ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES
SCHOOL OF INFORMATION SCIENCE

FACTORS AFFECTING THE IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING AT COMMERCIAL BANK OF ETHIOPIA

BY

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JUNE, 2017

ADDIS ABABA, ETHIOPIA

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FACTORS AFFECTING THE IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) AT COMMERCIAL BANK OF ETHIOPIA

A Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Information Science

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June, 2017

Addis Ababa, Ethiopia

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Declaration

This thesis has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that the thesis is a result of my own investigation, except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

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This thesis has been submitted for examination with my approval as university advisor.

Advisor's Signature: _____

Solomon Teferra (PhD)

Acknowledgements

First, I would like to say Alhamdulillah. Next, I would like to express my gratitude to my research advisor Dr Solomon Teferra, who tirelessly provided me all with the necessary advice, guidance and comments throughout this study.

My deep thanks are also for my brother Abdu Hassen for his support in all aspect of my life, and his friends especially Worku and Andarg.

Additionally, my deepest appreciation goes to my family': my Mom, Dad, brothers and sisters for their moral and psychological support throughout my study. My especial thanks go to my younger brothers Yasin and Juhar for their follow-up and invaluable moral support throughout this study. I'm also grateful to all my friends, especially Fana, Tizita, Elham and Samri for their sincere friendship and moral support.

Last but not least, I would like to thanks all the Commercial bank of Ethiopia ERP project staffs, especially Abel, Betty, Lidia, Abebech, Addisu, Mikky, W/ro. Mekiya andW/ro. Haimanot (project manager).And also all technical teams of batch two who allowed me to do this study in their Institution. Likewise, I am greatly indebted to all my interview respondents for their willingness in giving their deep concept of ERP implementation on due date.

Thank you all!

Abstract

Enterprise Resource Planning (ERP) systems are software systems for business management, encompassing modules supporting functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, transportation and e-business.

When implementing an integrated and big ERP packages in to an organization, assessing the factors that affect the implementation and sharing experience is very important. Because ERP systems are complex and need huge budget investment, company re-arrangements and the implementation, success depends on various technological, organizational and individual factors of the companies and countries.

ERP success factors are variable and have different degrees of importance depending on the phase of ERP implementation. Therefore, the study will bridge the gap to find out organizational, technological, and individual factors affecting the implementation of ERP at each phase of ERP implementation in the Commercial Bank of Ethiopia.

Commercial bank of Ethiopia is implementing the Oracle ERP into its organization. Focusing on this company, the purpose of this study is to identify and analyze the organizational, technological, and individual factors and their influence at each phase of ERP implementation. Based on detail review of literatures, the researcher selected and used research model for the study that consists of technological, organizational and individual factors affecting the implementation of ERP system.

To conduct the study, the researcher has employed a case study in which qualitative research method was also used to collect and analyze data. Pattern matching technique was used to analyze the data collected through interview, direct observation and participation.

The research revealed that factors which affect ERP implementation as technological, organizational and people, the stages of CBE ERP implementation (requirement analysis, solution design, solution built and test, and production transition and support), the impacts of these factors

in their associated stage and current status (progress) of ERP implementation in commercial bank of Ethiopia in general.

The research is believed to give an insight into identification of factors affecting the implementation of ERP system and finally recommend the good management strategy and clear communication during the implementation of the system is a critical issue to success of the ERP.

Keywords: ***Enterprise Resource Planning (ERP)***, ***ORACLE*** *and* ***ERP Implementation Phases***

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List of Acronyms

APS	Advanced Planning and Scheduling
APTS	Application Development tools
BI	Business Intelligence
BPR	Business-Processing Reengineering
CBE	Commercial Bank of Ethiopia
CFF	Critical Failure Factor
CRM	Customer Relationship Management
CSF	Critical Success Factors
DBMS	Database Management System
ERP	Enterprise Resource Planning
IC	Inventory control
MIS	Management Information System
MRP	Material Requirements Planning
OSBS	Oracle Small Business Suit
OSM	Office of Strategic Management
PPM	Project Phase Model
R/2	Real-time / 2-tier
R/3	Real-time / 3-tier
SAP	System Application and Products
SCM	Supply Chain Management
T-24	Temonuse 24/7
UAT	User-Acceptance Test

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

An information system aims to support operations, management, and decision-making (Kroenk, 2015). Unlike the traditional disintegrated pieces of information systems, Enterprise Resource Planning (ERP) solution package is one integrated information system with different modules like finance, human resource management, supply chain management, production planning and so on. These modules are integrated as one enterprise information system (Rashid et al., 2002).

ERP is the integrated management of core business processes, often in real-time and mediated by software and technology. The ERP system integrates varied organizational systems and facilitates error-free transactions and production, thereby enhancing the organization's efficiency. However, developing an ERP system differs from traditional system development (Shaul and Tauber, 2012). ERP systems run on a variety of computer hardware and network configurations, typically using a database as an information repository (Khosrow–Puor, 2006).

Organizations are adopting Enterprise Resource Planning systems to meet the existing challenges of information era and for competitive advantages. ERP systems facilitate organizations to get the key business processes to be automated and integrated. ERP systems facilitate timely flow of information among different parts of the organization freely, which consequently, helps the management in making strategic decisions. ERP systems are integrated enterprise-wide systems that automate core enterprise activities such as human resource, manufacturing, finance and supply chain management etc. to generate and access information in real time environment (Rashid et al, 2002).

The success of ERP implementation is classified into three categories: successful, challenged and failed (Bearing point, 2004**).**

- Successful ERP project is the one which is within the budget, schedule and up to the expectations.

- Challenged ERP project is not within the project budget and schedule but the system is implemented and being used with minor problems and errors which can be corrected.

- Failed ERP is abandoned or not implemented and it is never used.

Many countries, especially the developed ones, have benefited the advantages of ERP systems by highly adopting these systems since early 1990s (Otieno, 2010). Developing countries are now adopting ERP. However, regardless of the ERP systems advantages and benefits mentioned here, developing countries like Ethiopia have not yet adopted and benefited much from such integrative information solutions (Otieno, 2010), which are usually suited to organizations with large size businesses or services. Various factors related to ERP implementation success or failure have been highlighted in the previous studies most of which have been in the developed countries (Shen, 2015).

The history of the Commercial Bank of Ethiopia (CBE) dates back to the establishment of the State Bank of Ethiopia in 1942. CBE was legally established as a share company in 1963. In 1974, it was merged with the privately owned Addis Ababa Bank (CBE, 2017). Since then, it has been playing significance roles in the development of the country both economically and technologically. The bank is a pioneer to introduce modern banking to the country like Western Union Money Transfer Services and currently working with other 20 money transfer agents like Money Gram, Atlantic International (Bole), Xpress Money. It has more than 1160 branches stretched across the country and four branches in South Sudan. It is the leading African bank with assets of 384.6 billion Birr as of June 30 2016 (CBE, 2016).

Generally, the Banking industry is growing relatively at a faster rate in Ethiopia than ever before. The type of services being provided has also improved and supported by modern technologies. This is due to the fact that number of banks has increased significantly and the competition among other banks becomes fierce (Rashid, et al, 2002).

As Esteves (2009) stated, the most significant drivers of a huge investment in ERP solutions are its integration capability, standardization, and improvement of processes, easy information access, faster decision-making facilities, dissatisfaction with legacy systems, and business consideration. According to Davenport (2000), the four key drivers of ERP adoption are corporate growth,

improved customer service, efficient distribution system, and reduced operational expenses. Davenport (2000) further stated that some benefits are likely to arise before others start; such as improved transactional processes and common data under a unified database appear prior to other benefits that are associated with improvements in management and decision making.

Shang and Seddon (2000) also defined list of ERP benefits from a review of 233 cases published in ERP vendors' stories. They also classified the benefits into five benefit categories: operational, managerial, organizational, IT infrastructure, and strategic.

1.2. Statement of the Problem

ERP is a software package used for integration of organization's legacy systems like finance, human resource, SCM, MIS, OSM, etc. The ERP system automates these activities with integrated application. It also facilitates the flow of information between all business functions inside the boundaries of the organization. ERP is the most complex software package offered to different buyers in several sectors of economy to centralized the database in real time working (Abbas, 2015).

There are many ERP vendors, but the major are, SAP (systems applications products in data processing), Oracle, PeopleSoft, Baan and J.D. But the two most commonly used ERP systems that are currently used in Ethiopia are SAP and ORACLE ERP systems. Most organizations in Ethiopia implemented the SAP ERP system while Ethio-telecom has implemented the ORACLE ERP system. Few researches have been conducted in Ethiopia following the start of ERP implementation in the country. Abiot and Jorge (2012) have made an assessment on MS-Dynamics ERP implementation in Mesfin Industrial Engineering. Derese (2013) has conducted a study on Oracle ERP system at Ethio-Telecom, Sintayehu(2014)reviewed success factors for implementation of Enterprise Resource Planning system at Ethiopian Airlines and also Kibebework (2015) has conducted research on the challenges and current status of ERP implementation at Mugher and Derba Cement industries. Almost all researches in this country are conducted on SAP ERP system except Derese, who studied Oracle ERP system on Ethio-telecom.

Commercial Bank of Ethiopia (CBE) is one of commercial banks currently running in the country, which is almost finishing (at production stage) of the Oracle ERP system implementation. When

implementing an integrated and big ERP packages in developing countries, assessing the factors that affect the implementation and sharing experience is very important (Sintayehu, 2014). Because ERP systems are complex and need huge budget investment, company re-arrangements and the implementation, success depends on various social, cultural and technical factors of the companies and countries (Roman, 2009).

Various organizations have different working practices that depend on their culture and nature of business (Kibebework, 2015). The organizational culture of banking industries differs from the culture of other organizations. In addition, the different ERP systems have their own unique implementation methodologies and technical requirements. Other researchers, Markus and Tenis (2000) suggested that ERP success factors are variable and have different degrees of importance depending on the phase of ERP implementation. Therefore, the study will bridge the gap to find out organizational, technological, and individual factors affecting the implementation of ERP at each phase of ERP implementation in the Commercial Bank of Ethiopia.

Research Question

This paper tries to address the following research questions.

Q1. What are the factors that affect ERP implementation at each phase?

Q2. How do those factors affect each stage of ERP implementation?

1.3. Objective of the Research

1.3.1. General Objective

The general objective of the research is to identify and analyze the organizational, technological, and individual factors and their influence at each phase of ERP implementation in the commercial bank of Ethiopia.

1.3.2. Specific Objectives

The specific objectives of the research are to:

- Review literature by identifying different papers (researches) which are related to this area of study.

- Identify the stages of ERP implementation followed by CBE.
- Identify factors affecting ERP implementation in the CBE at each stage.
- Forward recommendations for both researchers and the bank.

1.4. Significance of the Study

The main significance of this study is knowledge and experience sharing about ERP systems implementation between organizations in Ethiopia. The study is also vital for organizations, that are intended to implement ERP system.

Developed countries that have adopted ERP systems have many failure experiences and histories of ERP projects. This should not happen to Ethiopian organizations since it can seriously affect their entire business operations. So, the results of the study could be used as a reference for the bank and benchmark of ERP system implementation for Ethiopian context. Additionally, it will help organizations during project preparations, requirement analysis, building team of employee, ERP vendor selection, implementation partner identification, change management strategy, and other decisions, which are demanded by enterprise resource planning systems implementations. Finally, the results of this study can also be used to fill the literature gap on ERP in the Ethiopian context and can be used as a reference for future research work.

1.5. Scope of the Study

The scope of this research is conducted using a single-case study to investigate the factors affecting ERP systems implementation by considering the case of Oracle ERP project at CBE. Even though the results of the study can be extended and applied to other similar organizations and ERP projects, the focus of the study is around the four main ERP modules, which are fully implemented, and being used at CBE. The modules are; human resource management, supply chain management, business intelligence, and finance.

1.6. Organization of the Thesis

The research is organized in five chapters. The first chapter starts with a general introduction about ERP systems. It explains statement of the problem, the need or significance of the research, its

scope and limitations. Chapter two is detailed literature review about ERP, factors affecting ERP systems implementation, ERP implementation phase and related works. The third chapter discusses in detail about the methodology of the research, data collection, and analysis techniques. Chapter four is about analyzing the data, discussion and results. Finally, chapter five contains conclusions, and recommendations for future works.

CHAPTER TWO

REVIEW OF LITERATURE AND RELATED WORKS

2.1. Introduction

This section focuses on definitions of Enterprise Resource Planning (ERP) given by different scholars, history or evolution of an ERP system through different years and ERP implementation stages that scholars identified. This section also contains implementation of ERP in banking industry with its benefits, ERP in Ethiopia which assesses researches conducted on different companies implemented it, factors affecting ERP implementation, related works done on the area based on the objective of the study were also deeply presented, research model and finally summary of the chapter.

2.2. Definition of ERP

Enterprise resource planning systems or enterprise systems are software systems for business management, encompassing modules supporting functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, transportation and e-business (Rashid, et al, 2002).

The enterprise resource planning (ERP) system incorporates a set of programs that provides support for main organizational activities such as manufacturing and logistics, finance and accounting, sales and marketing, and human resource. It also helps for sharing of data and knowledge among different parts of the organization as well as reducing costs, and improves management of business processes (Adel, 2001).

The architecture of the software facilitates transparent integration of modules, providing flow of information between all functions within the enterprise in a consistently visible manner. Corporate computing with ERPs allows companies to implement a single integrated system by replacing or re-engineering their mostly incompatible legacy information systems. American Production and Inventory Control Society (2001) has defined ERP systems as “a method for the effective planning

and controlling of all the resource needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company."

"ERP (enterprise resource planning systems) comprises of a commercial software package that promises the seamless integration of all the information flowing through the company–financial, accounting, human resource, supply chain and customer information" (Davenport, 2000).

An ERP system is a vast information system, which enables decision-makers to have an enterprise-wide view of the information they need in a timely, reliable and consistent fashion (Kumar and Hillsgersberg, 2000).

ERP packages are integrated software packages that cover the techniques and concepts employed for the integrated management of businesses that help effective use of resource, to improve the efficiency of an enterprise (Ahmed, 2003).

ERP systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization (Kumar & Hillsgersberg, 2000). One database, one application and a unified interface across the entire enterprise (Tadjer, 1998). ERP systems are computer-based systems designed to process an organization's transactions and facilitate integrated and real-time planning, production, and customer response (O'Leary, 2001).

2.3. History of ERP

The evolution of ERP systems closely followed the development in the field of computer hardware and software systems and the history of ERP systems starts with efforts of automating inventory control systems in the1960s when most organizations designed, developed and implemented centralized computing systems for their inventory control systems (Rashid et al, 2002).

During the 1960s most organizations designed, developed and implemented centralized computing systems, mostly automating their inventory control systems using inventory control packages (IC). These were legacy systems based on programming languages such as COBOL, ALGOL and FORTRAN. Material requirements planning (MRP) systems were developed in the 1970s, which involved mainly planning the product or requirements according to the master production

schedule. Following this route new software systems called manufacturing resource planning (MRP II) were introduced in the1980s with an emphasis on optimizing manufacturing processes by synchronizing the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource and engineering (Rashid et al, 2002).

ERP systems first appeared in the late 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration. Based on the technological foundations of MRP and MRP II, ERP systems integrate business processes including manufacturing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, and transportation, providing accessibility, visibility and consistency across the enterprise (O'Leary, 2001).

During the 1990s ERP vendors added more modules and functions as "add-ons" to the core modules giving birth to the "extended ERPs". These ERP extensions include advanced planning and scheduling (APS), e-business solutions such as customer relationship management (CRM) and supply chain management (SCM) (Rashid et al 2002).

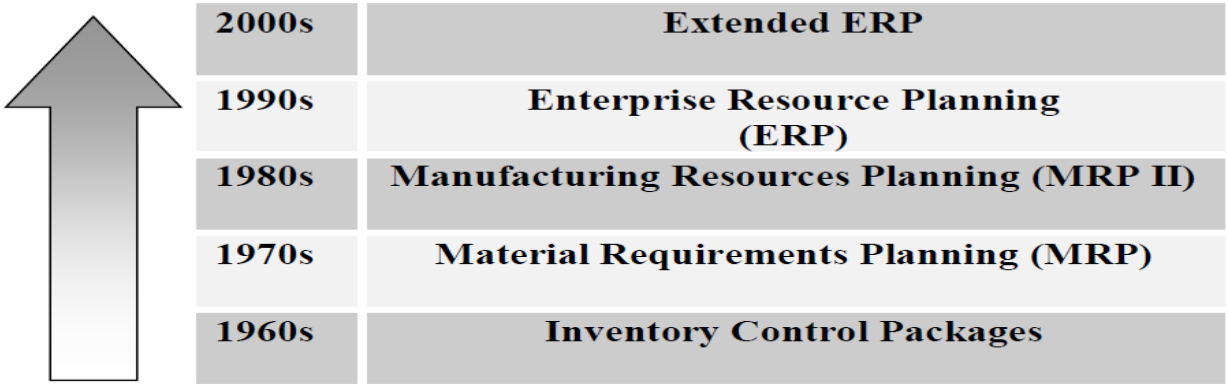

Figure 2.1: ERP evolution (source Rashid, et al 2002)

2.4. ERP Systems

The major ERP software suppliers are SAP, Oracle, PeopleSoft, Baan and J.D. Edwards. Together they control more than 60% of the multibillion-dollar global market. Each vendor, due to historic reasons, has a specialty in one particular module area such as Baan in manufacturing, PeopleSoft in human resource management, J.D. Edwards runs on multiple platforms with multiple databases, SAP in logistics and Oracle in financials (Rashid, et al, 2009).

