

**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**



**CRITICAL FACTORS AFFECTING ENTERPRISE RESOURCE PLANNING
IMPLEMENTATION IN THE CASE OF COMMERCIAL BANK OF ETHIOPIA**

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

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ADDIS ABEBA, ETHIOPIA

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ST. MARY'S UNIVERSITY
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FACULTY OF BUSINESS

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Declaration

I declare that this thesis is my original work prepared under the guidance of research adviser and has not been presented for degree in other university. Source and material used for this thesis are acknowledged by citation with explicit reference

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Dr. Dereje Teklemariam (Associate Professor)

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Table of Contents

CHAPTER ONE :INTRODUCTION	1
1.1. Background of the study	1
1.2 Statement of the problem	2
1.3 Research questions	4
1.4 Research Objective	4
1.4.1 General objective.....	4
1.4.2 Specific objective	4
1.5 Research Hypothesis	4
1.6 Significance of the study	5
1.7 Scope of the study	5
1.8 Limitations of the study	6
1.9 Organization of the research report	6
CHAPTER TWO: REVIEW OF RELATED LITERATURE	7
2.1Theoretical review	7
2.1.1What is ERP system?	7
2.1.2 Phase of ERP Implementation.....	8
2.1.3 The Evolution of ERP	10
2.1.4 Expectations from ERP in CBE.....	11
2.2 Empirical studies in ERP implementation	13
2.3 Conceptual framework	18
CHAPTER THREE :RESEARCH METHODOLOGY	20
3.1 Research Design and Approach	20
3.2 Source of Data.....	20
3.3 Sample size determination	21
3.5 Data collection method and tools.....	22
3.6 Data analysis	23
3.7 Reliability and Validity Test.....	23
CHAPTER FOUR :RESULTS AND DISCUSSION	24
4.1 Background of the respondents.....	24
4.1.1 General Characteristics of Respondents.....	25

4.2 Key Factors that affect ERP implementation	27
4.3 Challenges faced during the implementation phases.....	31
4.4 Current status of ERP in the bank	33
4.5 Correlation Analysis	34
4.6 Linear Regression Analysis	36
4.10 Discussion of Findings.	39
CHAPTER FIVE :SUMMARY, CONCLUSION AND RECOMMENDATION	42
5.1 Summary	42
5.2 Conclusion.....	43
5.3 Recommendations	45
Reference	47
APPENDICES	52

List of Tables

TABLE 3.1 RELIABILITY STATISTICS RESULT (SOURCE: SURVEY RESULT, 2021).....	23
TABLE 4.1: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS.....	25
TABLE 4.2 FACTOR THAT AFFECT ERP IMPLEMENTATION.....	27
TABLE 4.3 CHALLENGE FACED DURING IMPLEMENTATION	31
TABLE 4.4 CURRENT STATUS OF ERP IN THE BANK.....	33
TABLE 4.5 CORRELATION ANALYSIS INTERPRETATION	34
TABLE 4.6 PEARSON’S CORRELATION AMONG ALL VARIABLES	35
TABLE 4.7: RESULTS OF LINEAR REGRESSION ANALYSIS CRITICAL FACTOR OF ERP IMPLEMENTATION	ERROR! BOOKMARK NOT DEFINED.
TABLE 4.8: ANOVA MODEL	38
TABLE 4.9: BETA COEFFICIENTS.....	ERROR! BOOKMARK NOT DEFINED.

List of Figures

FIG2.1: FLOWCHART FOR ERP IMPLEMENTATION (KHANNA AND ARNEJA,2011)	9
FIG 2.2: ERP EVOLUTION (SOURCE KASEM, EL-BAKR YAND SALAH, 2017)	11
FIGURE 2.3: CONCEPTUAL FRAMEWORK ADOPTED FROM DEZDAR(2017).....	19

List of Acronyms

CBE	Commercial Bank of Ethiopia
ERP	Enterprise Resource Planning
IT	Information Technology
SAP	System Application and Products
SSHR	Self Service Human Resources
HFM	Hyperion financial management
HRA	Human resource Administration
PMS	Performance Management System
MRP	Material resource planning
MRP-II	Manufacturing Resources Planning
OSM	Office of Strategic management
SPSS	Statistical package for social science
T-24	Temenos 24/7

ABSTRACT

Enterprise resource management (ERP) refers to type of software that organization use to manage day to day activity business activity such as accounting, procurement, project management, risk management and compliance & supply chain operation. A complete ERP suit also include enterprise performance management (EPM) software that help plan, budget, predict and report on an organization financial result. The main objective of this study is to assess the critical factor that affect the implementation of ERP in the case of commercial bank of Ethiopia. The implementation of ERP require several amount of resource, time and budget all the requirement accordingly have been analyzed with its impact in the implementation stage. Both quantitative and qualitative method used for collecting data. The quantitative data was collected using questionnaires from 106 respondents who have participated in the project implementation phase, the collected data was analyzed using SPSS. For the qualitative study, direct interview was conducted to collect data from 10 respondents which most of the participate in the project managerial area. The study revealed that critical factor which affect ERP implementation organizational support, the training provided during the implementation phase, compatibility and data accuracy are factor which helped for successfully implement ERP. The challenges faced during the implementation was knowledge gap between staff and top management involvement. The impact of these challenge and factors have been analyzed. The researcher has recommended for continuous skill development of the staff and improve communication with vendors during the implementation of ERP since this all have affected the implementation stage of the project in CBE.

Keywords: Enterprise resource management (ERP), factor and ERP implementation, CBE, Ethiopia

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

ERP is defined as framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage (Blackstone & Cox, 2005). Every functional unit of Commercial Bank of Ethiopia has its own goal and objectives, which is aligned to organization goal. The integration between these units should share and develop communication for the achievement of common goal. Enterprise Resource Planning (ERP) system is an enterprise information system designed to integrate and optimize the business processes and transactions in a corporation (Sekulic, Beric & Lolic, 2018).

According to Almgren and Bach (2014) Enterprise resource planning system is basically an information system that combines different subsystems into one system. This operation is called integration, whereby subsystems are integrated into one system. The mission of Commercial Bank is to be a World-class Commercial Bank by the year 2025. IT is beneficial, offering a wide range of prospective advantages such as productivity enhancement, flexibility, cost reduction, quality improvement (Melville, Kraemer & Gurbaxani, 2004). The main objective of implementing ERP system in Commercial Bank is to standardize and align business process of the Bank, manage different resources across the entire enterprise, support sophisticated data analyses and enhance strategic decision making and planning.

The commercial Bank of Ethiopia is one of the publicly owned bank in Ethiopia the number of employees in commercial Bank is over 34,880 permanent employees and several non-clerical staffs and over 1200 branches across Ethiopia (Commercial Bank of Ethiopia [CBE], 2021) which requires strategic resource managements one of the main resource to implement ERP system is to efficiently and effectively manage resources of the Bank. ERP manage the firm all resources in

very efficient and effective manner and reduce the expense by providing in time information (Egdair et al., 2015). ERP is a web-based client –server architecture license directly procured from vender, an Indian company called TECH MAHINDRA (CBE, 2021) implements it.

The Banking sectors are growing here in Ethiopia Due to the establishment of several Banks make the computation harder and harder. There are several factors for success and failure of ERP implementation. Bradford and Florin (2003) categorize the success factors of ERP implementation into three, which are Innovative characteristics, organizational characteristics and Environmental Characteristics. Umbel and Haft (2003) stated three principals of IT related project poor planning or poor management, change in business goal during the project and lack of business management support, which is directly related to ERP implementation.

Accordingly, the study will identify the process of implementing ERP in Commercial Bank of Ethiopia and will identify the success and failure factors during the process of implementation and after the system have been implemented in achieving the Bank goal and objective and the impact of ERP in CBE to be world-class Bank in 2025.

1.2 Statement of the problem

According to ERP implementation there were some Challenges faced during the implementation and after the implementation of ERP systems are data quality and maintaining accuracy, knowledge gaps on specialized area and developing interfaces with external system are some of the challenges and after the implementation of the ERP user acceptance of the system, supports from the vendor company are major challenges in CBE. The critical success factors of implementing ERP are controlled customizations, dedicated project team members; clear understanding of strategy of the Banks are some of the critical factors for the successful implementation of ERP (CBE, 2021). Overall in CBE ERP have been implemented successfully some of the down sides are some of the modules have not been implemented as expected due to vendor contract, user’s acceptance problem and other.

Regardless of the high cost of time and money invested in ERP implementation resource management of the Bank is one of the major activates which lead to efficient and effective management Experience sharing have been conducted before implementing ERP in CBE from other companies who have been implemented ERP, even though it is the first to implement ERP in Banking industry.

There are several vendors that implement ERP among those oracle and SAP are the most common venders in Ethiopia. Commercial Bank of Ethiopia has implemented ORACLE ERP some of the research conducted in Ethiopia have analyzed different aspect of ERP. Tekleab (2017) have made an assessment on Effective implementing ERP on human resource administration in ethio telecom. Nebiyou (2018) has conducted a research in the practices and challenges of ERP project implementation in CBE the research mainly focuses on the impact of ERP in HRA. Kibebework (2015) has reviewed the challenges and status of ERP implementation in the case of mugher and Derba cement industries his research findings are mainly focuses on the current status of ERP application which is limited to specific modules and have not consider the implementation phase of . Several other research has also been conducted in the past year and most companies in Ethiopia who have implemented ORACLE ERP especially in the Banking industry.

