

Effective project management has been emphasized to be essential by prior research to influence a successful ERP implementation project from a management perspective (Nah et al., 2003). As prior research an effective project management helps to coordinate the activities in all of the different stages in an ERP life cycle, from beginning until closing the project (Somers & Nelson, 2004). The project management is expected to assign an individual or a group of employees to drive success, follow project progress and take corrective action in case there is symptom of discrepancy between plan and progress in the project management (Nah et al., 2001).

Based on this survey result, the study is consistent with what authors on the area have so far researched.

H2 There is a positive and significant relationship between Top Management support and ERP implementation success.

The second hypothesis regarding top management support received from analysis result statistically shows top management support has positive effect on ERP implementation success and it has significant relationship with implementation success with positive coefficient value of $\beta=0.259$ at 0.000 significance with P value $p < 0.05$ (See table 4.14).

Top management support is rated as a major critical success factor by prior research. For an ERP implementation, a thorough and persistent involvement of high-level executives is discussed as paramount for an ERP implementation to be successful (Nah et al., 2003). This implies that many system users find top management commitment importantly when working with an ERP implementation. Handing the implementation over entirely to the technical departments of a

company is a mistake. Legare (2002) further discuss the importance of recognizing the human factor while implementing the ERP system; being able to acknowledge the different needs of the system users and knowing when to step in and when just to observe is critical for the implementation to be successful. To conclude, there is statistically significant correlation between the success of an ERP implementation and the commitment of top management.

Based on this, the study is consistent with what authors on the area have so far researched.

H3 There is a positive and significant relationship between education & training and ERP implementation project success.

The third hypothesis tested whether training and education has positive and significant impact on successful implementation of ERP system. Regression analysis coefficient resulted in 0.178 at a significance level of 0.010 when $p < 0.05$ which means that the hypothesis is accepted (see table 4.14).

The importance of proper education and training has been emphasized by prior research. They have suggested that training and education can mitigate a possible failure of the project since it involves the users accepting the project. Hence, nurturing a positive employee attitude and reaping the full benefits of the implemented system is vital (Finney & Corbett, 2007). To conclude, training and education showed a statistically significant and positive association with ERP success from according to data collected from ethio telecom.

Based on this, the study is consistent with what authors on the area have researched.

H4 There is positive and significant relationship between vendor support and ERP implementation success.

The fourth hypothesis asked for the importance of the vendor support when implementing an ERP system. The results depicted coefficient of 0.165 at a significance level of 0.02 when $p < 0.05$ (see table 4.14). The hypothesis is hence accepted since the significance level yielded a value below the p-value stating that it is statistically significant to say that vendor support describes a successful ERP implementation. Hence, the vendor support is significantly important factor for smooth implementation project.

Kremers and Van Dissel (2000) argues that if anything goes wrong, the need for a vendor support is badly important. It is also suggested to have a vendor support in place during the implementation phase and is mainly referred as maintenance and surveillance of the system. Another scenario could be due to the level of customization of the system, the more customization made, the larger need of a heavy vendor support is needed.

Based on this, the study is consistent with what authors on the area have so far researched.

H5 There is a positive and significant relationship between Teamwork & Composition and ERP implementation success.

The factor related to teamwork & composition in an ERP implementation success was the fifth hypothesis being tested. This hypothesis is accepted since the correlation coefficient depicted a coefficient value of 0.137 at a significance level of 0.01 when $p < 0.05$ (see table 4.14).

Prior research argues that the implementation team should lead the way, carrying out the planning phase, building morale and motivation and highlighting the need for a project champion as a part of the implementation team (Nah et al., 2001; Summer, 1999). There might have been an implementation where the implementation team was involved with task forces to connect users cross-functionally and to build a sense of togetherness during the process. (Akkermans & van Helden, 2002) state that the implementation or project team should consist of system users in order for the team to understand any practical implications. With that said, and to conclude the remarks both this study and prior study findings, there is statistical significance between the variable and implementation success.