2.4.1. Oracle Corporation–Flagship Product *Oracle Applications*

Oracle (Oracle, 2001), founded in 1977 in the USA, is best-known for its database software and related applications and is the second largest software company in the world after Microsoft. Oracle's enterprise software applications started to work with its database in 1987. It accounts for $2.5 billion out of the company's $9.3 billion in 1999, which places Oracle second to SAP in the enterprise systems category with over 5,000 customers in 140 countries. Oracles ERP system is known as Oracle Applications, having more than 50 different modules in six major categories: finance, accounts payable, human resource, manufacturing, supply chain, and front office.

Oracle has other strong products in the software field including DBMS, data warehousing, workflow, systems administration, application development tools (APTs), and consulting services. A notable feature of Oracle is that it is both a competitor and a partner to some of the industry leaders in the ERP market such as SAP, Baan and PeopleSoft because of the use of Oracle's DBMS in their ERP systems (Oracle, 2001).

Oracle has integrated its ERP solutions with the Internet and has introduced several applications in the electronic commerce and internet based commerce areas. Oracle's internet infrastructure is created around two powerful products: Oracle9i Database and Oracle9i Application Server. Another significant feature of Oracle is its OSBS, or Oracle Small Business Suite, which provides consistent financials, payroll, inventory control, order entry, purchase orders, and CRM functionality–all delivered as a Web service. Oracle also offers an easy-to-activate Web presence that helps companies to sell their goods via the Internet (Oracle, 2001).

2.4.2. SAP AG–Flagship Products *R/3, mySAP.COM*

Five former IBM engineers in Germany started SAP AG (System Applications and Products) in Data Processing, in 1972 for producing integrated business application software for the manufacturing enterprise (SAP, 2001). Its first ERP product, R/2, was launched in 1979 using a mainframe-based centralized database that was then redesigned as client/server software R/3 in 1992. System R/3 was a breakthrough and by 1999 SAP AG became the third largest software vendor in the world and the largest in the ERP sector with a market share of about 36% serving over 17,000 customers in over 100 countries. In 1999 SAP AG extended the ERP functions by adding CRM, SCM, sales-force automation and data warehousing. SAP has also invested significantly in its R&D sector with the result of newer versions of R/3 3.1, 4.0, 4.6 including internet functionalities and other enhancements. SAP's internet-enabled ERP solutions are provided by the recently launched ERP product called mySAP.COM. SAP has the broadest ERP functionality, capacity to spend significantly on R&D, strong industry-focused solutions and long-term vision (SAP, 2001).

2.4.3. PeopleSoft Inc.-Flagship Product *PeopleSoft8*

PeopleSoft is one of the newest ERP software firms started in 1987 in Pleasanton, California, with specialization in human resource management and financial services modules. PeopleSoft quickly managed to offer other corporate functions and attained a revenue of $32 million in 1992. Enterprise solutions from PeopleSoft include modules for manufacturing, materials management, distribution, finance, human resource and supply chain planning. SAP AG and Oracle–with longer experience, stronger financial base and worldwide presence–are the main competitors to PeopleSoft. Many customers comment that PeopleSoft has a culture of collaboration with customers, which makes it more flexible than its competitors. One of the strengths of PeopleSoft is the recognition by its customers that it is flexible and collaborative. The flagship application PeopleSoft8 with scores of applications was developed by PeopleSoft with an expenditure of $500 million and 2,000 developers over 2 years as a pure Internet-based collaborative enterprise system. "This revolutionary e-business platform is the first open XML platform to offer scalability and ease of use for all users. PeopleSoft 8 requires no client software other than a standard Web browser, giving you the ability to securely run your business anytime, anywhere" (PeopleSoft, 2001).

"This e-business applications and consulting services enable true global operations–managing multiple currencies, languages, and business processes for more than 4,400 organizations in 109 countries". PeopleSoft with about 10% market share, is the third largest ERP vendor after SAP AG and Oracle (PeopleSoft, 2001).

2.4.4. The Baan Company–Flagship Product Baan ERP

Founded in 1978 in The Netherlands, Baan (Baan, 2001) started with expertise in software for the manufacturing industry and by 1997 claimed an ERP market share of roughly 5%. Bann's revenue in 1998 was roughly $750 million and while facing a slight slowdown in 1999 started growing again in 2001 with sales up 12% at £7,231million and operating profit of £926 million.

Baan has more than 15,000 customer sites all over the world and more than 3,000 employees. Baan believes that "the Internet is the ultimate enabler" and "internet technologies help companies become order-driven and customer focused by enabling collaboration across the 'value chain.' Suppliers, distributors, manufacturers and customers can work together to deliver the right product at the right price" (Baan, 2001).

ERP solution areas that Baan covers include finance, procurement, manufacturing, distribution, integration and implementation, planning, sales, service and maintenance, business portals, collaborative commerce and business intelligence. Bann's flagship product is Baan ERP (formerly called Triton, then Baan IV), launched in 1998. One innovative product from Baan is the Organization ware tool that can cut implementation cost significantly by automatically configuring the enterprise software. Baan's ERP software is best known in the aerospace, automotive, defense, and electronics industries (Baan, 2001).

2.4. 5. J.D. Edwards & Co.–Flagship Product One World

J.D. Edwards was founded in 1977 in Denver (cofounded by **J**ack Thompson, **D**an Gregory and C. **Edward** McVaney) with long experience of supplying software for the AS/400 market. J.D. Edwards' flagship ERP product called One World is "capable of running on multiple platforms and with multiple databases, etc [and] revolutionizes enterprise software by liberating users from inflexible, static technologies" (JD Edwards, 2001). The product includes modules for finance, manufacturing, distribution/logistics and human resource, quality management, maintenance

management, data warehousing, customer support and after-sales service. J.D. Edwards' revenue jumped to $944 million in 1999 from $120 million in1992, having more than 5,000 customers in over 100 countries. The One World system is considered to be more flexible than similar competing products and within the reach of smaller enterprises. J.D. Edwards' Internet-extended version of One World was launched recently as One WorldXe ("Xe" stands for "extended enterprise") (JD Edwards, 2001).

2.5. ERP Implementation Phase

Many scholars identified different phases of ERP implementations. Esteves and Pastor (1999) identified six ERP implementations stages like adoption and decision-making, acquisition, implementation, use and maintenance, evaluation and retirements. Alizai (2014) on the other hand, identified five ERP implementation stages; preplanning, planning, detail design stage, delivery stage and go live stages. These have been consolidated to align with ERP implementation requirements (ALizai, 2014).

1. **Pre-planning:** It is important for organizations to perform comprehensive pre-planning analysis of their existing financial and operational performance indicators. At the organizational level, strategic planning for projects becomes vital when risks are high and resource are limited. All important decisions leading to financial approval, the development of a business case, gathering appropriate business, technical and architectural information should be obtained and shared with the appropriate people to allow for an informed decision.
2. **Planning**: This is the first official stage of the project in which initial project activities should be performed, such as the identification of key stakeholders and formation of a governing body and project team selection (including hiring new staff). Change and risk management strategies should be revisited and updated if necessary. A project management plan should be developed to scope the project activities. Project tasks should be scheduled and resource should be identified and allocated (including time and money).

   Accurate and timely information is very important for business process to execute project plans in accordance with their desired expectations. Therefore, it is important that information should be accurate during the entire planning process.

3. **Setup and re-engineering**: To execute the project effectively, it is important to structure the project team with the correct mix of technical and business professionals. As organization businesses lack resource, it is crucial for them to decide whether they need to hire or acquire the necessary skills. Organizations' should identify and reassess their available resource (in-house expertise and finances) to structure the project team according to the standard required for ERP implementation.

   The cost of implementation could be significantly higher if there is a need of customization in the application. Therefore, the organization's ideology should be examined to assess staff and management's attitude to change before making any decisions. The guiding principles of the project should be identified and a business case analysis should be completed to underline the expectations.

   The ERP application should be installed in the development environment and business process mapping should take place with gap analysis. Internal team training should occur to prepare existing organizational staff with the appropriate skill levels. For organizations businesses it would usually be wise to have the right mix of in-house and third party technical expertise to avoid any surprises in the post 'go live' phase.
4. **System design:** This is an important stage in which higher level design should be completed and approved. Extensive communication and coordination is required to address organizational expectations and users should be engaged consistently during the development process. Details in relation to user acceptance should be captured and documented.

   Staff and management attitudes to change should be examined and the change management plan should be updated to provide for resistance to change. ERP applications are complex in nature. Therefore, associated risks should be analyzed and addressed by developing a suitable risk mitigation plan. An initial application interactive prototype should be completed to demonstrate application functionality. This functionality should also be compared with midsize business expectations to ensure that it is addressing the business and technology needs.
5. **Configuration and testing:** Once the interactive prototype is completed, its comprehensive configuration should be executed in accordance with the requirements identified in the design document. Real data should be populated in test instances for

system testing, test interfaces should be developed and reports should be documented and tested accordingly. During the entire testing process, staff should be engaged and extensive communication should be conducted at the organizational level. Information system functions should be assessed and prospective change should be coordinated. The project budgetary estimates should be assessed and existing staff skill levels should be reassessed. System and user testing should be completed in this stage.

6. **Installation & 'go live':** In this stage, all post-testing activities should be executed, such as building the production environment, building the network (if required) and desktop installation (if required). User training should be completed and the system should 'go live' in the production environment. The lessons learned from the implementation should be documented, including change and risk management strategies, management of staff attitudes to change, ERP implementation, business technology issues and so forth. The system support should be ongoing to perform post production problem analysis.

2.6. ERP in Ethiopia

Many scholars suggested as ERP system have many advantages of companies. In order to get these multifunctional advantages many Ethiopian companies implemented the system into their organizations. Along with this, some researchers has conducted study on ERP system implementation in Ethiopia. For example Abiot and Jorge (2012) have made an assessment study on Ms-Dynamics ERP implementation in Mesfin Industrial Engineering. Derese (2013) has conducted a study on ERP system at Ethio-Telecom, Sintayehu(2014) reviewed success factors for implementation of Enterprise Resource Planning system at Ethiopian Airlines and also Kibebework (2015) has conducted research on the challenges and current status of ERP implementation at Mugher and Derba Cement industries.

CBE is trying and taking many organizational improvement systems, which facilitates its progressive functioning. Because of this, it is the first bank in Ethiopia which is currently purchasing and implementing the new enterprise resource planning called Oracle ERP. The bank has paid 2.6 million dollars for the purchase and licensing of Oracle ERP from Oracle; 22pc of the money was for the licensing of the solution. The bank will pay this amount (572,000 dollars) every year to renew the license. The system is integrated with the core banking system of the bank, by

which CBE's transaction, payments, settlements and taxes are automatically monitored (CBE, 2015).

2.7. Factors affecting ERP implementation

Different scholars described factors affecting ERP implementation in different country's context. According to Sintayehu (2014) there are twenty critical success factors of ERP implementation, these are; project planning and strategy, change management and communication, top management support and commitment, project management and leadership, clear user requirement and need assessment, capability of consultants and implementers, project scope management, training, documentation and knowledge transfer, team composition, dedication and retention, data preparation and migration, incentives and celebration of milestones, organizational culture and readiness, users involvement and system testing, quality control and feedback, business process change and less customization, adequate infrastructure and facilities (internet, laptops, project rooms, refreshments), trust and harmony between project team partners, basic IT capability of users and team members, appropriate integration and interfaces, and establishing ERP support team.

In addition to these Prakash and Dixit (2011) identified eight factors affecting the ERP implementation, discussed below.

I. **Data Provided**: Adequate and correct data should be provided. It had to be collected from the distributed Servers that had to be reconciled, mapped into the ERP System in its standard format and finally the data had to be uploaded into the system.
II. **Parallel Systems:** When issues began arising after implementation of ERP in Finance, HR, CSM and BI was completely ignored, they shift work with these modules back to the old system. This is vulnerable the proper integration of organization data and led to data mismatch in other modules as well. As a result, support system provided by the vendor became obsolete and difficult to implement. Hence, use of parallel systems should be avoided.
III. **Training and Testing:** Training and testing of the system should be done properly by the ERP consultants, that is, the vendor is provided as part of the implementation procedure to some group of people from the clients' side known as the Core Team. This core team in

turn trains the rest of people who are actually responsible for day-to-day transactions called the End Users. The training which is provided to the end users was not carried out mainly due to the fact that their lack of computer literacy, triggered a strong resistance to change for the new system being installed and caused reduction of employee's motivation.

IV. **Expectations from the ERP System:** Clarity in management objectives and expectations from the ERP System are clearly stated to the vendors. This led to a belief of the systems' power to integrate the company actual functions. According to the vendor, management expected a quick return on investment which was not practical since it takes few time to notice any significant returns. Hence, top management should be patient with the new system and any fear of failure should be done with for a successful running system.

V. **Employee Retention:** After the completion of ERP training provided to the staff and within some days of the system going live, many of the trainees from the organization quit the company causing great losses to organization in the form of shortage of key resource i.e. trained staff.

VI. **Design & Testing:** This is a very important part of software testing and should not be neglected; the computer workstations are set up in a room to represent each of the major tasks of customer service /order entry, planning, goods-in, stores and finance. A simplified data set is loaded and the company operations run through. The data is gradually increased as first the project team, then managers and finally users get more familiar with the software. This is conducted just before the ERP becomes fully functional in the organization.

VII. **Customization -** Customization Services involves any modifications or extensions that change how the out-of-the-box ERP system works. Customizing an ERP package can be very expensive and complicated. Some ERP packages have very generic features, such that customization occurs in most implementations. Customization work is usually undertaken as "changes requested beforehand" software development on a time and materials basis. But ideally, experts in the ERP implementation field have suggested that customization should be less than 30%. The level of customization in the case of Multiplex exceeded beyond this and posed a great deal of problems when key applications were run and found to be not working as they were intended to.

VIII. Stakeholders shall be identified in the initial phase including customers and vendors:

Stakeholders are all those who are directly or indirectly affected by a company implementing any new ERP system be it organizations like those of the supplier as well as the vendors. Failure to identify the stakeholders gives the implementing company a major setback when the concerned people or organizations work against the new system. So identification of all stakeholders has to be done in advance.

According to Somers and Nelson (2001), success factors affecting implementation of ERP are the following; top management support, project team competence, interdepartmental co-operation, clear goals and objectives, project management, inter-departmental communication, management of expectations, project champion, vendor support, careful package selection, data analysis and conversion, dedicated resource, steering committee, user training, education on new business processes, business process reengineering (BPR), minimal customization, architecture choices, change management, vendor partnership, vendor tools, use of consultants.

And also Upadhyay et al (2011), identified success factors affecting implementation of ERP as top management support, project team competence, project management, user training and education, external consultants, proper package selection, vendor's staff knowledge and support, clear goals and objectives, user involvement and participation, project champion, project cost, effective change management, project composition and leadership, organizational communication, information flow management and minimum customization.

Additionally, Nah et al (2001) identified success factors affecting the implementation of ERP. These are; teamwork and composition, top management support, business plan and vision, effective communication, project management, project champion, appropriate business and legacy systems, change management program and culture, business process reengineering (BPR) and minimum customization, software development, testing and troubleshooting, monitoring and evaluation of performance.

Huang et al. (2004), also identified lack of senior manager commitment to project, ineffective communications with users, insufficient training of end-user, fail to get user support, lack of effective project management methodology, attempting to build bridges to legacy applications, conflicts between user departments, the composition of project team member, fail to redesign business process, unclear/misunderstanding changing requirements.

Wong et al. (2005) identified factors affecting the implementation of ERP. These failure factors are; ERP system misfit, high turnover rate of project team members, over-reliance on heavy customization, poor consultant effectiveness, poor IT infrastructure, poor knowledge transfer, poor project management effectiveness, poor quality of BPR, poor quality of testing, poor top management support, too tight project schedule, unclear concept of the nature and use of ERP system from the users' perspective, unrealistic expectations from top management concerning the ERP system, users' resistance to change.

2.8. Related Works

The literature conducted on factors affecting ERP implementation is necessary to have better understanding, research model, selection of methodology, etc. Various aspects of ERP implementation have attracted the attention of academicians, researchers and policymakers from time to time in different countries (Prakash and Ashish, 2011).

Accordingly, many researchers have conducted different experiments to identify the factors that affects the implementation of Enterprise Resource Planning system in an organization. Some of them are as follow:

Abbas (2015), have conducted a research on Factors Affecting ERP Implementation Success in Banking Sector of Pakistan. The researcher identified organizational, technological and individual factors from literature and then determined their significant impact on successful implementation of Enterprise Resource Planning (ERP) in banking sector of Pakistan. The researcher also affirmed IT infrastructure and IT skills belongs to technological factors and self-efficacy, user involvement that belong to individual factor.

