



**Addis Ababa University
School of Commerce
Department of Logistics and Supply
Chain Management
Critical Success Factors of Implementing
Enterprise Resources Planning (ERP) System in
Sourcing:
The case of ethio telecom**

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Supply Chain Management

Critical Success Factors of Implementing
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Sourcing: the case of ethio telecom

This is to certify that the thesis prepared by Setargachew Maschal, entitled: Critical Success Factors of Implementing Enterprise Resources Planning (ERP) System in Sourcing: the case of ethio telecom is submitted in Partial fulfillment for the Degree of Masters of Arts in Logistics and Supply Chain Management complies with the regulations of the University and meets the expected standard with respect to originality and quality.

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List of Acronyms and Abbreviations

BPR	Business Process Reengineering
CRM	Customer Relationship Management
CRP	Conference Room Pilot
CSF	Critical Success Factor
e-business	Electronics Business
ERP	Enterprise Resource Planning
eTOM	Enhanced Telecom Operating Map
IC	Inventory Control
I-Procurement	Internet Procurement
I-Supplier	Internet Supplier
ITU	International Telecommunications
KCSF	Key Critical Success Factor
MRP	Material Requirement Planning
MRP II	Manufacturing Resource Planning
PCMM	People Capability Maturity Model
SCM	Supply Chain Management
UAT	Users Acceptance Test

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Abstract

Organizations look to enterprise resource planning (ERP) as a significant strategic tool of competition but there are many difficulties in compelling people to implement it effectively. In this case, how to help ERP's future effective implementation has already attracted some researchers' attention. The core research developed is focused on critical success factors of ERP implementation. Therefore, the major objective of this study is to identify the critical success factors of ERP System from sourcing perspective in ethio telecom and whether the implemented ERP system has successful and brought the intended outcome.

This study has used a descriptive and Explanatory research type to elaborates the existing phenomenon as it exists and to examine the current relationship between the success of ERP implementation and the critical success factors. The primary data was collected using questionnaires from Sourcing department staffs through simple random sampling method. In addition, the collected data was analyzed using mainly by SPSS (Statistical Package for the Social Sciences) version 20.

The study result shows that the deployed ERP system is implemented successfully and brought the intended outcome in improving the efficiency of Sourcing function and the overall performance at company level by reducing the decision making cycle time and Sourcing lead time. In addition, the research found that User training and Education, System Provider and/or Consultant support, Technological Infrastructure, Change Management & Effective communication have significant relation with the Success of ERP systems implementation and do have high impact on ERP implementation success. However, my data did not shows significant relation between Top Management commitment & Support, Project Management and Clear Goals & Objectives critical factors with Success of ERP Systems implementation.

Hence, the study has recommended that the company should give due attention to the Top Management Support, Project Management and Clear Goals and Objectives of CSFs while deploying the next phase of ERP System to enhance the overall success rate of ERP implementation since particularly Top Management Support and Project Management Factors have significant relation with ERP Implementation success as per the literatures and most of the empirical studies conducted in this area. Moreover, the company should also work on shortfalls to improve the existing ERP system successfulness and minimize the shortfalls in the next phase ERP System implementation. Finally, the study recommends for ERP practitioners to give due attention for the identified five KCSFs (i.e., User training and Education, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication) which have high predictive value and significant association with the Success of ERP System implementation while deploying this System.

Keywords: Key Critical successful factors (KCSF), Enterprise resource planning (ERP), ERP implementation, Sourcing and ethio telecom.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Sourcing is a core activity in the procurement function that can create value for the customers, encourage for innovation and identify new products and market possibilities for modern organizations. Sourcing is researching the market for potential input sources, securing the continuity of these sources, searching for alternative sources and keeping the relevant knowledge up to date (Vollman *et al.*, 2004). Sourcing is not simply a way to find the best price for a certain product but it has become a decision-making process that can shape the business of an entire organization. Nowadays sourcing is a critical activity in order to get a competitive advantage (Furlotti, 2014). The sourcing function, in general, has become extremely important due to the fact that business is getting more competitive for the majority of organizations.

There are several reasons behind this gradual increase in the importance and the scope of the sourcing function. Much is due to the ongoing trend toward specialization, meaning that every organization specializes in the increasingly smaller range of value added in its production process (be it manufacturing or services production processes), which leads to an increase share of externally acquired goods and services (Furlotti, 2014). Nowadays, purchasing to sales ratios in general are in the range of 30%-60% for service organizations, 50%-70% for manufacturing industries and 80%-95% for retailing firms and many organizations are seeing a further rise in this percentage. (Van Weele, 2010 as cited by Furlotti, 2014)

The key business issues regarding sourcing are time, profit, skills and cost saving. Critical decisions like the supplier's selection, performance's evaluation and cooperation are the challenges in the sourcing process. In today businesses, the efficiency in which organizations can manage the sourcing processes and flow of data has exceeded being a competitive advantage to be a condition for their survival in certain cases. Information systems were and still an essential tool that help organizations to enhance their Sourcing efficiency and apply more control on the quality, accuracy and to improve customer service, reduce cycle times, increase effectiveness, and decrease cost. The development of information and communication technologies (ICTs) has provided the companies with significant opportunities to reduce the cost of provision and increase their revenue (Tarhini *et al.*, 2015). Companies with all sizes, small, mid-size or large have a need to make their Business Processes standardized, therefore,

streamline their operations and improve the efficiency of these processes (Orozco *et al.*, 2015 and Abbasi *et al.*, 2015) as cited by (Tarhini *et al.*, 2015).

So, to improve and optimize the overall Sourcing efficiency Enterprise Resource Planning (ERP) system provide a more effective way to handle procurement and supply of the goods, services and other resources that are needed across the supply chain. From manufacturing and warehouse resources to transportation and execution processes, ERP systems offer cross-platform visibility on all aspects of the supply chain. ERP system is an information system that helps the organization to coordinate and integrate information within the organization. ERP system gives the company ability to manage its internal business processes (Monk & Wagner, 2009). It allows different departments with diverse needs to communicate with each other by sharing the same information in a single system and increases cooperation and interaction between all business units in an organization on this basis (Harrison, 2004). According to Njihia (2014), the purpose of ERP is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.

The benefits of ERP systems are linked to effectiveness and efficiency of business processes because firms can get more accurate and timely information (Trott and Hoecht, 2004). Through integrating business functions, firms can reduce data collection time, avoid data duplication and reduce the overall all operational costs. In addition with timely information, ERP helps managers to improve decision making speed and facilitates communication between users.

In order to gain these benefits, organizations have to allocate plenty of resources, capabilities, efforts, time and survive a challenging implementation process which found to be a very risky and complicated one because implementing the ERP system is not an easy job due to the fact that so many aspects must be managed and controlled on the same time (Yousef, 2010).

1.2 Statement of the problem

ERP is a very promising system that tends to integrate and streamline all organization's processes. Many studies record a lot of outstanding benefits of ERP systems in terms of inventory, planning, revenues, lead time, information accuracy/timing, decision support ...etc. ERP system assists the organizations to automate their business processes by coordinating and integrating the information between departments, which is one of the big benefits of this system (Monk & Wagner, 2009). However, ERP system implementation has never been an easy job. The associated risks are often high and widely vary due to the multi-dimensional nature of the system that crosses all functional areas in many levels. Inadequate resources, poor planning, unqualified team, system customization and organizational resistance are some of the problems that typically faced in ERP system implementation and negatively impact their success (Yousef, 2010). ERP systems are hard to implement with high rates of failures “three quarters of the ERP projects are considered failures and many ERP projects ended catastrophically” (Rasmy *et al.*, 2005). Therefore, have paved the way for a chase from both academicians and practitioners to understand and pinpoint the critical success factors that positively impact this type of projects' success.

Ethio telecom has launched implementation of ERP system as of October 2012. The implementation of ERP system in ethio telecom is not directly adopting the standard software tool rather it is about customizing & implementing the system taking into account the legislative environment of the country, organizational structure of the company and roles and responsibility of each functional department as well as sections, policies and procedures, internal processes and other related factors.

However, the implementation of ERP system in ethio telecom was challenging due to some of the following factors that have impaired the successfulness of the system. These include insufficient support of management at all levels, inadequate & untimely training for the system end users and poor communication of the objectives of the system implementation. Thus, research is very important to identify and understand the factors that impact heavily on the success of ERP implementation in the company.

Therefore, the researcher main reason to conduct this research is to identify the critical success factors which adversely affect the success of ERP system implementation in ethio telecom to learn the company so far experienced during the implementation of the previous two phases; to take corrective action and enhance the implementation of third phase ERP system. Because after implementing the phase one (i.e., iprocurement, Sourcing Buyer and Purchasing Buyer Module) and two (i.e., isupplier, Service Purchase Contract and Contract Module) ERP System, ethio telecom has in a long term plan to implement the third phase of ERP system. Mainly, other papers contextualized themselves on developed countries and there is a wide gap in the literature regarding implementations of ERP Systems in the developing countries in general and in particular Ethiopia.

Research Questions

This research identified the factors that influence the success factors of ERP systems implementation from Sourcing perspective in ethio telecom and will answer the following questions:

1. What are the critical factors for the successful implementation of ERP system from Sourcing perspective in ethio telecom?
2. What are the KCSFs (Key Critical Success Factors, most preferred CSFs) that should be taken into high priority for the successful implementation of ERP system from Sourcing perspective in ethio telecom?
3. Has the ERP system been implemented successfully in ethio telecom from Sourcing perspective?
4. Is there a significant relationship between the Critical Success Factors and the success of ERP system implementation?

1.3 Research Objectives

Based on the above explained research problem and questions the following general and specific objectives have been drawn:

1.3.1 General objective the study

The general objective of the study is to identify the critical success factors of ERP System from sourcing perspective in the case of ethio telecom.

1.3.2 Specific objectives of the study:

- ✓ To identify the CSFs for the successful ERP implementation from sourcing perspective in ethio telecom;
- ✓ To rank the CSFs based on their importance for successful ERP implementation of Sourcing modules in ethio telecom;
- ✓ To examine the relationship between the Critical Success Factors and the success of ERP system implementation.
- ✓ To identify whether the implemented ERP system has successful and brought the intended outcome in improving the efficiency of Sourcing function and the overall performance at company level.

1.4 Significance of the study

Findings of the research have both practical and theoretical significances. Some of them are:

It is intended that the findings of this research is to provide insight about the systems functionality with respect to sourcing activities and the company successfully implementation, provide the key critical factors of ERP System implementation, highlighting the obstacles faced and how it can be solved, as well as the gains achieved.

This research could also be used as a reference for further researches in the area and explore major issues related with the system deployment for designing significant milestones as a base and make it available for academic reference.

Finally, it will provide useful information and practical suggestions that may help practitioners of the company at different level to get a better understanding of how to deploy such systems. And the recommendations could also be used as an input for the next phase of ERP System deployment.

1.5 Scope of the study

The study has been delimited to the critical factors of ERP system deployment in ethio telecom for Sourcing activities, its effectiveness in terms of creating automated work environment and problems which impede the implementation success; and look in to the perception of employees from Sourcing department.

1.6 Definition of Terms

The main terms are defined as shown here under:

- ✓ Sourcing: is the process of identifying suitable suppliers that could provide required goods, services or works (UNOPS, 2014). The sourcing process also provides valuable information about products and specifications and is used to determine the appropriate solicitation method and type of competition.
- ✓ ERP: According to Kumar *et al.* (2000) ERP systems is a configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization to deal with the supply chain, receiving, inventory management, customer order management, production planning, shipping, accounting, human resource management and other business functions.
- ✓ Critical Success Factors: are defined as critical areas where things must go right for a business to flourish or the activities that make the difference between success and failure or at least the difference between incremental results and breakthrough results (Banfield, 1999 as cited by Yousef, 2010).

1.7 Organization of the Thesis

The research report has consisted of five chapters; the first chapter contains introduction of the study which consists of background of the study, statement of the problem, basic research questions, objectives of the study, definition of terms, significance of the study and Scope of the Study.

The second chapter contains assessment of different literatures both on the area which discusses various theories and concepts on Enterprise Resources Planning system and related empirical reviews in relation to the company's actual situation and sourcing activities. And in chapter three the research methodology and design has been detailed and the sample size, Source of data, data collection tools, the procedure of data collection and the method of data analysis.

Then, chapter four presents all the collected data in a clear manner and the analysis accordingly. And finally, the last chapter (i.e., Chapter Five) is about the conclusion and recommendation, which portrays the summary, conclusion, limitation of the study and recommendation part.

CHAPTER TWO: LITERATURE REVIEW

This chapter presents the review of related literatures and imperial facts. It includes the conceptual understanding of what ERP mean, the historical background of the system and its related evolutionary stags, ERP Life Cycle, ERP Modules, the benefits to be obtained from ERP implementation & ERP implementation risks, definition of ERP success, Critical Success Factors and Success indicators were dealt under literature review part.

2.1 Theoretical Literature

2.1.1 Definition of ERP:

In simple terms “ERP systems are software packages that enable the integration of business processes throughout an organization” and ERP system is defined as “a single software system allowing the complete integration of information flow from all functional areas in companies by means of a single database and accessible through a unified interface and channel of communication” (Ustasüleyman, T. & Percin, S. 2010; and Salmeron, J. & Lopez, C., 2010 as cited by Abu-Shanab *et al.*, 2015). And also, ERP is a system that uses computer technology in order to link various functions such as accounting, inventory control, finance, operations, supply chain, and human resources across an entire company (Abu-Shanab *et al.*, 2015). ERP system is a software package of different modules such as supply chain management, sourcing management, financial accounting, manufacturing, human resources, planning and development and so on. Each module is business process specific and customized based on the companies need and requirements.

Wallace and Kremzar (2001) as cited by Yousef (2010) described ERP as an enterprise-wide set of management tools that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision-making and proving high degrees of cross-functional integration among sales, marketing, manufacturing, operations, logistics, purchasing, finance, new product development and human resources, thereby enabling people to run their business with high levels of customer service and productivity and simultaneously lower costs and inventories, and providing the foundation for effective e-commerce.

Apart from the ideas mentioned above the definition and characteristics of ERP systems are: a

modular packaged software system that enable to the integration of business processes throughout an organization, access to data in real time, retrieving processes in an enterprise-wide database and facilitating smooth flow of common functional information and practices across entire organization. Therefore; companies who are implementing the ERP system are benefiting from the single integrated system by reducing data collection time and avoid data duplication.