Based on this, the study is consistent with what authors on the area have researched.

H6 There is a positive and significant relationship between user involvement and ERP implementation success.

The sixth hypothesis tested if there is any relationship between ERP implementation success and user involvement. This hypothesis is accepted since regression analysis coefficient yielded a value of 0.128 which is positive but low and close to zero with significance level at 0.018 when $p < 0.05$ (see table 4.14). Hence, according to this survey result user involvement has also significant effect on ERP implementation success.

It is evident that the respondents believed that the user involvement in the ERP implementation was moderately important factor, as showed in descriptive statistics (mean value) analysis of user involvement in table 4.10. Coefficient of regression analysis also (table 4.14) indicated user involvement is important factor for ERP implementation success.

When we see prior research literatures, Bhatti (2005) and Francoise et al., (2009) argue for the importance to involve the users in the development of the system and to get a hold of existing knowledge in areas the implementation team lacks enough expertise. Esteves and Pastor (2000) further argue that involving the users enhances the system quality, use and acceptance of the system.

Based on this, the study is consistent with what authors on the area have researched.

H7 There is a positive and significant relationship between business process reengineering and ERP implementation success.

The seventh hypothesis investigated the impact of business process reengineering on ERP implementation success. The hypothesis is accepted on the result of regression coefficient of 0.105 at a significance level of 0.004 when $p < 0.05$ (see table 4.14).

Prior research has emphasized that BPR plays a crucial role, both in the earliest stages and throughout the implementation phase (Somers & Nelson, 2004).

Based on this, the study is consistent with what authors on the area have researched.

To Summarize, effective project management ($\beta=0.559$), top management support ($\beta=0.259$), education & training ($\beta=0.178$), vendor support ($\beta=0.165$) and teamwork & composition ($\beta=0.137$), user involvement have ($\beta=0.128$) and business process reengineering ($\beta=0.105$). All the success factor under study have a positive and significant impact on ERP implementation success at 95% confidence level ($p<0.05$)

Test of Hypotheses

Variables		Hypotheses Acceptance	Remark
Effective Project Management	(H1)	Supported	
Top Management Support	(H2)	Supported	
Training & Education	(H3)	Supported	
Vendor Support	(H4)	Supported	
Teamwork & Composition	(H5)	Supported	
User Involvement	(H6)	Supported	
Business Process Reengineering	(H7)	Supported	

Table 4.15 Test of hypotheses based on correlation and regression analysis.

Chapter Five

Summary, Conclusion and Recommendation

This chapter provide the summary of the findings and it give conclusion and recommendation of the study based on the findings of the study.

5.1 Summary

As modern companies worldwide face an ever-increasing degree of globalization, the need for a constant flow of information is intensified. ERP systems have become vital to companies in their efforts to hasten and sharpen the flow of information. However, implementing an ERP system is complex and costly. Worldwide, much research has been done on what makes an ERP implementation successful, however, due to unfamiliarity of the system it is new subject area for our country in general and specifically to ethio telecom.

Enterprise Resource Planning (ERP) systems have become one of the most important developments in the corporate use of information technology. ERP implementations are usually large, complex projects, involving large groups of people and other resources, working together under considerable time pressure and facing many unforeseen developments. For an organization to compete in rapidly expanding and integrated marketplace, ERP systems must be employed to ensure access to an efficient, effective, and highly reliable information infrastructure. They have almost become the de-facto option for replacing legacy systems.

Despite the benefits that can be achieved from a successful ERP system implementation, there is evidence of high failure in ERP implementation projects. There is evidence that most ERP implementations exceed their budget and their time allocations. Identifying the success factors as early as possible can provide valuable clues to help project managers improve their chances of success. This research focuses on seeking the most important success factors that influence the implementation success of an ERP system in ethio telecom. Based on a literature review a list of seven success factors are identified as important in ERP system implementation success.