The researcher has used a survey questionnaire to collect data and analyzed it by correlation and regression values show that all CSFs have significant impact on success implementation of ERP. IT infrastructure is less significant as compared to management commitment, IT skills, Training and education, self-efficacy and user involvement (CSFs) in Pakistan Banking Sector. Finally, In order to measure the reliability of constructs the researcher has developed a theoretical framework.

The other researchers are Lee and Lee (2001) who conducted a research on factors affecting ERP system implementation in higher education institutions. They identified three factors affecting

ERP system implementations in higher education. These are administrators, technical teams and End users. The researchers have used a survey questionnaire to collect data and analyzed it by ANOVA results and showed critical success factors (CSF) have significant impact on success implementation of ERP.

They hypothesized these factors and analyzed on ANOVA for testing. And after analysis they have identified seven implementation difficulties: lack of end user involvement, inadequate project funding, lack of business process reengineering, insufficient planning time, insufficient research on vendors, improper technical and insufficient training.

Additional relevant work to this study is a research conducted by Maditinos et al (2012), on factors affecting ERP system implementation effectiveness in Greece. Their study introduced a conceptual framework that investigates the way that human inputs (top management, users, external consultants) are linked to communication effectiveness, conflict resolution and knowledge transfer in the ERP consulting process, as well as the effects of these factors on the effective implementation of ERP system.

They examined their proposed conceptual framework with the use of a newly developed survey questionnaire and gathered data in Greek companies which implemented ERP. The empirical data were analyzed using the structural equation modeling technique. Finally, they have found from the empirical study that the assistance provided by external consultants during the ERP implementation process is essential, knowledge transfer is an extremely significant factor for ERP system success, knowledge transfer concerning technical aspects of ERP systems is more important than effective handling of communication, as well as conflict resolution among organizational members and the role of top management support less importance.

The other study is conducted by Sayegh (2010), Factors affecting the implementation of ERP systems in organizations in the UAE. After reviewing many literature the researcher identified eight critical success factors (CSF's) from these, twenty-four sub-factors were prepared. The researcher also proposed six critical failure factors (CFF's).From these fifteen sub-factors were prepared. These all factors have been divided into three project phases; pre-implementation, implementation and post-implementation.

The researcher has used multiple case studies strategy and has employed the interview to collect data. Finally the researcher found out the CSF's are strategic visioning and planning (pre-implementation project phase), change management (BPC & BPR), communication, ERP strategy &implementation team, project management and management support & involvement were classified as part of the implementation phases and performance evaluation and organizational fit of ERP systems/technical support have been classified as part of the post-implementation phases of an ERP. And critical failure factors (CFF's) like not clear strategic visioning &planning (pre-implementation project phase), poor change management, lack of communication, ERP strategy &implementation team (implementation phase) and performance measurement and lack of organizational fit of ERP systems/technical support difficulties as the post-implementation phases of ERP system implementations.

There are limited researches conducted on ERP in the context of Ethiopia. We present five research studies which were done in this country.

Abiot and Gomez (2012) conducted on a successful ERP implementation in an Ethiopian company called Mesfin industrial engineering in which the researchers have presented experiences of a successful implementation by conducting a case study method. The main objective of the study was to examine the implementation of ERP system considering the key technical, business and cultural dimensions. The research was carried out within the case company by having a detailed look at the issues behind the process. The researchers finally recommended that it is necessary to study and report more ERP implementations in different Ethiopian companies.

The other research is done by Derese (2013) on ensuring successful ERP implementation framework at Ethio-Telecom, a government company. The main objective of the study was to present experiences that were obtained from a successful ERP implementation project. As a research methodology, the researcher used a case study approach with qualitative and quantitative methods. The researcher developed a framework that identified CSFs that need to be addressed during pre-implementation, implementation and post-implementation phases. The researcher also recommended that more researches should be conducted to identify more contextual factors.

Sintayehu (2014) also conducted the research on the success factors for implementation of Enterprise Resource Planning system at Ethiopian Airlines. The objective of the study was to

investigate CSFs and sharing experiences to other Ethiopian organizations with similar context and environment. The researcher has used a qualitative case study strategy like interviews, observations and an online survey questionnaire (supplementary) as main data collection techniques. Finally, the researcher identified twenty factors that can be critical for the success of ERP system implementation in the context of Ethiopia. These factors are project planning, top management support, project management and leadership, capability of consultants, change management and communication, organizational readiness and overall knowledge transfer. The researcher also recommended more single and multiple case studies of ERP implementation should be conducted in Ethiopian organizations to strengthen the findings of success factors.

The other researcher who has conducted a study on ERP in Ethiopia is Elsa (2015) on ERP post-implementation management framework on Ethiopian Airlines. 22The main objective of this study was to investigate technical, organizational, and operational issues of ERP post-implementation success in the context of Ethiopian airlines and design a solution framework to address those issues. The researcher has employed both quantitative and qualitative research approach. Therefore, survey questionnaire and interview contents were prepared based on the defined research model by partially adapting from existing literature and developed her own. Finally, the researcher has developed a high-level ERP post implementation management framework.

In addition to these studies, Kibebework (2015) also conducted research focusing on the challenges and current status of ERP implementation, the case of Mugher and Derba cement industries. The main objective of this study is to assess the challenges and current status of ERP implementation in both companies, and have used both quantitative and qualitative research approaches. The researcher has found factors that affect ERP implementation, namely; disregarding organizational, people and strategy factors that encompass top management support, users training and education, effective project management, user involvement, suitability of software and hardware communication and data accuracy creates great challenge for the success of an ERP implementation. The researcher also found that, there is an explicit linkage between critical success factors and ERP implementation stages. Knowing such relation and determining which critical success factor are best needed in which ERP implementation stage may enable organizations to successfully implement an ERP.

2.8.1. Summary of Related Researches

Authors	Objectives/purpose	Methods/techniques	Main findings
Abbas (2015)	To identify critical success factors of ERP implementation and impacts of critical success factors for the successful implementation of ERP in banking sector of Pakistan	Survey questionnaire	The researcher identified CSFs which have significant impact on successful implementation of ERP. IT infrastructure is less significant as compare to other CSF like management commitment, IT skills, Training and education, self-efficacy and user involvement.
Maditinos, et al (2012)	To investigate the way that human inputs (top management, users, external consultants) are linked to communication effectiveness, conflict resolution and knowledge transfer in the ERP consulting process and their impacts.	Survey Questionnaire	They identified factors like the assistance provided by external consultants, knowledge transfer, knowledge transfer concerning technical aspects of ERP systems is more important than effective handling of communication, as well as conflict resolution among organizational members and the role of top management support less importance.
Lee and Lee (2001)	To Investigate CSF's affecting ERP system implementation in higher education, USA.	Survey Questionnaire	They have identified seven implementation difficulties: lack of end user involvement, inadequate project funding, lack of business process reengineering, insufficient planning

Authors	Objectives/purpose	Methods/techniques	Main findings
			time, insufficient research on vendors, improper technical and insufficient training.
Sayegh (2010)	To understand the critical success and failure factors of ERP system implementations in organizations that are based in the U.A.E.	Case Study with Interview as the main source of data collection	The researcher identified CSF's are Strategic visioning, planning, Change Management, Communication, ERP strategy & Implementation Team, Project Manager, Performance Evaluation and Organizational fit of ERP systems/technical support. And also Critical failure factors like Not clear Strategic Visioning & Planning, Poor Change Management, Lack of Communication, ERP strategy & Implementation Team, Performance Measurement and Lack of ERP technical support.
Abiot & Gomez (2012)	Examines key dimensions of ERP implementation issues with in the case company by focusing on business, technical as well as cultural issues To develop/ design a framework	Case Study with Interview as the main source of data collection	Presents experiences of a successful ERP implementation projects based on the investigated case study.
Derese (2013)	To address factors for ensuring successful implementation of ERP in organizations	A case study with semi-structured interview as the main source of data collection used	A framework proposed on critical factors that need to be focused on each phase of ERP implementation

Authors	Objectives/purpose	Methods/techniques	Main findings
Sintayehu (2014)	To find out the factors that determines the success of ERP implementation.	A case study with questionnaire and Interview	Identified twenty critical success factors of ERP implementation.
Elsa,T. (2015)	To investigate technical, organizational and operational issues of ERP post-implementation management and design a solution framework.	A case study with questioner as the main source of data collection used.	The framework presents core issues/ activities from four perspectives (Management, People/users, Process and Technology).
Kibebework,A. (2015)	To investigate & identify the challenges & current status of ERP implementation	Both qualitative and quantitative survey	Identified strategy , Organizational and people factors

Table: 2.1.Summary of related researches

Table 2.1 shows most of the local researches are done on ERP critical success factor, ERP implementation framework and post implementation.

Since organizations have different working practices that depend on their culture and nature of business, like the organizational culture of banking industries differs from the culture of other organizations. And also different ERP systems have their own unique implementation methodologies. In addition to these ERP success factors have different degrees of importance depending on the phase of ERP implementation. Therefore, this study will focuses on these to find out organizational, technological, and individual factors affecting the implementation of ERP at each phase of ERP implementation in the Commercial Bank of Ethiopia.

2.9. Research Model

Since the study is focusing on the current status and factors affecting the implementation of ERP at CBE, the research model on which the research bases inherit from Abbas (2015) and Alizai (2014) model to make the study more comprehensive. Accordingly, this research model or framework was adopted from these researchers, because their works are very relevant to this objectives and selected company and the reason for the selection of this model is its relevance to the study the researcher conducted.

This research model was selected for the study, after conducting detail review of related works conducted in different countries and different companies, vender, etc.

There are certain research approaches that have been used to examine and identify factors or variables that are critical for successful implementation of an ERP system such as those presented by Bancroft et al. (1998) and Ross (1998). Markus and Tanis (2000) and Parr et al. (2000) are some of the works on project phase model (PPM) which identifies success factors associated with the business process stages of ERP implementation. Alizai (2014) also identified factors that could influence the implementation of ERP system; these factors are classified into three, as follows:

Organizational Factors: the factors directly or indirectly relate to the structure of the organization, operational, human and management requirements. These factors include staff ICT skills, management ICT skills, organization size, internal barriers, support, funding, strategy,

business objectives, customer response/attitude, government regulations, competitive pressure, external barriers and suppliers.

Technical Factors: this factor group relates to the *soft* and *hard* aspects of the technologies being adopted, including ICT infrastructure, purchase, implementation and integration cost, system evaluation and selection criteria, complexity, vendor after sale support services and the selection criteria for software.

People or individual factors: these factors related to human resource factors like skills, conflict resolution procedures, etc. In addition, Abbas (2015) proposed technological, organizational and people factors that we adopted and analyzed for this study, as a research model depicted as follows;

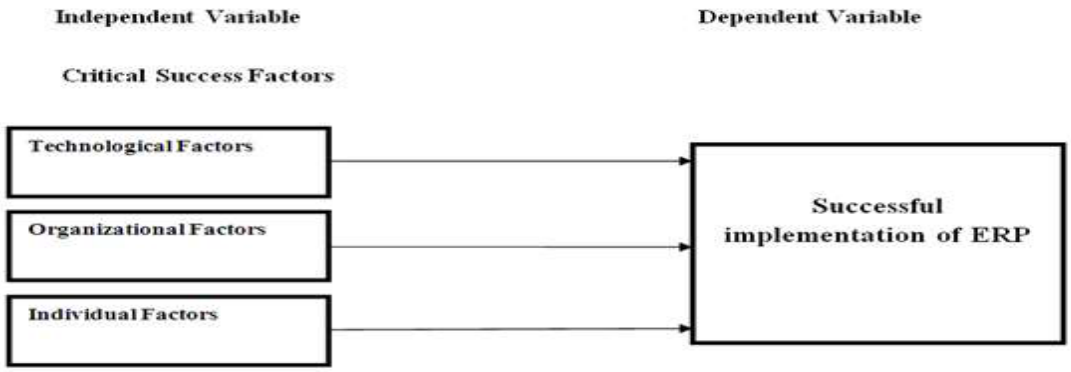

Figure 2.3: The theoretical Framework (adopted from Abbas, 2015)

As we can see from the above figure 2.3, there are three critical success factors for an implementation of ERP in an organization. These three factors were deeply analyzed and agreed factors by different scholars, so we used them as factors for the case company, CBE.

Generally, these all types of factors (technological, organizational and people) and its associated stages were adopted from Abbas (2015) and Alizai (2014) respectively. The table 2.2 shows them.

Stages	Technology factors	Organizational factors	People factors
Pre-Planning	• Business requirements identification • Technical requirements identification • Impact of technology	• Organizational Knowledge • Organizational Political support • Change and Risk Analysis;	• Limited resource (Skills)
Planning stage	• Selection criteria with relevant parameters • Accurate information on ERP applications	• Cultural factors (local, national) • **Project Management;** o Detailed project plan & communication strategy o Project Leadership (risk & issues) o Clear & well defined objectives (Scope) o Organizational change management o Risk Planning & Monitoring; o Effective Communication	• User support base for application • Change Management planning .
Detail Design stage (Set-up, Re-engineer, System Design)	• ERP complexity; • Cost of implementation • ERP compatibility *integration* issues • Development of a system design strategy	• Issues due to Mergers/ Acquisitions • **Project Management:** o Project monitoring & control o Risk Monitoring; o Stakeholder expectation management o Effective Communication & Coordination; o Organizational change management o Organizational resource management	• In-house expertise • **Change Management** o Business support for UAT team o Staff attitude to change o Management attitude o Clarity in communication o Communication transparency Internal & external team engagement

Stages	Technology factors	Organizational factors	People factors
Delivery stage (Configure, develop and test)	• ERP installation aspects; • **Data migration** .Practically performing or doing • **Application integration** Interface system information Integrate and test integration	• Limited Resource (Budget) • Information System Function (UAT) • Project monitoring & control (report) • Organizational change management (monitoring)	• Staff Involvement • Allocate Dedicated resource for testing (people/skill) An ability to fix defects in testing) • Key users involvement for testing
Go Live stage (Sign off and Go live)	• ERP implementation(Go live) issues (Update); • Business & Technology Issues (Update); **Operational implication analysis** Knowledge management for ERP maintenance/support	• Strategic Management Issues (Update) • Effective Communication • Project monitoring & control • Organizational change management • **Operational implication analysis** o ERP business functional impact(simple to complex)	• Staff attitude to change (Update) • Management attitude (Update) • End user engagement • **Operational implication analysis** o Succession planning o Knowledge management for ERP maintenance/support

Table 2.2: Factors affecting ERP implementation at its different stages (Adopted from Alizai, 2014)

As we can understand from table 2.2, there are different factors affecting ERP implementation at each phases. Therefore, this work focuses whether the same holds true in the CBE context.

2.10. Summary

This chapter discussed in detail a foundation to create well understanding of the ERP system definitions, history, implementation stage and detailed explanation about factors affecting ERP implementation. In addition, related works were reviewed to be able to get the methodology of other researchers in that the way they have conducted ERP related studies in developed and developing countries.

Having laid a basis from the different literature, a research model was adopted that will be a benchmark of this research. Therefore, the research model supports this study, whether it is ‘agreed’, ‘oppose’ it or ‘add new knowledge’ to it (factors affecting ERP implementation at each phase). The approach followed to undertake the research and the results will be investigated in next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

The previous chapter, presented factors affecting ERP system implementation and issues related with ERP system implementation by reviewing literature. This chapter discusses about the methodology by which the researcher employed conduct the study. Thus, overview of the methodology**,** research purpose, research approach, research strategy, the case study as a research method, case selection and sampling, data collection method, methodological limitations, data analysis techniques, related works and their methodologies, quality of research and finally summary of the methodology are presented below. Therefore, this chapter outlines the methods that were used in answering the research questions.

3.2. Overview of Methodology

Several researchers have written widely on research methodology. The primary issue in most of the studies on research methodology is that the selection of methodology is based on the research problem and stated research questions. Methodologies cannot be true or false, only more or less useful (Silverman, 2001). Naichiamaset al. (1996) for instance states that methodologies are considered to be systems of clear rules and produced, upon which the research is based, and against which claims for knowledge are evaluated. Conducting any type of research should be governed by a well-defined research methodology based on scientific principles. Research methodology can be again defined as a method or way to systematically solve the research problem (Blaxter et al, 2006). The researcher also defined methodology as the overall approach that supports the research process.

The research method is the important part of a research, because it helps researchers to decide how to achieve the specified objective, what data to collect, and how to collect and analyze the data in order to solve the target problems. Therefore, it needs much consideration on choosing the appropriate methods, which can provide the desired outputs.

According to Eldabi (2002), a series of steps as a research paradigm needs to be followed in a methodology part of a research. Based on his suggestion this research followed the basic framework of research paradigm developed by Foster (1998).