And it is also defined as a method for the effective planning and controlling of all the resources needed to reduce time and total cost of operations. By default, ERP systems are assumed to provide the necessary information throughout the organization and even the supply chain to facilitate the decision making and organizational activities (Wittstruck, D. & Teuteberg F., 2012 as cited by Abu-Shanab *et al.*, 2015).

2.1.2 Phase of ERP Life - Cycle

A good knowledge and deep understanding of ERP project life cycle and the activities that should be done on each phase would greatly improve the project planning and the way the implementation process will be handled (Yousef, 2010).

The phases of ERP life-cycle consist of several stages that an ERP system goes through during its whole life within the holding organization. The following six ERP implementation Phases has been identified by (Yousef, 2010: pp 23 - 27): Planning, System Selection, decision phase, acquisition phase, implementation phase, use and maintenance phase, evolution phase and retirement phase.

2.1.2.1 Planning:

This phase is where ERP project idea blooms and a clear vision about the system impact on organization's future-processes generated. A well designed plan is essential to enlighten the main aspects of project and justify the huge resources are to be allocated for the implementation. It identifies the duration, cost, budget, risks and benefits. A simple tool to study the feasibility of an ERP project is a Cost-Benefit Analysis that takes in consideration the net present value of money. This analysis studies the benefits of ERP (tangible and intangible) against costs (one-time and on-going).

2.1.2.2 System Selection:

From this point on, all resources, efforts and plans are to be geared in a certain direction, and it should be the right direction. In this phase, organization's requirements, resources, capabilities and objectives of the organization have to be combined all together to select the most suitable ERP system. As a start, it's recommended to conduct a GAP analysis. In GAP analysis, an organization can analyze its current situation and processes against the desired ones and defines gaps between them. These gaps along with objectives and budget determined by top management in previous phase should be translated into criteria for selecting the system.

2.1.2.3 Pre-Implementation:

This phase includes all preparations organization make prior getting in the implementation process. These preparations include the modules to be implemented, choosing the implementation team, the implementation strategy and training.

Originally, the core of ERP system states in the unique integration between its modules. Organization supposed to implement all modules if it wants to get advantage of the whole benefits. This method calls “Vanilla Implementation” and it's too expensive to adopt. However, organization can select certain modules instead according to its budget and requirement. This way, the cost will considerably decrease.

Implementation team has to be carefully selected and intensively trained before implementing the system to make sure that the team is qualified to hold the implementation process professionally and efficiently. Preferably, employees get educated and trained on the system on this phase so they will show less resistance during the implementation.

Another important decision the top management should make in this phase is whether organization should reengineer its processes to fit ERP modules or customizing it to meet its unique requirements. This decision is very critical in ERP project and organization should be completely aware in the advantages and disadvantages of each option then taking the one that can fit its situation the most. Sumner (2005) declared the advantages and disadvantages of reengineering and customization approaches as indicated in the table below:

Table 2:1 Re-engineering vs. Customization

	Pros.	Cons.
Customization Approach	Support unique business processes, strategic processes are maintained	An ERP may not support these unique business processes, re-inventing the wheel, customization is difficult since modules are integrated, difficult to upgrade the software to newer version.
Re-engineering Approach	Is supported by an ERP solution, takes advantage of shared or generic processes within industries (e.g., industry templates), best practices may represent improved process changes, documents best practices, works well when there is minimal organizational change.	Does not support strategic or unique business processes, resistance occurs when there is extensive organizational change.

Source: Sumner (2005)

2.1.2.4 Implementation:

There are three main approaches to implement ERP systems: “Big Bang” approach, Local-wise approach and Module-wise approach (Parthasarathy, 2007). In “Big Bang” approach, organization implements all modules at the same time so it can reap all benefits of system. However, this option is costly, risky and time consuming. Instead, organization can segment the implementation processes either on a location-wise by implementing it in a certain branch or regional office or module-wise by implementing selected module. The last two options considerably reduce costs, risks and duration. If smoothly gone, organization then can extend the implementation processes to include the rest regions and modules.

This phase includes installing and configuring the system, migrating data from old to new system, assure integration among modules, establishing security and access authorities, running pilot test and testing and verifying outputs. Sumner (2005) stated that “ERP implementation includes addressing configuration issues, migrating data from the old system to the new system, building interfaces, implementing reports and pilot testing”.

2.1.2.5 Post-Implementation:

Post implementation phase includes activities that support the ongoing and improvement of ERP system such as: continuous follow up and evaluation for the system, maintenance, troubleshooting, training of new users, upgrading, and training on the new versions.

2.1.2.6 Decline:

Although ERP systems have been designed to last, an organization may give up the system in some cases like high maintenance and/or upgrading cost, unavailable upgraded-version from vendor, availability of more advanced systems or versions from other vendors, failure of system to satisfy organization's need and so forth.

2.1.3 ERP Modules from Sourcing Perspective,

Enterprise Resource Planning is an integrated, software-centric information system that operates via a common database at the core of the system (Yousef, 2010). ERP system links all enterprise's functions in a single database proving by that an interactive environment for all system's users across the organization to execute their jobs in a much more efficient, accurate and easy way.

The Sourcing ERP system has consisted most of the necessary job functions as a standard package such as iprocurement, Sourcing Super User, Sourcing Buyer, Sourcing Team Member, and Sourcing Supplier responsibilities (isupplier), Contract module etc...and it is customized against customer request. A complete e-procurement platform would include all the functions starting from Online database functions of supplier to Online payment status inquiry functions (Chen *et al.* 2014)

2.1.4 The benefits of ERP implementation from sourcing perspective

Sourcing is the process of developing channels of supply at the lowest total cost, not just the lowest purchase price. It expands upon traditional purchasing activities to embrace all activities within the procurement cycle, from specification to receipt and payment of goods and services (Douglas A. *et al.*, 2007). At a tactical level, Sourcing involves numerous activities, consisting of many material and information flows (Martinez, 2007).

Sourcing is not simply a way to find the best price for a certain product. Instead, this process consists of activities that are continuously changing in intensity, duration, and quality, thus producing variations in performance (e.g., time, cost, labor productivity, and capacity utilization), efficiency, and effectiveness of the purchasing department's work (Craighead *et al.*, 2007; Choi and Krause, 2006 as cited by Martinez, 2007)

In fact, adopting ERP systems as the primary platform to reduces sourcing lead time and creates a complete audit trail of supplier commitments. Benefits of ERP System were improved in terms of responsiveness, orders' management, delivery time, cash management and flexibility by enabling the use different languages, currencies and accounting standards through one single system (Yousef, 2010).

Online negotiation through ERP system makes it easy for participants from multiple organizations to exchange information, conduct bid and auction processes, and create and implement agreements. Professional buyers, business experts, and suppliers exchange information online for a more agile and successful sourcing process. Information sharing through ERP can result in exchanging information for inventory with the benefits of reducing costs and provision of up to date information for timely decision making, helping the company to be more responsive to customer requests and enables the company to have more competitive advantages over the others; in addition, ERP can also have the benefits of data sharing with vendors, including actual and forecasted sales, as well as future plans and forecasts, streamlines the supply chain and implements collaborative replenishment approaches (Brown and Susan, 2007).

Chen *et al.* (2014) has stated Ordinarily complete e-procurement platform and identified the following nine (9) function system function:

1. Online database functions of supplier: This includes company online registration, company notification (e-mail, fax), account and password management, basic protection in platform, and integration of suppliers in platform;
2. Online application functions: This includes procurement company applicant search, input of procurement application, revision of procurement application, removal of procurement application, online review of procurement application (for managers);
3. Online price inquiry and price quotation functions (procurement): This includes

- transformation of reviewed procurement application forms into price inquiry, supplier search, supplier notification (e-mail, fax), bargaining and haggling, archive search;
4. Online price inquiry and price quotation functions (business): This includes: quotation and re-quotation, archive search, price inquiry search, and meeting confirmation;
 5. Online bidding functions: This includes production of bid form, online quotation bids from suppliers, supplier notification (e-mail, fax), searching for bid quotations (procurement), searching for bid quotations (supplier), and bid voiding operations;
 6. Online price comparison functions: This includes notification of meeting for supplier (e-mail, fax), online price comparison operations, production and entry of price comparison form;
 7. Online delivery revision functions: This includes procurement delivery form, online revision of terms of delivery, revision of delivery schedules and terms of delivery by supplier, and online adjustments of terms of delivery by purchasing entity;
 8. Online notification functions: This includes notifying the supplier (e-mail, fax);
 9. Online payment status inquiry functions: This includes online inquiry of payment status for the supplier.

In general, implementing ERP system has improved Sourcing efficiency in particular and improved the organization business performance in general by providing timely direct and indirect spending data to all departments; reducing the time spent compiling, reconciling, and consolidating data from fragmented systems; and spending more time analyzing, making proactive decisions, and taking action. In addition, the system enables the organization to analyze detailed transaction-level data to understand the factors driving supplier performance, procurement costs, and identifying cost savings across business units, geographic locations, products, and procurement organizations.

2.1.5 ERP implementation risks

Despite all the benefits of implementing ERP system is a risky undertaking, due to the behavioral and management related challenges in the implementation process of the system. If poorly managed, these risks can seriously affect the implementation process leading to either, partial or total failure for the whole project and an ERP system failure doesn't only mean the loss of resources that have been invested on it; Further and due to its cross-functional nature,

improperly implemented system can negatively impact organization's processes (Yousef, 2010).

According to D.E. O'Leary (2000) as cited by Evelina P. *et al.* (2016), all risks within the project framework of ERP system introduction can be divided into 3 main groups:

- i. **Technical risks:** Technical risks are associated mainly with data processing, software modification, integration of systems, errors in data, network capabilities, etc. Occurrence of technical risks and compensation of their effects typically involve experts from a technical company together with the software vendor.
- ii. **Business risks:** Business risks appear in projects because of wrong choice of certain models and business processes. The examples of business risks can be lack of resources, unskilled assessment of costs and benefits, decline in operational efficiency as a result of the system introduction etc.
- iii. **Organizational risks:** Organizational risks are related to human factors, the operating model and organization structure as well as the aspects of the company's corporate culture. The examples of institutional risks are lack of training for users, key personnel turnover, cultural aspects, lack of attention to the choice of professional consultants, unrealized reengineering of business processes, etc.

The business risks and organizational risks are, as a rule, the most serious and difficult to control but the Technical risks are largely related to the information processing technology and are usually handled by the company IT professionals and vendors (Evelina P. *et al.*, 2016).

2.1.6 ERP Critical Success Factors and Success Indicators

2.1.6.1 Definition of ERP success

On an organizational level, the matter of ERP success is relative some how to the motivations behind adopting the system and the returns it was expecting; however, many studies addressed certain criteria that based on an ERP system can be labeled either as successful or failed (Yousef, 2010).

Sneller (1989) study on MRP systems sees that success can be defined in two dimensions: improved performance and user satisfaction. Improved organizational performance mainly in increasing the inventory turnover, increased on-time deliveries, decreased lead times, and decreased material shortage and decrease material expenditures. User Satisfaction in terms of

functionality, equipment performance, interaction features and office environments. And also Yousef (2010) generalize that, an ERP system success depends on two main aspects: achieving the goals for which ERP systems have been designed from one side and meeting the user's expectations from another side. In general many researchers explores that, ERP implementation success often results from a number of factors, such as user participation and involvement in systems development, assessment of business needs, processes during the analysis phase of the project and the level of data integration designed into the system.

2.1.6.2 Critical Success Factors

The CSFs of ERP systems are those conditions that must be met in order for the implementation process to occur successfully (S. Finney and M. Corbett, 2007). ERP Implementation success depends on different factors like support of top Management, project management, change management, availability of the required resources and training. For example, Brown and Susan (2007) have identified the following eleven(11) success factors for ERP implementation:

1. **Top management support;**
2. **Project team constitution and communication;**
3. **Change in management arrangements;**
4. **Training procedures both during and after the implementation;**
5. **Infrastructure**, including existing business and legacy systems and technical architectures;
6. **Technical support level of skill both in-house and from consulting sources;**
7. **Compatibility or fit of ERP system to the existing business processes;**
8. **Selection of implementation partners** and their ability to provide multi skilled personnel;
9. **Consultation access** and retention for both vendor consultants and implementation partners;
10. **Business process re-engineering (BPR)** willingness and competency factors;
11. **Data accuracy;**
12. **Project scope in terms of step-by-step** or organization-wide radical change;
13. **Vendor relationship nature of contract**, in particular support for business process analysis, technical changes and updating;

On top of these success factors Al-Sabaawi (2015) have identified the following eight critical success factors for the success of ERP implementation after reviewing the recent several case studies, surveys, and literature which were conducted by a number of researchers:

1. **Commitment and support of top management:** Top management support has been consistently identified as the most important and crucial success factor in ERP system implementation projects. ERP implementation was in general a top-down decision and the success of such an implementation depended on the alignment of the ERP implementation with strategic business goals (Yingjie, 2005). Top management to provide the necessary resources and authority or power for project success. Top management support in ERP implementation has two main facets: (1) providing leadership; and (2) providing the necessary resources. To implement ERP system successfully, management should monitor the implementation progress and provide clear direction of the project. They must be willing to allow for a mindset change by accepting that a lot of learning has to be done at all levels, including themselves (Bhatti, 2002).
2. **Project management:** Project Management involves the use of skills and knowledge in coordinating the scheduling and monitoring of defined activities to ensure that the stated objectives of implementation projects are achieved. The formal project implementation plan defines project activities, commits personnel to those activities, and promotes organizational support by organizing the implementation process (Bhatti, 2002 and ALdayel and Al-Mudimigh, 2011).
3. **User training and education:** When the ERP system is up and running it is very important that the users be capable to use it, hence they should be aware of the ERP logic and concepts and should be familiar with the system's features (Yingjie, 2005). Jafari *et al.* (2006) Stated that there are three aspects concerning the contents of training are: Logic and concept of ERP, Features of the ERP system software, Hands on training.
4. **Business Plan and Vision:** The business must have clear visions and business plan for ERP project. It is very important to identify goal before implement ERP project. Business plan reflect a long term vision. Clear vision and mission provide the guideline for ERP implementation (Tsai *et al.*, 2010). One of the biggest problems ERP project leaders face comes not from the implementation itself, but from expectations of board members,

senior staff, and other key stakeholders (Nah, 2003). It is important to set the goals of the project before even seeking top management support. Many ERP implementations have failed as a result of lacking clear plans (Al-Fawaz, et.al, 2008).

