



ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

**ASSESSMENT OF POST-IMPLEMENTATION OF ENTERPRISE
RESOURCE PLANNING SYSTEM (ERP)**

CASE OF ETHIOPIA RED CROSS SOCIETY

By

SHIMELIS TADESSE

OCTOBER, 2021

ADDIS ABABA, ETHIOPIA



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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 Systems

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Advisor: MELKAMU BEYENE (Ph.D.)

October, 2021

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By: Shimelis Tadesse

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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 this thesis entitled “ASSESSMENT OF POST-IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING SYSTEM (ERP) CASE OF ETHIOPIAN RED CROSS SOCIETY” 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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Shimelis Tadesse

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

Advisor's Signature: _____

Melkamu Beyene (Ph.D.)

Dedication

This work is dedicated to my Classmate and friend Ato Sewnet Bekalu who passed way during our study. Rest in peace my dear!

Acknowledgements

First of All, I would like to thank Almighty God for being with me from starting to end during all period of my study.

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List of Acronyms

CRM	Customer Relationship Management
CSF	Critical Success Factor
D&M Model	Delone and Maclean Model
ERCS	Ethiopian Red Cross Society
ERP	Enterprise Resource Planning
HQ	Head quarter
HR	Human Resource
ICRC	International Committee of the Red Cross
IFRC	International Federation of the Red Cross and Red Crescent Societies
MRP	Material Requirement Planning
ROI	Return on Investment
SAP	System Application Product
SPSS	Statistical package for social science
SQ	System quality

Abstract

In order to achieve the many benefits ERP systems, the organization have to offer, an organization needs to achieve ERP post implementation success. The challenge is that many organizations don't realize meaningful business process improvements after their ERP implementations [48]. The main objective of this study is to assess post implemented ERP in Ethiopian Red Cross Society in quality, user satisfaction and net benefit dimension and to assess the major issues in the post implementation ERP in ERCS. The data was collected through online survey questionnaire and interview which are adopted from D&M Model [13]. The general approach of this research was a case study in which combination of quantitative and qualitative methods have been used to collect and analyze data using SPSS software. From the findings of the study, the quality of work ERP, user satisfaction of ERP and net benefits of ERP have positive impact in ERP post implementation success. Network connectivity problem in regional branches and lack of adequate training and unreliability IT support are found to be major issue of ERP post implementation. The study recommends Network connectivity issue the organization should upgrade the band width the network in regional branch so as to have smooth operation of ERP system. Periodical refreshment training for employee should is recommended. Improvement of ERP support system should be done by hiring additional dedicated IT experts.

Keywords: *Enterprise Resource Planning (ERP), ERP-SAP and ERP post Implementation*

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Chapter One

1. Introduction

1.1. Back ground of the study

To deal with a rapidly-changing setting environment, Businesses Company need to have capabilities to integrate, build, and reconfigure internal competencies. Organizations develop their capabilities to create competitive advantage by leveraging organizational resources [27]. In this case Information system is tool that organization can improve their own practice and procedure. Business environments are becoming increasingly complex with functional units requiring more and more inter-functional data flow for decision making, timely and efficient procurement of product parts, management of inventory, accounting, human resources and distribution of goods and services [20]. In this context, management of organizations needs efficient information systems to improve competitiveness by cost reduction and better logistics. It is universally recognized by large and small-to medium- size enterprises that the capability of providing the right information at the right time brings tremendous rewards to organizations in a global competitive world of complex business practices. [38]

The introduction of an information system such as Enterprise Resource Planning (ERP) system in an organization brings with it changes on how users work. Enterprise resource planning systems are used by organizations looking to manage their business functions within a centralized and integrated system. ERP systems' set of generic processes, make the dramatic perfection that they are capable of only, when used to connect parts of an organization and integrate its various processes smoothly.[49]

ERP is commonly used by companies working within the supply chain to help keep track of all the moving parts of manufacturing and distribution. However, ERP can be utilized by a number of different industries including those in healthcare, nonprofit groups, construction and hospitality. Organizations needing to manage their staff, customers and inventory can all rely on ERP benefits.

Ethiopian Red Cross Society (ERCS) is humanitarian organization, works in partnership with the Ethiopian government, the International Federation of the Red Cross and Red Crescent Societies (IFRC), the International Committee of the Red Cross (ICRC), partnering national societies, volunteers and beneficiaries.

The Ethiopian Red Cross Society renders its humanitarian and community-based development initiatives guided by the fundamental principles of the movement all over the country through its National headquarter, 11 regional, 32 zonal, 88 woredas (district) branches and over 4500 kebeles Red Cross Committees (grass root Red Cross Committees). One of ERCS's strategic objectives is intended to make

working environment of the National society attractive and conducive through enhancing participatory environment, improving reward package, improving working facility, enhancing ICT infrastructure and usage, improving safety and security.

ERCS has adopted ERP-SAP (one of an enterprise resource planning software developed by the German company SAP SE.) on March 2014 to incorporate the key business functions of the organization and support its internal business operation thereby humanitarian aid can be improved. It has been 6 years that ERCS start implementation of ERP to support its business process there by organization to use a system of integrated applications to manage the business and automate many back office functions related to Accounting System, fixed asset management, logistic services and human resources

Users of ERP ERCS in three departments (i.e. Finance, HR and logistic are obligated to use the ERP system intensively in their day-to-day activities because it is standard ways of performing the common business activities mentioned in the above. Other employee or occasional user of ERP system of which employee self-service like performance appraisal and employee history are also expected to use the ERP system and no other manual system are allowed. Therefore, the aim of this study is to analysis and evaluate the adoption of EPR Thereby investigating the selected dimension of success on the ERP systems for post implementation success. Finds out current status and the issues of the ERP post implementation in ERCS.

1.2. Statement of the Problem

ERP post-implementation is the phase after selection and configuration of the ERP system, user training, and the system going live stage. Even though studies concerning the ERP post-implementation phase, or the phase after going live have been made they have received little attention [6]. There many studies globally and some locally on ERP success factor [45], [51][61]. In Ethiopia context, even though, some researches are undertaken on ERP success factor which is their focus only on the process up to ERP implementation phase which cover from initiation up to go-live of the system [61],[62].

However, recently scholars [35] are recommending attention should also be given for post implantation phase since post-implementation success factors are significant for assessing an overall impact of ERP post-implementation. The successful implementation of ERP is only a first step in the accomplishment towards achieving ERP success. The real work and challenge appear post-implementation. That one year after you ‘go-live’ with your ERP implementation is the most crucial one, as it determines the long-term success of the system. The challenge is that many organizations don’t realize meaningful business process improvements after their ERP implementation [50]

By the time companies go live with their ERP systems, they’ve run a marathon – the average implementation can take up to four years. Yet when it comes to results, half of our survey respondents (49

percent) clearly recognize that going live isn't the end of their ERP program, but merely *the end of the beginning*. [48]

Enterprise resource planning implementation is a costly project that tends to face serious challenges. Thus, it is essential to perform the success assessment at the post-implementation stage of an ERP project to evaluate how much the system has succeeded in achieving its predetermined objectives [65].