Organizations that intend to implement an ERP system must have enough resources to do so (Hunton, Lippincott &Reck, 2003). ERP is a huge and complex project to be implemented, which requires number of staff for the customization and implementation. Implementation of ERP in Commercial Bank of Ethiopia involves several consultants, IT staffs, business analysis from is functional units and Tech Mahindra techno-functional consultants. Since ERP is a system that completely changed the previous system to a newly ERP system it has gone through several risk factor.

The main objective of this study will analysis and explore the critical success factors and challenges while implementing ERP system in CBE. We'll also review the phase of ERP after the implementation of ERP system and how all the success factors and challenges affected the Bank structure.

1.3 Research questions

- What are the critical success factors that affect the implementation of ERP in CBE?
- What is the current status of ERP implementation?

1.4 Research Objective

1.4.1 General objective

The main objective of this study is to assess the critical factors that affect ERP implementation in CBE, during the implementation phase what were the main success factors and what was the challenge that affect the delivery time, budget and mainly the contributions ERP made for effective and efficient management of resource in the Bank.

1.4.2 Specific objective

The study specifically aims to:

- Identify the major critical factors of ERP implementation.
- Identify the current status of ERP application.

1.5 Research Hypothesis

The hypothesis of this study is to identify the major critical factors that have impacted the implementation of ERP. Theoretically and empirically it is supported that there are factor variables that impacted ERP implementation and it is tested on the data empirically.

H1: There is a positive relationship between data availability and integrity and ERP implementation.

H2: There is a positive relationship between Top management involvement and ERP implementation.

H3: There is a positive relationship between vendor support and ERP implementation

H4: There is a positive relationship between Team composition and Competence and ERP implementation.

H5: There is a positive relationship between User Training and Education and ERP implementation.

H6: There is a positive relationship between enterprise wide communication and ERP implementation

H7: There is a positive relationship between user acceptance and ERP implementation.

H8: There is a positive relationship between Organizational support and ERP implementation

H9: There is a positive relationship between Project management and ERP implementation

1.6 Significance of the study

The findings of the study will ensure the implementation of ERP in Banks will help management of resources and increase the efficiency and effectiveness of Bank specially leading it to excellent Bank. The study will also contribute for other Bank sectors to encourage to implement ERP technology changing manual based work to the efficiency of work that contribute in employee satisfaction and accordingly it will have huge impact in the development of Banking industry.

It may also help other companies to adapt the success factors while implementing ERP and avoid risk that could occur.

1.7 Scope of the study

The scope of this study will be delimited to access and identify the factors that affect ERP system and the impact of the factors that affect the implementation of the application both the success factors and the challenge will be analyzed and after the implementation of the system the consequence of that factors and what have been caused by those factors.

1.8 Limitations of the study

This study is limited to access the factors that have on ERP from the vendor side, since the application is purchased from outside source, which is Tech Mahindra it will only access the factors that have an impact on the application during the implementation and customization of ERP in Commercial Bank of Ethiopia.

1.9 Organization of the research report

This study has been organized in five chapters, the first chapter deals with introduction parts, which include background of the study, statement of the problem, objective of the study, significance of the study, scope and limitation of the study. The second chapter include literature review, theoretical review, empirical review and conceptual framework. Chapter three deals with research methodology Research Design, Data Type and Source, Research strategy, Sampling procedure, Strategies for data collection, Data collection method and tools, Data presentation. Chapter four is about analyzing the data, detail discussions and findings. Finally, chapter five includes summary, conclusion and recommendation.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

In this chapter, we will review theoretical, empirical and conceptual framework will be covered. By considering, historical background of ERP system theoretical review will answer the meaning of ERP system, Things to consider before implementing ERP in the Banking industry and expectation of the Bank from the ERP. In the Empirical, review previous experience of other companies and experience sharing will be discussed, whereas the conceptual framework dependent and independent variable influence will be expressed in diagram.

2.1 Theoretical review

2.1.1 What is ERP system?

It was in the beginning of the 1990s when the enterprise resource planning (ERP) system was first introduced (Almgren et al., 2014). ERP is the process of business management software that allows an organization/firm to manage the business and office functions with the help of system of integrated applications. ERP software integrates all parts of entire operations, including planning, development, purchasing, and inventory, manufacturing processes, sales and marketing (Zubair & Zamani, 2014).

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 & Hillsgersberg, 2000).

ERP is “an integrated information system that can be used to manage all the resources, data, and functions of a firm from shared data stores” ERP systems include gathering organization data to consolidate and manage organization resource in to one manageable format (Kallunki, Laitinen and Silvola, 2011). A business management software suite that include human resources, finance, procurement, project management and strategic office. There are several benefits of implementing oracle ERP it allows business to make informed business decisions by maximizing organizational

performance, reduce cost, make reporting easy and manageable and several other benefits can be consumed from this application. ERP systems are integrated, customized, and packaged software based systems that handle the majority of system requirements in all functional areas of a business such as finance, human resources, manufacturing, sales and marketing (Lin, 2010). The development of technologies this day are changing day to day different versions of oracle ERP has been released till now each have added new features to the application, due to all this reasons implementing ERP is recommended by certified oracle developers to ensure business needs.

2.1.2 Phase of ERP Implementation

Each projects in an organization have different phases that passes through in order to be successfully implemented. ERP is a huge project which can change the complete business structure of an organization, if ERP is implemented the business function of an organization operate their day to day activity successfully. Most implementation phase are different in each organization according to the organization structure, Khanna and Arneja (2011) briefly analyze the phases of ERP implementation.

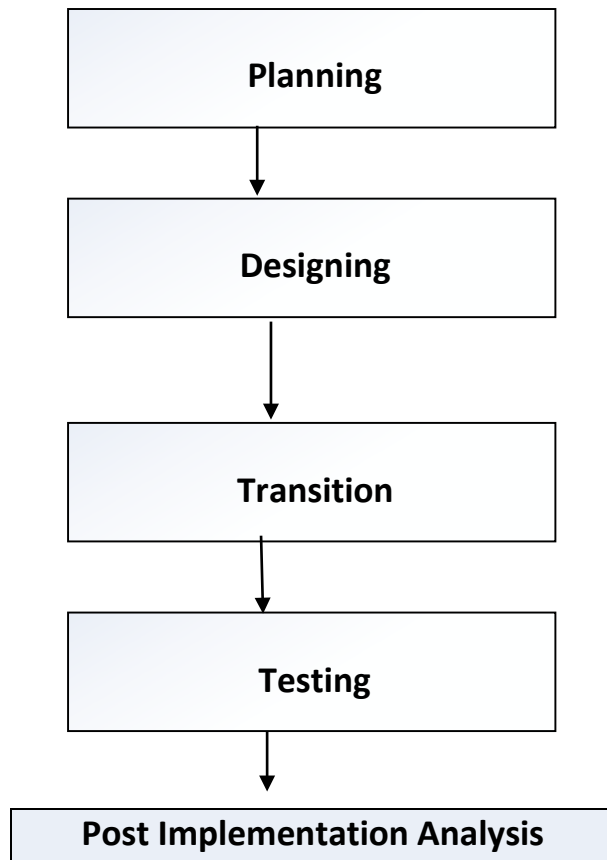


Fig2.1: Flowchart for ERP Implementation (Khanna and Arneja,2011)

As shown on the diagram the first phase of ERP Implementation is planning this phase involve consulting with different vendors and top management of the organization, plan will be developed roles and responsibilities are assigned overall prepare the organization to the implementation of ERP. The second phase will be designing which involve models will be created how the project take places in the organization project team members will be selected to participate the third phases are Transition in this phase responsibility will be assigned according to the requirement, training and knowledge sharing will be handled at this phase. The fourth phase is testing in this phase the organization test case scenarios. Installation and customization according to the organization requirement will be set, the fifth and final phase is post implementation Analysis after the implementation is over the level of acceptance by the user will be taken place here and changes and updates through time will be at this phase of implementation.

2.1.3 The Evolution of ERP

The evolution of ERP started early in 1960s which is directly related to the development of software becoming more specific application to the computer systems. The features of ERP software helped the business field to integrate technologies in to the filed, which leads to performance development.

During 1970 material resource planning (MRP) where developed for inventory control within production control, then MRP evolved into MRP I and MRP II systems, which enhance manufacturing processes by integrating accounting functions and customer ordering data. The practical aspect of MRP orients regarding that it is based on comprehensible rules, providing cognitive support as well as a powerful information system for decision making (Shojaie,Bahoosh & Pourhassan ,2015).

In 1980 the evolution of MRP developed to its second level where manufacturing resource planning developed and extend to manufacturing process and management activity, in 1990 MRP II where introduced which included different business area like Human resources, finance, procurement etc.

ERP system where introduced in the begging of 1990, which included accounting, manufacturing, Human resource, inventory, project management and other by using relational database management system(RDBMS) to store data, RDBMS is modern data base system which allow to enable concurrent access of database. ERP vendors customizes and add new modules to the core module of ERP. In 2000 extended ERP where introduced, extended ERP included advanced planning and scheduling.