5. **Technological infrastructure:** management must make a careful choice of an ERP package that best matches the legacy systems, e.g. the hardware platform, databases and operating systems (Yingjie, 2005) and (Frimpon, 2012). Bhatti (2002) argued that adequate IT infrastructure, hardware and networking are crucial for an ERP system's success. It is clear that ERP implementation involves a complex transition from legacy information systems and business processes to an integrated IT infra-structure and common business process throughout the organization. Hardware selection is driven by the firm's choice of an ERP software package. The ERP software vendor generally certifies which hardware (and hardware configurations) must be used to run the ERP system. This factor has been considered critical by the practitioners and as well as by the researchers.
6. **Departments (Stakeholder) participation:** During the implementation phase there are different partners involved such as consultants and software and hardware vendors. An adequate partnership between them will ease achievement of the goals defined (Frimpon, 2012).
7. **Change Management:** Role of Change Management are Change the dynamics of the organization to ensure the new system succeeds by ensuring there is readiness to the demands of a very hard taskmaster, Educate users in current industry best practices and vigorously train them in the technical uses of the system, An ERP implementation project is a long and arduous endeavor.
8. **Communication:** Strong communication within the entire organization during the implementation process increases success for ERP implementation. It allows the organization's stakeholders to understand the goal and the expected benefits of the project as well as to share the progress of the project. An "open information policy" protects the various communication failures for the project (Seo, 2013).

2.1.6.3 Success indicators

Chung (2007) have identified the following success indicators for the success of ERP

implementation after conducting surveys and reviewing related literature which were conducted by a number of researchers:

1. Perceived Usefulness

Perceived usefulness can be defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”. The word useful refers to “capable of being used advantageously” (Davis, 1989). The strong relationship between perceived usefulness and actual system use has been empirically verified in many IS research contexts. Most of the success factors defined in many researchs are assumed to have a direct impact on perceived usefulness, which can lead users to intention to use or actual use of ERP systems.

2. Intention to Use / Use

Several researchers Ein-Dor and Segev (1978), Hamilton and Chervany (1981), Ives *et al.* (1980), and Lucas (1975) as cited by Young C. (2007) have proposed “use” as a success measure of information systems in the IS research contexts. Having adopted from their concept, intention to use / use is considered the main indicator of the success of ERP system adoption in this research. Its direct antecedents are perceived usefulness and perceived ease of use as described in the previous section. This research assumes that the amount of use can have a positive impact on the degree of user satisfaction.

3. User Satisfaction

The literature shows that user satisfaction is the one of the most widely used success measures of information system success (DeLone and McLean, 1992). It is hard to deny the success of an information system with which its users are satisfied. Many researchers have declared that user satisfaction is highly correlated with intention to use / use as well as project success.

4. Individual Impact

It is very difficult to define the word “impact” among all the possible measures of information systems success. It is closely related to performance, so improving users’ performance is certainly evidence that the ERP system has had a positive impact. Possible indications that an information system has a positive individual impact include: better understanding of the decision context, improving user’s decision making productivity, producing a change in user

activity, and changing the decision maker's perception of usefulness of the system (DeLone and McLean, 1992). It is assumed that user satisfaction will have a direct positive impact on individual impact which should eventually lead to some organizational impact.

5. Organizational Impact

DeLone and McLean (1992) found that field studies which dealt with the impact of ERP systems chose a variety of organizational performance measures. The possible measures of organizational impact include: cost reductions, lead-time reduction, revenue increase, profit increase, Return on Investment (ROI), the extent to which an information system is applied to major problem areas of the firm, and some other qualitative or intangible benefits.

6. Report Capability

Young C. (2007) stated that one of the major benefits of ERP systems for the company are management and measurement of each reporting. Thus, the reporting capability can have a significant influence on perceived usefulness and considered as a success indicators for the ERP system implementation.

7. System compatibility

Compatibility is referred to as the capability of an information system to exchange data with other systems (Young C., 2007). Basically, an ERP system integrates all needed functions together, and each function can be different software (e.g. in-house developed software or third party product). Sometimes, users need to exchange data with stand alone programs they mostly use (e.g. Microsoft products, scheduling programs) with ERP systems. For these reasons, compatibility can have a strong relationship with successfulness of ERP systems and considered as success indicators.

8. System reliability

System reliability can be defined as the degree to which the system ensures the delivery of data to the users. It is an important component of the technical quality of IT systems, and partly affects how well a system performs its expected function (Kim, 1988 and Perry, 1992 as cited by Chung, 2007). One of the most important advantages of ERP systems is to provide real-time and accurate information but this advantage can be corrupted if a system is not reliable (Chung,

2007). So, system reliability is one of the system success indicators of ERP implementation.

2.2 Empirical Review

2.2.1 Harrison L. J. (2004) investigated the motivations for ERP System Implementation in Public Versus Private Sector Organizations. The factors regarding benefits sought through ERP system implementation, critical factors surrounding successful ERP implementation and the perception of project team members' satisfaction with modules implemented and their concerns about implementing ERP software were identified in this study.

The goal of the study was to increase the knowledge base regarding Enterprise Resource Planning (ERP) Software implementation, particularly in the public sector. A questionnaire has been developed accordingly and 200 copies have been distributed on a random sampling to 100 private-sector organizations and 100 public-sector organizations.

The study stated the Factors that attributed to successful ERP system implementations were top management support, and knowledgeable project managers and team members. In addition, the study found differences among the two groups, public and private sector organizations, regarding some benefits sought and the level of satisfaction with some modules.

2.2.2 Soja (2006) study examined the ERP implementation based on the projects success factors model. The model was defined on the basis of thorough literature review and feedback from ERP adopters, and the factors were grouped and also identified a collection of potential ERP implementation success factors.

The study was conducted a pilot survey with questionnaires presented in person to eight people representing enterprises introducing ERP into their organizations and to five experts working at companies delivering ERP systems and implementation services. And analyzed the respondents opinions concerning the importance of subsequent factors for implementation success and about the factors' appearance in their projects. The synthetic measure of implementation

success was constructed and the factors' impact on the implementation project success was examined.

The study found that the most influential factors for the ERP implementation success with the greatest influence, based on the project type, are: Team Involvement, System Reliability, Team Composition, Detailed Schedule, IT Infrastructure and Top Management Support. However, project management has not influence on ERP Implementation success. In addition, the research reveals some differences in perceptions and attitudes between two main parties involved in an implementation project, i.e. people from enterprises introducing ERP into their organizations and experts representing system supplier site.

Finally, the Study suggest that the factors' influence on the implementation success should be examined taking into account the division of the projects into groups regarding the project duration, the scope being implemented and the size of an enterprise. The leading roles of certain factors appear in divided groups and imply that the implementations' conditions are diverse depending on project type.

2.2.3 Shah et al. (2011) study also explored the impediments of Successful ERP Implementation based on a Case Study in a Public Organization and attempted to understand how and why different factors impeded successful ERP implementation in a public organization that outsourced the development and implementation of ERP system to a multi-national software company in the case of Pakistan.

The study was used Semi-structured interviews of the top management, end users, and project team were conducted during the study. In addition, shareable documentation related to ERP implementation process was also used as a source of information to explore the factors that impeded the development & implementation of ERP system as planned.

The research findings reflect that top management hardly realized the importance

of user involvement and did not encourage their participation at the outset of the project. Due to lack of management support the users were not enthusiastic to be part of the implementation process. Lack of Top management appeared as a barrier to successful ERP implementation. Lack of user involvement during implementation of ERP system led to resistance in adoption of such change. Consequently, the user pretended that system is not user friendly, so they did not use the system.

Finally the study conclude that, lack of user involvement, lack of top management support, lack of vendors experience and support, and lack of change management as impediments of ERP successful implementation. The factors explored in developing country have not been found different but same as developed countries. Moreover, turnover of ERP developers team members and transfer/posting or retirement from service of top management of beneficiary organization were also found as impediments towards successful implementation of ERP system.

2.2.4 Ziemba E. & Oblak I. (2013) explored the critical success factors for successful ERP systems implementation in public administration. The study explained the nature of business process management in public administration with special attention to ERP systems that are supporting business process management as well as critical success factors for their implementation in the case of Poland government agency. In order to present the practical dimension of ERP systems implementation, especially CSFs for ERP systems implementation in public administration, action research has been applied. Action research as well as creative thinking and logical deduction helped to define critical success factors which are essential in case of managing ERP implementation in public administration

The main survey was conducted through semi-structured interviews of the end users and the project team members and shareable documentations related to ERP implementation were analyzed during the study. In addition, logical

deduction has been used to propound CSFs.

Finally the study has pointed out that incompetent consultants and unskilled project persons were a major challenge for ERP system implementation in public organization. In addition, the study found out that behavioral and management related challenges, rather than pure technical glitches such as software bugs and technical difficulties in configuration, were much more significant factors of trouble during ERP implementation. Those behavioral issues include the end user not being ready, resistance to change, lack of training, lack of coordination between functional groups, and lack of project planning. The overall results obtained from this research may prove to be helpful for researchers and scholars in developing studies on ERP systems supporting processes in public administration as well as government agencies interested in implementing ERP systems

2.2.5 Kalema et al. (2014) also identified the critical success factors influencing the effective usage of enterprise resource planning systems in the context of higher educational institutions in South Africa. The study was used a combination of techniques to formally characterize and determine the critical success factors influencing the effective usage of enterprise resource planning systems, with special reference to higher education institutions.

The study was used a closed-ended questionnaire based on the Likert scale, asking respondents to give their opinions about the importance of each factor to rank the validated ERP success factors. The questionnaires for data collection were administered to participants in higher educational institutions where ERP systems are used. Data was collected from the integrated tertiary software (ITS) respondents who were team leaders mainly from the African universities sampled from (www.itsug.org.za) website.

This study analyzed thirty-seven ERP success factors identified from the and classified into Critical, Active, Reactive, and Inert categories based on the significant contribution to the ERP System implementation. In this study, the

researchers identify ten critical success factors influencing the effective implementation of ERP systems in higher education institutions. Finally, this study, identified ten critical success factors influencing the effective implementation of ERP systems in higher education institutions. These factors are: top management support, management of expectations, business process reengineering, project team composition and competence, education and training of users, interdepartmental cooperation and communication, involvement of users in systems development and integration, culture of resistance within an organization, vendor and consultant support to users, as well as system changes and upgrade to new versions. Furthermore, this study proposed the way forward for decision makers regarding the dominance of a factor or a set of factors during the implementation of ERP systems.

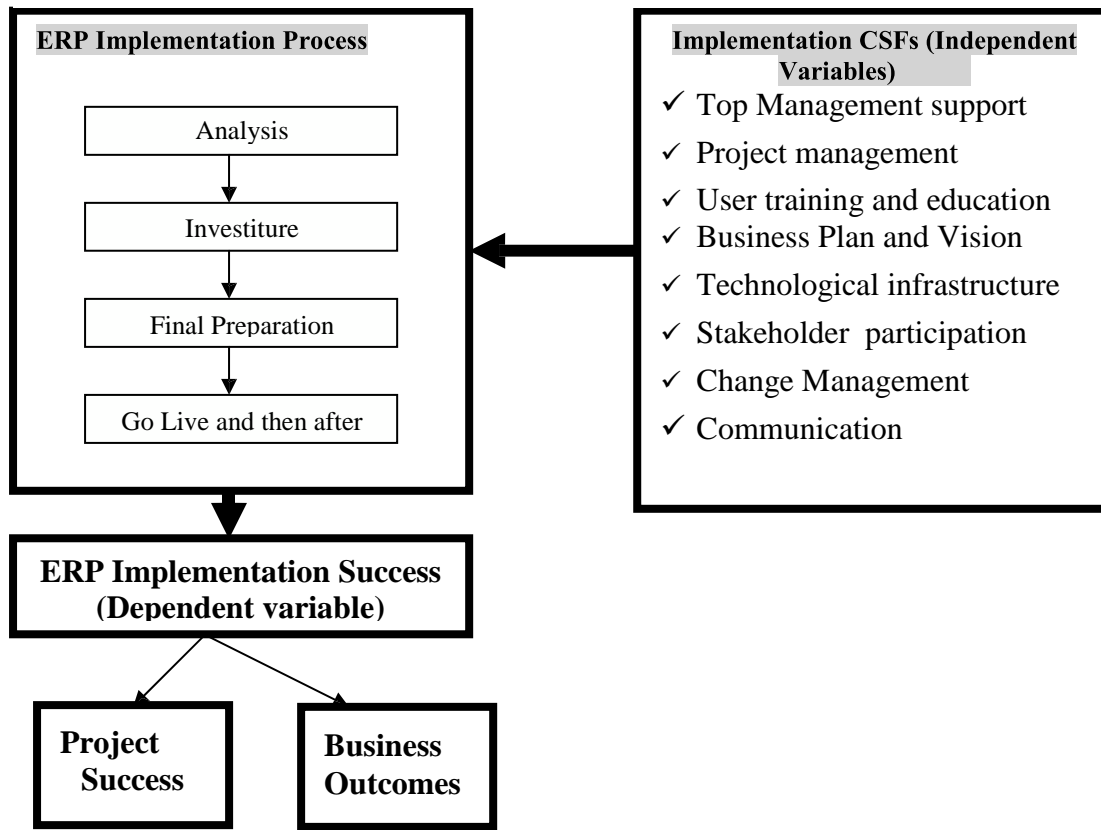
2.2.6 AL-SABAAWI (2015) study has identified a set of critical success factors for ERP implementation in order to ensure the success of ERP system at higher education and in developing countries. The study has identified eight CSFs (i.e., Commitment and support of top management, Project management, User training and education, Business Plan and Vision, Technological infrastructure, Departments (Stakeholder) participation, Change Management and Communication) with new framework of factor analysis after extensive literature review.

The questionnaire was designed after a preliminary observation on the practice and reviewing the available literature to collection the data. The researcher circulated the research questionnaire among the parties that had the ability and knowledge to answer it. The survey instrument asked the experts to rate the impact of 8 identified factors of ERP success using expressions relevant.

The study found that most of the identified eight factors have been accepted, but the most important success factors to ERP implementation success are Project management, Technological infrastructure and Commitment and support of top management.

2.3 Conceptual Framework of the ERP System Implementation

Figure 2-1: Enterprise Resource Planning Systems implementation framework



Source: T.R. Bhatti (2005)

Bhatti (2005), has introduced this an integrative conceptual framework of what we call “integrated ERP implementation,” which is comprised of a set of theoretically important constructs. This framework has been developed based on the project life cycle approach, in which the ERP implementation project goes through different phases before it goes live. There are number of factors that affect the ERP implementation process are termed in different study as implementation critical success factors. The above stated success factors which was suggested by Al-Sabaawi (2015, P. 499) are used in this study because these were already validated in previous research.