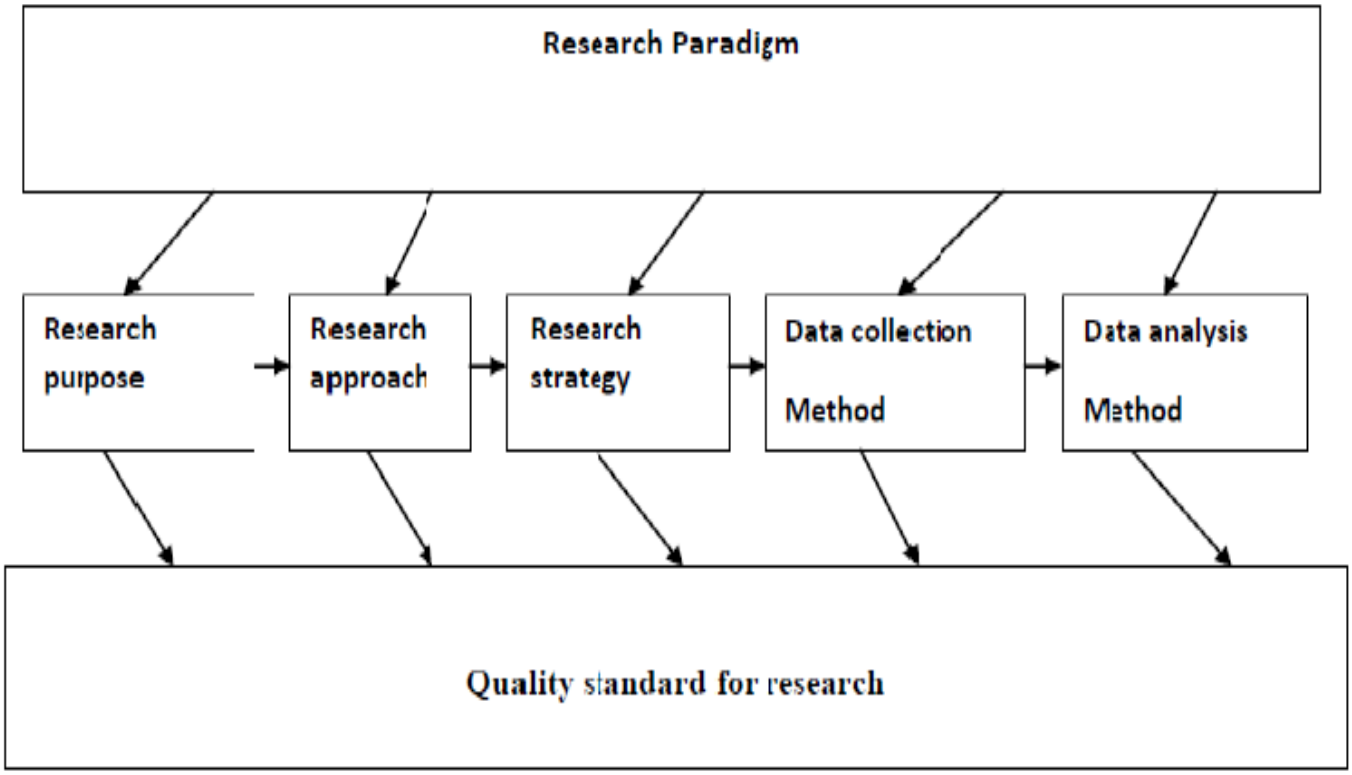

Figure 3.1: Framework for the research Paradigm (source: Foster 1998)

3.3. Research Purpose

A research for academic purpose is usually undertaken to further enhance knowledge on a topic of interest to the researcher. There are three types of academic researches depending on the problem area and the nature of the phenomenon and based on the purpose of the research namely; exploratory, descriptive or explanatory (Saunders et al., 2007).These all methods can be used against the research strategy of a case study to assist in explaining, describing and illustrating the research as a means of adding knowledge to research through the case. These three research types are discussed in detail below.

Exploratory studies: According to Saunders et al.(2007), exploratory studies are most beneficial if one needs to clarify their understanding of a certain difficulty. He also states that such a study is applied to assist one in finding out "what is happening; to seek new insights; to ask questions and to assess phenomena in a new light". As described by Saunders et al. (2007), there are three ways of undertaking exploratory studies, which are studying different literature, interviewing professionals in the topic of choice, and conducting focus group discussions. All lead to the input of gathering information from trusted and qualified sources.

Exploratory research is often used when a problem is not well known, or the available knowledge is not absolute. The technique best suited for information gathering when performing an exploratory research is interview (Yin, 1994). So this exploratory research can be used for the purpose of this research.

Descriptive studies: these studies would be used in order to "describe an accurate profile of persons, events, or situations" (Robson, 2002, as cited in Saunders et al., 2007). A descriptive study can be considered as an extension of the exploratory study where it is actually necessary to begin the research by having a clear picture of the concept proposed. It is also appropriate for situations where a problem is clearly identified and the intention of the research is not to present the link between causes and symptoms.

Explanatory studies: Explanatory studies are valuable when studies are meant to establish causal relationships between different variables. Examining a situation or a problem to explain the relationship between variables would be the outcome of an explanatory study (Saunders et al., 2007). Yin (2009) adds that explanatory study is used as a means to answer 'how' and 'why' questions and get answers, especially for the case study research method.

For this research, the exploratory studies was used to assess the ongoing ERP implementations in light of the factors affecting that would be highlighted to understand the best and most beneficial way of implementing ERP systems. Since this research aims to explain and assess the current situation of ERP system implementation in CBE, it is important to understand certain concepts on the data that would be collected prior to collection. So, descriptive research was used for the case of this research. The output of this research would also be focused on explanatory studies where

understanding the cause and effect of variables are of importance to the researcher. Therefore, all three methods were employed, but mostly explanatory studies are used to achieve the objective of this research.

3.4. Research Approach

Research approach can be divided into a quantitative, qualitative, or mixed approach. The decision of whether to carry out a quantitative or qualitative approach lies in the researcher's approach (Kanaan, 2009). The approach also can be either inductive or deductive.

3.4.1. Quantitative versus Qualitative Research

Quantitative approach involves counting and measuring (quantifying) using numbers to explain certain answers. They give out descriptive data such as mean, frequency and correlation as they draw significant relations between variables (Gillham, 2000). Qualitative approach simply signifies that the information gathered from qualitative data needs to be interpreted by the researcher since information gathered from people is what the result is.

Qualitative data refers to "all non-numeric data or data that have not been quantified and can be a product of all research strategies" (Saunders et al. 2007). It is practical when the researcher wants to transform data that has been observed or reported without the use of numbers, only words. Qualitative approach of analysis is usually used when the sample size of the study is small-scale.

Disclosing the factors affecting ERP system implementation through single case study, and comparing them with existing literature was the method we followed in this study. The purpose of this research was to investigate certain factors in-depth and provide a better understanding of them, rather than providing a causal relationship without generalization. Therefore, a qualitative research approach was the method we employed for this study.

3.4.2. Inductive versus Deductive Approach

Inductive research (reasoning) is moving from specific observations to broader generalizations and theories. Informally, scholars sometimes call it a "bottom up" approach. In inductive research, we begin with specific observations and measures, begin to detect patterns and regularities, formulate

some tentative hypotheses that we can explore, and finally end up developing some general conclusions or theories.

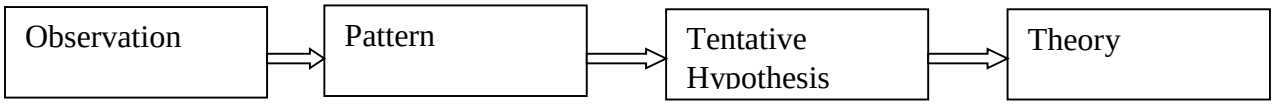

Figure 3.2: Inductive research (source: William, 2006)

According to Wilson (2010), deductive approach is concerned with "developing a hypothesis based on existing theory, and then designing a research strategy to test the hypothesis. It implies that deductive means reasoning from the general to the particular. If a causal relationship or link seems to be implied by a particular theory or case example, it might be true in many cases. A deductive design might test to see if this relationship or link did obtain on more general circumstances. It also indicates deductive approach can be explained by the means of hypotheses, which can be derived from the propositions of the theory. In other words, deductive approach is concerned with deducting conclusions from premises or propositions.

Deduction begins with an expected pattern "that is tested against observations, whereas induction begins with observations and seeks to find a pattern within them".

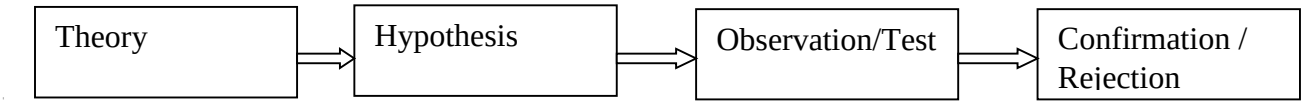

Figure 3.3: Deductive reasoning (source; Wilson, 2010)

The table below shows the summarized similarity and differences of both inductive and deductive researches, (source: Cole, 2016).

	Deductive Research	Inductive Research
Introduction	Deductive reasoning, also called deductive logic, is the process of reasoning from one or more general statements regarding what is known to reach a logically certain conclusion.	Inductive reasoning, also called induction or bottom-up logic, constructs or evaluates general propositions that are derived from specific examples.
Arguments	Arguments in deductive logic are either valid/invalid. Invalid arguments are always unsound. Valid arguments are sound only if the premises they are based upon are true.	Arguments in inductive reasoning are either strong or weak. Weak arguments are always not convincing. Strong arguments are convincing only if the premises they are based upon are true.
Validity of conclusions	Conclusions can be proven to be valid if the premises are known to be true.	Conclusions may be incorrect even if the argument is strong and the premises are true.

Table 3.1 Comparison of Inductive and Deductive Research

Inductive approach is used for this study because it starts with specific observation into the data to find patterns and regularities and finally ends with developing general conclusion and theory. In this case, the aim is to identify specific ERP implementation factors and analyze their influences on the overall ERP implementation success. Hence, inductive approach is preferred for this research.

3.5. Research Method and Strategy

According to Saunders et al. (2007), no research strategy can be considered as superior or inferior to another. The research strategy that should be chosen have to be one that finally guided by the time available to undertake the research, the research question, its objectives and the extent of existing literature or knowledge on the topic.

The most important condition for differentiating among the various research strategies is to identify the type of research question being asked (Creswell, 2003; Hair et al. 2006). It is possible to identify some situations in which all research strategies might be relevant and other situations in which two strategies might be considered equally attractive. We can also use more than one strategy in any given study. To this extent, the various strategies are not mutually exclusive. Nevertheless, we can also identify some situations in which a specific strategy has a distinct advantage (Yin, 1989). According to Yin (1994), there are five strategies to collect data and get results, namely: experiment, survey, archival analysis, history, and case study. In addition, there are three criteria to determine the research strategy, i.e.; the nature of research questions, control over behavioral events, and focus on present events. However, it is important to notice that boundaries among the above methods are not completely clear and they may overlap with each other. The relevant situation for different research strategies are summarized in the table 3.2 below.

Strategy	Nature of questions	Requires control over behavioral events	Focused on contemporary event
Case Study	How, Why	No	Yes
Experiment	How, Why	Yes	Yes
Survey	Who, What, Where How , How many	No	Yes
Archival analysis	Who, What, Where How many, How much	No	Yes /No
History	How, Why	No	No

Table 3.2: Characteristics of different research strategies (Source: Ahmed, 2011)

For this study, a research method that we used is the case study method. According to Gillham (2009), a case study can have many meanings or interpretations. A case can be an individual, group of people, society, community, organization, etc..., and would be two or more of these. He also defined a case study as "an investigation of a case that seeks to find data about the certain case where it can be explained into words answering certain questions or a research question".

Yin (2009) states that using a case study strategy is mostly beneficial to answer questions that relate to how and why questions. He also explains that with case study, a researcher does not have control over behavioral events and focuses on present or contemporary events as opposed to historic ones (see the above table). A case study has been defined as "a strategy for doing research

which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002: cited in Saunders et al., 2007). The goal of a case study is to expand and analytically generalize theories where input of observation can be added to research (Yin, 2009).

Case study can be either single or multiple. A single case study will focus on one organization from a single industry, for example this study. Multiple case studies however allow the researcher to present data on more than one organization either from the same or different industry.

The use of case study in this research will particularly add knowledge of technological, organizational, and individual factors that affects ERP system implementation that will add to the research by representing real events and processes applied. It will also be used to add to findings from the various literature, where gaps, if any, can be highlighted, presented and be used as a basis of knowledge for the researcher and anyone interested in the topic.

The purpose of this research is to answer questions of 'how' and 'why', but not only this. Therefore, following the case study method helps in gathering the information required to support this research. Single case study has been used and data has been collected, analyzed, and compared with existing literature.

3.6. The Case study as a Research Method

According to Yin (2009), using the case study method as a research method and linking it to the research strategy requires consideration of at least four different application strategies. These are: "the first and most important is to explain any causal links that arise from the real-life study of a certain case. Second would be to describe the real-life scenario as it really is when the study was undertaken. Third would be to illustrate the real-life setting, and the certain study that answers the research question, by evaluating the situation through description of the scenario. Fourth would be to show and add new knowledge gained from the case study; either adding new knowledge from the outcome of the study or agreeing with old knowledge is the main product."

Yin (2009), also advises to follow a six-step method for conducting a case study research approach -plan, design, prepare, collect, analyze and share. The case study method's limitations and strengths are discussed below.

3.7. Case Selection and Sampling

According to Yin (2009), for a researcher who is designing their case study research, the first step prior to data collection would be to select the final case(s) that will be a part of the case study. Scientifically, researchers choose cases depending on the research objective and by considering other factors. This means that research objective may influence the case as well as the researcher himself may select the case that is appropriate according to population, resource etc. Yin (2009) advises that, in such scenario, the researcher screens the final candidate case studies prior to beginning data collection to avoid any problems that occur during the data collection process.

Commercial bank of Ethiopia is selected as a case for this study based on two reasons. First, CBE is the pioneer bank implementing Oracle ERP system in Ethiopia. Second, business experiences and services of CBE are multi-functional, which different banks and other organizations in Ethiopia can share. Due to the above reasons, CBE is the appropriate choice for this study.

Sampling techniques is divided into two, namely; 'probability or representative sampling' and 'non-probability or judgmental sampling' (Saunders et al.'s, 2007). Probability or representative sampling uses a form of random selection of samples as opposed to non-probability or judgmental sampling that do not depend on random selection of potential cases.

Saunders et al.'s, (2007)also divided non-probability sampling into four methods. These are quota, snowball, self-selection, convenience and purposive sampling. Quota sampling refers to the selection of non-random cases as per a certain fixed quota. Snowball sampling is mostly used when the researcher is trying to find a population that is difficult to get. This means, one person informs another about the research and through that, more cases can be attained.

Self-selection method refers to allowing each case to explain why they would like to take part in the research. Through advertising or a form of media, people contact the researcher and data is collected from those who responded.

Convenience sampling method, individuals are usually chosen in the most convenient way to participate in the research. Usually, walker-byes are stopped and questioned respondents.

The purposive or judgmental sampling technique allows researcher to make their own selection study participants based on their judgment considering the research needs and requirements. Purposive or judgmental sampling technique, which is non-probability method is used for selection of study participants for this research. The data was collected through individual interviews.

3.8. Candidate Selection

ERP has many support process modules that can be used for different purposes but CBE have implemented five of them. These are Finance (6 module), Human Resource (9Modules), Business Intelligence (2 modules), Supply Chain Management (5 module) and Hyperion (6 module). Among these five major support processes this research focuses on four of them; Finance, Human Resource, Business Intelligence, and supply Chain Management support process modules. This is because of Hyperion support process module is still at infancy level and was not included for the study.

The selection of study subjects (candidates) for this research was conducted with non-probability or judgmental or purposive sampling method. Currently, more than 100 dedicated employees are engaged in the CBE ERP project. From them, researchers selected ten (10) respondents; ERP Project manager, ERP Project consultant (local), ERP Team Leader, ERP Super User, and ERP Technical Team as presented in the table below. They are selected purposively as all the selected candidates are involved at all phases of the ERP implementation, and meet the selection criteria. This method also agrees with Yin's (2009), proposed method of candidate selection, in the sense that certain pre-selection criteria were checked when candidates are selected. The criteria followed in this research are:

1. All candidates have involved in implementation of ERP system at all phases.
2. They are all still using the system.

No	Support Process	Interviewee(s) Role
1	Finance	Team Leader, business manager/Super User and Technical Team
2	Human Resource	Team Leader, business managers/Super User and Technical Team
3	Supply Chain Management	Team Leader and Technical Team
4	For all Support process	ERP Project manager
		ERP Project Consultant

Table 3.3: Interviewee candidate (Source: Primary Data)

Table 3.3 shows that respondents of the interviewees from each module of ERP implementation those are highly involved. These were selected as they have a knowledge or experience about the ERP implementation.