Implementing an ERP system, usually leads to a long-lasting and expensive project with several particularities that mostly have as consequences fails which leads to the failure of that implementation [50]. That explains the importance of evaluating the success of an ERP project in the post-implementation phase and thus knows how the ERP project has achieved their initial defined objectives.

Business benefits of ERP can only be enjoyed by a company if it stays focused and makes continuous efforts in the stage after implementation has been completed, which is called the post-implementation phase [66]

The three dimensions of success of ERP which are time, budget and quality have featured in many traditional definitions of project management success. However, over time, studies have shown that these are not sufficient to measure project success. A poor control of any of the three golden constituents: schedule, quality, and budget poses threats to the success of a project [39]. And more over meeting the budget and time, the ERP system is more appropriate when we evaluate the implementation ERP success which from start up to go-live phase of the implementation. Some researchers are undertaken in the area of ERP post implementation in Ethiopian context. Elsa Tadele [51] has undertook study to investigate technical, organizational, and operational dimension issues of ERP post-implementation success in the context of Ethiopian airlines and design a solution framework to address those issues. And other researcher [45] has studied on “Assessment of Enterprise Resource Planning Post Implementation success: The Case of Ethio-telecom with the dimensions of Impact of ERP post implementation at individual and organizational level.

A Study Abiot & Jorge [61] presented experiences of a successful implementation by conducting a case study at private company called Mesfin Engineering found in Ethiopia. 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 selected organization by having an in-depth look at the issues behind the process. However, the success of the ERP adoption only considered with respect to the implementation activities that covers up to the go-live stage of the system.

All these local Researchers have recommended further study on other sectors, multiple organizations and other ERP system products to make contribution in having a holistic picture of ERP post-implementation success issues.

ERCS has adopted ERP SAP six years ago and rollout and go live of the system has been completed 2 years ago. However, the success of ERP post-implementation study was not conducted. Therefore, it is very important to conduct this research to understand success and challenges encountered during ERP post-Implementation phase at Ethiopian Red Cross Society.

This study sought to establish how quality, user satisfaction and net benefit dimensions can be used to describe the success of ERP post implementation in Ethiopian Red Cross Society.

This study observes the dimensions of quality, user satisfaction and net benefit dimensions of information system as a research gap that is not covered in local context. However, these dimensions are also important because an organization can leverage or control such factors to improve the success of the system as they are observed in studies [14] and [26]

1.3. Research Questions

The following research questions are to be addressed in this research work:

- What is the impact of quality of work of ERP, user satisfaction and net benefit in ERP post implementation?
- What are the major issues in the post implementation ERP in ERCS?

1.4. Objectives of the study

1.4.1. General objectives

The general objective of the study is to assess of ERP Post Implementation with quality, user satisfaction, and net benefit dimension in Ethiopian Red Cross Society.

1.4.2. Specific Objective

Specific objectives of the study:

- To assess the impact of quality of ERP on its post implementation
- To assess the impact of user satisfaction of ERP on post implementation
- To assess the impact of net benefit ERP on post implementation
- To identify the major implementation issue encounter in the ERP post implementation
- To recommend best future action to taken for improvement

1.5. Significance of the study

This study will have significant benefit for ERCS to identify the status of the ERP implantation thereby assessing the success of the post implementation. The study and also benefit the organization by identifying the major challenge of implementation and recommend the corrective measure in order to sustain the success or improve the utilization of ERP system in ERCS.

In addition, since there is limited research on ERP post implementation study in Ethiopian context this study can be used as feedback/input for other similar origination for further study of their ERP post-implementation issues.

1.6. Scope and limitation of the study

This study limited to the only post implementation phase does not cover pre-implementation phase and implementation phase. The study to assess of adoption ERP in limited to quality, user satisfaction, and net benefit dimension. And also limited to ERCS, can be give valuable feedback but may not be address other organization post implantation issues.

1.7. Organization of the Thesis

This thesis report is organized into six chapters. Chapter one, the present chapter, is a general introduction to the problem and includes the objective of the research along with the significance and scope of the study. Chapter two is devoted to literature review. It discusses concepts of an ERP system in two sections. In the first section, the basic concepts of an ERP system are discussed in sufficient detail. In the second section, ERP post-implementation related international and local studies are reviewed and presented. In chapter three, the research methodology is described. Data presentation, analysis and discussions are presented in chapter four. The fifth chapter declares summary, conclusions and recommendations.

Chapter Two

2. Literature Review

2.1 Over View of the chapter

This chapter presents the literature review on concept of ERP and ERP post implementation related research and which shows that ERP researchers have mainly concentrated on issues related to the post implementation phase of the ERP lifecycle because the focus this research is the ERP post implementation phase in ERCS.

2.2 ERP Systems Definition.

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 [54]

Grant Glossary [12] has also defined Enterprise resource planning (ERP) as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.

ERP is one the latest technologies that many organizations have undertaken. Typically, Enterprise Resource Planning (ERP) systems are software packages composed of several modules, such as human resources, sales, finance and production, providing cross-organizational integration of transaction-based data management throughout imbedded business processes support [38]

2.3 ERP Historical Account -The Emergence of ERP

The term ERP was coined in 1990 by Gartner [38]. But its roots date to the 1960s. Back then, the concept applied to inventory management and control in the manufacturing sector. Software engineers created programs to monitor inventory, reconcile balances, and report on status. By the 1970s, this had evolved into Material Requirements Planning (MRP) systems for scheduling production processes.

In the 1980s, MRP grew to encompass more manufacturing processes, prompting many to call it MRP-II or Manufacturing Resource Planning. By 1990, these systems had expanded beyond inventory

control and other operational processes to other back-office functions like accounting and human resources, setting the stage for ERP as we've come to know it. In [5] ERP systems history identified in four phases.

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

ERP systems follow the trend of its predecessors: MRP-II systems that consisted in a change from a materials emphasis to a holistic view of the manufacturing environment. Additionally, ERP systems add technology aspects to the overall system requirements. These include features such as a client/server-distributed architecture, and Object- Oriented Programming (OOP) development practices. Both of these factors help with the scalability task. This scalability and their evolution towards including supply chain and customer relationship management operations provide the extension into customer and supplier.

2.4. ERP Systems Concept

An ERP system is based on a common database and a modular software design. The common database can allow every department of a business to store and retrieve information in real-time. The information should be reliable, accessible, and easily shared. The modular software design should mean a business can select the modules they need, mix and match modules from different vendors, and add new modules of their own to improve business performance. Ideally, the data for the various business functions are integrated. In practice the ERP system may comprise a set of discrete applications, each maintaining a discrete data store within one physical database. ERP system; therefore, links all enterprise's functions in a single database proving by that an interactive environment for all system's users across the organization to execute their jobs in a much more efficient, accurate and easy way in figure below illustrates the central-database concept in ERP Systems. Dwivedi [15] also states anatomy of an enterprise system at the heart of an enterprise system is a central database that draws data from and feeds data into a series of applications

supporting diverse company functions. Using a single database dramatically streamlines the flow of information throughout a business.