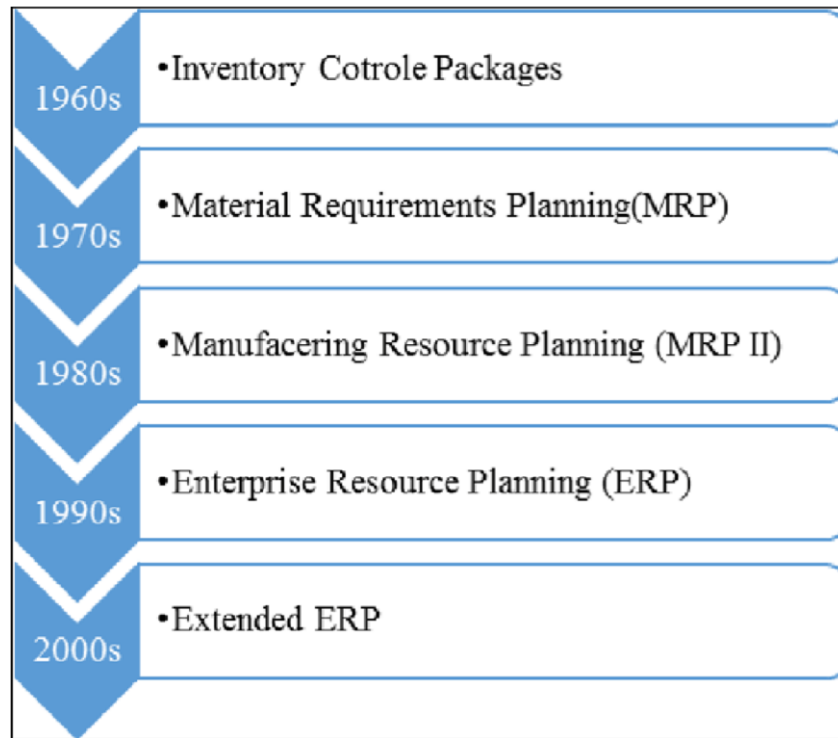


Fig 2.2: ERP evolution (source Kasem, El-Bakr yand salah, 2017)

2.1.4 Expectations from ERP in CBE

As we know, ERP is a resource management tool. CBE expect to manage its resource effectively and efficiently. From oracle ERP application CBE has applied different modules like human resource modules which are Oracle Core Human Resource, Oracle Payroll, Oracle SSHR, Oracle I-Recruitment, Oracle Time and Labor, Oracle Learning management, Oracle PMS, Oracle Succession and procurement modules include Purchasing, Sourcing, inventory, Fleet Management and oracle finance includes cash management, Fixed Assets management, Treasury (bond management), Expense and general ledger and Hyperion planning which is an ERP module for office of strategy which include HFM, Scorecard and strategic management, Hyperion planning and Hyperion project financial planning Oracle Business intelligence and data warehouse include interactive dashboard ,business intelligence, business intelligence mobile there were a high expectations from all this module to improve and increase interactions, satisfaction and capability and also to make it easy availability of information's and fast response

time to increased interaction across the organization. According to the negotiation between the vendors and CBE all the agreement and expectation will be delivered by the vendors of oracle ERP that is TECH MAHINDRA.

2.1.5 Related work on ERP implementation

Regarding research conducted on ERP implementation only limited research was conducted. Foziya Ahmed (2017) has conducted study on “factors affecting the implementation of ERP at Commercial Bank of Ethiopia”. The main objective of the study was to identify and analyze organizational, technological and individual factors that affect the implementation of ERP in the context of CBE. The general approach of the research was a case study in which to collect and analyze data both qualitative and quantitative method were used, mainly in this research the data were collected through interview. A research model was established which is categorized in three technological, organizational and people factor.

Tsegaye Bekele (2019) has conducted a research on “analysis of success factors for ERP project implementation”: in the case of Ethio Telecom. The main objective of the study was to find out success factor of ERP implementation project and their impact on the implementation success in Ethio telecom. As a research methodology, the research uses a case study approach with qualitative and quantitative approach. However, the study mainly focuses on managerial and organizational perspective. It does not include technical perspective of ERP application implementation. The researcher also recommends ensuring all departments and Functional unit further study on all department of organization including the technical perspective to ensure the implementation of ERP.

2.2 Empirical studies in ERP implementation

According to different companies, ERP implementation success factors and failure factors have been analyzed before the implementation of oracle ERP in CBE mainly the knowledge sharing have been taken from Ethio tele-com and Ethiopian Airlines (CBE, 2015). Since CBE is, the first Bank to implement ERP in the Banking industry from the companies that experience sharing have been conducted

Knowledge's conducted from the above two companies

Ethio telecom has started implementing ERP while the number of their employees where 7500 which has grown through time and two implementers where consider for the implementation of ERP and oracle have been selected the project where intended to implement finance, HR, supply chain and Business intelligence. Excluding the business intelligence, the other modules have been implemented in Ethio telecom there are some different modules that have been applied in the case of CBE advice have been taken and the knowledge sharing have helped the implementation of ERP in CBE. Ethiopia Air Lines is also one of the other company that CBE considered to take experience of ERP implementation in the case of Ethiopia Air Lines their main aim was not to automate the system instead to consume accurate data of their customer, to upgrade the status and systems to the world standard, by using centralized Database which helps for the accuracy and consistency of information (CBE,2015). The two companies have different objectives to be conducted from the ERP system that is why CBE have chosen to conduct experience from different view. From both company's different advice was taken from the project managers of ERP projects they have identified project team knowledge sharing, end user's involvement, top management involvements, test environments, good planning, regular meetings and discussions were very important factors in the implementation of ERP.

- a) **Knowledge sharing between project team members** –Users' involvement, competence of users, training of users and resistance to change, user competency, and user knowledge of the system is considered as individual factors in the ERP system success (Gorla & Lin, 2010). Since the project team will be from different backgrounds of experience and

knowledge sharing of experience and knowledge will help the project teams to work comparatively and easily, the project teams are from technical staffs (IT staffs), business staffs (HR, finance, procurement and other) from CBE all these members are required to work together in order to achieve the project team.

- b) **End user's involvement** – the management and the team members of project implementation need to clarify the expectation of CBE from the ERP project and share the benefit of ERP before it goes live. Elkhani (2014) users are more likely to experiment with the system features, enabling them to learn the system more quickly
- c) **Top management involvement**- top management support is a prerequisite for the successful ERP system implementation (Madininos et al., 2012). In order for the success of implementing ERP top management involvement has a major role.
- d) **Good planning** – Planning for ERP systems and their implementations requires an integrated approach to meet the requirements of various functional areas (Mandal & Gunasekaran, 2003). planning a project is a key success factors for any project, oracle ERP is a big project in CBE it has involved more than 100 dedicated project team members, huge budget and more than a year to be implemented so specially in such types of project planning plays a major role.
- e) **Regular meeting and discussion** – updating the progress of the project during implementation must be conducted regularly between project team members and top managements of the Bank.
- f) **Test environment**- before implementing new features or modules, data, new features and any implementation will have tested in this environment before implementing in the production environment.

2.2.1 Critical factors in ERP implementation

The critical success factor in ERP implementation is described using the literature reviews and from the conclusion of the literature. The critical success factor has been chosen based on the experience and examination result of the literature. The researcher uses the critical factors that are practiced in several times of Commercial Bank of Ethiopia. The researcher reviewed several factors and chooses the critical ones which is categorized in to 6 critical success factors.

Team composition and Composition

Project efficiency can be measured in terms of project team performance which refers to the extent that project team members have completed the project as predefined cost and schedule (Unger-Aviram, Zwikael, & Restubog ,2013). They claimed that higher the team efficiency will result in lower the deviation in estimated time and cost of the project.

Kotlarsky & Oshri (2005) also stated that effective team performance may be the result of successful collaboration among team members. Similarly, Zwikael & Unger-Aviram (2010) asserted that skillful project teams are necessary for the accomplishment of the desired success. Team collaboration is another important factor in teamwork which means working together in united way (Thamhain, 2004) .Collaboration between Team members strengthens the relation at work.

Vendor Support

Project teams within vendor organizations, providing additional resources and political cover as required (Graham and Englund, 2004). Miranda and Kavan, (2005) support collaboration between vendor project teams and their clients, where necessary, to renegotiate the contracts with the clients.by examining project influence on organizational goal vendor support have critical influence in the success of the implementation.

Ross and Weill (2002) stated that vendor project managers are not members of the executive team. Therefore, they are unlikely to be familiar with their organizations' strategic intents and oversight from senior executives on the conduct of projects is needed to ensure projects stay on track.

User Training and Education

Zeitoun (1998) suggests that the influence of the tools and techniques depends on the practitioners training as well as the implementation process. Several success factors relate to human influenced factors, project management and do not relate directly to tools and technique of the hard project management. ERP project implementation require large amount of resource which include trainings for the successful implementation of the project providing training for the practitioner is critical factor for the implementation of ERP.