They are; effective project management, top management support, vendor support, training & education, teamwork & composition, user involvement and business process reengineering. Based on the survey result effective project management, top management support, vendor support, training & education, teamwork & composition, user involvement and business process reengineering factors have significant influence on ERP implementation. However, a significant variation is seen on the degree of their effect.

Quantitative research approach and deductive type of reasoning were used for this study. The study used both description and explanatory research design, due to research's combined nature of both descriptive and explanatory attributes. As data collection methodology, administered questionnaires were distributed to the representative of the study via email. The collected responses were analyzed by using both descriptive and inferential statistics.

Regarding to the demographic information about the respondents, the findings indicated that majorities of the respondents were male and most percentage of the respondents possessed first degree as their highest academic qualification followed by post graduate/ master's degree holder. No, employee with below first-degree academic qualification was participated in project. In addition, majority of the respondents had worked in ethio telecom for a period between 9 to 12 years. Regarding age, majority of the respondents found in the age range of 35-45 years old.

The regression analysis result demonstrated that there is a positive and significant relationship between all seven independent factors under study and ERP implementation success. An examination of the joint relationship portrayed that independent variables determine or predict ERP implementation success by 76.9%, which mean R square of the study is 0.769.

5.2 Conclusions

The study is all about “Analysis of success factors for enterprise resource planning implementation”. There are different factors these influence ERP implementation successes. By considering different theoretical and empirical (research conducted by different authors), seven variables those are important from ethio telecom context, were sorted and discussed. They are; effective project management, top management support, vendor support, training & education, teamwork & composition, user involvement and business process reengineering. Each factor contains different statements which is a minimum of three statements and a maximum of six statements. The respondents were asked to give their agreement or disagreement level for Likert scale type questions. Their responses were investigated through mean, standard deviation, correlation and regression analysis tools.

- The findings showed positive and relevant relationship between effective project management and ERP implementation success. The finding of regression analysis indicated that effective project management highly determine the chance of successful ERP implementation. But there was a gap of project management during ERP implementation project in ethio telecom. There was project creep which mean unplanned modules had been added at the middle of project and affect project time and cost.
- Similarly, there is a positive and significant association between top management supports and ERP implementation success. This shows, top management is a key factor in the ERP implementation project. Top management therefore needs to spearhead the ERP implementation project and provide resources needed overall guidance to ensure successful implementation. When we discuss the top management practice in case of ethio telecom, the finding of the study depicted, there is knowledge gap of top management about functionalities of ERP. There was length decision bureaucracy and resource shortage.
- Education and Training is also a very important factor in the ERP implementation project. According to survey result it indicates that intensive project team’s training and education raise the chance of successful ERP implementation. But it didn’t give enough attention in ethio telecom. One-time training was given which is not effective due to complicity of the software.

- Teamwork & composition has also significant relationship with the ERP implementation. It can therefore be concluded that putting together good teamwork and composition of project team is a critical step in successful ERP implementation. In case of ethio telecom there was good teamwork among project team members, but representation of all work unit was not fair, more project team represent technical work units like IS department. Since the software would have used through all functional units' proportionate representation is necessary.
- The findings of the study also show that vendor support is another significant critical success factor in ERP implementation. This implies, for an ERP implementation project to be successful there must be vendor support. Along consultant the support from Vendor Company was very helpful. Without oracle company or vendor, the project was unlikely successful.
- Regarding to user involvement, survey result shows, it has positive relationship and significant effect on ERP implementation success. in this case study of ethio telecom, users have been participated through ERP implementation but at early stage of the project there was less user's participation, it was only involvement of top management at early stage of project.
- Another variable under study was business process reengineering. Statistically it has positive and significant impact on ERP implementation success as survey result of under case study.

The regression analysis for this study indicated that the independent variables are strong predictors of ERP implementation success which is confirmed by R Square 0.769. In other words, those seven critical success factors determine ERP implementation success by 76.9 %.