ERP Concept

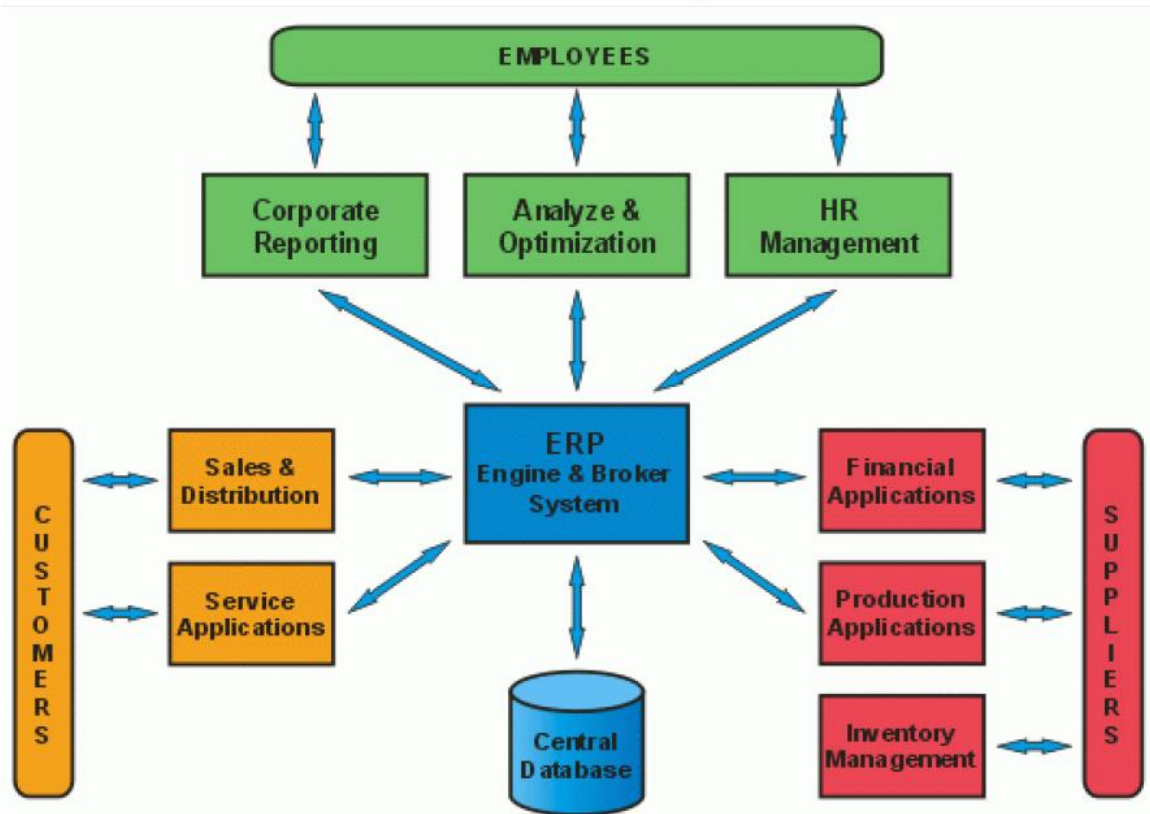


Figure 2.1 ERP Concept

(Source Adapted from "How Does ERP Work" <https://www.redwoodlogistics.com/how-does-erp-software-work/>)

In order for a software system to be considered ERP, it must provide an organization with functionality for two or more systems. While some ERP packages exist that only cover two functions for an organization (QuickBooks: Payroll & Accounting), most ERP systems cover several functions.

ERP Benefits

Organization can invest in ERP with confidence that expansion or change in any country or division will be supported. The solution provides global businesses with concrete benefits that enable success, including the following [7].

- Improved productivity for greater efficiency and responsiveness
- Increased insight for more assured decision making
- Advanced flexibility and adaptability to cut costs and speed change
- A partner for long-term growth

Wayne Wedell, Author at Aptean Industrial Manufacturing ERP Workwise Edition [56] Has identified 15 primary ERP benefits when implementing a robust ERP system and explained below

Competitive Advantage

While some manufacturers choose to stick to the tried-and-true methods of the past, others seek technology solutions. With so many benefits that ERP provides, users can see improvements within multiple departments. Implementing the software helps to keep organizations ahead of the competition because the business no longer runs the risk of making costly business mistakes, which could place business behind the back instead of ahead. Manufacturers cannot afford to put off an ERP implementation while their competition invests in ERP and starts reaping the many benefits.

Improved Process Efficiency (Operational Benefit)

An ERP solution eliminates repetitive processes and greatly reduces the need to manually enter information, which not only improves user productivity, but it eliminates the possibility of inaccurate data which could lead to making costly business mistakes. The implementation of an ERP system will also improve daily business activities by streamlining business processes, which makes it easier and more efficient for companies to collect data, no matter what department they're working in. Think of ERP as an extra hand and brain, designed to keep businesses on track, noticing every detail and making work life easier and more efficient, from software users down to its customers.

Accurate Forecasting (Managerial benefits)

Enterprise resource planning software gives your users, and especially managers, the tools they need to create more accurate forecasts. This helps software users, and businesses as a whole, think ahead and properly plan what they need from inventory and sales down to financials and customer service. With stronger forecasting, businesses can effectively decrease business costs, which saves money as well as become more overall proactive unit. Since the information within ERP is as accurate as possible, updating in real time, businesses can make realistic estimates and more effective forecasts.

Department Collaboration (Organizational benefits)

Nobody wants to run an isolated business with each department functioning separate from the other. Collaboration between departments is a crucial and often necessary part of the business, especially because business projects often involve more than just one department. With the data entered into ERP systems being centralized and consistent, there's no reason why departments can't work together, sharing

information and collaborating whenever it is needed. The software also touches on almost every aspect of a business, thus naturally encouraging collaborative, interdepartmental efforts. The beauty of ERP software is that it updates in real time, so no matter if you are using ERP software in the morning, afternoon or from a remote location, the opportunity to communicate, share information and use data is always available and accurate.

Scalable Resource

Structured ERP systems allow the addition of new users and functions to grow the initially implemented solution over time. No matter how big or small a business is ERP grows with it, being able to occupancy new users and new rounds of data whenever the business is ready to expand. There is no worry about whether you will need a brand-new system once a new user or two needs to be added, simply make sure that the enterprise solution that you choose is able to grow with business because ERP should be able to facilitate that growth.

Integrated Information (Operational benefits)

Enterprise resource planning software acts as a central hub for all of the important information that your business and the departments within it need to maintain daily business practices and operations. No more issues with data spread across separate databases; all information will be housed in a single location. This means business can integrate platforms like your CRM software with the ERP system, keeping data consistent, accurate, and unique. Know customer, their orders, and inventory, all in one place. There is also no need to worry about whether the information that you are using from the system is accurate, since it is updated in real time across the board. This improves your data accuracy, which eliminates making potential business mistakes with false data and analytics.