Takey and Carvalhoe,(2015) mentioned ability to mobilize, integrate and transfer knowledge, skills and resources to reach or surpass the configured performance in work assignments, adding economic and social value to the organization and the individual. Ginaet al. (2009) Found that the task-relevant knowledge and skill shave solved the relationship between individual experience and performance on consequent tasks. Furthermore, the organizational experience weakened the positive relationship between individual experience, knowledge and skills.

Data Availability and Integrity

Fu and Easton, (2017) define data integrity as widely used to represent a set of characteristics data, such as its accuracy, completeness, consistency, and timeliness. They also mentioned poor level of data quality can have a severe impact on effectiveness of the project. The data quality which is feed to the application during and after implementation will identify the accuracy of the result of the application which is part of the success of project.

According to Redman (2001) data are said to be high quality if they are fit for their intended in operation, decision making and data quality. Mainly for the success of project implementation data quality can be considered as critical factor.

Top Management Involvement

ERP studies have generally viewed top management support as the most important factor for ERP implementation success (Somers & Nelson, 2001). Top management must be involved at every step of the ERP implementation' (Al-Mudimigh et al, 2001) for the success of project implementation top management support is considered as one of the critical factors.

Akkerman & Van Helden (2002) also suggested that success factors including top management support are closely causally related and changes in any of them will affect through in all the other. Top management support mainly considered as critical factor for ERP project success for decision making, resource arrangement and contract agreement and several other advantages.

Enterprise Wide Communication

Kwak & Ibbs (2002) stated communication as it includes having a communication plan, information distribution path, progress reporting, and information sharing system for management and customers. They have also defined that project communication management across organization should include method and techniques to build Trust and relationship among team members.

Effective communication is a critical element of team effectiveness, both in traditional and virtual teams (Pitts et al., 2012). For the purpose of effective project implementation communication across the organization has a critical role in project implementation ERP projects have consumed large number of resources and staff for its success as communication

User Acceptance

Yusuf, Gunasekaran and Abthorpe (2004) suggested involving the users in the system testing is vital, so that the user can check the complexity and accuracy of the system, control that it works properly in the operational environment, and is one of many steps for user acceptance. ERP project implementation have required different testing environment for the purpose of test before production phase.

Organizational support

Fortune & White (2006) Organizational support is the most cited critical success factor in project management literature Organizational support as a practice that focuses on project managers and their team support during project. Which include organization should offer to support project processes properly .Organizational support have main role as critical factor for project success.

Project Management

Munns and Bjeirmi (1996) stated that project management has its role in achieving project success, but several other factors beyond the control of project management, also affect project success. Where as Baccarini (1999) conclude that only the combination of project management success with product success will create project success. During the implantation of ERP project considering well organized project management will lead for the success of the implementation.

2.3 Conceptual framework

In this study, both independent variables and dependent variable have an influence the implementation stage. There are success factors to implement the application and some limitation that have affected the implementation of the application. As mentioned there are different factors that affect the implementation of ERP in CBE, in the conceptual frame work some of the variable that affect the implementation phase will be shown. Since ERP is an oracle application which is bought from vendor TECHMAHINDRA the vendor cooperation has an impact on the implementation the knowledge gaps between team members, the data quality and accuracy, which is used during the implementation, will have an impact on the application. Integration with the existing applications, Top management involvement and end user acceptance all have its impacts on the implementation of the project in CBE.

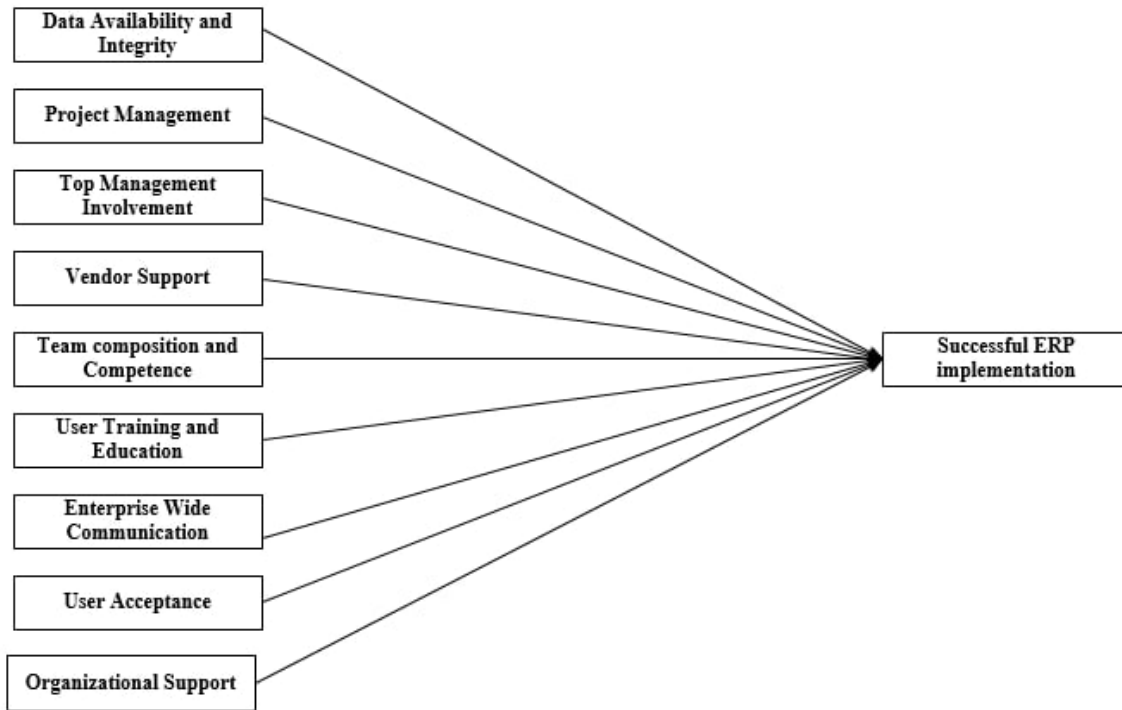


Figure 2.3: conceptual framework adopted from Dezdar (2017)

CHAPTER THREE

RESEARCH METHODOLOGY

This study is about critical factors affect ERP implementation in Commercial Bank of Ethiopia in this chapter we discussed the approaches and methodologies use in this study, research strategy, research design, data type and source, strategies for data collection and sampling.

3.1 Research Design and Approach

For the purpose of this study explanatory research design was applied. In order to identify the relationship between dependent and independent variable explanatory research design is applied. The research followed a mixed approach both quantitative and qualitative methods. Quantitative approach is applicable to reach large number of staff and qualitative approach is used to explore in depth opinion of an individual.

3.2 Source of Data

This study used both primary and secondary sources of data for collecting data .primary sources supports the researcher to cover large number of project participates and accurate data from the interview conducted to top management of the Bank which will help to gather valid data. The primary source of data collected from organization report which were collected during project implementation phase and organizational website.

3.3 Sample size determination

The target population incorporate commercial Bank of Ethiopia ERP project participants, top managements who have contributed in the project and officers who have directly uses ERP system especially during the test phase before the application goes live.

As per the data obtained from project management of the Bank, there were around 100 dedicated project participants and 50 CBE staff have participated for the test purpose. The sampling size determined as per Yemane sampling technique. To collect qualitative data interview were conducted with 10 people who are project participants as Team leader, project office director and ERP project manager.

Based on the sampling formula (Yemane, 1967) TO calculate sample size

n =Sample size N =population size e =level of precision

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

$$n = \frac{150}{1 + 150(0.05)^2}$$

$$n = \frac{150}{1.375}$$

$$n = \sim 109$$

3.4 Strategies for data collection

Primary data collected from project team members who have been participated during the implementation of ERP project using questioner and interview to assess the factors that affect the project during the implementation phase and interview with key participants helped to collect accurate and trusted data.

To support the primary data and to complete information missing from the primary data source, more information's have been collected from organizational annual report and company website, which is reported during the project implementation phase. Since the researcher was one of the technical staff of the organization starting from the implementation of the project to administrating the application getting access to organization data and observation of the application was simple, which was very helpful to support the data collection for the research.

3.5 Data collection method and tools

The primary chosen data collection method is questioner for quantitative data collection, one of the reason was it could be easy to reach number of respondent's interview were accurate also conducted with key staff of the project for accurate and trusted information. Questioner in the instrument ware prepared by considering both technical and non-technical or functional team of ERP project team members and validated with ERP application manager who is currently managing the application in CBE. Questioner were distributed using Google form to respondents due to COVID, since online Google form was chosen to distribute the questioner around two weeks were given to respondents to submit the question.

For collecting trusted and accurate information from respondents where difficult to clear out that semi-structured interview was conducted with key managerial participant. Rubin and Rubin (2005) semi-structured interview, which is a more flexible version of the structured interview as "it allows depth to be achieved by providing the opportunity on the part of the interviewer to probe and expand the interviewee's responses.

3.6 Data analysis

The researcher analyzed the data through questionnaires, interview and review organizational data analyzed statistically to detail description for the variable under the study. The data collected from the questioner were checked and coded for each response then imported to SPSS software.

To check the significance of each critical factors for ERP implementation, correlation and regression analysis were used. Correlation analysis was used to test association of variables for determining the value of correlation between variables. To identify impact of each critical factors on ERP implementation, regression analysis was used.