3.9. Pilot Interview and Reflection

After extensive reviewing of literature and related works, a sample of semi-structured interview questions were adopted from Alizai (2014) and Abbas (2015), finally organized as per the context of CBE's ERP implementation. Then the interview questions were tested through discussion with five individuals those are involved in CBE's ERP implementation. The purpose of the pilot interview was to identify errors and ambiguity of ideas in the questions, as well as its inclusion of all ideas about CBE's ERP system implementation. Those questions with vague terminologies that are difficult to understand by interviewees are revised based on the pilot interviews.

After the questions are revised based on comments received from individuals, face-to-face interviews were conducted with study participants. The researcher conducted all the interviews for this research.

3.10. Data Collection Method

Yin (2009) identified five components of a research design in a case study, these are; a study's questions, its propositions (if any), its unites of analysis, the logic linking the data to the propositions, and the criteria for interpreting the findings. The researcher also states that evidence in case studies can be found through "direct observation of the events being studied and interviews of the persons involved in the events". Saunders et al (2007) defines an interview as a purposeful discussion that occurs between people that assists in gathering valid and reliable data of current

situations that are relevant to the research question. In this case, the interview technique was used primarily to collect all relevant data from representatives of four support processes of CBE's ERP implementation project teams.

In addition to interview, the researcher used document analysis, direct observations, and participant observation. Since the researcher was one of the technical team member of the organization's ERP implementation, getting access to data and staff of the bank was not as such difficult. Direct and participatory observations were also used as supplementary methods to interviews. Direct observation refers to the researcher observing the actual case in the place of its existence while participatory observation refers to the researcher taking part in the case and not being as passive as a regular observer.

3.10.1. Interview

According to Creswell (2007), interviews are well appropriate when looking for opinions, experiences and privileged information from respondents in key positions. There are three formats of interviews, namely: unstructured interview, semi-structured interviews, and structured interviews. Unstructured interviews are open discussions and these types of interviews are not appropriate since the scope of the study will not be controlled. Structured interviews on the other hand are closed questions that are associated with short answers. These also cannot be used for this study because it affects getting detailed data or information. Semi-structured interviews are preferable for this study since it allows detail discussions that enable controlling the scope of the study.

The researcher has prepared a semi-structured interview guide based on the objective of the study. The interviews were conducted at a convenience place and time agreed between the researcher and interviewee. The interviews were not recorded as interviewees expressed their unwillingness during the pilot discussions. The researcher also believed that insisting interviewees for recording will make them refrain from the interview. Due to this, only notes were taken from the interviews. The note was taken in English and Amharic and the Amharic notes are translated later into English. The notes were expanded, reviewed and summarized immediately after each interview.

The interview process has been started by contacting the selected candidates, briefly describing the objective of the study and also sharing the interview outline through personal e-mail. Based on the first briefing, an interview appointment was set at the interviewees' convenient place and time. Most of the interviews were conducted out of the normal office hours so that the informants can give an in-depth feedback without time constraint. The interviewees were conducted with in the span of four weeks and each interview took between 60 to 90 minutes.

All the interviews were conducted in the interviewees' respective offices in order to keep their comfort. The interview was started by a brief introduction of the objective, scope and expected benefits of the study. The interview has been conducted using the prepared interview questions.

After all interview process were accomplished, the responses organized and analyzed to summarize the required information for the study. Then the summarized ideas were compared with relevant and existing literature of the research.

3.10.2. Observation and Participation

Direct observation and participant observation were also used as primary data collection method in addition to the semi-structured interview for this study. Direct observation is a situation in which the researcher makes a site visit and collects data from the case company. Participatory observation is a method in which the researcher actually participates in the events being studied and related activities (Yin, 2009).

The researcher has made observation on how the ERP system is being implemented and used. This enabled the researcher to know what is necessary and what are fulfilled for ERP system implementation. ERP systems are new, complex (especially its navigation) and user interfaces are not as user friendly. ERP systems get user appreciation as they are used more and more through experience. Based on this, some of the super users become easily familiar with the new system while others are observed are not yet comfortable with the system.

In addition to this, since the researcher was on one of the technical teams, the researcher has involved in CBE's Oracle ERP implementation. The researcher also has attended various trainings workshops and conferences provided by both by the vender side and in-house experts of CBE.

These trainings have given understandings about ERP systems as a whole, the need for them, their demand in Ethiopia and factors that affect its implementation with conditions to be fulfilled for such ERP systems. Overall, observations and participation of the researcher in the Oracle ERP implementation enabled us to get detail knowledge about the implementation of Oracle ERP.

3.10.3. Document Analysis

Document analysis was used to support the analysis by reviewing different documents of Commercial Bank of Ethiopia. Some of the documents that were analyzed include Commercial Bank of Ethiopia's support processes like Finance, Human resource, supply chain management, business intelligent and Hyperion documents of Oracle ERP system.

CBE's strategy plans, contract agreements between CBE and Tech Mahindra Ltd and were also reviewed to collect additional data to understand about the company and the ERP project. Even if detail literature review is done which are conducted in developed countries, there is limited or no research or document on ERP implementation especially regarding the Oracle ERP in this country.

3.11. Data Analysis Method/Technique

According to Yin (2009), data is analyzed to draw empirically based conclusions. There are some techniques of analyzing data; to examine, categorize, tabulate, test etc. He also identified five analytical techniques to analyze data for case study research strategy; pattern matching, explanation building, time series analysis, logic models and cross-case synthesis.

Pattern matching is an analytic technique that is strongly pushed to be used for analysis. The researcher analysis of the data is considered to be findings that agree, disagree or add new knowledge to the existing literature.

Generally, analyzing data is based on developing and applying a certain method that will break the data down into results that are tested against the factors affecting ERP implementation success. Factors that affect the implementation of ERP have been derived from the literature and this research tends to use a pattern matching technique where findings will agree, disagree or add knowledge to existing literature.

3.12. Research Validity and Reliability

In any research, it is vital to present its validity and reliability. Validity, according to Kvale and Brinkmann (2001), infers that data received or analyzed is based on the truth, and is presented correctly. They also define reliability by highlighting that is concerned with ensuring the findings of the research are consistent, dependable, and if the research were to be done all over again, by other researchers, the same results and findings would be gathered. According to Yin (2009), there are four tests that researchers can undertake to ensure validity and reliability are not ignored throughout the case study; construct validity, internal validity, external validity and reliability.

Construct validity is referred to when data is being collected. Yin (2009) advises that 'multiple sources of evidence' are used and that it would be important to establish a 'chain of evidence'. Internal validity is concerned with the data analysis phase where it is advised to follow any of the analysis methods described earlier, such as pattern matching. External validity is the third test that deals with validity of a certain study. Yin (2009) stated that such test deals with generalizing beyond the immediate case study. It is mainly used during the research design phase. Case studies rely on analytic generalization where a researcher is attempting to generalize a certain set of results to a broader theory (Yin, 2009). Theory is the keyword that is to be used as a basis of the research design. Reliability is concerned with the data collection phase where it is advised that case study protocol be used.

To ensure validity in this research, the following has been done at every stage of the tests highlighted by Yin:

- **Construct Validity:** Interviews were the main source of data collection. Interviews that have been done with ten employees for all case to ensure that different ideas and backgrounds. All interviewees were part of the ERP implementation projects that took place. This also adds to the data triangulation construct validity, which addresses several sources of evidence referring to the same topic. Other sources of evidence, such as observation and having been a part of the implementation process myself, add to the research validity as a complimentary source.

  The interviews were presented to the respective interviewees within one to two days after the interview. This is used to get feedback from the interviewees regarding to the report. The

responses were very constructive with few useful comments and corrections. Accordingly, adjustments were processed into final interview result and reached in consensus with the interviewees prior to using the interview output.

- **Internal Validity:** Since this research follows an explanatory method, it is a tool that was used to ensure validity during the data analysis phase where pattern matching was the technique followed. The aim was to ensure that the data gathered from interviews matches the data derived from the literature.

- **External Validity:** Since this research is not attempting to generalize a theory, but rather to ensure agreement and add knowledge, if possible.

- **Reliability:** Interviews scheduled were only with those that were a part of the implementation phase and have used the system afterwards. They had background knowledge, which was important to ensure that information they share is reliable. Interviews were set at their offices, to ensure that a certain comfort zone was maintained where the stress factor could be reduced. The interviews were conducted in English and Amharic through note taking.

3.13. Summary

The objective of this study was to identify and analyze factors affecting ERP implementation in CBE. The methodologies selected and employed were chosen in order to meet the objective of the study. Accordingly we used a case study in which qualitative data collection methods like interview, observation and participations were applied. They were selected after detail analysis of related literatures conducted, in which majority of researches on ERP implementations were done in a similar strategy, case study.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1. Introduction

In the previous chapter, the methods and techniques that were used in answering the research questions has been presented. In this chapter, we focused on the analysis of the results obtained from the interview that was conducted to asses and identify factors affecting and stages of ERP system implementation at Commercial Bank of Ethiopia based on the selected research model. Observations and participation, and document review (in support of interview) about ERP system implementation at CBE were also analyzed. The detail discussions of them are presented as follow.

4.2. ERP Implementation at Commercial Bank of Ethiopia

As stated before and data gained during interviews, ERP system was decided to be implemented at commercial bank of Ethiopia as part of its IT transformation project to upgrade and replace the existing back office support systems like the financial, human resource management, supply chain management, business intelligence and Hyperion support systems.

There is some motives that forced the bank to implement ERP, the main ones are the followings;

- Its vision, that is by 2025 the bank aimed to join world-class banks, hence ERP is one of the standards to be fulfilled.
- Successful implementation of core banking, the previously existing T-24 core banking system enabled to implement ERP system.
- Solution for its core processes (support processes) like finance, HRM, SCM, BI and Hyperion.
- Need for common enterprise-wide database (reduces Inconsistency & reconciliation)

Additionally, after analyzing interview, observation and participation CBE was implemented ERP for two major benefits; business and technical benefits. The business benefits it obtained from implementation of ERP are;

- Bank wide integration on a common system,
- Improved internal communications,
- Reduce or eliminate manual processes,
- Enhance strategic decision making and planning capabilities,
- Establish a self-service environment for employees,
- Enable higher availability of administrative systems,
- Support sophisticated data analyses for use in decision-making and
- Integrated workflow, industry best practices, and reduced dependence on paper

Secondly, the technical benefits CBE aimed to get from ERP are also as follow;

- Reduce or eliminate the need for shadow systems;
- Platform for re-engineering business practices and continued process improvements;
- Develop and maintain consistent data definitions;
- Provide accessible, user-friendly administrative and employee support services;
- Increase data integrity, validity and reliability;
- Assure system wide security and protection of confidential information;
- Create a more seamless integration between technology and support processes by providing a single platform based on new technologies and
- Access to data in real time;

Generally, all these factors made the CBE to implement ERP system into its system to automate support processes, to cope up with advancing technology, to compete with its competitors, etc in order to boost its company in all aspects of its activities (CBE, 2010).

4.2.1. CBE Support Processes Automation by the ERP Systems

During this study, we have identified support processes that can be greatly automated by ERP from documents like CBE contract agreement with ORACLE ERP tech Mahindra, manuals, interview and observation. These are Finance, HRM, SCM, BI and Hyperion each of them are discussed in detail below.

Finance: The finance support process has two sub-processes under it. These are Fund Management and Accounts & reconciliation. The activities under these sub-processes are partially supported by the core banking solution. Fixed asset administration is handled by in-house developed isolated system. Thus, implemented ERP system in general, and the Finance module in particular, is expected to handle a wide range of financial activities including automatic inter-branch as well as head office accounts settlement, tangible or fixed and intangible asset management, and fund management activities.

Human Resource: The other core support process is the Human Resource process which is also supported by isolated software called UniQue which perform in a centralized way. The bank is using this system to administer records and profile of all CBE employees centrally at its head offices. The network infrastructure for this application system is limited to the Head Office building. The other wing of HR expected to be incorporated in the ERP system is the learning and development aspect of the bank.

Supply Chain Management: this is a procurement sub process responsible for facilitating the acquisition & distribution of fixed and non-fixed assets, stationary and other items that are useful in running the bank's day-to-day activities.

Hyperion: The strategy management process mainly focuses on aligning the organizational mission and vision with strategic goals and objectives of the bank. It is also concerned with the effective cascading of the scorecard/plan and budget up to the level of individuals. The requirements of three sub-processes structured under it, namely planning and strategy management, Evaluation and Monitoring, and change management, are included in this document.

Business Intelligence: The other strategic functionality the bank acquired from the proposed software is Business Intelligence that enables the company to easily keep track of all the information important for the organization. Business Intelligence is an important component of banks' implementation of IT based strategies. It helps to improve products, enhance customer relationships, make better forecasts based on past trends, handle competition, manage risk, increase operational efficiency etc., on the way to a healthier bottom line.

Additionally, **fleet management** is also supported by the automated system as CBE has many vehicles and previously fleets managed manually. By and large, these support processes have been equipped technologically from ERP implementation to perform their activities in line with modernized, timely and fully as per the need of the bank that can be maintainable, upgraded and customized.

The solution installed by Tech to CBE is based on the best governance solution practices. The figure 4.1 shows interfaces how the implemented stack can interact with other applications of CBE or External parties (national payment system) that provided a holistic low maintenance and list of Oracle modules with corresponding support processes for CBE based on requirements.

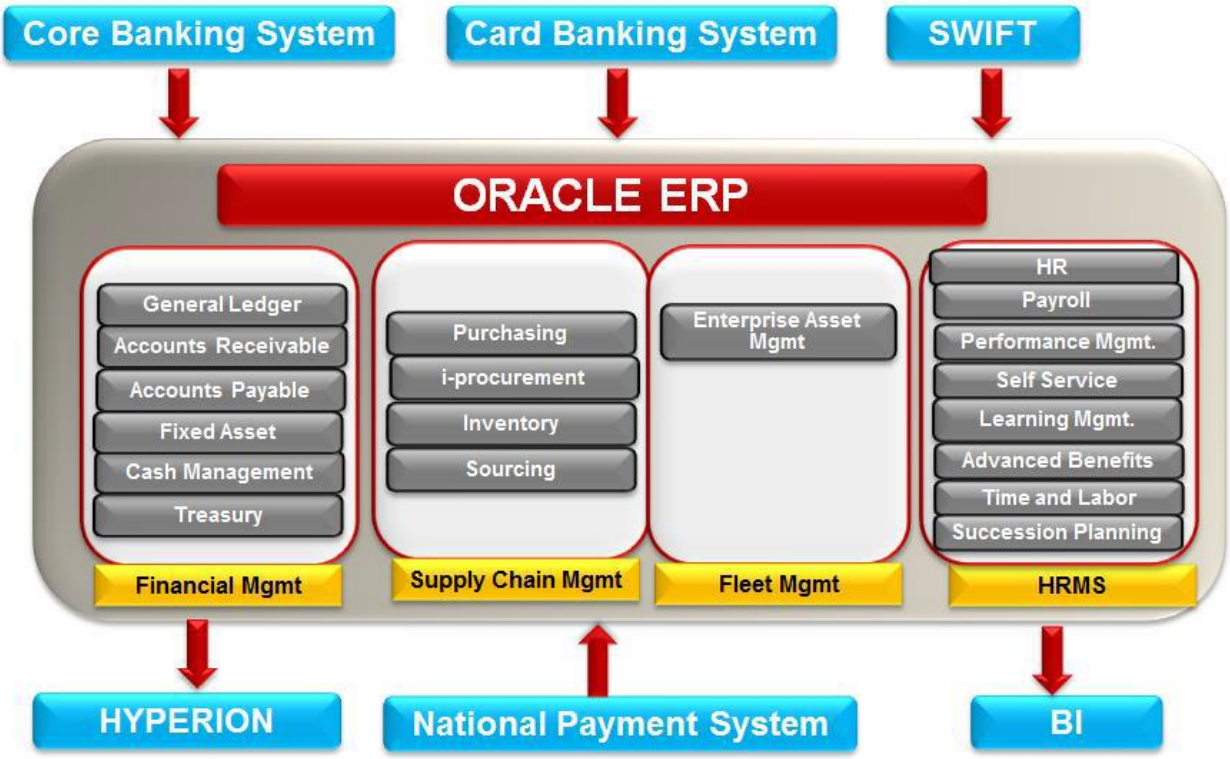

Figure: 4.1: ERP Application Architecture Overview (Source: CBE contract memo)

4.3. Interview Result Analysis

As we have discussed in chapter three, more than 100 dedicated employees engaged in the CBE ERP project currently. However, from them, we selected ten (10) candidates for an interview; ERP Project manager, ERP Project consultant (local), three ERP team leaders, two ERP super users and three ERP technical team. Each of the candidates selected have been involved in ERP implementation at all phases (from requirement analysis up to go-live (production) phases. According to Yin's (2009), the employed method of candidate selection in the sense that certain pre-selection criteria were checked when candidates were being selected to assist, through interviews, for this study. The criteria followed in selection of the interviewees are: all candidates have involved in implementation of ERP system and they are all still using the system.