Cost Savings

With every business, you want to be smart with your financials and avoid making costly mistakes that could hurt your business in the end. With one source of accurate, real-time information, enterprise resource planning software reduces administrative and operations costs, allows businesses to utilize money in other, much needed areas. It allows manufacturers to proactively manage operations, prevents disruptions and delays, breaks up information logjams and helps users make decisions more quickly. If you've chosen the right solution for your business, and the right vendor who meets your needs, you're bound to see a powerful ROI. ERP software is available to help you become smarter about saving and spending when necessary.

Streamlined Processes

As manufacturers grow, their operations become more and more complex, which unfortunately increases the opportunity for costly mistakes to be made. Manufacturing software automates business

operations cross-departmentally, providing accurate, real-time information to everyone utilizing the solution, all while eliminating manual duty, which often has the potential to lead to errors. ERP increases efficiency and productivity by helping users navigate complex processes, preventing data re-entry, and improving functions such as production, order completion and delivery. Streamlined, efficient processes throughout.

Mobility

An advantage of enterprise resource planning software is its ability to make users the center of its attention, providing deployment styles that will give on the road sales reps the same opportunities as in-office users to use ERP whenever and wherever they need. With Work wise ERP software, users have access to a centralized database from anywhere you work and from different devices including your laptop, tablet or cell phone. The adaptability of an ERP software is crucial, as it increases productivity and makes information accessible with limitation of space.

Customized Reporting

ERP software helps make reporting easier and more customizable, fit to meet all of your needs. With improved reporting capabilities, your company can respond to complex data requests more easily. This improves productivity, completes process faster and helps to close out projects without large wait times in between. Users can also run their own reports without relying on help from IT, saving your users time to use toward other projects.

Increased Productivity

It's not with ERP software's automation and streamlining capabilities. Often times, when tedious tasks take up much needed business time, there can be a delay in production, which can affect your business and even the customer service experience. Having redundant processes automated, users have more time to work on other time sensitive, pressing projects and tasks that may truly require more of your attention and time. Users will also be able to work easier since the solution was designed for ease-of-use. ERP was designed with ease of use in mind, as well as giving business a break from long winded tasks, allowing you to shift your focus toward other matters.

Regulatory Compliance

A benefit of ERP software, which often times goes unnoticed, is how it ties well into regulatory compliance within the manufacturing industry. Powerful ERP solutions are designed to keep track of regulations within the industry and monitor changes in compliance. This allows users, and businesses at large, to stay abreast with laws, regulations, guidelines and specifications as it relates to business processes.

Flexible Systems

Modern ERP software systems are robust, flexible, and configurable. They are not a one-size-fits-all proposition but can be tailored to the unique needs of a business. ERP systems also can adapt to the ever-changing needs of a growing business, ensuring you won't have to buy a new solution once your needs change or your business grows. When implementing the ERP software of your choice, it is important to make sure that you can customize applications and suits, so that your system has every function needed in order to assist with daily business operations. Make sure that your ERP system can grow as your business grows, allowing you to add new users when and if needed. ERP's flexibility also goes into how it is implementing, which can be done in either your choice of the cloud or on premise.

Customer Service

It's easier to provide high-quality customer service using an enterprise solution, especially when you're using one as well-equipped as Work wise ERP. Sales and customer service people can interact with customers better and improve relationships with them through faster, more accurate access to customers' information and history. You'll also have access to marketing automation and contact center software, ensuring your customers are being interacted with consistently. Additional features including lead scoring, which helps with searching for leads to move through the sales pipeline, social media monitoring and email campaigning, which allows users to track the status of their campaigns. Work wise ERP also integrates with CRM, which is designed to strengthen the relationship between a business and its customers.

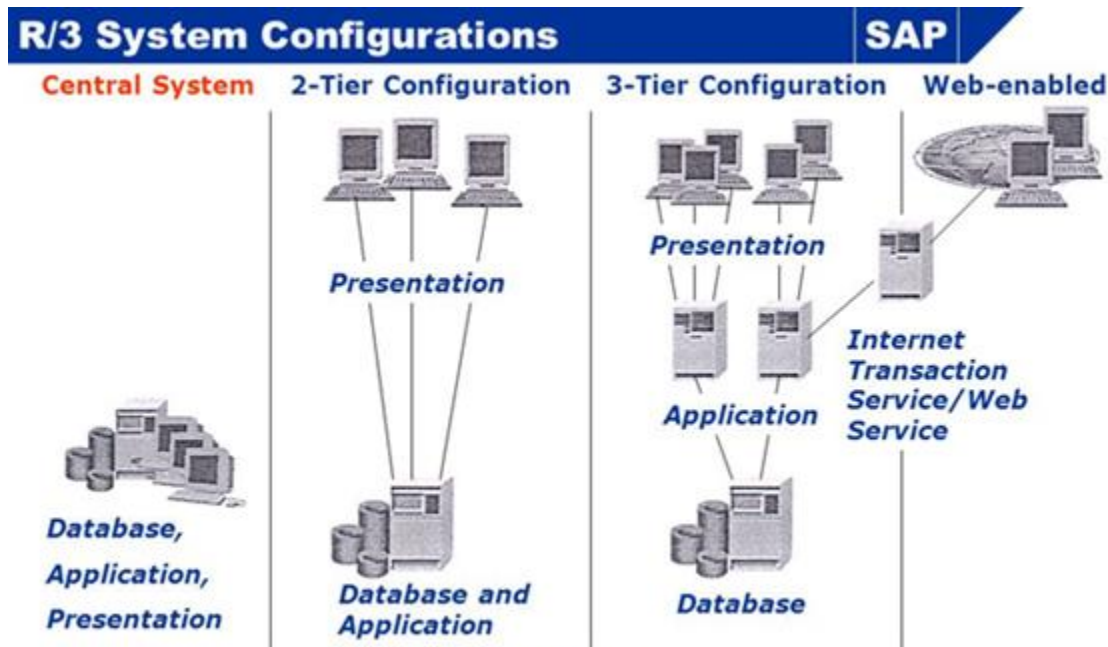
Data Reliability

ERP provides reliable data that can be accessed from different locations (if implemented in the cloud) and through multiple devices including tablets and smart phones. With the ability to update in real time, ERP improves data accuracy and consistency. With this, users can ensure that all data and analytics are safe to use, without running the risk of errors. ERP user data can also have additional security through firewalls and built-in protection resources. Improved security removes the risk of important business information getting into the hands of the wrong person. Both accuracy and safety are key with Work wise ERP software.

ERP architecture

When explaining ERP architecture, one must understand what ERP systems are comprised of in terms of their structure. The server may be centralized; however, many users are in multiple locations in order to utilize the ERP systems. This ERP architecture is thus on that server maintaining applications and databases at the same time. This is how ERP architecture can be understood. Enterprise Resource Planning systems are intended to utilize several applications, as well as any data contained within. The ERP systems

can be understood in that, there are systems known as two-tiered and three-tiered as shown in figure below. Two-tiered systems are working two ERP systems; corporate and division.