3.7 Reliability and Validity Test

Reliability is the extent to which measurements are repeatable when different people perform the measurement on different occasion, under different condition, supposedly with alternative instruments, which measure the construct or skill (Dorst, 2011). Validity means measure what is intended to be measured (Field, 2005). In researches, the validity and reliability must be ensured using different techniques.

Reliability of the scales checked with the application of the Cronbach Coefficient Alpha for the computations to check for the internal consistency of the scales. Alpha of 0.70 was set as an acceptable measure of reliability. The cronbach alpha coefficient indicates the consistency of responses to items. Cronbach Alpha test implies that the instrument's internal consistency as 77.8% which is the acceptable percentage.

Table 3.1 Reliability statistics result (Source: Survey Result, 2021)

Reliability Statistic		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.778	.787	27

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter deals with the result and discussion of the data analysis and support of ERP in CBE division based on the analysis. For the data collection questioner and interview were used, first the questions for the questioner was analyzed with ERP application manager after ward the questioner were distributed using Yamane sampling technique 106 respondents respond the questioner. The finding from the questioner is presented in two main parts; the first part presents general direction (gender, Age, Work experience, educational status, and position and division area) of the respondents. As for the interview for 10 top manager and directors the interview were conducted. As a result, the response rate is 97%, thus in a chapter the information gathered from respondents are analyzes in detail.

4.1 Background of the respondents.

The first part of questioner consists detailed information about the respondents, which represent CBE staff who have a part in ERP implementation project. Accordingly, the questions and responses have been described and summarized. General direction where included in the question in part one which represent the background of respondents

Respondents for this research are mainly selected from each modules of ERP implementation. The participates who have responded the questioner are from finance, office of strategies, Human resources, Procurement, technical implementer and others. Thus, 109 questionnaires were distributed to CBE staff who were part of project implementation stage from 109 questionnaires 106 were returned. This shows that the response rate was 97.2%

4.1.1 General Characteristics of Respondents

Demographic characteristics of respondents were summarized on the bases of gender, age, education status, job position, work experiences and Division area.

Table 4:1 Demographic Characteristics of Respondents

Profile	Description	Frequency	Percentage
Gender	Male	72	67.9%
	Female	34	32.1%
Age	18-25	15	14.2%
	26-35	55	51.9%
	36-45	26	24.5%
	46-60	10	9.4%
Work experience in CBE	1-5	39	36.8%
	6-10	34	32.1%
	11-15	15	14.2%
	16-25	18	17%
Job Position	Officer	64	60.4%
	Manager	15	14.2%
	Director	8	7.5%
	Other	19	17.9%
Division area you are working	Human Resource	14	13.2%
	Procurement	14	13.2%
	Office of Strategy	23	21.7%
	Finance	18	17%
	Other	37	34.9%
Educational Status	Bachelor Degree	64	60.4%
	Masters Degree	15	14.2%
	Other	10	9.4%

The gender formation of respondents for the questioner is the number of female respondents are 34 and number of male respondents are 72 out of total 106 responses. Respondents, which are 68% male and 32% female participants of ERP project implementation, have responded the question, which implies the sample respondent's size can generalize result.

Most of the staff who have participated in ERP project implementation are in the age group between 26-35, which takes 53% of the total participants this age group can easily adapt to changes and new technology, which helps the organization for successful implementation of the project.

As shown in the table 4.1 above, the number of employee who have served the Bank one to five years where the main participate of ERP project implementation and employee who have served the Bank up to 10 years where also big part of the project which shows in order to implement ERP successfully the Bank was trying to explore new ideas and experience. Overall the percentage indicate new employees were purposefully selected to dedicate them self to be part of the implementation stage.

According to educational status of project participates most of the respondents where Bachelor Degree holders with 61.8% followed by master's degree holder with 28.4%, there were also some international certificate holders who have a role in the ERP project. The percentage shows that educational back ground where considered while developing team for the project to be part of CBE staff employee must hold at list first degree and some of the certified participants are from supportive Implementer Company like Fairfax technology.

In terms, of position officers takes largest part of participation since the implementation of ERP require customization and development according to CBE requirement both technical and functional officer participated by 58.8% of the total participates and managers and directors also involved in managing the progress of application and on some decision making other position represents CBE staff in top management area and staff who are not willing to mention positions they holds in the organization, in general all the position of the staff ,who have a part in the project have involved in the data collection.

The questioners were distributed to all the core support division of the Bank, which is included in the ERP implementation. The application has modules for human resource, procurement, OSM and finance. 35.3% of the respondents are under other description, which implies to technical staff (system administrator, programmers) followed by OSM staffs and finance department. Considering all the respondents from the division, it is possible to collect detailed information about ERP application implantation in Commercial Bank of Ethiopia.

4.2 Key Factors that affect ERP implementation

Assessment was conducted to identify the factors that affected the implementation of ERP. Organization support during the implementation, staff skill, experience of consultants and compatibly of ERP with other application. All have been studied accordingly and the result is shown in table 4.6.

Table 4.2 Factor that affect ERP implementation

Key factors that affect ERP during the implementation phase		Rating Scale				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Adequate Organization support during project implementation	F	15	61	19	11	0
	%	14.2%	57.5%	17.9%	10.4%	0
Skilled staff in customization and installation of application	F	14	47	22	21	2
	%	13.2%	44.3%	20.8%	19.8%	1.9%
Vendors consultant have limited experience in ERP implementation in developing country	F	11	43	32	19	1
	%	10.4%	40.6%	30.2%	17.9%	0.9%
Compatibility with existing system.	F	6	58	24	17	1
	%	5.7%	54.7%	22.6%	16%	0.9%
User interface of the application is easily understandable by users	F	12	67	10	13	4
	%	11.3%	63.2%	9.4%	12.3%	3.8%
Availability of the system	F	13	54	19	15	5
	%	12.3%	50.9%	17.9%	14.2%	4.7%
	F	8	54	25	17	2

The process time is fast respondent	%	7.5%	50.9%	23.6%	16%	1.9%
The system has features easily understandable by users	F	12	64	16	14	0
	%	11.3%	60.4%	15.1%	13.2	0
Accurate data have been provided to the system	F	15	52	19	19	1
	%	14.2%	49.1%	17.9%	17.9%	1%
Training where provided accordingly	F	4	55	25	16	6
	%	3.8%	51.9%	23.6	15.1%	5.7%
Data are always available in ERP system	F	9	51	26	17	2
	%	8.5%	49.1%	24.5%	16%	2%
Data provided from other system to ERP are accurate	F	6	45	34	18	2
	%	5.7%	43.4%	32.1%	17%	2%
Data availability are as expected by the user	F	8	50	26	21	0
	%	7.5%	48.1%	24.5%	19.8%	0
The support from Vendor were sufficient to the staff	F	4	52	25	21	4
	%	3.8%	49.1%	26%	19.8%	3.8%
The support was according to the agreement	F	3	30	41	15	5
	%	2.8%	28.3%	38.7%	23.6%	6.6%
Consultants provided by the vendors were experienced	F	4	40	31	24	7
	%	3.8%	37.7%	29.2%	22.6%	6.6%
The support was provided according to the project schedule	F	2	32	42	24	6
	%	2%	30.2%	39.6%	22.6%	5.7%

As shown on the Table 4.2 respondents were asked factors that affect ERP implementation phase. 71.7% of Respondents agreed on the Adequate Organization support for the project and 17.9% remain neutral where as 24.6% of the respondent were not satisfied with the organizational support during project implementation. As a result, majority of the staff were satisfied with organizational support, which is one of positive impact for any project.

Skill of the staff in customization and installation of the application were also analyzed as a factor and 57.5% of the respondents were agreed that the skill of the staff was adequate and 20.8% of respondents remain neutral 18.8% of the respondents disagreed on the skill of CBE staff as key

factor for ERP implementation. 51% of the respondents also agreed on vendor's consultant's limited experience of implementing ERP in developing country 30.2% of the respondents remain neutral and 18.8% of the respondents disagreed on the experience of the consultants. We can conclude from the finding that both skill of the staff and limitation of consultant experience were considered as key factor for the implementation of ERP, which affect the implementation phase negatively.

There is different application which is applied in Commercial Bank of Ethiopia and compatibility of ERP with the existing system is agreed by 60.4% of the respondents and 22.6% of the respondents remain neutral. 16.9% of the respondents disagreed on the compatibility of ERP with the existing applications.

ERP have different features which have different functionality and we can conclude that it is easily understandable by CBE staff which is indicated by 71.7% of the staff and 13.2% disagreed by saying it is not understandable Over 63.2% of the respondents agreed on the availability of the system was as expected by the Bank, 17.9% of the respondents remain neutral and 18.9% of the respondents were not satisfied by the availability of the system. 58.4% of the respondents agreed on the fast respondents of the system and 23.6% remain neutral.17.9% disagreed on the response time of the response, overall the application could be called fast respondent in the case of CBE since majority of the staff agreed on the response time which is considered as key factor for the implementation of ERP.

As shown in the above table 4.2 the data provided to the system were also analyzed as factor 63.3% of the respondents agreed on that accurate data provided during the implementation phase, 17.9% of the respondent remain neutral and 18.9% of the respondents disagreed on the accuracy of the data. Usability of the system depends on the accuracy of the data if the information provided to the system is not accurate it could have lead to failure of ERP implementation but in CBE case majority of the team member respond agreed that the data is accurate. 57.6% of the respondents agreed on that data were available in the system during the implantation and testing phase of the application, 24.5% of the respondents remain neutral and 18% of the respondents disagreed on the availability of the data. In conclusion, the findings of the analysis indicate that data are available in the ERP system.