Upon the completion of ERP implementation project, the success of ERP systems can be measured by a mix of project outcome and the project and business outcomes (intended business performance improvement) (Bhatti, 2005). Chung (2007) stated that the business outcomes will be evaluated based on organization impact (i.e., the measure of the effect of information on organizational performance) and individual impact (i.e., the measure of the

effect of information on the behavior of the recipient). The Project success also will be evaluated in terms of time, budget, quality and scope as usual project management contexts applied.

2.4 ERP System and Implementation Process in ethio telecom

2.4.1 Reasons of ethio telecom to implement ERP System

Ethio telecom is a government owned company born from the ambition of the Ethiopian government to provide a world class telecom operator for the country and better serve its customers by being a customer centric company. Since December, 2010 based on the newly introduced organizational objective and structure as Telecom service provider has introduced several System supported tools to equip the back office activities through IT in a manner that can highly assist the core telecommunication activities, and implementation of modern information and management technologies guarantees a successful improvement in competitive ability.

For companies to improve transparency of the business process, up-to-date information is required about all operation and financial indicators, assets and resources of all departments and divisions. Actuality is very important: information for the previous quarter or month will not help in making justified decisions. Hence, the requirements for a powerful system that can quickly process large volumes of information are highly required.

ERP is an information system for company management, designed for the efficient planning and management of all company resources, as well as for the automation of all or individual key business processes. This solution enables proactive resources management for the quick adaptation of business processes to changing market conditions and allows precise evaluations of company's current state of affairs, which helps to increase the company's competitiveness across the board.

In addition to the reasons mentioned above ethio telecom also introduce this system with the vision of obtaining world class telecom service provider. To be a world class telecom operator there are many requirements set by ITU that all telecom operators across the world need to fulfill, and some of the requirements are having a well-defined business process as per the international standard named eTom and PCMM, supporting all this business process by

information system mainly ERP and deploying the best quality of service for the customers in all aspects of product and services. Hence; for the fulfilling the expected requirement and to support the steady growth of the country's economic development ethio telecom implemented an integrated ERP system. And mainly the license for this system implementation has been procured from the world well known software developer named Oracle through open tender with the help of France telecom experts and integrated by softpro (i.e. Indian software integrator). And the major reasons that drive the company to choose for ERP are mainly related to improving company's performance and decision making, to reduce labor costs, bureaucracy and other related errors. And the other reasons are: to enhance the integration among work units, and establish organizational standardization across different locations.

2.4.2 ERP Implementation Process at ethio telecom

According to the company ERP project charter (2011) the implementation of the system in ethio telecom go through different process and as indicated below the entire system implementation phases:

i. Package Evaluation and Selection

At this stage a decision about a perfect package from the best vendor will be done. For ethio telecom ERP implementation two globally known IT developer companies named Oracle and SAP has been participated, and these companies present their respective business solution and the benefits that the company will get. And the established commodity team in collaboration with the respective division assesses these two companies as per the evaluation criteria including the financial offers, considering all the parameters defined Oracle has been selected in all implementing, configuring and customizing system requirement.

ii. Project Planning

In this phase the detail Designs and implementation plan has been defined considering the available resources. During this phase different activities has been undertaken among these activities: Resources has been identified, Implementation team has been selected and task for each team has been allocated, detail activities has been identified, project governance

document designed, Special arrangement for contingencies has been framed.

iii. Conference Room Pilots (CRPs) Discussion

Most ERP project teams understand the value of functional and integration testing. It's an important pre-go-live step to ensure the software works according to design specs and that data flows accurately through the system. Conference room pilots (CRPs) are also critical to addressing several non-technical critical success factors. CRP Demos are scheduled during Analysis, Design and Build Phases of the project. The CRP session should not be scheduled too early or too late in the project. For a typical project optional timing for the first session would be middle of the phase. This gives sufficient time for the team to work on the tasks. The conference room pilots have been done on phase basis:

CRP – 1: Detailed requirements gathering interviews will be conducted, and the entire project members from the respective Division has been participates in this requirement gathering phase. The major activates held at this stage is: analyzing the existing business process modeling and gap analysis, draft process flows and initial software configuration completion prior to the CRP2, Prioritization of requirements/processes (based on business ranking and level of configuration /customization/development required) to be demonstrated in CRP2 or CRP3, Completion of requirements for “bucket one” for custom development delivered to technical team.

CRP – 2: At this stage review of key business scenarios against predefined scripts has been undertaken. The scenarios will be driven from the business process and **requirements mapping** activities carried out earlier in the project to show how the business processes, are mapped in to system functionality. Requests for additional functionality (an increase to the baseline requirements) have been handled as part of the scope management process within the project.

CRP – 3: During CRP3 most converted data has been available by the team for review in CRP environment. In addition some detail requirements like reports issue, Interfaces, Conversions, Enhancements / Extensions components has been reviewed and any gap identified during CRP2 has been addressed here. After the completion of this phase the system beloved that it can be fully integrated with the company work process and after the

final testing process it goes for go-live.

UAT: User Acceptance Testing (UAT) is the last phase of the software testing process. During UAT, actual software users test the software to make sure it can handle required tasks in real world scenarios, according to specifications. Once the CRP sessions has been completed, the users came together with the consultants and run through a series of routines, setup according to the methodology utilized by the team in creating the testing scenarios. Each scenario is run by the user and acceptance test has been signed to move toward go-live. This way, the team can be able to review the entire project and ensure that someone has signed off that they have tested their scenarios and verified that the system is functioning as expected.

iv. Team Training

After completion of the mentioned steps employees who will work on the system has been trained for their own respective module. This training delivery was handled by grouping the participants in to two named super user and end users. The super users are those team members who are highly involved since the requirements gathering and they attend this training regardless of their work unit since they will have a significant role in assisting the end users from the company side. Whereas, the end users are those employee of the company who trained focusing on their specific work units in supporting the daily routine.

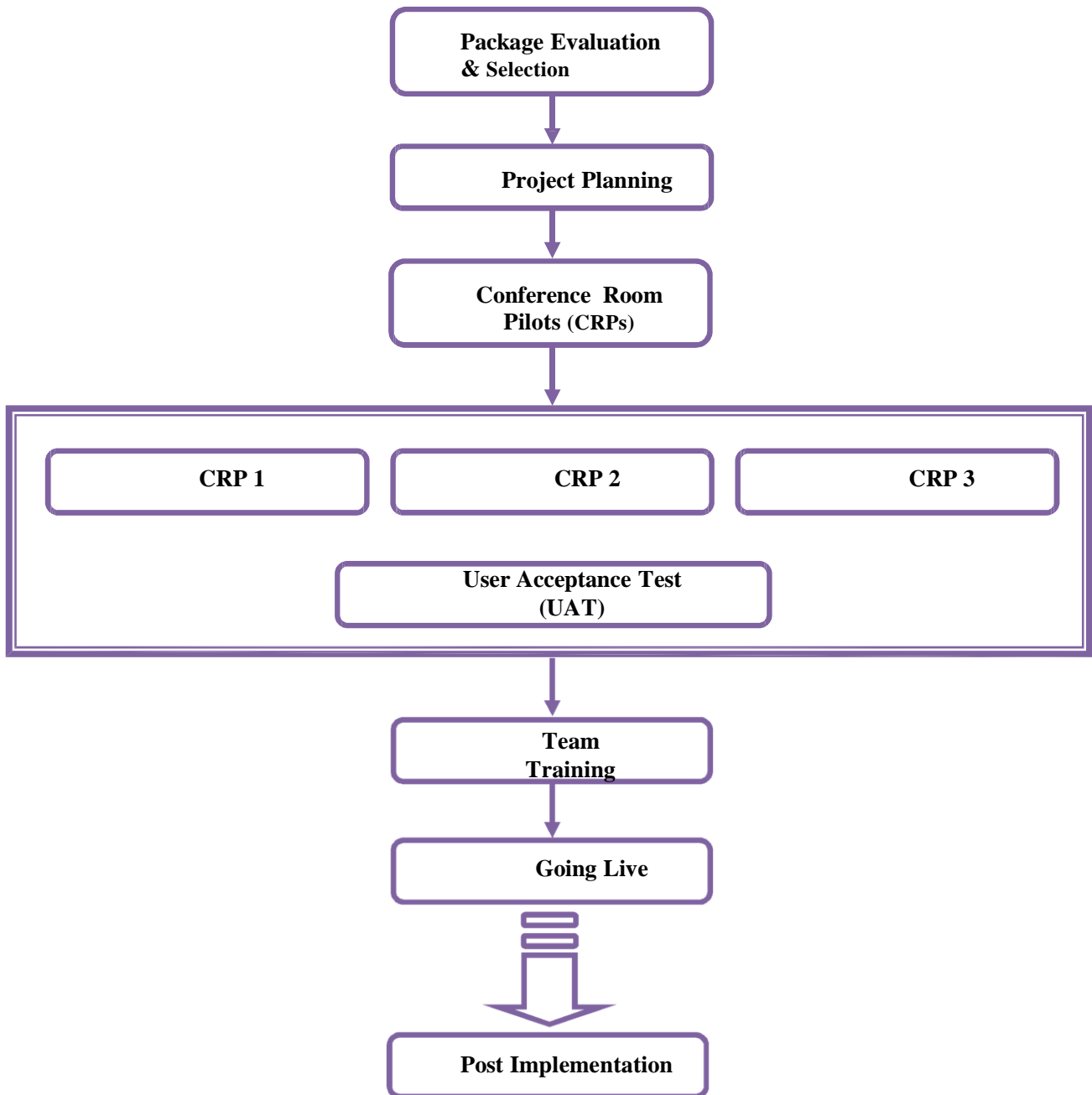
v. Going Live

The work is complete, data conversion is done, databases are up and running, the configuration is complete & testing is done. The system is officially proclaimed. Once the system is live, there was an intention that the old system (manual working system) shall be totally swapped, but what has been done in reality will be addressed during data analysis and presentation part.

vi. Post Implementation

At this phase vendors as well as super users assist the end users in any difficulty they face, in the case of ethio telecom in addition to the super users a dedicated system experts from the vendor side has been assigned, the main responsibility of the expert is to support the functional units assessing the emerged new but very critical requirements.

Figure – 2-2: ERP Implementation Phase in ethio telecom



Source: ethio telecom ERP implementation project charter (2011)

2.5 Literature Gap

The study has reviewed the previous literature with a focus on success factors for ERP system implementation in the worldwide and in developing country in particular to identify a gap on the literatures used and referred on this study. The researcher has analyzed the literature gap to the subject matter of the study in to two parts that are to be the concept gap and the amount of previous study availability gap regarding the Critical Success Factors of ERP system implementation from sourcing perspective.

There is a shortage in the availability of the research made on Critical Success Factors of implementing ERP system in the developing countries in general and Ethiopia in particular. However, there is almost none studies have been conducted in the area that directly related to Critical Success Factors of implementing ERP system in sourcing particularly in Ethiopian context.

To bridge this gap, this research was aimed to identify the critical success factors which adversely affect the success of ERP system implementation in sourcing by considering the case of ethio telecom. Therefore, this research fill the gap of the unavailability of researches made in the area so as to serve as reference and starting point to conduct in-depth analysis of Critical Success Factors in Sourcing ERP Modules to increase the success rate of ERP implementation.

CHAPTER THREE

RESEARCH DESIGN & METHODOLOGY

This chapter presents the research methods. It deals specifically on the research design, sampling procedure, data collection methods, procedures of data collection and method of data analysis to identify the critical success factors of ERP System from sourcing perspective and in ethio-telecom to ensure the successful implementation of ERP system.

3.1 Research Design

Considering the requirements and objectives that have been discussed before, this study is used Explanatory research type to examine the current relationship between the success of ERP implementation and the independent variables (the identified critical success factors). Explanatory studies are useful when you wish to establish causal relationships between variables. The emphasis in this sort of study is to examine a situation or a problem in order to explain the relationships between variables (Saunders, Lewis & Thornhill, 2000 as cited by Yousef, 2010)

On the other hand, the study is descriptive in certain aspects especially in the theoretical part in order to portray the ERP implementation project and difficulties of the organizations are likely to go through during the implementation process and in order to accurately describe the finding of the research. In addition, the researcher has used descriptive study. Studies concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situation are all examples of descriptive research studies (Kothari, 2004, p.37).

To achieve the specific and general objectives of the study the researcher has used a mixed **qualitative and quantitative research approach** to analyze the collected data. According to Creswell (2003) the use of both approaches is tandem so that the overall strength of the study is greater than either qualitative or quantitative research. Thus, this design is used to give prediction depending on the finding of the research and to answer the basic questions stated in this study.

3.2 Data Collection

In order to achieve the study objectives the researcher has used both primary and secondary data.

3.2.1 Primary data source

To get the required information and data for this study, Primary data were collected through well structured questionnaire. It includes open ended and close ended questions. This instrument of data collection is quite popular, particularly in case of big enquiries (Kothari, 2004, p.100).

3.2.2 Secondary data source

The secondary data were collected from the company's work processes, Company's reports, policies, procedures, forms and other documents which are linked with the ERP system and also from different literatures on the area.

3.3 Population

The target population of this research were consisted those individuals who are working in Sourcing Department. Based on the company's headcount report as of December 20, 2016 it has 104 Permanent employees in Sourcing Department at head quarter of the company with four hierarchical levels i.e., 1 officer, 6 managers, 12 Supervisors & 85 Staffs. The first two levels are classified as management group whereas the last two levels are categorized as non-management group.

3.4 Sample Design and Size

The Sampling frame for the sample of this research has taken from ethio telecom Headquarter Sourcing Department and the researcher used simple random sampling technique to collect the primary data because the population is relatively homogeneous for the characteristics of interest. Simple random sampling is the most straight forward and give equal chance for population to include in the sample. Simple random sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being selected (Kothari, 2004).

To determine the sample size, formula of Yamane (1967:886) cited by Glenn D. Israel (1992) from University of Florida was used. The researcher has used this formula to calculate the sample sizes and meet the 95% confidence level

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

Where: N = Population size

n = sample size

e = desired level of precision ($\pm 5\%$)

$$n = \frac{104}{1 + 104(0.05)^2} = \mathbf{83 \text{ sample size}}$$

Accordingly, the researcher has distributed 83 questioners for the selected sample through simple random sampling method and collected 79 responses with 95.2% return rate.

3.5 Data Presentation and Analysis

The Statistical Package for the Social Sciences (SPSS) version 20 has used as the main tool to manipulate the collected data. To address the study objectives, descriptive statistics, correlation and regression analysis has been employed.