5.3 Recommendation and future research suggestions

The correlation analysis shows that there is a strong positive relationship between effective project management, top management support, training & education, vendor support, teamwork & composition, user involvement and business process reengineering and ERP implementation success at different degree of importance or effect level. Regression analysis tells us these factors

predicts the dependent variables (ERP implementation success) with strong R square (0.769). Therefore, based on these conclusions the following recommendation are given.

The study finding idicated effective project management, top management support, vendor support, training & education and teamwork & composition, user involvement and are business process reengineering as success factors these are very helpful to ensure ERP implementation success. Therefore, the researcher recommends firms implementing ERP to take these factors very seriously in ensuring ERP implementation success.

- ❖ Project manager should effectively manage project scope. Any scope creep cause project time delay and over budget. So, appropriate plan and project scope management should be the major focus area of project manager. As discussed in data analysis and interpretation part the major ERP implementation constraints ethio telecom faced was time delay project schedule and over budget. These problems could be managed through effective project management.
- ❖ Top management should comminute about importance and benefits of ERP to all the key stakeholders in the ERP implementation project. The involvement can enhance adoptability of the system and overcome resistance to change and prevent conflicts from emerging during the implementation process. Top management should also provide leadership during the implementation. Top management should communicate benefits of ERP implementation to project team and another all stakeholders. Decision bureaucracy should be also shortened. Top management should allocate resource needed for smooth project progression. Since, the attendance of the top management during the ERP implementation could also strength the employees' confidence in the whole project it should not be underestimated.
- ❖ The organization's management must strive to improve employees' knowledge and skills to ensure successful ERP implementation. This can be done through intensive training and education. Education and training should not be given attention at the time of project failure, rather it should be preplanned.
- ❖ The project team must be properly selected to ensure all the departments and functional units are represented based on their potential usage of ERP system in their future daily operations. Teamwork and composition of ERP implementation project team should be

balanced, or cross functional and comprise a mix of functional units' staff. So that the internal staff can develop the necessary technical skills which help ERP implementation success and post implementation operation.

- ❖ Vendor should provide unreserved support during ERP implementation project. Intensive communication should be there in between project manager and vendor. In case of conflict of process and misunderstanding, it should be managed wisely. Vendor should ensure the delivery of project with in scope, time and budget to avoid cost overrun as much as possible.

Regarding to recommendation for future researchers, the researcher would like to forward these two points;

- ❖ Since this study conducted within single company as a case study, the result is only partly generalizable. To reach on more generalized finding the future researchers should take two or more companies from different industries as a case and broaden target population base.
- ❖ There might be important critical factors like consultant didn't included in this study, so it is recommended if such factors and the other success factors are included in factors list and analyzed .

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Appendix

Appendix One

Questionnaire on Analysis of Critical Success Factors for Enterprise Resource Planning.

Dear Respondent,

My name is Tsegaye Bekele Tekle. I am a post-graduate student at St. Mary's University school of graduate study. Currently, I am conducting research on a title "Analysis of Critical Success Factors for Enterprise Resource Planning the Case of ethio telecom", for the partial fulfilment of Master of Art Degree in Project Management. Hence, you are kindly requested to participate in this research by filling the following questions. The objective of this questionnaire is to gather information on research entitled above and only for academic purpose. Therefore, your genuine and sincere cooperation in filling this questionnaire will be highly helpful for successful accomplishment of the study.

Thank you in advance for your cooperation!

Direction: Please answer the below questions by putting "X" sign in the box of your answer.

Section One.

1. Gender:

Male Female

2. Age:

(a) < 35 years (b) 35-45 years (c) > 45 years

3. Education:

(a) Less than Certificate/Diploma (b) Certificate/Diploma

(c) Degree (d) Postgraduate and above

4. Years of Service

(a) Below 3 (b) 3-6 (c) 6-9 (d) 9-12 (e) above 12

Section Two: Critical Success Factors (CSFs) assessment or independent Variable Related Questionnaire.