Respondents were asked to show the level of their agreement on the training provided and 55.7% of the respondents believe the training was provided for each module, 23.6% remain neutral and 20.8% of the respondents disagreed the training was provided to each module. According to training, the survey result shows that different training was conducted to minimize the knowledge gap but the staff were not satisfied with the training provided.

Respondents were asked if the support provided by vendor was sufficient to CBE staff and 52.9% of the respondents has agreed that the support was sufficient, 26% remain neutral and 23.6% of the respondents disagree. Which show majority of the respondents were satisfied with the support provided. Respondents were also asked if the support was as per the agreement of the organization and 31.1% of the respondents agreed that the training was as the agreement of the Bank, 38.7% of the respondents remain neutral and 30.2% of the staff disagreed that the training was not as per the agreement. As shown in the statistic the result of this question were confessing and as discussed in the interview some of the top management explain that the agreement of the Bank and the application provider company have not been provided to all staff member of the Bank for security purpose.

Regarding the schedule of the support provided 32.2% of the respondents agreed on that the support was provided according to the project schedule, 39.6% of the respondents remain neutral and 28.3% of the respondents disagreed that the training provided up to the schedule. The number of respondents who remain neutral or disagreed is greater than the respondent who agreed to the support provided according to schedule. We can conclude that the support was not provided according to the schedule.

4.3 Challenges faced during the implementation phases

An assessment on challenges faced during the implementation phase of ERP project has been analyzed different challenges were occurred during the implementation, each challenges were discussed with the project team members before finalizing the questioner. Challenges that was face during the implementation were listed below in the table cause of the challenged are knowledge gap between in CBE staffs, vendor cooperation with CBE staff, limitation of resources, environmental infrastructure, communication gap between technical and business staff of the organization, Top management involvement and user acceptance to the new project all have different level of impact on the project implementation stage. Each causes have different level of impact according to the respondents.

Table 4.3 challenge faced during implementation

Causes of challenges faced during the implementation of ERP		Rating scale				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Knowledge gap between CBE staffs	F	17	60	21	6	2
	%	16%	56.6%	19.8%	5.7%	1.9%
Vendor cooperation with CBE staff	F	9	52	33	12	0
	%	8.5%	49.1%	31.1%	11.3%	0
Resource limitation	F	15	43	14	31	3
	%	14.2%	40.6%	13.2%	29.20%	2.8%
Infrastructure have not been fully providing for the project purpose	F	11	42	20	29	4
	%	10.4%	39.6%	18.9%	27.4%	3.8%
Lack of Experience on project implementation	F	16	42	19	27	2
	%	15.1%	39.6%	17.9%	25.5%	1.9%

Respondents were asked the cause of the challenged faced during the implementation of ERP. While analyzing results from the questions it shown that 72.6% respondents think knowledge gap between CBE staff who were part of the project were challenge in the project, 7.3% of the respondents disagree on this factor while 19.8% were neutral about the cause of the challenge. As

the result that most of the participants agreed on knowledge gap of staff were challenge and one of the factor that affected the implementation phase.

Were as the challenges faced by the cause of vendor cooperation with CBE staff, 57.6% of the respondents agreed on vendor cooperation as challenge of ERP implementation phase. 31.1% remain neutral and 11.3% of the respondents disagreed that vendor cooperation were challenge during the implementation. We can conclude that majority of the respondents believe that vendor cooperation with the staff were challenge faced during the implementation phase.

Regarding resource limitation 54.8% of the respondents agreed on resource limitation as challenge of the project .13.5% of the respondents responded neutral as resource limitation were challenge during implementation phase where as 32% of the respondents disagreed on resource limitation as challenge during ERP implementation. As a result, majority of the respondents says there was resource limitation in the implantation phase.

As of infrastructure, 50% of respondents agreed on infrastructure were not provided for the project purpose.18.9percentage remain neutral and 31.2% disagree on infrastructure provided were not challenge during implementation. Where as 54.7% of the respondents believe lack of communication between technical and business, staff of CBE were challenge and 17.9 remain neutral, 27.4% of the respondents disagree on lack of commination between CBE staff as challenge in ERP implementation phase.

Lack of experience on the project implementation were also challenge faced during the implementation of ERP as 54.7% of the respondents agreed and 27% of the respondents disagreed on lack of experience was a challenge of ERP implementation while 17.9% chosers to be neutral. So we can conclude that lack of experience in project implementation have been a challenge in project implementation.

Overall, we have discovered from the finding that all the challenges listed are faced during the implementation of the project, majority of the respondents have agreed that the challenge were face during ERP implantation.

4.4 Current status of ERP in the Bank

The impact of ERP has been assessed from project participates on how ERP has changed the Bank working structure from different perceptive like the impact of ERP in resource management, communication improvement, effectiveness of cost, change in knowledge sharing and management improvement after the implementation have been studied. Accordingly question that are provided to asses the impact of ERP are shown in table 4.4.

Table 4.4 current status of ERP in the Bank

The current status of ERP in Commercial Bank of Ethiopia		Rating scale				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Resource management improvement	F	18	66	14	8	0
	%	17%	62.3%	13.2%	7.5%	0
Support from the vendor side are still available	F	18	65	18	5	2
	%	17%	61.3%	17%	4.7%	2%
Staffs are using the application with improved knowledge	F	20	56	16	13	1
	%	18.9%	52.8%	15.1%	12.3%	0.9%
Knowledge sharing between employee improved	F	21	60	10	14	1
	%	19.8%	56.6%	9.4%	13.2%	0.9%
Management of division improved	F	15	65	14	8	4
	%	14.2%	61.3%	13.2%	7.5%	3.8%

Over 79.3% of the respondents agreed on the improvement of resource management in CBE have been adapted currently after the ERP implementation and 13.2% of respondents remain neutral. 7.5% of the respondents disagree on the improvement. As a result, we can conclude majority of the respondents agreed on the improvement of the Bank resource management that was one of the reason to implement ERP.

78.3% of the respondents also agreed on the Support from the vendor side are still, 17% of the respondents remain neutral and 6.7 % of the respondent disagreed on the support are available currently .The respondents also agreed 71.7% users are still using the application with much

improved skill 15.1% remains neutral and 13.2% of the respondents disagreed on the skill improvement of staff. As for improvement of knowledge sharing between employee 76.4% agreed the improvement of the employee in knowledge sharing, 9.4% remain neutral and 14.1% disagree on the improvement overall we can say that ERP application have positive improvement on knowledge sharing between staff.

Currently the status of the implementation of ERP the communication between the management division have been improved agreed by 75.5% of the respondents, 13.2% remain neutral and 11.3% of the respondents disagreed that the management division have been improved after the implementation of ERP. All the improvement of the Bank after the implementation of ERP has a positive impact on the performance of day-to-day activity and increase the effectiveness of the Bank.

4.5 Correlation Analysis

Correlation is a measure of the strength of a relationship between two variables .which study a possible connection between two variable. Complete correlation between two variables is expressed by either + 1 or -1.

Table 4.5 Correlation analysis interpretation

Correlation value	Interpretation
0.9-1(-0.9 to-1)	Very high positive(negative) correlation
0.7-0.9 (-0.7 to -0.9)	High positive(negative) correlation
0.5-0.7 (-0.5 to -0.7)	Moderate positive(negative) correlation
0.25-0.5 (-0.25 to 0.5)	Low positive(negative)correlation
00-0.25	Negligible correlation

Source: Parvez ahammad(2016)

Table 4.6 Pearson's correlation among all variables

		Successful ERP Implementation	User Acceptance	Vendor Support	Data Availability and Integrity	Team Composition and competence	User Training and Education	Enterprise Wide Communication	Project management	Top Management Involvement	Organization Support
Successful ERP Implementation	Pearson Correlation	1	0.049	.781**	.780**	.798**	.677**	.862**	.659**	.798**	.200*
	Sig. (2-tailed)		0.616	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040
	N	106	106	106	106	106	106	106	106	106	106
User Acceptance	Pearson Correlation	0.049	1	0.082	0.083	0.064	0.000	0.080	0.077	0.035	.736**
	Sig. (2-tailed)	0.616		0.402	0.399	0.512	1.000	0.418	0.435	0.720	0.000
	N	106	106	106	106	106	106	106	106	106	106
Vendor Support	Pearson Correlation	.781**	0.082	1	.740**	.773**	.661**	.766**	.690**	.657**	0.132
	Sig. (2-tailed)	0.000	0.402		0.000	0.000	0.000	0.000	0.000	0.000	0.176
	N	106	106	106	106	106	106	106	106	106	106
Data Availability and Integrity	Pearson Correlation	.780**	0.083	.740**	1	.764**	.728**	.821**	.708**	.764**	.233*
	Sig. (2-tailed)	0.000	0.399	0.000		0.000	0.000	0.000	0.000	0.000	0.016
	N	106	106	106	106	106	106	106	106	106	106
Team Composition and competence	Pearson Correlation	.798**	0.064	.773**	.764**	1	.654**	.765**	.622**	.699**	0.147
	Sig. (2-tailed)	0.000	0.512	0.000	0.000		0.000	0.000	0.000	0.000	0.132
	N	106	106	106	106	106	106	106	106	106	106
User Training and Education	Pearson Correlation	.677**	0.000	.661**	.728**	.654**	1	.717**	.724**	.654**	0.090
	Sig. (2-tailed)	0.000	1.000	0.000	0.000	0.000		0.000	0.000	0.000	0.358
	N	106	106	106	106	106	106	106	106	106	106
Enterprise Wide Communication	Pearson Correlation	.862**	0.080	.766**	.821**	.765**	.717**	1	.684**	.838**	.220*
	Sig. (2-tailed)	0.000	0.418	0.000	0.000	0.000	0.000		0.000	0.000	0.023
	N	106	106	106	106	106	106	106	106	106	106
Project management	Pearson Correlation	.659**	0.077	.690**	.708**	.622**	.724**	.684**	1	.622**	.228*
	Sig. (2-tailed)	0.000	0.435	0.000	0.000	0.000	0.000	0.000		0.000	0.019
	N	106	106	106	106	106	106	106	106	106	106