3.6 Validity

According to Kothari, (2004), Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested.

As stated above, questionnaire was used to collect the primary data (see Appendix). Meanwhile, the questionnaire was adopted from Chung (2007), Yousef (2010) and Mohmed Y. Al-Sabaawi (2015) scientific Standardize questionnaires.

Therefore, to assure validity of the instrument the researcher has given a chance for professionals on the area to review the questionnaire and it was finally validated by the advisor.

3.7 Reliability

The test of data reliability is another important test of sound measurement. A measuring instrument is reliable if it provides consistent results, (Kothari, 2004). Moreover, reliable

measuring instrument does contribute for validity. The reliability analysis applied the level of Cronbach Alpha (α) as the criteria of internal consistency. Which were at a minimum acceptable level ($\text{Alpha} \geq 0.65$) suggested by Sekaran (2003) as cited Yousef (2010) . The overall Cronbach Alpha (α) = 0.803 (i.e., 80.3%) for 66 items questioner of the study. Therefore the result is an acceptable level as suggested by Sekaran.

3.8 Ethical Issues

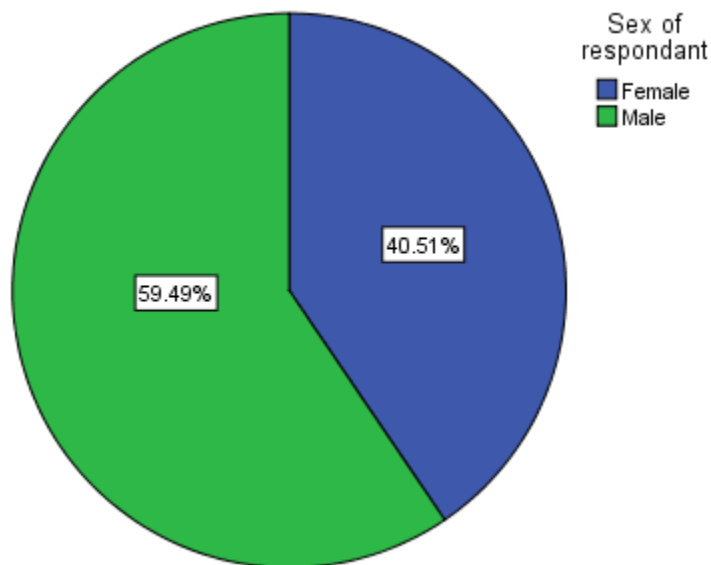
The study is in line with the organizations policy in relation to any intellectual property rights of the organization. Regarding privacy of the respondents, their responses are strictly confidential and only use for academic purposes. Concerning references, all the materials and sources are properly acknowledged.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter presents the results of the study and interpretation of the findings. The chapter comprised of two sections. The first part presents the profile of respondents showing gender, age group, level of education, work experience, and position of respondents. The second section presents analysis of the study variables by using descriptive analysis, Correlation and regression statistics. And it has also contains the discussion of results and overall responses.

4.1. Demographic Information of the Respondents



Sources: primary data, April – 2017

Figure - 4.1: Gender proportion of the respondent

Based on the collected data, the overall staffing composition of Sourcing Department is dominated by male employees, the proportion of female employees are relatively low and its counted as 40.51% of the department employees and the remaining 59.49% is covered by male employees. Therefore, from the investigated fact, we can deduce that the general sex composition of sourcing department's human resource is relatively dominated by male employees.

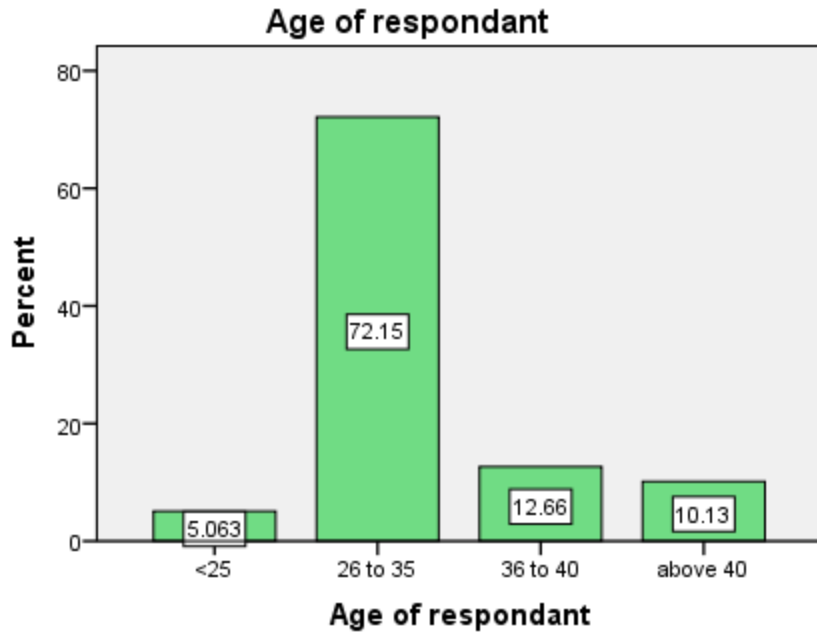


Figure - 4.2: Age of respondent *Sources: primary data, April – 2017*

Concerning age status, 72.15% of the employees are between the age 26 and 35, and the other 12.66% are between 36 and 40. Furthermore, 10.13% of the employees are at the age of 40 or above, and the remaining 5.06% of the employees are either they are on the age of 25 or below that. This indicates that the department is staffed with young and energetic employees. In other words, most of the employees are belonging in the productive age group.

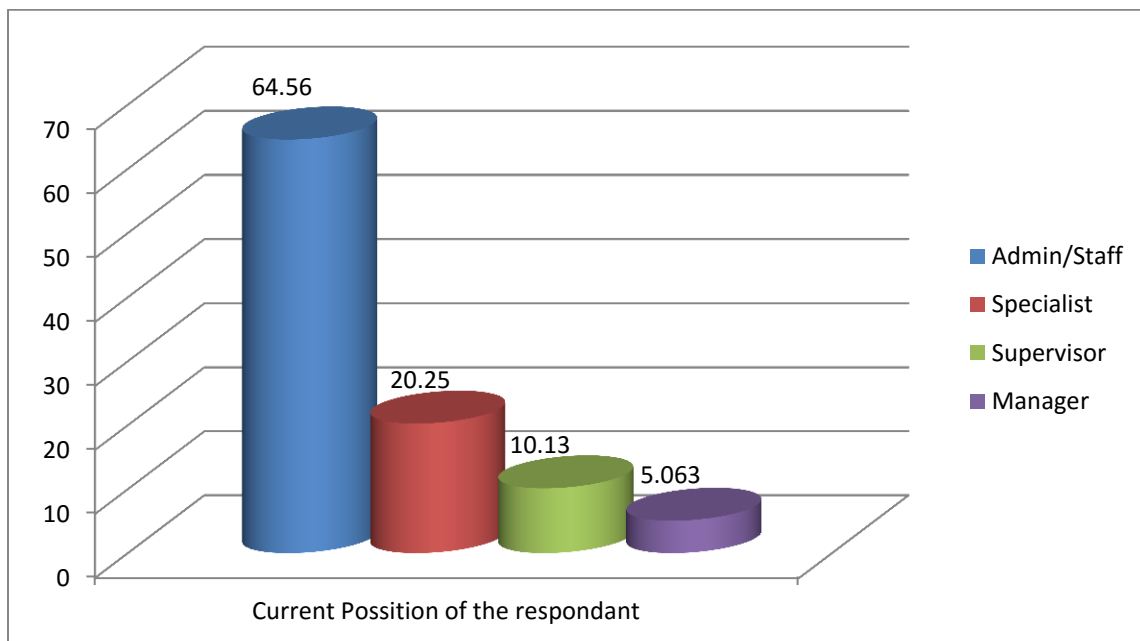
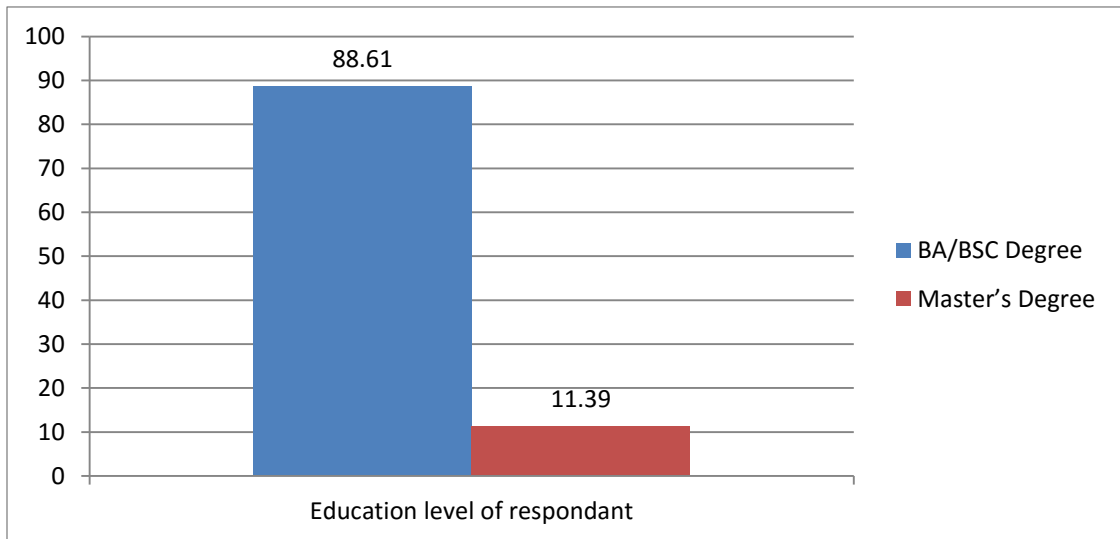


Figure - 4.3: Current position of respondent. *Sources: primary data, April – 2017*

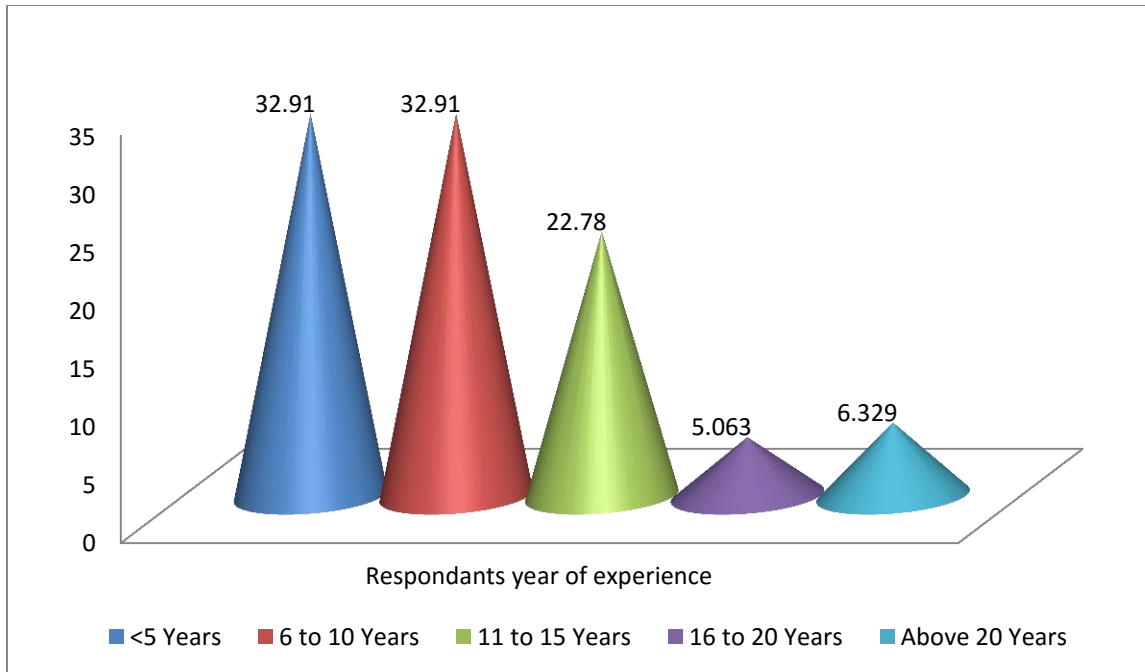
The findings above indicates that majority of the respondents were Procurement administrator/staff (64.56%) followed by procurement specialists in the department (20.25%). The procurement Supervisors and managers were constituted (10.13%) and (5.06%) of the respondents respectively. This findings shows that the large proportion of employees participated in the survey were procurement administrator.



Sources: primary data, April - 2017

Figure - 4.4: Education Background of respondent

The educational level of employees of the department, 88.61% of the employees are first degree holders and the remaining 11.39% of the employees have specialization at a master's degree level and no one has Diploma or less. Therefore, all the department's employees have above a first degree and we can say that human resource profile of the department in terms of educational background is in a good status and had gained rich information.



Sources: primary data, April - 2017

Figure - 4.5: Respondents' years of experience

As depicted on the above chart, majority of the employees have relatively shorter existence in the company. And to be specific, 65.82% of the respondents have been working with the company below 10 years (i.e., 32.91% for each below 5 years and from 6 up to 10 years span of experience). Moreover, the other 22.78% of the respondents have an experience which spans from 11 up to 15 years while 5.06% of the respondents have been working with the company for at least 16 up to 20 years and the remaining 6.33% have longer experience (which is 21 years and above) in the company.

4.2. Success level of Over all Sourcing ERP System implementation

This part covers the data presentation and analysis on how much the deployed ERP system successful and brought the intended outcome in improving the efficiency of Sourcing function and the overall performance at company level.

	N	Minimum	Maximum	Mean	Std. Deviation
Over all, Sourcing ERP System implementation is successful	79	2	5	4.00	.801
Valid N (listwise)	79				

Sources: primary data, April - 2017

Table – 4.1: Result of ERP implementation success status based on the requested general question For the question which asked employees whether the over all Sourcing ERP System implementation is successful, the results show that most of the respondents’ agreed on the successfulness of the deployed ERP system. They were represented by means of 4 (i.e., 80% of the respondent) have confirmed the success of Sourcing ERP System and the means indicate a high level of success.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Intent in to use/Accessibility of ERP System	79	2.00	4.00	3.2595	.64976
User Satisfaction	79	2.00	4.25	3.2437	.51418
Individual Impact	79	2.00	4.50	3.7025	.53421
Organizational Impact	79	2.50	5.00	3.3259	.49896
Project Success	79	2.33	4.33	3.3924	.57428
Compatibility	79	2.20	4.40	3.2633	.51793
System reliability	79	2.00	5.00	3.1772	.62552
Reporting Capability	79	2.67	4.67	3.7384	.46123
Grand mean of Success Indicators	79	2.66	4.07	3.3879	.30451
Valid N (listwise)	79				

Sources: primary data, April - 2017

Table – 4.2: Results of ERP implementation success status based on the requested Success indicators questions

Based on the requested success indicators question which asked employees to identify the success level of the deployed Sourcing ERP System most of the respondents are agreed with the success of the system particularly from Reporting capability, individual impact, Project Success and organizational impact of success indicators measurement perspectives as shown from the Mean result stated in the above table.