Source <https://slideplayer.com>

Figure 2.2 Three-tiered ERP architecture

This two-tiered system is separate, allowing for two different ERP systems operating separately application and database are the same. Three-tiered systems are where the client is also in utilization of ERP as well application database and presentation at different layer.

There are different levels of access between these ERP 'levels'. One level may have different access than another level, which creates the two and three-tiered systems within what would be considered as the entirety of the system.

Types of ERP

There are three different types of ERP implementations – cloud, on premise, and hybrid. Explore the benefits of each and choose the one that makes the most sense for your business.

Cloud ERP

Cloud-based computing (also called Software as a Service, or SaaS) allows users access to software applications that run on shared computing resources (for example, processing power, memory, and disk storage) via the Internet.

On-Premise

ERP Run your enterprise resource planning software in your own data center – for maximum flexibility and control.

Hybrid ERP

Run some of your ERP applications in the cloud and some on premise with hybrid ERP, also known as two-tier

ERP Providers

ERP development from software solution provider mainly emerged as a sequel of their MRP products. Some of the early solution providers are provided below.

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

SAP AG Systems, Applications and Products in Data Processing, was started by five former IBM engineers in Germany in 1972 for producing integrated business application software for the manufacturing enterprise [57]. 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.

Oracle Corporation–Flagship Product *Oracle Applications*

Oracle 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 [31]. 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 resources, manufacturing, supply chain, projects and front office. Oracle has other strong products in the software field including DBMS, data warehousing, work flow, systems administration, application development tools (APIs), 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.

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 revenue of \$32 million in 1992. Enterprise solutions from PeopleSoft include modules for manufacturing, materials Management, distribution, finance, human resources 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 Baan Company–Flagship Product *Banner*

Founded in 1978 in The Netherlands, Baan [31] 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. 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.

J.D. Edwards & Co.–Flagship Product *One World*

J.D. Edwards was founded in 1977 in Denver [57] 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. The product includes modules for finance, manufacturing, distribution/logistics and human resources, 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 in 1992, 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 OneWorld Xe (“Xe” stands for “extended Enterprise”).

ERP Functional Modules

ERP software is made up of many software modules. Each ERP software module mimics a major functional area of an organization. Common ERP modules include modules for product planning, parts and material purchasing, inventory control, product distribution, order tracking, finance, accounting, marketing,

and HR. Organizations often selectively implement the ERP modules that are both economically and technically feasible.

Financial Module

Financial Module Both for-profit organizations and non-profit organizations benefit from the implementation of ERP financial module. The financial module is the core of many ERP software systems. It can gather financial data from various functional departments, and generates valuable financial reports such balance sheet, general ledger, trail balance, and quarterly financial statements.

HR Module

HR Module HR (Human Resources) is another widely implemented ERP module. HR module streamlines the management of human resources and human capitals. HR modules routinely maintain a complete employee database including contact information, salary details, attendance, performance evaluation and promotion of all employees. Advanced HR module is integrated with knowledge management systems to optimally utilize the expertise of all employees.

Production Planning Module

Production Planning Module in the process of evolution of manufacturing requirements planning (MRP) into ERP, while vendors have developed more robust software for production planning, consulting firms have accumulated vast knowledge of implementing production planning module. Production planning optimizes the utilization of manufacturing capacity, parts, components and material resources using historical production data and sales forecasting.

Purchasing Module

Purchasing Module Purchase modules streamline procurement of required raw materials. It automates the processes of identifying potential suppliers, negotiating price, awarding purchase order to the supplier, and billing processes. Purchase module is tightly integrated with the inventory control and production planning modules. Purchasing module is often integrated with supply chain management software.

Inventory Control Module

Inventory Control Module Inventory Control is a complete multi-location inventory management system that keeps track of stock levels and processes inventory receipts, shipments, returns, and adjustments. It includes extensive screen inquiry and reporting functions to give us detailed, current information crucial for effective inventory management.

Sales Module

Revenues from sales are live blood for commercial organizations. Sales module implements functions of order placement, order scheduling, shipping and invoicing. Sales module is closely integrated

with organizations' ecommerce websites. Many ERP vendors offer online storefront as part of the sales module.

Marketing Module

Marketing Module ERP marketing module supports lead generation, direct mailing campaign and more.

The life-cycle of an ERP system

Business application suites such as ERP represent a significant investment of capital and time. To manage ERP, organizations need to understand what tasks are involved in each phase of its life cycle. The life cycle of ERP implementation is a structured outline of the various stages involved in the implementation process.

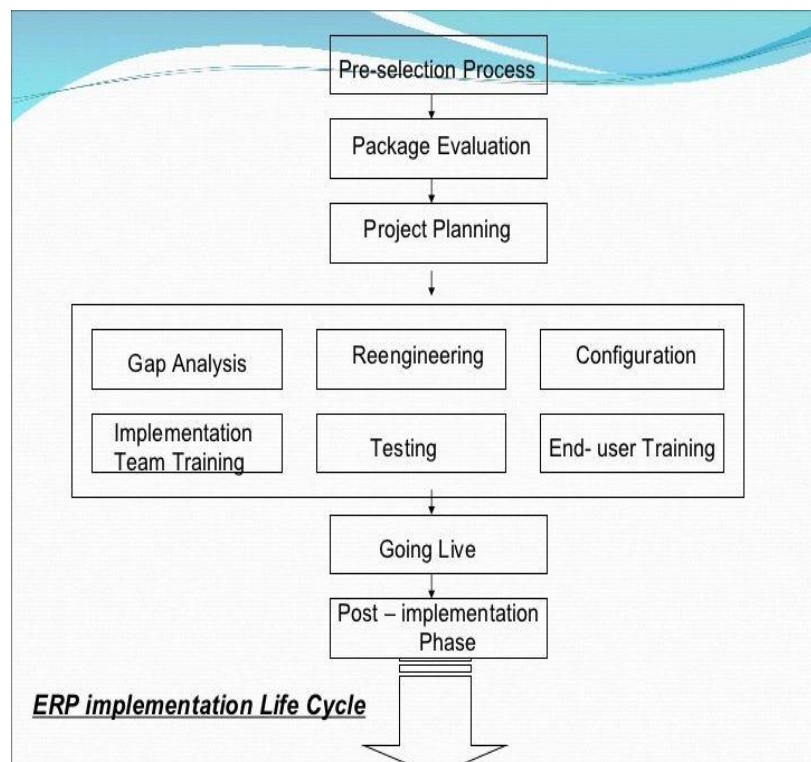


Figure 2.3 ERP Implementation life Cycle

(Source www.slideshare.net/sawanlaladiya/erp-implementation-life-cycle-10316390)

1. Pre evaluation Screening: Once the company has decided to go for the ERP system, the search for the package must start as there are hundreds of packages it is always better to do a thorough and detailed evaluation of a small number of packages, than doing analysis of dozens of packages.

This stage will be useful in eliminating those packages that are not suitable for the business process.

2. **Evaluation Package:** This stage is considered an important phase of the ERP implementation, as the package that one selects will decide the success or failure of the project.

3. **Project Planning:** This is the phase that designs the implementation process. It is in this phase that the details of how to go about the implementation are decided. Time schedules deadlines, etc. for the project are arrived at.