Directions: Based on your experiences as ethio telecom ERP implementation Project team member, I hope you have good experience of implementation project and how different critical success factors affect ERP implementation project. Hence, you are kindly requested to rate each of the following statements by putting “X” on the appropriate number with respect to your level of agreement/disagreement against each statement using 5- point Likert scale whereas, 1 = Strongly dis-agree, 2 = Dis-agree, 3 = Neutral, 4 = Agree , 5 = Strongly agree

No.	Critical Success Factors for Enterprise Resource Implementation Project	Level of Agreement				
		Strongly agree (5)	Agree (4)	Neutral (3)	Dis-agree (2)	Strongly dis-agree (1)
1	Top Management Support					
1.1	Top management is the most significant factor for ERP implementation.					
1.2	Top management was familiar with ERP system.					
1.2	Top Management Provided good leadership for ERP implementation.					
1.4	ethio telecom organizational culture supports implementation of ERP system.					
1.5	Our organization’s management style was supportive for ERP project implementation success.					
1.6	Top management created awareness on benefits of ERP implementation.					

2	Teamwork and Composition				
2.1	Teamwork & composition is the most significant factor for ERP implementation.				
2.2	ERP implementation team consisted of all functional units of our company.				
2.3	Project team composed of competent and capable staffs.				
2.4	Our company has a work culture that favors teamwork and collaboration.				
2.5	The composition of the implementation team was highly helpful for ERP implementation success.				
3	Education and Training				
3.1	Education & training is the most significant factor for ERP implementation success.				
3.2	I acquired technical knowledge and skills which contributed to successful ERP implementation from training.				
3.4	Training and education enhanced my proficiency and level of knowledge.				
3.5	Continual training during implementation was more effective than training for limited period.				
4	User Involvement				
4.1	User involvement is the most significant factor for ERP implementation.				
4.2	As users all work units participated in ERP implementation process from early stage.				
4.3	ethio telecom were given opportunity to test functionalities of Oracle before ERP implementation.				

4.4	As a user feedbacks from ethio telecom was considered by vendor.					
4.5	I noticed resistance to the new system.					
5	Effective Project Management					
5.1	Effective Project Management is the most Significant factor in ERP implementation.					
5.2	Project scope was effectively managed by project manager.					
5.3	ethio telecom has made effective project planning and control.					
5.4	Key stakeholders in the organization were alerted when ERP was being implemented.					
5.5	ERP system implementation was easy to adopt and did not cause disruption.					
5.6	Modules and functions were implemented as per the project scope.					
6	Vendor Support					
6.1	Vendor support is the most significant factor for ERP implementation success.					
6.2	Major conflict was created between vendor and our company during ERP implementation.					
6.3	ERP vendor (Oracle) was very supportive.					
6.4	There was dedicated support team from vendor during ERP implementation.					
6.5	I was satisfied with overall vendor support.					
7	Business Process Reengineering					
7.1	Business Process Reengineering is the most significant factor for ERP implementation					

7.2	Oracle ERP system is easily compatible with existing process of the organization.					
7.3	Migration of data from older system to ERP was easy and accurate.					

8. Would you like to offer any suggestions or comment on aspect of critical success factors for ERP implementation and overall ERP Implementation project in ethio telecom? If you have any suggestion, please forward it here through open space provided-----

Declaration

I declare that this work has not been previously submitted and approved for award of a degree by St. Mary's University or any others. To the best of my knowledge and belief, the thesis contains no material previously published by another person except where due reference is made in the thesis itself.

Tsegaye Bekele _____

Student

Signature

St. Mary's University, Addis Ababa

January, 2019

Endorsement

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Wubshet Bekalu (PhD

Advisor

St. Mary's University, Addis Ababa

Signature

January, 2019