The mean result indicated that more than 74% of the respondents were agreed on the success of Sourcing ERP System from individual impact and reporting capability perspective of the system with mean of 3.7 and 3.74 respectively. And also almost above 65% of respondents were agreed

with the success of Sourcing ERP system from Compatibility, satisfaction level of the user, Accessibility of the ERP system, Organizational Impact, project success and System reliability Success indicators perspective with mean of 3.26, 3.24, 3.33, 3.33, 3.39 and 3.2 respectively.

In general, Most of respondents were agreed on the successfulness of ERP System from sourcing perspective and they were represented with grand mean of 3.39 of success indicators. Thus, the grand mean of the success indicators is also indicated that ERP System implementation at ethio telecom from sourcing perspective is successful.

4.3. Correlation test between the ERP Success Factors and ERP Implementation Success

Correlations

		Grand mean of Success Indicators	Top Management commitment & Support	Technological Infrastructure	Change Management	User Training	Project Management	Clear Goals & Objectives	Effective Communication	System Provider and/or Consultant support
Grand mean of Success Indicators	Pearson Correlation	1	.275*	.490**	.448**	.483**	.194	.138	.320**	.441**
	Sig. (2-tailed)		.014	.000	.000	.000	.086	.225	.004	.000
	N	79	79	79	79	79	79	79	79	79
Top Management commitment & Support	Pearson Correlation	.275*	1	.188	.447**	-.005	.385**	.396**	-.039	-.084
	Sig. (2-tailed)	.014		.097	.000	.963	.000	.000	.735	.464
	N	79	79	79	79	79	79	79	79	79
Technological Infrastructure	Pearson Correlation	.490**	.188	1	.125	.040	.111	.410**	-.184	.064
	Sig. (2-tailed)	.000	.097		.274	.726	.330	.000	.105	.573
	N	79	79	79	79	79	79	79	79	79
Change Management	Pearson Correlation	.448**	.447**	.125	1	.316**	.126	.072	.050	.122
	Sig. (2-tailed)	.000	.000	.274		.005	.269	.527	.663	.285
	N	79	79	79	79	79	79	79	79	79
User Training	Pearson Correlation	.483**	-.005	.040	.316**	1	.007	-.170	.427**	.056
	Sig. (2-tailed)	.000	.963	.726	.005		.954	.135	.000	.627
	N	79	79	79	79	79	79	79	79	79
Project Management	Pearson Correlation	.194	.385**	.111	.126	.007	1	.169	-.139	-.022
	Sig. (2-tailed)	.086	.000	.330	.269	.954		.136	.222	.850
	N	79	79	79	79	79	79	79	79	79
Clear Goals & Objectives	Pearson Correlation	.138	.396**	.410**	.072	-.170	.169	1	-.386**	-.107
	Sig. (2-tailed)	.225	.000	.000	.527	.135	.136		.000	.350
	N	79	79	79	79	79	79	79	79	79
Effective Communication	Pearson Correlation	.320**	-.039	-.184	.050	.427**	-.139	-.386**	1	.358**
	Sig. (2-tailed)	.004	.735	.105	.663	.000	.222	.000		.001
	N	79	79	79	79	79	79	79	79	79
System Provider and/or Consultant support	Pearson Correlation	.441**	-.084	.064	.122	.056	-.022	-.107	.358**	1
	Sig. (2-tailed)	.000	.464	.573	.285	.627	.850	.350	.001	
	N	79	79	79	79	79	79	79	79	79

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

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

Sources: primary data, April - 2017

Table – 4.3: Results of Correlations between the independent(ERP Success Factors) and dependent variable (ERP Implementation Success).

As indicated in the above table the Pearson correlation result between the independent and dependent variables; all of independent variables have positive relationship with ERP Implementation Success particularly Technological Infrastructure (.49), Change Management(.448), User Training(.483), System Provider and/or Consultant support(.441) and Effective Communication(.320) have high correlation with the ERP Implementation Success. However, Top Management commitment & Support(.275), Project Managementand(.194) Clear Goals & Objectives(.138) have relatively weak positive correlation with Success of ERP System. The values of the correlation coefficients vary between +1.00 and –1.00. Both of these extremes represent perfect relationships between the variables, and 0.00 represents the absence of a relationship (Robert Ho., 2006)

4.4. Multi Linear regression assumption

4.4.1. Normality: The Regression assumes that variables have normal distributions. Non-normally distributed variables (variables with substantial outliers) can distort relationships and significance tests.

Descriptive Statistics

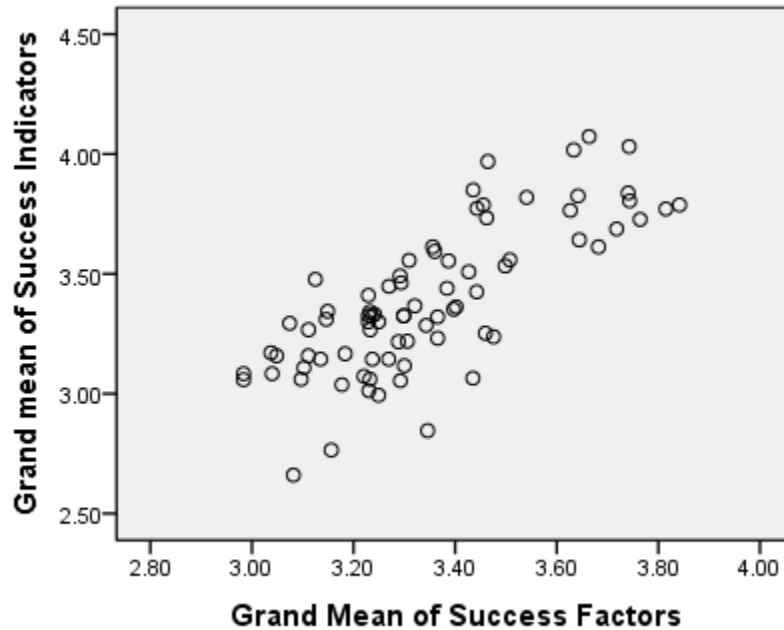
	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Grand mean of Success Indicators	79	.261	.271	-.363	.535
Top Management commitment & Support	79	.130	.271	-.921	.535
Technological Infrastructure	79	.503	.271	.476	.535
Change Management	79	-.130	.271	.556	.535
User Training	79	-.371	.271	-.379	.535
Project Management	79	.733	.271	.127	.535
Clear Goals & Objectives	79	.621	.271	-.092	.535
Effective Communication	79	.058	.271	-.986	.535
System Provider and/or Consultant support	79	-.423	.271	-.589	.535
Valid N (listwise)	79				

Sources: primary data, April – 2017

Table – 4.4: Summary of Skewness and Kurtosis result

As shown in the table both Skewness and Kurtosis results are within the range and all variables have normal distributions.

4.4.2. Linearity test: multiple linear regression needs the relationship between the independent and dependent variables to be linear. It is also important to check for outliers since multiple linear regression is sensitive to outlier effects and the linearity assumption can best be tested with scatterplots.



Sources: primary data, April – 2017

Graph – 4.5: Summary of linearity test.

As indicated in the graph the relationship between the independent and dependent variables is linear.

4.4.3. Multicollinearity test: Multicollinearity is defined as any linear relationship among the predictor variables in the regression model, and it can be associated with an unstable estimated regression coefficient (Chatterjee and Hadi 2006 as cited by Chung 2007). Multicollinearity occurs when the independent variables are not independent from each other and the assumption is that there is little or no multicollinearity in the data.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Top Management commitment & Support	.532	1.880
	Technological Infrastructure	.791	1.264
	Change Management	.641	1.560
	User Training	.663	1.509
	Project Management	.817	1.224
	Clear Goals & Objectives	.613	1.631
	Effective Communication	.554	1.804
	System Provider and/or Consultant support	.780	1.282

a. Dependent Variable: Grand mean of Success Indicators.

Sources: primary data, April – 2017

Table – 4.5: Summary Collinearity test

The Collinearity statistics were included for detecting multicollinearity. The tolerance indicates the percentage of the variance in a given predictor that can not be explained by the other predictors, so a small tolerance means that the variable has high multicollinearity. The other index, the variance inflation factor (VIF) greater than 2 is usually considered problematic in multicollinearity (Chung 2007). Thus, all the predictors result is below 2 and overall, the regression model looks fine.

4.5. Regression Analysis

Regression analysis is the technique of developing predictive equations when there is more than one independent variable present. It is used to compute multiple correlations identifying the strength of relationship between several independent variables and a single dependent variable. It should be noted that correlation does not imply causation. Although correlations can provide valuable clues with respect to causal relationships among variables, a high correlation between two variables does not represent adequate evidence that changing one variable may result from changes of other variables (George and Mallery, 2007 and Sirkin, 1999 as cited by Chung, 2007).

In this research, there are eight different independent variables associated with the ERP implementation success. This section investigates how the independent factors act together to affect the dependent variables by using Linear regression analysis.

4.5.1. Model Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.834 ^a	.696	.661	.177

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	5.035	8	.629	20.045	.000 ^b
1 Residual	2.198	70	.031		
Total	7.233	78			

Table – 4.6: Model Summary

Enter method (i.e. putting at one time all specified variables regardless of significance levels) was used among the method of entering variables in regression analysis. As indicated in the above table the summary of regression analysis on the dependent variable indicating that R² values is very high. As a rule of thumb, an R² of 20% might be considered high in social science research, but totally unacceptable in biological science project or a precision instrument testing (Lucas, 2007). R², which is called to the coefficient of determination, is interpreted as the proportion of variation in the dependent variable that potentially could be explained by the independent variables (Sirkin, 1999 as cited by Chung, 2007).

Thus, R² of regression on the eight success factors was .696, indicating that the combination of these factors' have approximately 66.1% of impact on ERP implementation success. And also, the ANOVA table shows that the computed F statistic is 20.045, with an observed significance level of 0.000. Therefore, the significance level result also shows that, the strong linear relationship between the predictor and dependent variable which means all predictors variable have impact on the dependent variable.

4.5.2. Regression Analysis result

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.350	.378		.926	.358
Top Management commitment & Support	.056	.063	.080	.884	.380
Technological Infrastructure	.191	.034	.411	5.554	.000
Change Management	.157	.068	.191	2.326	.023
1 User Training	.272	.068	.324	4.005	.000
Project Management	.074	.048	.112	1.539	.128
Clear Goals & Objectives	.047	.064	.062	.735	.465
Effective Communication	.134	.069	.173	1.958	.054
System Provider and/or Consultant support	.192	.044	.327	4.385	.000

a. Dependent Variable: Grand mean of Success Indicators

Sources: *primary data, April – 2017*

Table - 4.7: Summary of Regression Result

In this table, B values indicate the coefficients and constant for the regression equation that measures predicted value for ERP Implementation success, while Beta values refer to the standardized regression coefficients which allow for an equal comparison of the coefficient weights. The t value refers to the value of B divided by the standard error of B. Among the predictors factors “**ERP System User Training and education**” has highly predicted value to the ERP Implementation success which means 1% changes on the training factors; ERP Implementation success will increase by 27.2%. In addition, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication have impact with 19.2%, 19.1%, 15.7% and 13.4% respectively which are also relatively high predicted value. However, the remaining Project Management, Top Management commitment & Support and Clear Goals & Objectives has relatively low predicted value with 7.4%, 5.6% and 4.7% respectively.

Therefore, ERP System User Training and education, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication have high Predicted values and the most contributor of ERP Implementation success. Thus, these factors are considered as Key Critical Success Factors (most preferred CSFs) that should be

taken into high priority for the successful implementation of ERP system from Sourcing perspective in ethio telecom.

In addition, those the five KCSFs (User Training and education, System Provider and/or Consultant support, Technological Infrastructure, Change Management, and Effective Communication) have a significant impact on “ERP implementation success”, but the analyzed data did not shows significant impact between the remaining three factors (i.e., Top Management commitment & Support, Project Management and Clear Goals & Objectives) and the successful implementation of ERP system as shown the result on the table.

4.6. Summary of Secondary Data

The researcher has collected around one year logged and TT (Travel Ticket) created issues which was raised from the overall ERP users i.e., from Finance, Warehouse, Human Resource and so on. Accordingly there were 75 recorded issues starting from May 12, 2016 to April 7, 2017 but from the recorded issues only 17 of them are sourcing issues as shown in the below table.

No.	TT Number	Issue	TT Created Date	TT Closed Date	Status
1	ERP_SCM_2016_0067	can not found the RFQ for approval	1-Jul-16	4-Jul-16	close
2	ERP_SCM_2016_0014	requisition inprocess status	6-Jun-16	26-Jul-16	close
3	ERP_SCM_2016_0005	unable to create requisition	2-Jun-16	26-Jul-16	close
4	ERP_SCM_2016_0068	purchase order generation failed	4-Jul-16	5-Jul-16	close
5	ERP_SCM_2016_0094	Po_detailed_report_for_FCY_transaction	25-Oct-16		close
6	ERP_SCM_2016_0099	po approved but show rejected	26-Oct-16	27-Oct-16	close
7	ERP_SCM_2016_0100	unable to do receiving on iproc	7-Nov-16	7-Nov-16	close
8	ERP_SCM_2016_00101	PO Desktop Receiving Validation	25-Nov-16		open
9	ERP_SCM_2016_00102	unable to create PO from RFQ	30-Nov-16		open
10	ERP_SCM_2016_00106	order not generated for requisition number	10-Dec-16		clsoe
11	ERP_SCM_2016_0110	unable to cancel order			close
12	ERP_SCM_2016_0106	requisition number created and approved but there is no order number requisition number 288040			closed
13	ERP_SCM_2017_0131	Enclosed 1 scenario for maintenance work order summary repor V1 0		21-Feb-17	closed
14	ERP_SCM_2017_0136	PO validation to enter requester and delivery loc for destination type other than inventory	23-Feb-17		open
15	ERP_SCM_2017_0138	Unable to create Purchase Requisition on ethios smart form with IS domain.	24-Feb-17		close
16	ERP_SCM_2017_00156	unable to create po from RFq	4-May-17		close

No.	TT Number	Issue	TT Created Date	TT Closed Date	Status
17	ERP_SCM_2017_0157	the order is canceled but it holds same money on order management it should be canceled	5-Apr-17		open

Sources: secondary data, April – 2017

Table - 4.8: Summary of Secondary data

The logged sourcing issues during a year is relatively low due to the complexity and bulkiness of the integrated modules of Sourcing ERP system and it shows that the department employees' have well understand the system and accepted the change and believes that using a particular system would enhance his or her job performance. Possible indications that an information system has a positive individual impact include: better understanding of the decision context, improving user's decision making productivity, producing a change in user activity, and changing the decision maker's perception of usefulness of the system (DeLone and McLean, 1992).