4. **GAP analysis:** This is considered the most crucial phase for the success of ERP implementation. This is the process through which the companies create a complete model of where they are now, and in which direction will they opt in the future.

5. **Re-engineering:** It is in this phase that human factors are taken into consideration. While every implementation is going to involve a significant change in number of employees and their job responsibilities, as the process becomes more automated and efficient, it is best to treat ERP as an investment as well as cost cutting measure.

6. **Team training:** Training is also an important phase in the implementation, which takes place along with the process of implementation. This is the phase where the company trains its employees to implement and later, run the system.

7. **Testing:** This is the phase where one tries to break the system. One has reached a point where the company is testing the real case scenarios.

8. **Post implementation:** Once the implementation is over; the vendor and the hired consultants will go. To reap the fruit of the implementation it is very important that the system has wide acceptance. Finally, upon receiving the acceptance, the project is declared closed and a life cycle of ERP implementation is said to be complete.

ERP Lifecycle

Siau, K. [42] has defined four areas of concern or viewpoints by which the different phases of the lifecycle should be analyzed: product, process, people and change management:

1. **Product** - This dimension focuses on aspects related to the particular ERP product in consideration, such as functionality, and on related technical aspects, such as hardware and base software needs. A thorough understanding of the software tool's capabilities must exist in order to make an alignment with the business

strategy in order to determine whether the software is being used effectively, in accordance with the needs of the organization, and how it can best be applied to further the goals of the organization.

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

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

4. **Change management.** This dimension refers to the body of knowledge that is used to ensure that a complex change, like that associated with a big system, gets the right results, in the right timeframe, at the right costs. The change management approach tries to ensure the acceptance and readiness of the new system, allowing the organization to get the benefits of its use.

2.4.1 ERP Post-Implementation Phase

Going Live: The End of the Beginning

By the time companies go live with their ERP systems, they've run a marathon – the average implementation can take up to four years. Yet when it comes to results, half of our survey respondents (49 percent) clearly recognize that going live isn't the end of their ERP program, but merely the end of the beginning. [11]

Since the focus of this study is investigating ERP success on maintaining and enhancing the system to meet the ongoing needs of the organization, here therefore we review most related research that undertook on the area of ERP implementation which address starts from go-live of the ERP system where the system is in operational use and forward.

ERP implementation is a first wave called “go live” stage and post-implementation ERP is the second wave called “post go-live” stage [47]

Difference between Pre-implementation and Post-Implementation

According to [47] the life cycle of an ERP system can be understood in two big phases or “waves” differentiated by a central moment between them. In the first wave include the components of the ERP that the enterprise requires are selected, their adaption to the specific needs and after that implemented,

ending with go live. The second wave is the post implementation phase, where it has to focus on supporting and enabling the organization to maximize the value and the return of investments made in the ERP system.

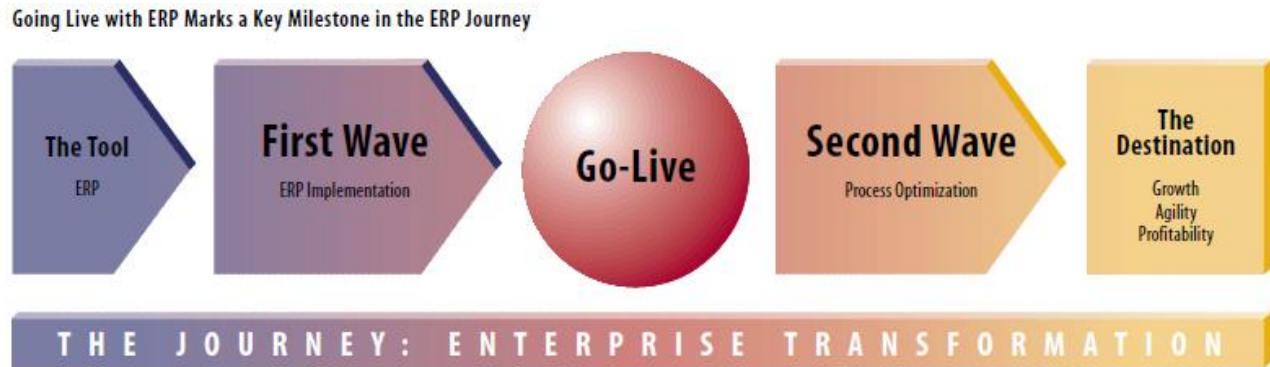


Figure 2.4 the two waves of ERP Implementations. (Source Deloitte Consulting's Perspective on: Making ERP spell ROI)

Studies reveal that ERP post implementation phase is just as important as the pre implantation and implantation phases to achieve continued success. Far from being over at go-live, ERP-enabled transformation occurs in waves – waves that, if properly managed, can help companies maximize, accelerate and sustain the fuller benefits of ERP-enabled systems. Unfortunately, some companies lose focus once they go live. Thus, while one ERP-enabled company hits the tide perfectly, the next might miss the boat .and according to [22] as companies spend an immense investment on these projects, in the beginning managers are focusing on the most common success factors to reach the main goal of a proper implementation. For evaluating ERP projects in retrospective, an applicable measurement of the whole implementation and its economic effects is essential.

Generally, the life-cycle of an ERP system can be partitioned into two major phases: The implementation phase includes the selection and implementation of an ERP system, ending with the go-live of the system. The second phase, also called ERP post-implementation phase, covers all activities after go-live, including the stabilization, operation and extension of the ERP system [34]. Firms generally reported success in their ERP system deployments, however there are many ERP projects have not been effective enough and hence have been unable to achieve all the expected especially during post implementation phases and faced difficulties in completing their implementations and achieving effective integration due to numerous technical, managerial, and organizational challenges. Therefore, most firms adopted a critical success factors CSF-based implementation approach to overcome these difficulties [1].

Some research has been done on evaluating and measuring success for ERP post implementation using CSF. From the literature it is understood that there are certain factors which supports successful implementation of ERP. And also, frequent commentaries in the literature have stated that certain critical success factors (CSFs) have to be accomplished in an organization for an enterprise resource planning system project to be successful [40].

Critical success factors (CSFs) for ERP Post-Implementation Phase

“Careful analysis... of an industry is often needed to identify the basic requirements for success – namely, those few things that management must do exceedingly well if the company is to prosper. Some of these requirements are intuitively apparent.”

– D. Ronald Daniel

The concept of CSFs, initially proposed in the early 1960s by the name of D. Ronald “Ron” Daniel employed by the firm McKinsey & Company introduced the concept of what would be later dubbed “Critical Success Factors”. [1]The idea of Critical Success factors was delivered as an anecdote to one of the problems organizational managers were encountering within operations management of their organizations.

Critical success factors (CSFs) are also referred to specific activities, procedures or areas that a business or organization depends on for its continued survival. Critical success factors are unique to each organization, and will reflect the current business and future goals. An organization’s critical success factors can be identified by applying business analytics.