After deeply reviewing of theoretical and empirical related literatures to determine factors, affecting ERP implementation at each stage in different organizations and countries based on type of ERP venders. Accordingly, there are five stages of ERP implementations namely; pre-

planning, planning, detail design stage, delivery stage (development and test) and go live. However, during pilot interview the interviewees recognized all these phases modified into four and we could observe it on the CBE contractual agreement. These modified phases that CBE adopted for ERP implementation are; where preplanning and planning phases are merged in to requirement analysis phase, detail design stage (modified into solution design phase), deliver stage was modified as solution build and test (UAT) and go live phase as production transition and support.

According to CBE contractual document we found, the bank used a methodology called 'SIMPLE' ERP implementation methodology to implement Oracle ERP.

SIMPLE Implementation Methodology

SIMPLE implementation methodology is a simple, structured, flexible and scalable approach suggested for fast and high quality successful implementations (CBE, 2015). SIMPLE facilitates quicker and more efficient business system implementations by selecting and focusing on required tasks in the project plan, reducing the implementation timeframe and ensuring consistent quality standards in every phase of the implementation. This implementation methodology is selected based on its advantages for the bank. These advantages are;

- Provides a systematic, faster, process driven, cost effective and value added approach to implementation to give optimal ROI for customers' investments
- All phases and processes of Implementation are well defined and simplified for speedy and effective execution
- Simplified documented processes and deliverables to ensure customer teams in the project have advance information on the deliverables and content and
- More scientific and systematic approach for accurate effort estimations and tracking.

CBE SIMPLE ERP implementation methodology has four implementation phases. These are;

1. Business Requirements Analysis: During this phase, the business analysts work closely with the client's key business users and managers to understand and review their existing business processes. The project team ensures that all aspects of the current and future requirements (including reporting, security, and integration requirements) of the business are brought to the table and thoroughly evaluated with respective stakeholders.

2. Solution Design: In this phase, the teams finalize the business solutions based on the future business process design. The future process model is converted into the required steps to be completed for translating this solution in to the ERP. The future design must take into account any security requirements and enhancements agreed with the business, as well as all business needs to be met in the project.

3. Solution Build and Test (UAT):This phase involves building any required enhancements agreed during the solution design phase. Project teams prepare the functional specifications and ensure sign off from stakeholders before starting to build such enhancements. Eventually these enhancements are tested in the presence of both the customer and project business teams. The business system test is performed to validate the proposed future process model in an environment that closely resembles the production environment and thus validates the configuration of the new system. The technical designing and integration of modules are developed. Coding and testing of all customizations and other custom software, including application extensions, data conversions, and interfaces, is done during this phase. UAT is the key business users test the new applications and the required custom components for acceptance. Project teams will have to ensure that the new applications meet all the critical business needs to commence production. Also assessed is the readiness with respect to data extraction and upload programs for the production transition phase. Based on these test results and assessments, approvals are provided to start the production transition phase.

4. Production Transition and Support: During this phase the new applications systems are setup and the required master data is uploaded in accordance with the conversion strategy. The production environment is prepared in accordance with the transition strategy and the efficiency of the new systems is measured. The new systems are put to use and any teething

problems are resolved. In the new environment, end users are bound to raise queries, which need to be effectively resolved by the support teams. Once the steady state is reached, new systems are transitioned to the maintenance and support team.

As we have stated in this objectives we identify and analyze these phases with their associated factors. In this four phases (Requirement Analysis, Solution Design, Solution Build & Test(UAT), go-live or production) in which each have three corresponding factors (Technological, Organization and Individual) based on the context of the company. The table 4.1 shows data collected from the interviewees that were summarized using Microsoft office Word. The feedback of the interview were scored as agreed, disagreed and/ or add new factors.

- **Agreed** factors - factors remain unchanged represented by asterisk (*)
- **Disagreed** factors - factors are removed completely or moved to other stages represented empty
- **Add new** factors- new factors are added

Phase	Factors	Interview Candidate (C)									
Requirement Analysis	**Technology Factors**	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	Business requirements identification	*	*	*		*		*	*	*	*
	Technical requirements identification	*	*		*	*	*	*	*	*	*
	Impact of technology	*	*	*		*	*	*	*	*	*
	Selection criteria with relevant parameters	*	*	*		*	*	*		*	*
	Accurate information on ERP applications	*	*	*		*	*	*	*	*	*
	Other Factors										
	Organizational Factors										
	Organizational Knowledge	*	*	*	*	*	*	*	*	*	*
	Organizational Political support	*	*	*	*	*	*	*	*	*	*
	Change and Risk Analysis	*	*	*	*	*	*	*	*	*	*
	Cultural factors (local, national)	*	*	*	*	*	*	*	*	*	*
	Project Management	*	*	*	*	*	*	*	*	*	*
	Other factors										
	People factors										
	Limited resource (Skills)	*	*	*	*	*	*	*	*	*	*
	User support base for application	*	*	*	*	*	*	*	*	*	*
	Change Management planning	*	*	*	*	*	*	*	*	*	*
	Other factors										
Solution Design	**Technology Factors**										
	ERP complexity	*	*	*	*	*	*	*	*	*	*
	Cost of implementation	*	*	*	*	*	*	*	*	*	*
	ERP compatibility integration issues	*	*	*	*	*	*	*	*	*	*
	Development of a system design strategy	*	*	*	*	*	*	*	*	*	*
	Other factors										

	Organizational Factors										
	Issues due to Mergers/ Acquisitions	*	*	*	*	*	*	*	*	*	*
	Project Management	*	*	*	*	*	*	*	*	*	*
	Organizational structure definition	*	*	*	*	*	*	*	*	*	*
	Organizational Ideology	*	*	*	*	*	*	*	*	*	*
	Effects of managerial style	*	*	*	*	*	*	*	*	*	*
	Other factors										
	People factors										
	In-house expertise	*	*	*	*	*	*	*	*	*	*
	Change Management	*	*	*	*	*	*	*	*	*	*
	Other factors										
Solution Build & Test(UAT)	**Technology Factors**										
	ERP installation aspects	*	*	*	*	*	*	*	*	*	*
	Data migration	*	*	*	*	*	*	*	*	*	*
	Application integration	*	*	*	*	*	*	*	*	*	*
	Other factors										
	Organizational Factors										
	Limited Resource (Budget)	*	*	*	*	*	*	*	*	*	*
	Information System Function (UAT)	*	*	*	*	*	*	*	*	*	*
	Project monitoring & control (report)	*	*	*	*	*	*	*	*	*	*
	Organizational change management (monitoring)	*	*	*	*	*	*	*	*	*	*
	Other factors										
	People factors										

	Staff Involvement	*	*	*	*	*	*	*	*	*	*
	Allocate Dedicated resource for testing	*	*	*	*	*	*	*	*	*	*
	Key users involvement for testing	*	*	*	*	*	*	*	*	*	*
	Other factors										
Production (Go live)	**Technology Factors**										
	ERP implementation(Go live) issues (Update)	*	*	*	*	*	*	*	*	*	*
	Business & Technology Issues (Update)	*	*	*	*	*	*	*	*	*	*
	Operational implication analysis	*	*	*	*	*	*	*	*	*	*
	Other factors										
	Organizational Factors										
	Strategic Management Issues (Update)	*	*	*	*	*	*	*	*	*	*
	Effective Communication	*	*	*	*	*	*	*	*	*	*
	Project monitoring & control	*	*	*	*	*	*	*	*	*	*
	Organizational change management	*	*	*	*	*	*	*	*	*	*
	Operational implication analysis	*	*	*	*	*	*	*	*	*	*
	Other factors										
	People factors										
	Staff attitude to change (Update);	*	*	*	*	*	*	*	*	*	*
	Management attitude (Update);	*	*	*	*	*	*	*	*	*	*
	End user engagement	*	*	*	*	*	*	*	*	*	*
	Operational implication analysis	*	*	*	*	*	*	*	*	*	*
	Other factors										

Table4.1: Interview Result of Factors with their phases

The table 4.1 shows the feedback of the candidates of the interview as agreed, disagreed and adds new factors to the associated phase. The collected data from the interview about each factor at each phase were analyzed based on the majority of the interviewees in terms of agreed, disagreed or added new factor. Accordingly, each candidate is interviewed to express his/her feedback on

the factors as per the phase. When the new factor arises from one interviewee, it is directed to the next or other for approval. We have analyzed each factors based on the phases they belong;

1. Requirement Analysis Phase

This is the first phase of ERP implementation, that in turn has three factors affecting ERP implementation like; technological, organizational and people factors and their detail with sub-factors presented as follow.

I. Technological Factor

From analysis of related literature this factors consists of the following factors; business requirements identification, technical requirements identification, impact of technology, selection criteria with relevant parameters and accurate information on ERP applications.

The detail discussion data collected from interview about each technological factor were presented in below.

From interview response on 'business requirement identification', majority of the interviewees agreed on this factor as first phase and the proper identification of business requirement is a critical foundation for the overall implementation of ERP. According to interview of three respondents on business requirement identification, the said "*you should know your exact business requirement before implementation of the system*". Additionally, unless this is clearly identified, the company's successful ERP implementation is impossible. However, two of the interviewees said due to many some other factors like change occurs on bank side, cost, technical skill, etc, setting the exact requirement identification is difficult.

Regarding the 'technical requirement identification', majority of the interviewees agreed on this factor as first phase and the well identification of technical requirement is also basic for the overall implementation of ERP because the system is created abroad and brought into the company. According to two of the respondents on technical requirement identification, currently available and expected technical (on both hardware and software) should clearly be identified. Most of the respondents agreed with, even though this technical requirement identified at first the coming new

system into the company, need more or some additional. But one of the respondent disagreed because of difficulty of setting the exact technical requirement identification at this stage.

The interviewees response to 'impact of technology' majority of the interviewees agreed on this factor as first phase and the technological impact that it bring in to the company is an issue due to implementation of ERP. According to interviewees of five respondents' feedback, the impact of technology is the change that is going to be brought is ERP functionality in CBE. However, the technology impact was challenging for ERP implementation, because business reengineering, data migration, etc from existing system to the new system. Due to these one of the respondent disagreed, this is always new technology adoption brings challenging technical skill.

The data collected about 'selection criteria with relevant parameter and accurate information on ERP' from the interviewees, majority of the interviewees agreed on this factor as first phase and the technological impact that it brings in to the company is an issue due to implementation of ERP. Three of the interview candidates justifies as selection criteria with relevant parameter should conducted following its procedures, and accurate information about the product and strategic implementation methodology should also be given due consideration from different vendors. However, three respondents disagreed on selection criteria with relevant parameter and accurate information, because with available resource and data properly selecting with relevant parameter and accurate data of new technology is difficult in requirement analysis stage.

Generally, interviewees gave their idea on technological factors identified in requirement analysis phase, used as a best practice for knowledge of ERP implementation. In addition, some candidates added new factors like establishing data migration strategy.

II. Organizational Factor

This is the second factor included in requirement analysis phase affecting ERP implementation that includes; organizational knowledge, organizational political support, change and risk analysis, cultural factors (local, national) and project management.

According to data obtained from interview 'organizational knowledge', all of the interviewees agreed on this factor as requirement analysis phase having good knowledge about the organization

or company that enables create defined business strategy and main objectives of the ERP implementation. For example two interviewees among interviewed said *'knowledge of what they want that is documented should be presented to the venders'*. So the need of organizational knowledge of a company is one factor of requirement analysis phase.

'Organizational political support' is also another factor of organizational factors that affects ERP implementation. All of the interviewees agreed on this factor as requirement analysis phase and organizational factor, in this case the bank is administered by board of directories and senior management needs the approval and support from these boards before implementation. So, organizational political support plays a vital role during its initiation.

The interviewees' response to 'change and risk analysis' majority of the interviewees agreed on this factor as first phase and the organizational factor. Some respondent from all suggests that the probability of occurrence of risk and possibilities of administrative changes analysis must be conducted prior to the implementation. Additionally, they said *'project management should consider change and risk analyses'.*

Regarding 'cultural factor' (both local and national), all of the interviewees agreed on this factor as first phase and the organizational factor. Majority of the respondents argue that cultural issues are expressed like attitude of the staffs and consultants, working hour, holidays, experience, background, etc should be clearly set earlier to ERP implementation. Hence, the organizational culture of the company should be analyzed in requirement analysis phase.

'Project management' is also another factor on which all the interviewees agreed, as it is the requirement analysis phase and organizational factors. Almost all interview candidates suggests project management like detail project plan and communication strategy (based on who, when, what and how), project leadership (like organizing the staff in to project teams for each phases, identifying skill gap of the staff), clear and well defined objective (scope), organizational change management and risk monitoring.

In general, interviewees feedback on organizational factors identified in this phase, gives a good understanding of the company prior to ERP implementation. Some candidates added new factors

like business objective and direction, budget estimation and effective communication (ERP selection) that should be included in the organizational factor of this phase.

III. People Factor:

People factor or individual factor is the third factor included in requirement analysis phase affecting ERP implementation. These factors are limited resource (skills), user support base for application and change management planning.

Regarding 'limited resource', all of the interviewees agreed on this factor as requirement analysis phase and the people factor. Many of the respondents agreed on the people factors like number of human resource and skilled work force required for each module of finance, HR, SCM, BI and Hyperion support processes. The kind of skill required from the staff for this ERP project is also identified and known before the project kick off. However, identifying and knowing the exact number and skill of workers required for the project is difficult during this phase since the overall information about the product is new as few of the interviewees suggested.

According to response of interview candidates 'user support base for application' is also agreed as another people factor during requirement analysis phase. They agreed, as the company should ensure whether the providing vendors have local agents that can support and follow up the users of ERP implementation.

Regarding to 'change management planning', the interviewees agreed on this factor as it is a requirement analysis phase and a people factor. According to some respondents' since the new product aimed to be brought into the company that in turn brings some changes into the organization after the execution of the system. So, proper change management planning of the changes following its implementation is mandatory, unless it leads both company and workers into fear and stress which finally affects the feasibility of ERP and company's productiveness. As they stated change management planning includes training strategies, team building, clarity in communication, team competency and incentives with deliverables.

The overall interviewees' feedback on people factors identified in this phase, they agreed on the importance of proper management and utilization planning of ERP implementation staffs from all

support processes and finally few candidates added new factors like developing communication strategy and effective time management factors to this phase.

Generally, requirement analysis phase factors like technological, organizational and people factors agreed by the interviewees' remain unchanged and additional new factors suggested by interviewees included into corresponding factors.

2. Solution Design Phase

This is the second phase of ERP implementation, that also has three factors affecting ERP implementation like; technological, organizational and people factors and their detail with sub-factors presented as follow.

I. Technological Factors

This factor from analysis of related literature this factors consists of the following factors; ERP complexity, cost of implementation, ERP compatibility integration issues and development of a system design strategy.

The detail discussion data collected from interview about each technological factor in this phase were presented in below.

From interviewees' on 'ERP complexity', majority of them agreed on this factor as solution design phase and it is a technological factor, to solve ERP complexity both the buyer of the product (CBE in this case) and providing vendor should set activities, technical instruments (server and hardware), and also identify ERP modules as per support processes. According to some interview on ERP complexity, they agreed as knowing ERP complexity in design solution phase is difficult. So, due consideration about its complexity factor should be given and it is known at higher levels (phases).

According to respondents' on 'cost of implementation', majority of the interviewees agreed on this factor as a solution design phase and it is technological factor. Some of them argued that implementation cost is an ongoing that can be added throughout the process of implementation. It

is also a basic for the overall implementation of ERP because the system cost is very high that is created abroad and brought into the company.

The interviewees response to 'ERP compatibility integration issue' most of the interviewees agreed on this factor as a second phase and the technological factor. They agreed that '*ERP system integrates with internal and external application should be documented and technically designed document should be created'.* So, ERP compatibility issue documentation is used for later reference when some adjustment is required.

According the data collected about 'development of system design strategy' from the interviewees, majority of them agreed on this factor as design solution phase and the technological factor. They suggest development of system strategy is output of gap analysis to solution design phase.

Generally, respondents' feedback on technological factors identified in solution design phase, a benchmark for ERP implementation because a well design solution facilitates the implementation and testing of the ERP. Additionally, some candidates added new factors like data quality analysis, data cleaning and show product in design.

II. Organizational Factor

The organizational factor is the second factor analyzed in solution design phase affecting ERP implementation that includes; issues due to mergers/ acquisitions, organizational structure definition, organizational ideology and effects of managerial style.

From interview 'issue due to merge or acquisition', all of the interviewees agreed on this factor as design solution phase and organizational factor. Having a good knowledge about the company related to what to be merged or new acquisition due to ERP implementation enables the company to revise their objective or scope. Some interviewees' suggested that *'during expectation of merging or acquisition project scope should be revised'.* Therefore, the company may expend or reduce its objective and/or scope.

According to the response of the interview candidates 'organizational structure definition' is also another factor of organizational factors that affects ERP implementation and all of the interviewees

agreed on this factor as solution design phase. Some suggests that after organizational structure identified it facilitates knowledge transfer among different levels of management.

The interviewees' response to 'organizational ideology' majority of the interviewees agreed on this factor as solution design phase and the organizational factor. They all suggest that there is change adoption issues and resistance of the staff to the change that is caused by fear of the ERP consequence, loss of status, technological skills, etc.