However, from the logged Sourcing issues most of them are not complex such as an able to create RFQ from Requisition and to create PO from RFQ and from this it can be inferred that there is a need for continues training together with precise desk instruction to fill the gap and solve frequent request for support.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

To gather information for the study primary sources including questionnaire and observations were used, and also secondary sources including the company's work processes, Company's reports, policies, procedures, forms and other documents which are linked with the ERP system were used to identify the critical success factors of ERP System from sourcing perspective in ethio-telecom to ensure the successful implementation of ERP system. Accordingly, the following summary, conclusion, and recommendation are drawn.

5.1 Summary of Findings

Around 80% (with 4.0 mean result) of the respondents believed that the deployed Sourcing ERP system does implement successfully based on the question which asked employees whether the over all Sourcing ERP System implementation is successful, the results show that most of the respondents' agreed on the successfulness of the deployed ERP system. In addition, based on the requested success indicators question which asked employees to identify the success level of the deployed Sourcing ERP System most of the respondents are agreed with the success of the system particularly from Reporting capability, individual impact, Project Success and Organizational impact of success indicators measurement perspectives with mean result of 3.7384, 3.7025, 3.3924 and 3.3259 respectively.

Based on the regression analysis the statistical results show that from the identified and analyzed eight Critical Success factors Five of them are predicted factors as indicated the result and rank here under:

- i. ERP user training and education is considered the main predictor of the ERP success with 27.2% predicted value which means 1% changes on the training factors; ERP Implementation success will increase by 27.2% and ranked First.
- ii. System Provider and/or Consultant support with 19.2%, Technological Infrastructure with 19.1%, Change Management with 15.7% and Effective Communication with 13.4% have relatively moderate predictor of the ERP success and ranked from the second to fifth respectively.

- iii. However, the remaining three critical success factors Project Management, Top Management commitment & Support and Clear Goals & Objectives have relatively low predictor value with 7.4%, 5.6% and 4.7% and ranked from Sixth to Eighth respectively.

Therefore, ERP System User Training and education, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication are considered as Key Critical Success Factors (most preferred CSFs) that should be taken into high priority for the successful implementation of ERP system.

Furthermore, the statistical results show a significant relation between the studied majority of Critical Success Factors and the success of ERP systems implementation as indicated below:

- ✓ The studied User training and Education factors has significant relation (0.00 sig. level) with the Success of ERP systems implementation. Users training (both, implementation team and employees) has found important to educate employees about the system, how to utilize it and how it will change their works was found important to increase their acceptance to the system and prepare them to use it and participate in implementing it successfully. Particularly, the intensive training of internal staff that handles the implementation process improving the internal implementation team would be a very good advantage for ERP project not only for next steps in the implementation processes but also to be as a reference, diffuse knowledge across the organization and train new employees (Yousef, 2010)
- ✓ System Provider and/or Consultant support has significant relation (0.00 sig. level) with the Success of ERP systems implementation. This result indicates the importance of the role of consultants in successful ERP implementation. Decision makers in the company should pay attention to choosing the right consultant when they consider implementing or upgrading their ERP system.
- ✓ Technological Infrastructure also significant relation (0.00 Sig. level) with Success of ERP systems implementation. The result indicate that the factor is critical for ERP implementation and transition from legacy information systems and business processes to an integrated IT infra-structure and common business process throughout the

organization. (Bhatti 2002) stated that adequate IT infrastructure, hardware and networking are crucial for an ERP system's success.

- ✓ Change Management has significant relation (0.023 Sig. level) with Success of ERP systems implementation. The result shows that, the importance of this factor to successfully implement the ERP System in the organization. Role of Change Management are Change the dynamics of the organization to ensure the new system succeeds by ensuring there is readiness to the demands of a very hard taskmaster, Educate users in current industry best practices and vigorously train them in the technical uses of the system, An ERP implementation project is a long and arduous endeavor. Sporadic and unfocused commitment to the project can doom it (Frimpon, 2012 as cited by Al-Sabaawi, 2015).
- ✓ The Fifth Critical Success Factors that have significant relation with Success of ERP Systems implementation is Effective Communication (0.054 Sig. level). The result indicated that Communicating ERP system with employees in terms importance, awareness and impact on their jobs was found important to prepare the employees for the change and reduce their resistance; and also to enhance the implementation process success.

However, the analyzed data did not shows the significant relation between Top Management commitment & Support, Project Management and Clear Goals & Objectives and ERP Systems implementation even though its have positive correlation with ERP Success.

5.2 Conclusion

The finding revealed as majority of the respondents believed that the deployed ERP system is implemented successfully and brought the intended outcome in improving the efficiency of Sourcing function and the overall performance at company level by reducing the decision making cycle time and Sourcing lead time. Hence, the company should consider the next ERP project phase to automate the remaining Sourcing Process if any.

Based on the finding, ERP System User Training and education, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication are the most contributor of CSFs for the success of Sourcing ERP Module implementation from the identified and analyzed eight Critical Success factors.

In addition, the finding show that User training and Education factors, System Provider and/or Consultant support, Change Management, Technological Infrastructure and Effective Communication have significant relation with the Success of ERP systems implementation and do have high impact on ERP implementation success.

On the other hand the analyzed data did not show significant relation between Top Management commitment & Support, Project Management and Clear Goals & Objectives success factors and Success of ERP Systems implementation even though these factors have positive correlation with ERP Success. These, indicates that the company might not give attention to these factors.

As a whole and from the Multi-Regression test the research conclude that, the deployed Sourcing ERP System have implemented successfully and a greater chance to success when all these factors considered and well managed for the future ERP system implementation. However, User training and Education factors, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective Communication found to have the greatest impact on ERP implementation success over the other factors.

5.3 Limitation of the study and Further Research work

5.3.1 Limitation of the study

There are some possibilities of measurement errors. The study focused on perception of the respondents and the instrument relied on self-reports and perceptions of the respondents alone. This may have resulted in some degree of perceptual inflation of self-assessment scores. Those who enjoyed great satisfaction with new technology may have inflated their response with respect to their intention to continue to use the system.

5.3.2 Recommendation for Future Work

The study was carried out, based on the existing scenario of the level and usage of ERP; but ERP can be further enhanced in future. Therefore Research should be conducted in future to know whether ERP is improving with changing time or not within the company. And also this study was conducted in the case of ethio telecom from sourcing perspective; future research needs to be extended to other industry sectors in order to generalize the results.

5.4 Recommendation

Based on the findings and conclusions arrived at during the study, the following recommendations have been made:

- ✓ The researcher recommends that the company should work on shortfalls and improve the existing ERP system successfulness and minimize the shortfalls in the next phase ERP System implementation.
- ✓ The researcher recommends that to give high emphasis on the User Training and education even if this factor has high predictor value and significant relation with the success of ERP implementation because as per summery of secondary data and the respondents'' comment regarding on this factor there are some suggestions to provide advanced level training and education to more utilize the system with minimal support.
- ✓ The company should give due attention to the Top Management Support, Project Management and Clear Goals and Objectives of CSFs while deploying the next phase of ERP System to enhance the overall success rate of ERP implementation. Because, particularly Top Management Support and Project Management Factors have significant relation with ERP Implementation success as confirmed by Chung (2007), Youssef (2010) and Al-Sabaawi (2015).
- ✓ During the analysis of the findings, it was found that there are five CSFs (i.e., User training and Education factors, System Provider and/or Consultant support, Technological Infrastructure, Change Management and Effective communication) found to have high predictive value and significant association with the Success of ERP System implementation. Thus, the researcher recommends for ERP practitioners to give due attention while deploying the ERP system.
- ✓ Finally the researcher recommends for further study to the Academicians on this area since the research area is new and technological innovation to our country.

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Appendix

Appendix-A: Questionnaire

ADDIS ABABA UNIVERSITY School of Commerce

Department of Logistics and Supply Chain Management
Program: MA Degree in LSCM

Dear Respondents

This research study is entitled “The Critical Success Factors of Implementing Enterprise Resources Planning (ERP) System in Sourcing: the case of ethio telecom” and being prepared for partial fulfillment of Master Degree in Logistics and Supply Chain Management at Addis Ababa University School of Commerce. The research study attempts to address the factors that affect the implementation of ERP systems in ethio telecom from Sourcing perspective.

This questionnaire has been designed to collect the opinion and experiences of sourcing staffs, supervisors and managers while utilizing the ERP system in their day to day operational tasks which are required data for this study. These data will be treated confidentially and used for academic purposes only. Therefore, your genuine response to the questions is vital for the quality and successful completion of the study. Because, the accuracy of the information you provide highly determine the reliability of the study.

Your assistance in answering these questions will be highly appreciated!!

Do not hesitate to contact me with the following contact address if you have any question/comment about the questionnaire.

Contact Address:

Setargachew Maschal

Tele - +251 911 50 44 95

E-mail – setegnabizto@gmail.com

Thank you in advance for your unreserved cooperation!

Part I: Demographical Information - Please put '✓' in the box

1.1. Gender

Male Female

1.2. Age Group:

≤ 25 26 – 35
 36 – 40 40 and above

1.3. Educational level:

Technical school graduate College Diploma
 BA/BSC Degree Master's Degree
 Phd Other please specify: _____

1.4 The Current position you hold in the organization

Admin/Staff Supervisor
 Manager Other please specify: _____

1.5. Years of Experience:

≤ 5 5 – 10
 11– 15 16 – 20
 21 and above

Part II: Critical Success Factors of implementing ERP System

Please read each statement carefully and show the extent of your agreement on the statements by circling the numbers in the column using the following rating scale (Likert Scale). The numbers below has been defined with their respective equivalent meaning to ease the questionnaire for each respondent. Hence;

- 1 = Strongly Disagree 4 = Agree
 2 = Disagree 5 = Strongly Agree
 3 = Neutral

1. ERP implementation in Ethio Telecom from sourcing perspective

Where: 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

STATEMENT	Scale				
Over all, Sourcing ERP System implementation is successful	1	2	3	4	5

If there is any other issue/ problem that you observed in relation to overall ERP implementation Success from sourcing perspective please write hereunder;

.....

2. To what extent do you agree with the following statement regarding ERP implementation Success Factors?

Where: 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

No.	Factors	Scale				
1.	Top management commitment and support					
1.1	There has been top management support to technological innovations	1	2	3	4	5
1.2	Top management has provided committed leadership for ERP implementation	1	2	3	4	5
1.3	Top management has supported the ERP implementation project positively and enthusiastically	1	2	3	4	5
1.4	Top management has allocated all the required resources for ERP implementation	1	2	3	4	5
1.5	Top management has intervened at the right time when the situation warrants for the successful implementation of the ERP System.	1	2	3	4	5
1.6	Top management has recognized the efforts of ERP project team and provided sufficient incentives for the ERP implementation.	1	2	3	4	5
2.	Project management					
2.1	The ERP project team members have carefully been selected	1	2	3	4	5
2.2	The ERP project management team had the commitment to advocate and manage the ERP implementation project	1	2	3	4	5

No.	Factors	Scale				
2.3	The ERP project management team had the commitment to advocate and promote the objectives and the importance of ERP implementation it shall contribute to Sourcing efficiencies.	1	2	3	4	5
2.4	There were sufficient communication to system users and stakeholders to inform the project progress and to get all the necessary support for the successful completion of the project.	1	2	3	4	5
2.5	There were sufficient evaluations to measure the successfulness of ERP system implementation from sourcing efficiencies perspective.	1	2	3	4	5
3.	ERP System User Training					
3.1	Ethio telecom has provided all the required resources for training	1	2	3	4	5
3.2	There were adequate training materials on ERP system in sourcing Department as well as in organization.	1	2	3	4	5
3.3	There were continuous training after deployment of each new module for the functional sourcing employees and other stack holders such as system users, supplier, etc.	1	2	3	4	5
3.4	System users were given the opportunities to perform test on the ERP system before it was fully implemented/go live	1	2	3	4	5
3.5	System users were participated in the system requirement design & development at the early stages of ERP project.	1	2	3	4	5
3.6	Sourcing staff has been trained sufficiently on the system to perform their day to day duties.	1	2	3	4	5
3.7	The ERP System trainings were delivered by highly qualified consultants and trainers on the subject matter.	1	2	3	4	5
3.8	The ERP System training programs were properly and adequately designed for internal and external Stakeholders.	1	2	3	4	5
4.	Clear Goals and objectives					
4.1	Ethio telecom has a clear goals & objectives about the ERP system implementation and the significance it will have on sourcing department in particular and on the company's overall performance in general.	1	2	3	4	5
4.2	ERP system implementation is part of ethio telecom long term strategy.	1	2	3	4	5
4.3	Ethio telecom has addressed the short term and long term benefits that it sought from ERP system implementation.	1	2	3	4	5
4.4	The ERP system has been fully customized in line with the business requirement, sourcing policy and procedure as well as the company's organizational structure	1	2	3	4	5
4.5	While deploying & implementing ERP system in the company, Country's regulatory framework/compliance procedures are fully considered.	1	2	3	4	5
4.6	There are no sourcing processes and/or work flows not	1	2	3	4	5

No.	Factors	Scale				
	performed using ERP system processed due to system incapability and /or incompatibility.					
5.	Technological infrastructure					
5.1	There were adequate resources of IT infrastructure for ERP system implementation.	1	2	3	4	5
5.2	There were reliable and /or dependable internet connections to smoothly run the ERP system.	1	2	3	4	5
6.	System provider and/or Consultant Support					
6.1	The hired consultant had led the ERP implementation in a right direction.	1	2	3	4	5
6.2	The hired consultant had helped the ERP implementation successfulness.	1	2	3	4	5
6.3	The system provider has offered well designed and intensive training programs for system end users and/or the project implementation team.	1	2	3	4	5
6.4	The system provider has been consistently providing adequate support to ethio telecom in troubleshooting any technical or procedural problem during the ERP system implementation	1	2	3	4	5
6.5	The system provider's support has been continued during post-implementation of the ERP system in terms of maintenance and upgrading the system.	1	2	3	4	5
7.	Change Management					
7.1	There were clearly defined procedures at Company level in place to manage change from system perspective.	1	2	3	4	5
7.2	Management approach to change was successful in managing the transition to ERP	1	2	3	4	5
7.3	Adequate resource given for change	1	2	3	4	5
7.4	There were exists a mechanism and/ or a procedure to entertain staffs and/or stakeholders opinion and/ or ideas for the improvement of ERP system.	1	2	3	4	5
8.	Effective communication					
8.1	Employees were aware about the huge resources ethio telecom has invested on ERP system implementation	1	2	3	4	5
8.2	Employees were aware about the benefits of the ERP system for ethio telecom	1	2	3	4	5
8.3	The ERP project team has prepared a clear message regarding ERP system and communicated to all system users and/or stakeholders.	1	2	3	4	5
8.4	The ERP project team clearly understand the goals/objectives of ERP implementation	1	2	3	4	5
8.5	Staffs' and /or stakeholders' suggestions and ideas for the improvement of ERP system were encouraged and recognized for their contribution and awarded for the same.	1	2	3	4	5
8.6	Introduction of a new ERP system Module is always well communicated to sourcing employees and/or stakeholders prior to commissioning of the system.	1	2	3	4	5

No.	Factors	Scale				
8.7	Ethio telecom has sufficiently communicated the ERP systems objectives and/goals to sourcing staffs in particular and to all stakeholders whose daily duties impacted due to implementation of the system	1	2	3	4	5

If there is any other issue/ problem that you observed in relation to ERP implementation Success Factors please write hereunder;

.....