In [29]14 Generic CSFs are identified these are: Top management commitment, Implementation strategy, Communication, Training and education, Implementation team, change management, User involvement, Business process reengineering, Use of consultants, Project support, ERP selection, Project management, Quality management and Risk management. From these CSFs, hypotheses are formed which are tested through a survey including 15 Likert-style rating scale question. And in the result, it is found that the system users regard the following four CSFs as critical to the success of an ERP implementation: Training and education, Change management, ERP selection and Risk management. The CSFs are not ranked in a particular order of importance. The results furthermore research can be made with the focus on the perceptions and preferences of the system user.

[28] Collected all the CSFs found in the ERP literature and then determined the similarities or patterns of communality between them. The next step was to map them in a matrix (see below)

	Strategic	Tactical
Organizational	Sustained management support Effective organizational change management Good project scope management Adequate project team composition Comprehensive business process reengineering Adequate project champion role User involvement and participation Trust between partners	Dedicated staff and consultants Strong communication inwards and outwards Formalized project plan and schedule Adequate training program Reduced trouble shooting Appropriate usage of consultants Empowered decision - makers
Technological	Adequate ERP implementation strategy Avoid customization Adequate ERP version	Adequate software configuration Legacy systems

Table 2.1 Organizational and Organizational VS Strategic and Tactical

Realizing that different CSFs are important in different phases of the ERP project, recent literature prioritized and classified CSFs, according to the ERP life cycle implementation process.

Critical Success Factors to the Post-Implementation Phase we can name two categories of the factors to determine the post-implementation phase: the effort for continuous improvement which is associated to the improvement and integration of the system's processes, and the organizational support which is related to technical capabilities and soft skills of the work team and the ERP systems users.

According to [25] Critical Success Factors in Post-Implementation Stage Users training and education is an important factor of the successful Reimplementation as many projects fail in the end due to lack of proper training. It makes the user comfortable with the system and increases the expertise and knowledge level of the people. Features of ERP system and hands on training are all important dimensions of training program for end users. And both perceived usefulness and learnability are determinants for end-user technical acceptance with ERP systems, leading to a successful ERP implementation.

2.4.2. ERP Systems Success Measurement Model

Measuring the success of Enterprise Resource Planning (ERP) systems for adopting organizations is an emerging area of research. In the IS literature, the term "success" has been used synonymously with effectiveness, and it is stated that effectiveness of an IS can be "defined as the extent to which an

information system actually contributes to achieving organizational goals.”[24]. As different factors are important in different stages, it is important to classify the CSFs identified into the phases of ERP implementation life cycle where the factors may come into play Classification of CSFs of ERP implementation into Markus and Tanis' process-oriented ERP life cycle model in figure below

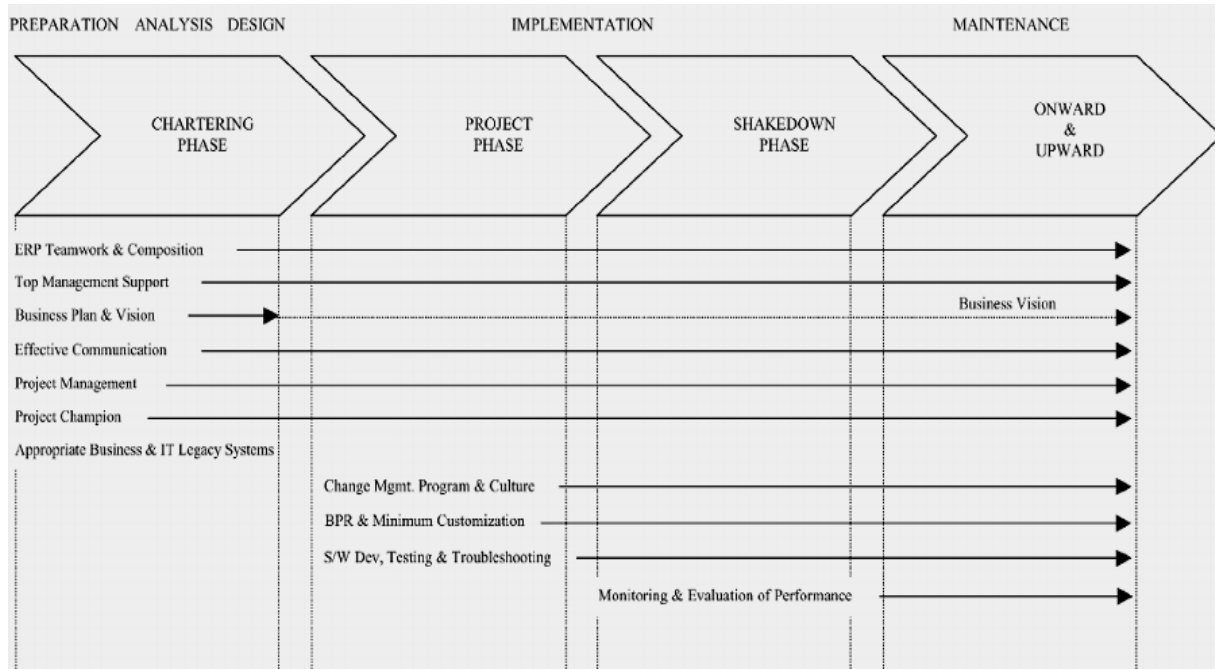


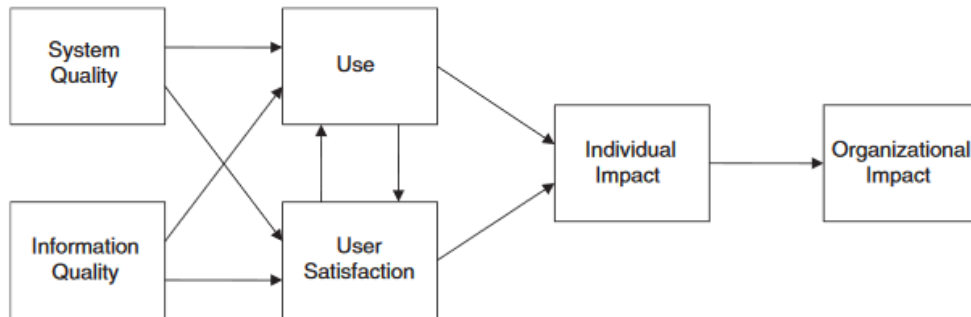
Figure 2.5 Markus and Tanis' process-oriented ERP life cycle model

Top management support Top management support is needed throughout the implementation as the project must receive approval from top management. Business plan and vision additionally, a clear business plan and vision to steer the direction of the project is needed throughout the ERP life cycle [54].

Effective communication Effective communication is critical to ERP implementation. Project management good project management is essential. An individual or group of people should be given responsibility to drive success in project management [59] **Project champion** Project sponsor commitment is critical to drive consensus and to oversee the entire life cycle of implementation [60] **Appropriate business and legacy systems** Appropriate business and legacy systems are important in the initial chartering phase of the project [59].

A study [26] proposes that System Quality and Information Quality singularly and jointly affect both System Use and User Satisfaction additionally, the amount of System Use can affect the degree of User Satisfaction positively or negatively - and the degree of User Satisfaction also affects System Use.