Top Management Involvement	Pearson Correlation	.798**	0.035	.657**	.764**	.699**	.654**	.838**	.622**	1	.326**
	Sig. (2-tailed)	0.000	0.720	0.000	0.000	0.000	0.000	0.000	0.000		0.001
	N	106	106	106	106	106	106	106	106	106	106
Organization Support	Pearson Correlation	.200*	.736**	0.132	.233*	0.147	0.090	.220*	.228*	.326**	1
	Sig. (2-tailed)	0.040	0.000	0.176	0.016	0.132	0.358	0.023	0.019	0.001	
	N	106	106	106	106	106	106	106	106	106	106

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

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

According to Pearson correlation analysis there is significant positive relationship between dependent and independent variable except one variable which is user acceptance. Range between value ($r=0.049$, $p>0.01$) which shows Negligible correlation. The other eight variable have positive correlation relation with the dependent variable the result shows (Vendor support $r=0.781$, $p<0.01$, Data Availability and integrity $r=0.780$, $p<0.01$, Team Composition and competence $r=0.798$, $p<0.01$, User Training and Education $r=0.677$, $p<0.01$, Enterprise Wide Communication $r=0.862$, $p<0.01$, Project management $r=0.659$, $p<0.01$, Top Management Involvement $r=0.798$, $p<0.01$ and Organizational support $r=0.2$, $p>0.01$) since correlation does not show or measure the cause effect relationship regression analysis is conducted to measure the cause and effect relationship between successful ERP implementation and each variable.

4.6 .Linear Regression Analysis

Linear regression is a statistical method that allows us to summarize and study relationships between two continuous variables. For the purpose of identifying cause effect of dependent and independent variable linear regression have been found necessary for this research.

Table 4.7: Results of linear Regression Analysis critical factor of ERP implementation

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901 ^a	.812	.794	.222
a. Predictors: (Constant), Top Management Involvement, Vendor Support, Team Composition and competence, Data Availability and Integrity, Project management , User Training and Education, Enterprise Wide Communication, Organization Support b. Dependent Variable: ERP Implementation Success				

Source: Own survey, 2021

According to table 4.7 Adjusted R square value is 0.794 which indicate 79.4% of independent variable have an influence on the dependent variable which is Successful ERP Implementation. From the table 4.6 we have analyzed that user acceptance is not correlated to Successful ERP Implementation so it is not included in the regression analysis, if an independent variable is not correlated with the dependent one it will not be included in the regression.

ANOVA

ANOVA test helps to find out if the study result are significant. The value of R and R² identified from the model summery is F=52.2 and P<0.001, Overall the Regression model is significant.

Table 4.8: ANOVA Model

		ANOVA^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.403	8	2.550	52.209	.000 ^b
	Residual	4.738	97	.049		
	Total	25.142	105			

a. Dependent Variable: @1. Successful ERP implementation

b. Predictors: (Constant), Vendor Support, Data Availability and Integrity, Team Composition and competence, User Training and Education, Enterprise Wide Communication, Project management

Top Management Involvement ,Organization Support

Source: Own survey, 2021

Table 4.9: Beta Coefficients

		Coefficients						
Model		unstandardized Coefficients		Standardize d Coefficients Beta	T	Sig.	Collinearity Statistics Tolerance	VIF
		1	(Constant)	1.297	0.236		4.650	0.000
	Vendor Support	0.139	0.064	0.175	2.155	0.034	0.294	3.402
	Data Availability and Integrity1	0.293	0.79	0.320	3.732	0.01	0.582	1.718
	Team Composition and competence	0.160	0.059	0.218	2.706	0.008	0.300	3.337
	User Training and Education	0.312	0.087	0.375	3.585	0.001	0.179	5.588
	Enterprise Wide Communication	0.307	0.086	0.369	3.582	0.001	0.183	5.473
	Project management	0.142	0.65	0.179	2.178	0.032	0.364	2.747
	Top Management Involvement	0.149	0.064	0.202	2.323	0.022	0.289	3.460
	Organization Support	0.679	0.52	0.129	2.327	0.019	0.688	1.493

The contribution of variable in the model for the dependent variable and each variable is ranked based of their contribution. According to table 4.9 data availability and integrity takes the higher contribution rate for the successful implementation of ERP with beta value $B=3.732$ followed by $B=3.585$ user training and education, $B=3.582$ enterprise wide communication , $B=2.706$ Team composition and competence $B=2.323$ top management involvement also have a high contribution and $B=2.155$ Vendor support. All the variable have a significant contribution on the dependent variable with different rank level. Overall the independent variables have impacted the implementation phase of ERP for it success

It can be concluded that most of the variable which are data quality and integrity, vendor support, top management involvement, user training and education, organizational support, Enterprise wide communication and Team composition & competence have a positive effect on the successful implementation of ERP. The result shows all the standard beta coefficient of the total variation of successful ERP implementation is explained by the variability.

All the hypothesis test have been tested in Pearson’s correlation and standard beta coefficient and the result have been interpreted in the above tables and the ranking level have also been interpreted and analyzed, the test hypothesis.

Table 4.10: Test Hypothesis Result

Hypothesis Variable	Acceptance
H1:Data availability and integrity	Supported
H2:Top management involvement	Supported
H3:Vendor support	Supported
H4:Team composition and Competence	Supported
H5:User Training and Education	Supported
H6:Enterprise wide communication	Supported
H7:User Acceptance	Not Supported
H8:Organizational Support	Supported
H9:Project Management	Supported

4.10 Discussion of Findings.

The critical factors that affect ERP implementation phase have been discussed in detail;

These factors were identified during data collection by questionnaires and interview. ERP have been successfully implemented in CBE all the modules are in production stage all CBE staff are currently using ERP application. However, the implementation phase have faced positive and negative impact, which were resolved using different techniques. Currently, CBE staff administer ERP application.

Based on the questionnaires and interview, the researcher identifies critical success factor that affect implementation phase of the project, the assessment result shows most staff agreed that the organizational support was adequate during the implementation all the supports from the organization have been provided. There four, we can say the organization support were key critical factor for the success and most of limitation have been resolved. According to each module, trainings and educational support provided to the staff member as majority of the staff believe the training were provided for both technical and functional team members of the project and the training were provided by consultants and in-house staff for project participates. The result from the study shows that qualifying staff members of CBE staff was taken seriously by the organization.

Data availability and integrity were also key success factor that help the project to be implemented, the data provided to the system were accurate and have been tested in several test environments to check the accuracy and it were also available the to the project implementer as required. The project management were also identified as critical factor the implementation of ERP project were handled under project management office till it is successfully implemented , the project management office have selected staff who have adequate knowledge for the implementation and the project phase which are project initiation, project planning, project Execution, project monitoring & controlling and project controlling have been followed accordingly which is one of key element for the success of project

Top management involvement were also one of the critical factor for the implementation of project. As discussed in the above chapters the involvement of top management in project implementation

have huge role for its success. The support of the vendor was also adequate and helped CBE implement ERP project as known ERP is an outsourced project which is implemented by TECH MAHINDRA the support of Oracle and TECH MAHINDRA have helped the organization.

In addition, Team composition and Competence were identified as critical factors for the implementation of ERP as the project is implemented by dedicated team members which are gathered from different divisions of the Bank for the purpose of different project module implementation. User involvement and Enterprise-wide communication were also identified as critical factors from the interview and the survey question.

Training and knowledge transfer have been conducted to CBE staff according to each module for both technical and functional time several times to qualify staff for the implementation of the project and it has shown an improvement in performance of the staff so we can conclude that it is one of the critical factors for the implementation of ERP.

The assessment from the respondents shows that, the staff believe that resource management of the Bank has been improved. Assets of the Bank have been managed properly after the implementation of the ERP. Most staff members of CBE believe that there is an improvement in the management of resources. Good communication skills are very important to one's success as an administrator (Yate, 2009). Communication of the management with staff has been improved. Majority of the staff believe that communication between top management has been improved which helps to have a positive impact in the Bank. ERP system is cost-effective according to the study. Most of the staff members of CBE agreed on the cost-effectiveness of the application, since ERP is a resource management application and it is applied in the organization to effectively manage resources of the organization.