.....

.....

3. Success indicators in ERP from Sourcing Perspective.

To what extent do you agree with the following statement regarding success indicators of ERP implementation?

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

No.	Success indicators	Scale				
1.	Intention to use/Accessibility of ERP system					
1.1	I have access to the ERP system whenever I need to do my job/duties.	1	2	3	4	5
1.2	I can use the system without any limit to ERP system	1	2	3	4	5
2.	User Satisfaction					
2.1	I am very satisfied with the quality of information ERP system generate/provide.	1	2	3	4	5
2.2	I am very satisfied with the performance of the ERP system.	1	2	3	4	5
2.3	I have no problem with the quality of the ERP system out put	1	2	3	4	5
2.4	The ERP system interface is user friendly and I can use the system without any challenge.	1	2	3	4	5
3.	Individual Impact					
3.1	The ERP system has helped me in providing readily available information for effective decisions.	1	2	3	4	5
3.2	The ERP system has helped me to improve my quality of job and enhanced my performance efficiencies	1	2	3	4	5
4.	Organizational Impact					
4.1	With the implementation of the ERP system, Sourcing department as well as the company has saved operating costs.	1	2	3	4	5
4.2	The ERP system has reduced cycle time for decision making.	1	2	3	4	5
4.3	The ERP system has reduced the overall Sourcing lead time.	1	2	3	4	5
4.4	ERP system implementation leads to major departmental as well as organizational changes.	1	2	3	4	5
5.	Project Success					
5.1	The ERP project implementation was completed within	1	2	3	4	5

No.	Success indicators	Scale				
	the project implementation time plan.					
5.2	The scope of ethio telecom ERP project system is well matched with the company's requirements	1	2	3	4	5
5.3	The ERP project implementation was completed within the budget initially planned/allotted.	1	2	3	4	5
6.	Compatibility					
6.1	I have no difficulty in exporting data from the ERP system to other system, software or/application I currently use	1	2	3	4	5
6.2	I have no difficulty in importing data to the ERP system from other systems, software or /application I currently use	1	2	3	4	5
7.	System Reliability					
7.1	The ERP system is always reliable	1	2	3	4	5
7.2	There were no worries with regard to data loss while using ERP system.	1	2	3	4	5
8.	Reporting Capability					
8.1	The ERP system has the capability to generate useful information/report for decision makers timely.	1	2	3	4	5
8.2	The ERP system generated report has served as valuable information resources for strategic/tactical/operational decision making process	1	2	3	4	5
8.3	The ERP system generated reports are in a required formats and easily understandable by external users and decision makers	1	2	3	4	5

If there is any other issue/ problem that you observed in relation to ERP implementation and its utilization, please write hereunder;

.....

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.....

.....

Thank You Again!

Appendix –B: Summary of Secondary Data

Source from ethio telecom ERP Support Team

TT Number	Issue	TT Created Date	TT Closed Date	Severity	Status
ERP_SCM_2016_0006	ERP-2-CRM-SELL-DEALER-PICK-DELIVERED-01	12-May-16	25-May-16	Medium	Closed
ERP_SCM_2016_0005	CRM-2-ERP-DEALER-RETURN-RESOURCE-01	9-May-16	23-May-16	Medium	Closed
ERP_SCM_2016_0004	CRM-2-ERP-COMMISSION-PAYMENT-01	9-May-16	21-May-16	Medium	Closed
ERP_SCM_2016_0003	ERP-2-CRM-SELL-RESOURCE-DEALER-ACK-01 (WS)	4-May-16	21-May-16	Medium	Closed
ERP_SCM_2016_0002	CRM-2-ERP-SELL-RESOURCE-DEALER-01 (WS)	4-May-16	20-May-16	Medium	Closed
ERP_SCM_2016_0082	FMS payroll interface file	2-Aug-16	8-Aug-16	medium	close
ERP_SCM_2016_0081	FMS fozte list earning				
ERP_SCM_2016_0081	FMs personel EMPLOYEE interface files	2-Aug-16	8-Aug-16	medium	close
ERP_SCM_2016_0079	FMS change im categorie to resource type	1-Aug-16	3-Aug-16	medium	close
ERP_SCM_2016_0078	FMS cash consumption is not receiving files from ERP	2-Aug-16	8-Aug-16	medium	close
ERP_scm_2016_0074	unable to get CRM summary report from order management	21-Jul-16	22-Jul-16	medium	close
ERP_SCM_2016_0067	can not nd RFQ for approval	1-Jul-16	4-Jul-16	medium	close
ERP_SCM_2016_0045	physical counting v1.0	27-Jun-16	26-Jul-16	medium	close
erp_scm_2016_0022	balance shows -5 diffrence	6-Jun-16	28-Jun-16	medium	close
ERP_scm_2016_0021	maintain serial problmae	20-Jun-16	28-Jun-16	medium	close
ERP_SCM_2016_0020	the system didn't update received uantity	14-Jun-16	28-Jun-16	medium	close
ERP_scm_2016_0019	unable to query customer balance in recivable super user	19-Jun-16	26-Jul-02	medium	close
ERP_SCM_2016_0017	to rturn internal order number 10142235	9-Jun-16	26-Jul-16	medium	close
ERP_SCM_2016_0014	requisition inprocess status	6-Jun-16	26-Jul-16	medium	close
ERP_SCM_2016_0005	unable to create requisition	2-Jun-16	26-Jul-16	medium	close
ERP_SCM_2016_0004	reciver name empty	2-Jun-16	26-Jul-16	medium	close
ERP_SCM_2016_0068	purchase order generation failed	4-Jul-16	5-Jul-16	medium	close
ERP_SCM_2016_0001	Datafix to Rename CRM output files following duplicate issue	16-Jun-16			close
ERP_SCM_2016_0081	inventory recuoncilation for the loading of stok value on sep 28 2012	18-Aug-16	12-Oct-16		close
ERP_SCM_2016_0082	shipped status order number 10218850 & 10220413	19-Aug-16			close
ERP_SCM_2016_0077	list of some system rules under when the acruie at reciept	27-Jul-16	28-Jul-16	medium	rg deliver
ERP_SCM_2016_0083	Subledger Period Close Exception Report FOR purchasing	25-Aug-16		medium	close
ERP_SCM_2016_0086	unable to do inspection because the	15-Sep-16			close

TT Number	Issue	TT Created Date	TT Closed Date	Severity	Status
	location is impty				
ERP_SCM_2016_0085	Receiving Inventory recon.	15-Sep-16			close
ERP_SCM_2016_0084	Inventory Accrual recon	15-Sep-16			close
ERP_SCM_2016_0088	vacation rule	22-Sep-16			open
ERP_SCM_2016_0089	to create a DFF for internal Requisition on iprocurement to allow the outsourced Drivers	28-Sep-16		high	close
ERP_SCM_2016_0090	CRM orders not creating for new Assela & Batu Shops	10-Jul-16			close
ERP_SCM_2016_0087	unable to return serial items	16-Sep-16	16-Sep-16		close
ERP_SCM_2016_0123	create DFF Fields on Approval Assignment.	28-Sep-16			open
ERP_SCM_2016_0096	to create new DFF in OM as the values from iProc needs to be visible in OM DFF	27-Oct-16	9-Jan-16		close
ERP_SCM_2016_0095	to modify concurrent request XXSNP_UPDATE_DFF_FOR_ISO to copy Driver Licence number (Varchar) to ISO	27-Oct-16	29-Dec-16		close
ERP_SCM_2016_0094	Po_detailed_report_for_FCY_transaction	25-Oct-16			close
ERP_SCM_2016_0093	inter organization transaction in FA Clearing,	26-Oct-16			open
ERP_SCM_2016_0091	organization movement	18-Oct-16	20-Oct-16		close
ERP_SCM_2016_0098	inable to select source	28-Oct-16	31-Oct-16		
ERP_SCM_2016_0099	po approved but show rejected	26-Oct-16	27-Oct-16		close
ERP_SCM_2016_0099	unable to find order in importa order correction	7-Nov-16	7-Nov-16		close
ERP_SCM_2016_0100	unable to do receiving on iproc	7-Nov-16	7-Nov-16		close
ERP_SCM_2016_00101	PO Desktop Receiving Validation	25-Nov-16			open
ERP_SCM_2016_00102	unable to create PO from RFQ	30-Nov-16			open
ERP_SCM_2016_0103	how to close inventory period	2-Dec-16	2-Dec-16		close
ERP_SCM_2016_0104	dealer invoice blank	30-Nov-16	30-Nov-16		close
ERP_SCM_2016_0105	order waitin	1-Dec-16	1-Dec-16		close
ERP_SCM_2016_00106	order not generated for requisition number	10-Dec-16			clsoe
ERP_SCM_2016_00107	to get alert when inventory period is closed	10-Dec-16			open
ERP_SCM_2016_00108	inventory recuoncilation for the loading of stok value on sep 28 2012 for shops	10-Dec-16			open
ERP_SCM_2016_0110	unable to cancel order				close
ERP_SCM_2017_0118	Packing slip complete with error.	4-Jan-17	6-Jan-17		close
ERP_SCM_2017_0119	unable to recieve	5-Jan-17			close
ERP_SCM_2017_0120	When crm send return resource request to ERP side, ERP return one error 'Exceptio	10-Jan-17			close

TT Number	Issue	TT Created Date	TT Closed Date	Severity	Status
ERP_SCM_2017_0121	Serial duplicate with differ file around 500 files duplicated for this serial numbers	10-Jan-17			close
ERP_SCM_2017_0117	quantity diffrence	12-Jan-17			close
ERP_SCM_2017_0127	unable to find the reciever name in the iproc				
ERP_SCM_2016_0115	unable to interface shhipped status 10245734				
ERP_SCM_2016_0106	requisition number created and approved but there is no order number requisition number 288040			3/2/2017	closed
ERP_SCM_2017_0129	Reciver name problem		8-Feb-17		close
ERP_SCM_2017_0130	T Huwawei process cRM 108 files ends in error without error message	8-Feb-17			Close
ERP_SCM_2017_0131	Enclosed 1 scenario for maintenance work order summary repor V1 0		21-Feb-17		closed
ERP_SCM_2017_0133	ISO not generating from AW4	2/14/2017			open
ERP_SCM_2017_0134	unable to find the reciever name not appering for context internal use	2/15/2017			open
ERP_SCM_2017_0135	invoice not availabel on AR for the follwing r sample order 900000000039943,	23-Feb-17			open
ERP_SCM_2017_0136	PO validation to enter requester and delivery loc for destination type other than inventory	23-Feb-17			open
ERP_SCM_2017_0137	Inventory Reconciliation	24-Feb-17			open
ERP_SCM_2017_0138	Unable to create Purchase Requisition on ethios smart form with IS domain.	24-Feb-17			close
ERP_SCM_2017_00156	unable to create po from RFq	4-May-17			close
ERP_SCM_2017_0157	the order is canceled but it holds same money on order management it should be cacle	5-Apr-17			open
ERP_SCM_2017_0158	unable to book RMA order 20000177	7-Apr-17			open
ERP_SCM_2017_0159	TEP PO Receiving control	7-Apr-17			open
ERP_SCM_2017_00160	unable to increase onhand balance	7-Apr-17			open

Appendix – C: Assigned Code to the Total population

Assigned Code to the Population for the purpose of Random Sampling technique

NWS: Network Sourcing, FFS: Fleet and Facilities Sourcing, ISS: Information System Sourcing, CES: Customer Equipment Sourcing, CM: Contract Management and SRM: Supplier Relation Management

NWS1	FFS3	ISS3	CM5
NWS2	FFS4	ISS4	CM6
NWS3	FFS5	ISS5	CM7
NWS4	FFS6	ISS6	CM8
NWS5	FFS7	ISS7	CM9
NWS6	FFS8	ISS8	CM10
NWS7	FFS9	ISS9	CM11
NWS8	FFS10	ISS10	CM12
NWS9	FFS11	ISS11	CM13
NWS10	FFS12	CES1	CM14
NWS11	FFS13	CES2	CM15
NWS12	FFS14	CES3	CM16
NWS13	FFS15	CES4	CM17
NWS14	FFS16	CES5	SRM1
NWS15	FFS17	CES6	SRM2
NWS16	FFS18	CES7	SRM3
NWS17	FFS19	CES8	SRM4
NWS18	FFS20	CES9	SRM5
NWS19	FFS21	CES10	SRM6
NWS20	FFS22	CES11	SRM7
NWS21	FFS23	CES12	SRM8
NWS22	FFS24	CES13	SRM9
NWS23	FFS25	CM1	SRM10
NWS24	FFS26	CM2	SRM11
FFS1	ISS1	CM3	SRM12
FFS2	ISS2	CM4	Officer