All of interviewees' agreed that the 'effects of managerial style' is a factor in the second phase and the organizational factor. Majority of them also argued that as it directly determines the project success or failure because it depends on managerial style. Clear definitions of roles and responsibility of each staff, leadership ability, etc have impact on the ERP implementation.

Generally, according to interview feedback on organizational factors identified in solution design phase, it indicates clear picture (designed) of the organization's requirement. Additionally, few candidates added new factors like business process change or customization that should be included in the organizational factor of this phase.

III. People Factor

People factor which is also called individual factor is the third factor included in solution design phase affecting ERP implementation. These factors are; in-house experts and change management.

According to response of interviewees' about 'in-house experts' they all agreed on this factor as solution design phase and the people factor. In-house experts are internal trained staffs those can be an input for the ERP implementation. Interviewees suggest that in-house expert helps to identify internal needs to perform the upcoming tasks. Additionally, they said *'any weakness within the team should be tested then filled by some skill gap training'* and also during the contractual agreement activities performed by the company's in-house experts and by vendor should be clearly identified.

According to response of interview candidates about 'change management', they agreed as another people factor during solution design phase. Change managements like business support for UAT team, staff attitude, management attitude, organizational staff engagement, communication

transparency, internal and external team engagement. Always when any change occurs into normal functioning of workers, some challenges follow and proper change management skill should be taken.

The overall interviewees' feedback on people factors identified in this phase, they agreed on in-house experts and change management sub factors and few candidates added new factors skill match assessment for knowledge transfer should be included into the factor.

Generally, solution design phase factors like technological, organizational and people factors agreed by the interviewees' remain unchanged and additional new factors suggested by interviewees included into corresponding factors.

3. Solution Build and Test (UAT) Phase

This is the another phase of ERP implementation, that has also three factors affecting ERP implementation like; technological, organizational and people factors and their detail with sub-factors presented as follow.

I. Technological Factors

As we have stated in the previous section, this factor was also identified from analysis of related literature and primary data which consists of the following factors; ERP installation aspect, data migration and application integration.

As the data obtained from interviewees' show the majority of the respondents agreed on 'ERP installation aspect' and 'data migration' as technological factor as solution build and test phase. Interviewees' argue that ERP installation aspects like procedures, compatibility, expandability (can be upgraded), test, etc that could indicate its installation as per the requirement. Most of them also said that *'practically performed or did data migration at this stage'*. However, some respondents suggested data migration strategy included in the first phase of requirement analysis.

According to the data collected about 'application integration' from the interviewees, all of them agreed on this factor as a solution build and test phase, and the technological factor. They suggested

as application integration consists of interface system information that integrates and tests integration.

Generally, respondents' feedback on technological factors identified in solution build and test phase was a standard for ERP implementation because well solutions build and test phase facilitates the implementation and testing of the overall ERP. Additionally, these factors in this phase are unchanged also there were candidates who added new factors like prototyping for testing and perform system integration.

II. Organizational Factor

The organizational factor is the second factor analyzed in solution build and test phase affecting ERP implementation that includes; limited resource (budget), information system function (UAT), project monitoring & control (report), and organizational change management (monitoring).

From interview on 'limited resource or budget', all of the interviewees agreed on this factor as solution build and test phase as well as organizational factor. Some interviewees' suggested that the organizational management should employ a phase wise budgetary review. Therefore, the organization should review budget that considers each phase.

According to the response of the interview candidates 'information system function' is also another factor of organizational factors that affects ERP implementation and all of the interviewees agreed on this factor as solution build and test phase. Some respondents suggest that this factor related with user acceptance test (UAT), in that the organization should value IS.

The majority of the interviewees considered 'project monitoring and control' were as organizational factors in the solution build and test phase. They all suggest that this factor is related to project monitoring and evaluation report of the project progress.

The same is true with the 'organizational change management'. Some interviewees suggested that change planning should be carried out at early phase of the ERP implementation. Additionally they said '*change monitoring would be more relevant than change management*'.

Generally, according to interview feedback on organizational factors identified in solution build and test phase, it indicates budgeting of each phase, IS functions, monitoring project and change are unchanged. Few candidates added new factors like impact of scope change on project and cost tracking and updates that should be included in the organizational factor of this phase.

III. People Factor

People factor, which is also called individual factor, is the third factor included in solution build and test phase that affecting ERP implementation. These factors are; staff involvement, allocate dedicated resource for testing and key user involvement for testing.

According to response of interviewees' about 'staff involvement', they all agreed on this factor as solution build and test phase and the people factor. They also suggest that 'internal and external staff those are trained must be involved in this UAT'. Additionally, they said *'any weakness within the team should be tested then filled by some skill gap training'.*

According to response of interview candidates about 'allocation of dedicated resource for testing and key user involvements for testing' majority agreed as another people factor during solution build and test phase. Interviewees also suggest that allocating right key users for system testing and putting specific time frame.

The overall interviewees' feedback on people factors identified in this phase, they agreed on them and few candidates added new factors internal & external communication (supplier/ partners) should be included into the factor.

Generally, solution build and test (UAT) phase factors like technological, organizational and people factors agreed by the interviewees' remain unchanged and additional new factors suggested by interviewees included into corresponding factors.

4. Production Transition and Support Phase

This is the final phase of ERP implementation, that has three factors affecting ERP implementation like; technological, organizational and people factors and their detail with sub-factors presented as follow.

I. Technological Factors

As we have stated in previous section, this factor also identified from analysis of related literature, which consists of the following factors; ERP implementation issues (update), business & technology issues (update) and operational implication analysis.

Regarding the 'ERP implementation issues' all of respondents agreed as go-live or production phase and it is also a technological factor. Interviewees' argues that the assessment and final go or no go decision is given. Prior to this, the final data will be loaded and validated.

According to respondents' business and technology issues', all of the interviewees agreed on this factor as a production phase, and it is technological factor. They responded as issues of testing of hardware and software as well as experts, review of left issues, etc. However, some respondent suggested some problems might appear after transition with the new ERP system.

As data collected from the interviewees' about 'operational implication analyses' majority of the respondents agreed on this factor as production phase and technological factor. They also suggested knowledge management for ERP maintenance or support, engaging with vendor to obtain ad hoc technical experts for support.

Generally, respondents' feedback on the overall technological factors identified in this phase, are highly important during and after implementation of ERP. Along with this technical documentation also plays a great role. Additionally, some candidates added new factors like go live internal support for applications, future enhancement/ items or functionality.

II. Organizational Factor

The organizational factor is another factor analyzed in production phase affecting ERP implementation that includes; change strategies (update), effective communication, project monitoring & control, and operational implication analysis.

From interview 'change strategy', all of the interviewees agreed on this factor as production phase and organizational factor. They conclude change strategy as changes occurred following the implementation of ERP into the company needs some comprehensive adjustments according to the new system. It also includes managers evaluate the change management to use the new ERP without resistance through persuasion and awareness.

The interviewees' response to 'project monitoring and control' was, majority of them agreed on this factor as this phase and the organizational factor. Additionally they suggest that this factor is related to project monitoring and evaluation report of the overall system.

According to interviewees' response on 'operational implication analyses' all of them agreed on this factor as production phase and the organizational factor. They suggest ERP business functional impacts on the production transition and support.

Generally, according to interview feedback on organizational factors identified in production phase, it indicates development process of the project and all factors remain unchanged. Additionally, few candidates added new factors like approvals of the goals that indicates the success of the project.

III People Factor

People factor is also called individual factor that is included in production phase that affects ERP implementation. These factors are; staff attitude to change (update), management attitude (update), end user engagement and operational implication analysis.

According to response of interviewees' about 'staff attitude to change, management attitude, end user engagement' they all agreed on this factor as production phase and the people factor. They also suggest that impacts of staff attitude toward the new change (about its pros and cons to them

and the company), the commitment of different level managements as well as end users (super users') reaction to the new ERP system have a great pressure. They key users have strong voice in deciding how the business process are handled and discuss possible change, improvement in the process of ERP system. Their feedback on 'operational implication analysis' was about succession planning and knowledge management for ERP maintenance/support.

The overall interviewees' feedback on people factors identified in this phase, they agreed on staff attitude to change (update), management attitude (update), end user engagement and operational implication analysis and few candidates added new factors like training program for staff (end user training), how to hand over the coming operations were added.

Generally, production phase factors like technological, organizational and people factors agreed by the interviewees' remain unchanged and additionally production (go live) is a development process of a project when the goal of the project are accomplished, desired outcome is proceeded, deliveries are accepted.

4.4. Discussion on Findings of Factors Affecting ERP Implementation Success

As we have discussed the detail of factors affecting ERP implementation at their corresponding phases of CBE in the previous section, now we summarize the overall finding in the following table.

Stages	**Technology factors**	**Organizational factors**	**People factors**
Requirement Analysis	• Business requirements identification • Technical requirements identification • Impact of technology • Selection criteria with relevant parameters • Accurate information on ERP applications • Establish Data Migration strategy	• Organizational Knowledge • Organizational Political support • Change and Risk Analysis • Cultural factors (local, national) • Project Management • Effective communication(ERP selection) • Business objective and direction budget estimation	• Limited resource (Skills) • User support for application • Change Management planning • People impact for ERP
Solution Design	• ERP complexity • Cost of implementation • ERP compatibility *integration* issues • Development of a system design strategy • Data quality analysis & data cleansing • Show product in design	• Issues due to Mergers/ Acquisitions • Organizational structure definition • Organizational Ideology; • Effects of managerial style • Detail Design: functional details, processes, fit gap • Business process change or customizations'	• .In-house expertise • .Change Management • .Skill match assessment for knowledge transfer • Skill match assessment for knowledge transfer
Solution Build & Test(UAT)	• ERP installation aspects • Data migration • Application integration • Prototyping for testing • Perform System integration	• Limited Resource (Budget) • Information System Function (UAT) • Project monitoring & control (report) • Organizational change management (monitoring) • Impact of scope change on project • Cost tracking and updates	• Staff Involvement • Allocate Dedicated resource • for testing • Key users involvement • for testing • Internal & external communication (supplier/

Stages	**Technology factors**	**Organizational factors**	**People factors**
Production (Go live)	• ERP implementation(Go live) issues (Update) • Business & Technology Issues (Update) • Operational implication analysis • Go Live internal support for applications • Future enhancements/left over items or functionality	• change strategies (update) • Effective Communication • Project monitoring & control • Operational implication analysis • Approvals to Go Live	• Staff attitude to change (Update) • Management attitude • (Update) • End user engagement • Operational implication • analysis • Training programs for • staff or end user training

Table 4.2: Factors affecting ERP implementation at each phase (CBE ERP implementation)

As we can observe from the above table, the ERP implementation in CBE has four stages (requirement analyses, solution design, solution build and test, and production). These all stages were discussed with the factors affecting the implementation of ERP. These factors were identified as they happen in the stage by the interviews, observation and participation we conducted during the study. According to observation and interview, the current status of ERP implementation in CBE is at the production (transition and support) level but Hyperion module is still not yet accomplished. The overall implementations have gone through the explained stages (from requirement to production). The intended support module incorporation was done and successfully implemented. However, there are some issues were arising on production phase but they are handled smoothly. The respective teams are responding to the emerging issues according to their occurrence

Q1. What are the factors that affect ERP implementation at each stage?

Based on the literature analysis, the implementation of ERP systems by different businesses tend to be influenced by several factors. Accordingly, different scholars identified those factors based on many dimensions of the businesses. However, majority of them concludes as these factors generally grouped into three; technological, organizational and individual factors. Haddara and Zach, (2011), identified some of the organizational factors, which potentially influences ERP implementation as; business complexity, change management and external factors (supply chain partners). Furthermore, business functional requirements, and degree that ERP can align itself to existing businesses process could be some of the other influential factors for the selection of ERP implementation.

Gien (2001), argued that the lack of experience in adopting ERP, access to an appropriate information for decision-making and resource (skill, time and money) makes it harder for companies to decide ERP implementation. Along with this, selection of an effective IT solution; cost of implementation and customization, staff training requirements and staff commitment on ERP implementation support are some of technological and individual factors that affect ERP implementation.

In addition to these, Alizai (2014) identified factors affecting implementation of ERP as change strategies, change management, project management, resource management (time, budget and skills), internal and external contractor, end user engagement, user acceptance testing. Application integration, customizations management, testing strategy, staff attitude to change, organizational ideology, effects of merger or acquisition on a project, strategic management issues, leadership support for the project and managerial style are also identified.

This research finding is similar to these findings that technological, organizational and people or individual factors that affect ERP implementation into the company. For example; First technological factors affecting ERP implementation as we identified from literature analysis and improved in the study are business requirements identification, technical requirements identification, impact of technology, ERP complexity, cost of implementation, ERP compatibility integration issues, ERP installation aspects, data migration, application integration, ERP implementation(Go live) issues, business & technology issues and operational implication analysis.

Secondly, organizational factors affecting ERP implementation as we identified from literature analysis and improved in the study are organizational knowledge, organizational political support, change and risk analysis, cultural factors, project management, mergers/ acquisitions issues, organizational structure definition, organizational ideology, effects of managerial style, limited resource, IS function (UAT), project monitoring & control, organizational change management (monitoring), change strategies, effective communication, project monitoring & control and operational implication analysis.

Finally, individual or people factors affecting ERP implementation identified are limited resource, user support base for application, In-house expertise, change management, staff involvement and attitude to change, management attitude, end user engagement and operational implication analysis.

In addition these factors those identified from literatures and improved as a context of the company, we found that some additional new factors to be added into each phases. Accordingly, technological factors we found were establishing data migration strategy, data quality analysis &

data cleansing, show product in design, prototyping for testing, performing system integration, go live internal support for applications and future enhancements/left over items or functionality.

Organizational factors we found in addition were effective communication, business objective and direction, budget estimation, detail design like functional, processes and fitting gap, business process change or customizations', impact of scope change on project, cost tracking and updates, and approval of production. Finally, people factor we found as additional to the existing factors are skill match assessment for knowledge transfer, internal & external communication (supplier/ partners), training programs for staff or end user and how to hand over to operations go live structure discussion.

Generally, this research finding is in line with the above-discussed researcher's finding in identifying factors affecting the implementation of ERP system into the company's context. These identified factors were analyzed in terms of technological, organizational and individual aspects of the company.

Many scholars identified different phases of ERP implementations. For example, Esteves and Pastor (1999) identified six ERP implementations stages like adoption and decision-making, acquisition, implementation, use and maintenance, evaluation and retirements. Alizai (2014) on the other hand, identified five ERP implementation stages; preplanning, planning, detail design stage, delivery stage and go live stages. Therefore, this research output is also consistent with these finding that we identified four stages based on the company's practical ERP implementation processes. These stages are requirement analysis, solution design, solution build and test (UAT) and production stages.

Generally, in this research question, we could identify factors affecting ERP implementation at each phase of CBE context. For further detail, see table 4.2.

Q2. How do these factors affect each stages of ERP implementation?

The effects of the identified factors on each stages of ERP implementation are discussed in detail in the previous section (interview analysis). The impacts of factors on the ERP implementation were analyzed according to technological, organizational and individual angle on the company

(CBE). In this regard, this finding is similar with Sayegh (2010) work of factors affecting the implementation of ERP in organizations in the UAE.

Generally the ERP implementation success of the CBE can be a good role model for another companies those want to implement any product of ERP especially Oracle.

4.5. Summary

This study was aimed to identify and analyze factors affecting the implementation of ERP in commercial bank of Ethiopia. Analyzing the identified factors at each stages was also conducted in the case company's implementation processes. Accordingly we identified factors categorizing them into technological, organizational and people factors.

We also discovered four ERP implementation phases like requirement analysis, solution design, solution build and test, and production (transition and support) phases. Along with this, we also identified ERP support modules used in CBE like finance, HR, SCM, BI and Hyperion, which are included in the ERP implementations.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This research, on factors affecting the implementation of ERP in commercial bank of Ethiopia was aimed to identify and investigate factors affecting the ERP system implementation. We have used a case study strategy to collect data based on related literatures conducted on ERP implementations. The study found the factors, stages and how these factors influence the stages of ERP implementation in the company.

This section presents overall conclusion of the study, recommendations for both the company and for researchers, and finally the limitations of the study.

5.2. Conclusion

Business organizations consider ERP system as an essential information system solution to serve and cope up with competitive business environment. CBE is one of business organizations driven by this force to implement ERP into its company in order to facilitate decision making, real time process integration, improve internal communications, etc. However, when implementing an integrated and big ERP packages, assessing the factors that affect the implementation and sharing experience is very important. Because ERP systems are complex, need huge budget investment, company re-arrangements and the implementation success depends on different organizational, people and technological factors of the companies.

In this study, CBE was selected as a case organization to identify and analyze factors affecting ERP implementation success. So this study was to identify the technological, organizational and individual factors and how they affect each phases of ERP implementation.