After the implementation of the ERP system in CBE, there have been positive changes, as majority of the employees believe that their management of the division shows performance improvement and knowledge sharing between staff has shown an improvement. Overall, since ERP has been implemented in the organization there is effective and efficient performance. Which shows employees are satisfied by the impacts or change of the organization after ERP implementation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter is organized into three sections, the first section summarizes the research, and the second section presents overall conclusions of the research and recommendations for the organization and the study.

5.1 Summary

The main objective of this research is to analyze the critical factors that affect ERP implementation phase. The general approach of this research is a case study using qualitative and quantitative methods. Data were collected for analyzing the identified factors of CBE that occur during the implementation stage. The qualitative data collection was conducted from 106 CBE staff. The candidate was selected from finance, procurement, OSM and HR who have different roles in each division. The collected data were analyzed using SPSS version 26. For the qualitative study, one-to-one interviews were conducted for 10 employees who have served the Bank in managerial and technical staff during the implementation phase of the project.

Accordingly, we identify critical success factors and challenges that occurred during the implementation of the project. The success factors are the training provided to enhance staff knowledge, top management involvement, team composition and composition, user acceptance of system, project management techniques, support provided from the vendor, organizational support, and accuracy of data provided to the system. The challenges that were faced during the implementation were knowledge gaps between staff and resource limitations. The research discovered that by resolving the challenges smoothly, CBE has successfully implemented ERP.

5.2 Conclusion

Based on the summary of the finding the following conclusion are drawn.

ERP have been successfully implemented in CBE, since 2017, the application has been available CBE staff. Several positive impacts have been seen after the implementation of ERP, which leads the Bank toward efficient and effective performance. The study is mainly concerned about critical factor that affect the implementation phase of ERP. Different factors have affected the implementation of ERP adequate organizational support, compatibility of ERP with other applications in the Bank, accuracy of the data provided during the implementation and the training, which were provided according to each module. Each factors have positively affected the project during the implementation phase. Where as knowledge gap between staff and the lack of experience to implement ERP in developing countries were challenges during the implantation.

In order to analyze data, we have used qualitative and quantitative techniques to collect data. As for the qualitative data analysis an interview was conducted to 10 top management staff in the organization and for the quantitative data analysis we have collected data from 106 CBE staff by providing questioner. The respondents were asked to give their agreement and disagreement based on their experience of ERP implementation in CBE and their response were analyzed by using regression statistic.

The study findings indicate during the implementation phase there were adequate support from the organization as majority of project team members believe the organizational support have been huge support for the success, which was one of the positive factor for the implantation of ERP. There four the study conclude organizational support have helped contributed implementation of ERP project for its success.

The study result has also shown accuracy of the data provided during project implementation and the trainings provided to the staff, have contributed the project implementation phase. Majority of the respondents have agreed that the data provide from the organization during the implementation phase were one of the success factor during the implementation phase, from the interview we have conducted we have also analyzed the data have been tested several times in the test environment.

As a result, data in the production ERP application is accurate as expected by the Bank.

As part of critical factor that affect the implementation phase most of the team member believed that ERP application was compatible with the other application in the Bank, the compatibility of the application has been successful which makes it easy to integrate with the other Banking application.

On the other hand, majority of the respondents believe the knowledge gap between the staff and the lack of experience where challenged during the implementation. Trainings were provided to improve the knowledge of the staff even though it was one factor that have negatively affected the implementation of ERP.

As the main objective of implementing ERP in CBE was to improve the resource management of the Bank most of the employee have agreed that resource management of the Bank have shown an improvement since the application have been implanted.

The research has revealed the critical factor that affect the implementation of ERP in the case of CBE and each factors have been discussed and studied with the help of CBE staff who were part of the project and the impact of ERP after the implantation have also been analyzed.

5.3 Recommendations

Based on the findings and conclusion drawn from the critical factors that affect ERP implementation in the case of Commercial Bank of Ethiopia. The recommendations are forwarded for further improvement in ERP application success.

1. Enhancing skilled staff, the organization should consider continuous skill development of staff on different area of fields. Providing training for organization staff and creating knowledge sharing events more often. Because it enables the staff who have limited skills in different area and new staff to develop skill which is required by the Bank.
2. Communication with vendors before making decision on critical factors different division of the staff should also be participated in discussions and meetings with outside vendors.
3. Organization change management by developing training and supports staff to new changes developing change resistance staff will help organization development from different perspective.
4. Improving response time even though the ERP performance is sufficient commercial Bank of Ethiopia is developing and number of the staffs are increasing the response time of the system could be affect so increasing resource in the application will improve response time, which will have positive impact on the performance.
5. The Bank sectors who have planed to implement ERP in the future can consider CBE experience in the implementation of the project.
6. Availability of the system increasing the availability of the system by decreasing the downtime of the application enhancing the skill of ERP system administrator.

7. Managing vendor support and skill during ERP implementation phase continuous communication should be them between CBE project manager, project team members and vendor consultants.

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ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Dear Sir or Madam:

My name is Harmela Yitbarek and I am a post-graduate student of Project Management at ST. MARY'S University school of Graduate studies I am conducting research on critical factors affecting the implementation of ERP at Commercial Bank of Ethiopia.

To Get full information and data about the critical factors that affect the implementation phase of ERP system in CBE, for the purposes of data collection both interviews and survey questioner will be distributed for both functional and technical team that involve in the ERP implementation project based on your experience during the implementation phase.

It is purely academic research will not have any negative effect on you, so that you are kindly requested to fill out this questionnaire, the interview will require approximately 40 minute for completing, and it contains essential questions that show how Commercial Bank of Ethiopia exercises the ERP implementation.

For any question or If you require additional information.

Mobile: - +251-913-09-06-68

Email: yharmela@gmail.com

Thank you for your cooperation and taking time!

APPENDICES

Appendix 1: Semi-structured interviews questions

1. What are the goals of the CBE achieved by implementing the ERP system?
2. Which role and responsibility you have had in the project implementation phase?
3. What were the limitations on the day-to-day business activity before ERP application?
4. The impact of Organizational support during implementation phase?
5. Has all the requirements been fulfilled by CBE to the vendor?
6. In your opinion, did the vendors supply the application according to the agreement?
7. Did the project have been applied according to CBE expectations?
8. Do you believe that CBE staffs accepted ERP application easily?
9. Did all the modules of ERP function as expected in day-to-day activity of the bank?
10. The role of ERP in the development of the bank after implementation?

Appendix 2: survey question

Part I. General direction

Answer the question by putting marks on the provided area.

1. Which division area you are working on?

Human resources

Office of strategy

other

Procurement

Finance

2. Sex

Female

Male

3. Age

18-25

26-35

36-45

46-60

4. Working experience in CBE

1-5

6-10

11-15

16-25

5. Educational status

Bachelor degree

Master's degree

other

6. Position you hold in CBE

Officer

Manager

Director

Other

Part II

Assessments of Critical Factors Affecting Enterprise Resource Planning Implementation in the case of Commercial Bank of Ethiopia

The questionnaire tries to assess the critical factors of ERP during the implementation phases in the case of Commercial Bank of Ethiopia. Therefore, your answers should relate to your own experience and understanding of ERP system implementation by considering CBE experience. Please use the following scales on each identified question. Responses to the question can be selected by clicking one check box per question.

Rating scale 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1- Strongly Disagree

Survey questions for factors that affect implementation phase

Responses to the questions can be selected by clicking one () check box per question Where 5-Strongly Agree, 4-Agree, 3-neutral, 2-Disagree, 1- Strongly Disagree

	Key factors that affect ERP during the implementation phase	Ratings				
		5	4	3	2	1
	Adequate Organization support during project implementation					
	Skilled staff in customization and installation of application					
	Vendors consultant have limited experience in ERP implementation in developing country					
	Compatibility with existing system.					
	User interface of the application is easily understandable by users					
	Availability of the system					
	The process time is fast respondent					
	The system has features easily understandable by users					

	Accurate data have been provided to the system					
	Training where provided accordingly					
	Data are always available in ERP system					
	Data provided from other system to ERP are accurate					
	Data availability are as expected by the user					
	The support from Vendor were sufficient to the staff					
	The support was according to the agreement					
	Consultants provided by the vendors were experienced					
	The support was provided according to the project schedule					

Survey questions for Challenges during implementation phase

Responses to the questions can be selected by clicking one check box per question

Where 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1- Strongly Disagree

	Challenges faces during the implementation of ERP	Ratings				
		5	4	3	2	1
	Knowledge gap b/n CBE staffs					
	Vendor cooperation with CBE staff					
	Resource limitation					
	Infrastructure have not been fully provide					

	Lack of Experience on project implementation					
--	--	--	--	--	--	--

Survey questions for current status of ERP

Responses to the questions can be selected by clicking one check box per question Where 5- Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1- Strongly Disagree

	The current status of ERP in Commercial Bank of Ethiopia	Ratings				
		5	4	3	2	1
	Resource management improvement					
	Support from the vendor side are still available					
	Staffs are using the application with improved knowledge					
	Knowledge sharing between employee improved					
	Performance of the system is fast					