In order to accomplish the objective of the study we used a qualitative case study (interview, observation and participation) and document analysis techniques to collect data. After deep review of literatures, research model was defined consisting of technological, organizational and people factors, and associated phases. Based on the research model interview questions were adopted from literatures and modified according to the context. The triangulation of data obtained through

interview, observation and participation, and document analysis made the output to be more comprehensive and get better output. This research aimed to identify factors affecting ERP implementation, stages of ERP implementation and how these factors affect each phases. So this study's findings on these concepts are summarized as follow. According to this research model, the major factors are technological, organizational and individual factors.

Technological factors affecting ERP implementation as we identified from literature analysis and improved in the study are business requirements identification, technical requirements identification, impact of technology, ERP complexity, cost of implementation, ERP compatibility integration issues, ERP installation aspects, data migration, application integration, ERP implementation(go live) issues, business & technology issues and operational implication analysis.

On the other hand, organizational factors affecting ERP implementation as we identified from literature analysis and interview of the study are discussed. These are; organizational knowledge, organizational political support, change and risk analysis, cultural factors, project management, mergers/ acquisitions issues, organizational structure definition, organizational ideology, effects of managerial style, limited resource, IS function (UAT), project monitoring & control, organizational change management (monitoring), change strategies, effective communication, project monitoring & control and operational implication analysis.

Finally, individual or people factors affecting ERP implementation identified are limited resource, user support base for application, In-house expertise, change management, staff involvement and attitude to change, management attitude, end user engagement and operational implication analysis.

In addition these factors those identified from literatures and improved as a context of the company, we found that some additional new factors to be added into each phases. Accordingly, technological factors we found were establishing data migration strategy, data quality analysis & data cleansing, show product in design, prototyping for testing, performing system integration, go live internal support for applications and future enhancements/left over items or functionality.

Organizational factors we found in addition were effective communication, business objective and direction, budget estimation, detail design like functional, processes and fitting gap, business process change or customizations', impact of scope change on project, cost tracking and updates, and approval of production. Finally, people factor we found as additional to the existing factors are skill match assessment for knowledge transfer, internal & external communication (supplier/ partners), training programs for staff or end user and how to hand over to operations go live structure discussion.

This study also found that there are four phases in CBE ERP implementation. These are requirement analysis, solution design, solution build and test (UAT) and production (transition and support) phases. In addition, the impacts of factors on the ERP implementation at each stage were analyzed according to technological, organizational and individual aspect of the company (CBE).

Generally, this research result revealed the factors that affect ERP implementation, the stages of CBE ERP implementation, the impacts of these factors in their associated stage and current status (progress) of ERP implementation in commercial bank of Ethiopia in general (see table 4.2).

5.3. Recommendations

As we have discussed earlier, this objective is to identify and analyze the organizational, technological, and individual factors and their influence at each phase of ERP implementation in the CBE. Depending on the finding, we recommend the following suggestions;

1. Proper management (both project and organization) should be considered. Because it enables to know managerial style, staff skill identifying and filling, effective communication, etc are considered as factors that could lead to implementation success.

2. Change management as factor to bring positive outcome, resistance from staff should be monitored through training and the ERP system explained for them well that reduce resistance to it. The company's culture should also be accepting this change and it should assist the staff to persuade this change rather than resist it.

3. Clear communication method should be set. The individuals those directly or indirectly influenced by the ERP implementation should involve.

4. Commercial bank of Ethiopia can also use this study as a post project lesson assessment.

5. Other companies in this country those have planned to implement ERP can consider these success factors for their ERP implementation.

6. Since this study is single case, researches of multiple case studies can give a general picture of factors affecting ERP implementation success are needed. Additionally, conducting ERP implementation related research on organizations with other ERP system packages (like SAP, PeopleSoft, Baan and Microsoft) can also help to get all-rounded solutions of ERP system.

5.4. Limitation of the Study

These research findings will be able to contribute to the existing literature on factors affecting ERP system implementation in CBE. However, the study has some limitations. The first is the sample size considered in this study. The sample size is limited but taking more may give deep understanding of the concepts on the system. Nevertheless, this research is still valid having analyzed the available sample size with the interview. Secondly, the time required to complete the research was very small and this had an influence on the researchers' decision to pick a small number of interviewees. So the short time did not allow an in-depth search for more information.

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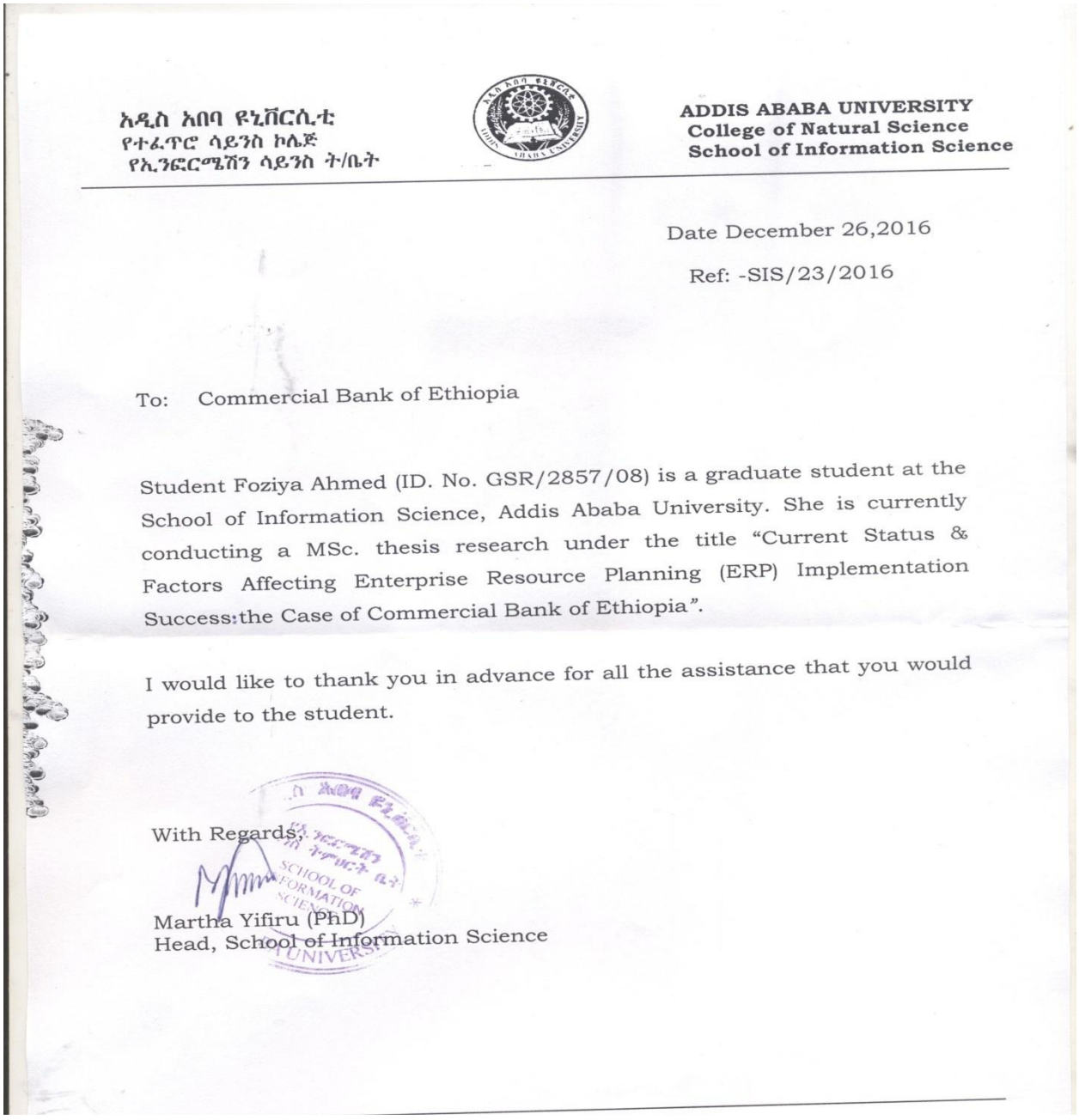
Appendices

Appendix A: **Letter of cooperation from AAU to commercial bank of Ethiopia.**



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ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date December 26,2016

Ref: -SIS/23/2016

To: Commercial Bank of Ethiopia

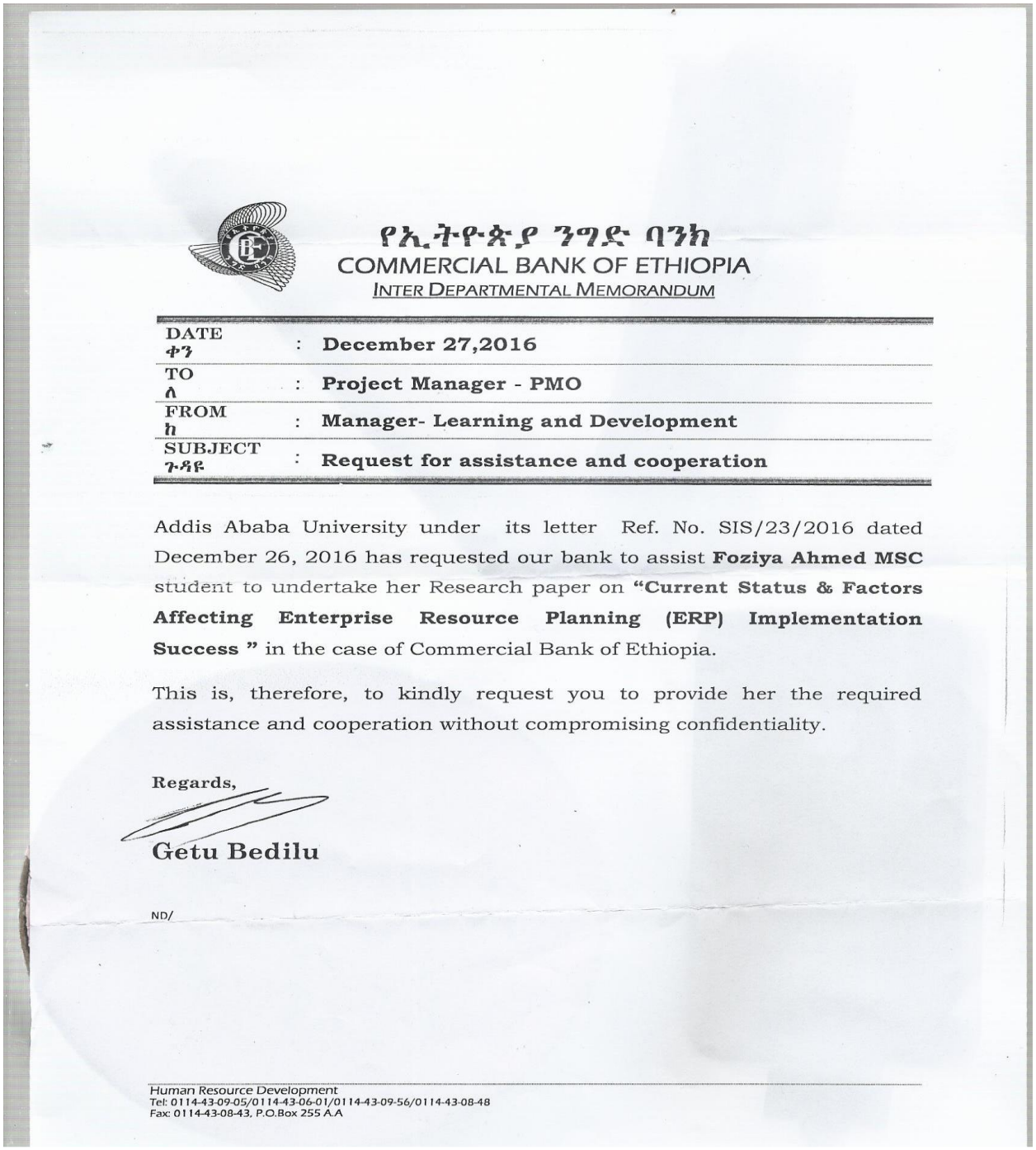
Student Foziya Ahmed (ID. No. GSR/2857/08) is a graduate student at the School of Information Science, Addis Ababa University. She is currently conducting a MSc. thesis research under the title "Current Status & Factors Affecting Enterprise Resource Planning (ERP) Implementation Success:the Case of Commercial Bank of Ethiopia".

I would like to thank you in advance for all the assistance that you would provide to the student.

With Regards,

Martha Yifiru (PhD)
Head, School of Information Science

Appendix B: **Letter of cooperation from the bank to ERP Project Management Office (PMO).**



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COMMERCIAL BANK OF ETHIOPIA
INTER DEPARTMENTAL MEMORANDUM

DATE ቀን	:	**December 27,2016**
TO ለ	:	**Project Manager - PMO**
FROM ከ	:	**Manager- Learning and Development**
SUBJECT ጉዳዩ	:	**Request for assistance and cooperation**

Addis Ababa University under its letter Ref. No. SIS/23/2016 dated December 26, 2016 has requested our bank to assist **Foziya Ahmed MSC** student to undertake her Research paper on **"Current Status & Factors Affecting Enterprise Resource Planning (ERP) Implementation Success "** in the case of Commercial Bank of Ethiopia.

This is, therefore, to kindly request you to provide her the required assistance and cooperation without compromising confidentiality.

Regards,

Getu Bedilu

ND/

Human Resource Development
Tel: 0114-43-09-05/0114-43-06-01/0114-43-09-56/0114-43-08-48
Fax: 0114-43-08-43, P.O.Box 255 A.A

Appendix C: **Semi-structured interviews**

ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL SCIENCES
SCHOOL OF INFORMATION SCIENCE

Dear Participant;

My name is Foziya Ahmed and I am a post-graduate student of Information Science at Addis Ababa University School of Information Science. I am conducting research on ***current status and factors affecting the implementation of ERP at Commercial Bank of Ethiopia.***

To get detailed information and data about the implementation of ERP system in CBE, I want to interview you. You are both functional and technical teams that involve in the ERP implementation project and also you have a good experience and knowledge on the area.

The interview will require approximately 90 minute for completing and it contains essential questions that show how your organization exercises the ERP implementation. Your response will be used only for research purpose.

If you require additional information or have questions, please contact me via,

Mobile: - +251-921-04-14-03
Email:-foziyaahmed@yahoo.com

Thank you for your cooperation and taking time for an interview!

Questions, which are used to guide the semi-structured interviews to find out the factors affecting the success of ERP implementation:

1. What are the goals of the company set to be achieved by implementing the ERP system?
2. Which modules of the ERP are implemented?
3. Which of the implemented modules are used?
4. What are the factors affecting /challenging this ERP implementation project?
5. What were the requirements for ERP implementation?
6. Did CBE fulfilled all the requirements before or during the implementation?
7. From your experience, which of the requirements affect the success of ERP implementation in the Ethiopian context, culture and so on, in general and for CBE in particular?
8. Do you believe that users and responsible managers have been highly involved during the implementation project?
9. What was the influence of technological, organizational and individual factors in the ERP implementation process?
10. What is the current status of the software?
11. Do you believe that the project attain its planned purpose?
12. What are the Factors affecting ERP implementation at each stage (see the attached table)
13. How those factors affect each stages of ERP implementation?
14. Any ideas and comments of your experience on this project?

Phase	**Factors**	**Interview Candidate (C)**									
Requirement Analysis	**Technology Factors**	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	Business requirements identification										
	Technical requirements identification										
	Impact of technology										
	Selection criteria with relevant parameters										

Phase	Factors	Interview Candidate (C)									
	Accurate information on ERP applications										
	Other Factors										
	Organizational Factors										
	Organizational Knowledge										
	Organizational Political support										
	Change and Risk Analysis										
	Cultural factors (local, national)										
	Project Management										
	Other factors										
	People factors										
	Limited resource (Skills)										
	User support base for application										
	Change Management planning										
	Other factors										
Solution Design	**Technology Factors**										
	ERP complexity										
	Cost of implementation										
	ERP compatibility integration issues										
	Development of a system design strategy										
	Other factors										
	Organizational Factors										
	Issues due to Mergers/ Acquisitions										
	Project Management										
	Organizational structure definition										

Phase	Factors	Interview Candidate (C)									
	Organizational Ideology										
	Effects of managerial style										
	Other factors										
	People factors										
	In-house expertise										
	Change Management										
	Other factors										
Solution Build & Test(UAT)	**Technology Factors**										
	ERP installation aspects										
	Data migration										
	Application integration										
	Other factors										
	Organizational Factors										
	Limited Resource (Budget)										
	Information System Function (UAT)										
	Project monitoring & control (report)										
	Organizational change management (monitoring)										
	Other factors										
	People factors										
	Staff Involvement										
	AllocateDedicated resource for testing										

Phase	Factors	Interview Candidate (C)									
	Key users involvement for testing										
	Other factors										
Production (Go live)	**Technology Factors**										
	ERP implementation(Go live) issues (Update)										
	Business & Technology Issues (Update)										
	Operational implication analysis										
	Other factors										
	Organizational Factors										
	Strategic Management Issues (Update)										
	Effective Communication										
	Project monitoring & control										
	Organizational change management										
	Operational implication analysis										
	Other factors										
	People factors										
	Staff attitude to change (Update);										
	Management attitude (Update);										
	End user engagement										
	Operational implication analysis										
	Other factors										