System Use and User Satisfaction are direct antecedents of Individual Impact. Lastly, this impact on individual performance should eventually have some Organizational Impact



DeLone and McLean IS success model (1992).

Figure 2.6 Delone and McLean IS success

The D&M model [36] has also been found to be a useful framework for organizing IS success measurements. The model has been widely used by IS researchers for understanding and measuring the dimensions of IS success. Furthermore, each of the variables describing success of an information system was consistent with one or more of the six major success dimensions of the updated model. The dimensions of success include:

System quality - the desirable characteristics of an information system. For example: ease of use, flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times.

Information quality – the desirable characteristics of the system outputs; that is, management reports and Webpages. For example: relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability.

Service quality –System Quality: Measures of the Information Processing system it self-the quality of the support that system users receive from the IS department and IT support personnel. For example: responsiveness, accuracy, reliability, technical competence, and empathy of the personnel staff. SERVQUAL, adapted from the field of marketing, is a popular instrument for measuring IS service quality.

System use – the degree and manner in which staff and customers utilize the capabilities of an information system. For example: amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose of use.

Net benefits – the extent to which IS are contributing to the success of individuals, groups, organizations, industries, and nations. For example: improved decision- making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development.

The A Priori Model

[45] Propose the following *a priori* model of ES success. Figure below shows how the *a priori* model deviates from Delone and McLean and Myers et al. with omitted measures italicized and new measures bolded. Further note, as indicated previously, the satisfaction construct was included in the *a priori* model with some trepidation. Unlike the *original* Delone and McLean model, the *a priori* model is simply a *measurement* model for assessing the multidimensional phenomenon of ES success using five separate dimensions of success system quality, information quality, satisfaction, individual impact, and organizational impact. The model does not purport any causality among the dimensions. Rather, the dimensions are posited to be correlated and additive measures of the same multidimensional phenomenon— ES success.

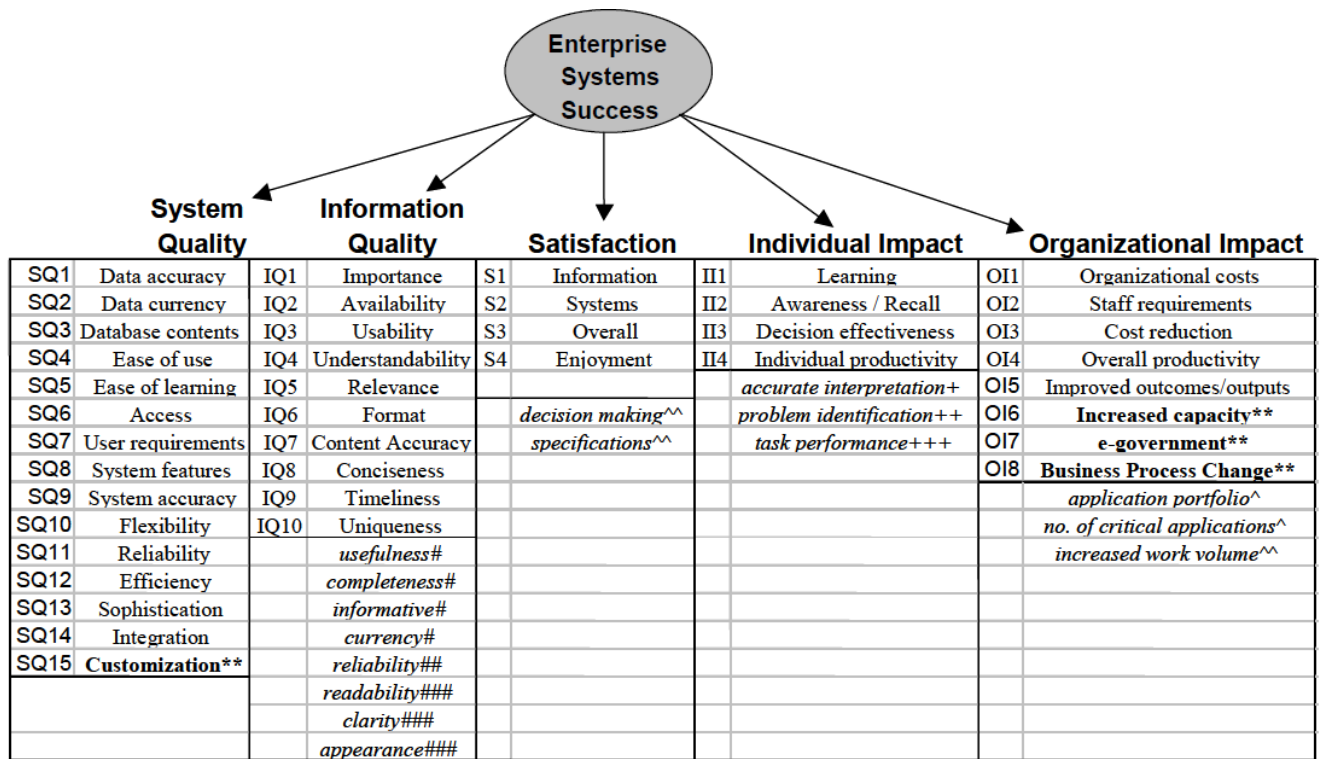


Figure 2.7 Apriori model of ES success

2.4.3. Related literature on the context of other countries

The study done by Atif Ali Gill, Arfan Shahzad, Subramaniam and Sri Ramalu [55] was focused on the key determinants that ensure the post-implementation success of ERP systems. This research is based on the Technology-Organization Environment (TOE) theory. In this study, project management posited as a technological aspect, leadership involvement as an organizational aspect while external support depicted as an environmental aspect. An empirical analysis was done in the context of the industrial sector of Pakistan. The results depict the strong influence of project management, leadership involvement and external support on ERP post-implementation success. The research delivers practical as well as theoretical implications by providing an integrative model of critical factors for ERP success at Post implementation phase. The researchers have recommended Qualitative researches for future work to explore more factors in the TOE theory and find operational and managerial benefits of ERP system at the post-implementation stage.

A study by Madapusi [32] aim to define enterprise resource planning (ERP) Systems, assess the varying performance benefits flowing from different ERP system implementation statuses, and investigate the impact of critical success factors (CSFs) on the ERP system deployment process.

Post-Implementation Evaluation of Enterprise Resource Planning (ERP) Systems examines the knowledge transfer process in ERP post-implementation projects, and specifically between the ERP project teams and the IT support team. Conceptual model was developed and a survey instrument constructed to gather data for testing the hypothesized model relationship.

The model was tested using factor analysis, multiple linear regression analysis and univariate Anova. The results indicate that the contributions of different ERP system modules vary with different measures of changes in performance and that a holistic ERP system contributes to performance changes. The results further indicate that the contributions of CSFs vary with different measures of changes in performance and that CSFs and the holistic ERP system influences the success achieved from deployments. Also, firms that emphasize CSFs throughout the ERP implementation process achieve greater performance benefits as compared to those that focus on CSFs during the initial ERP system deployment.

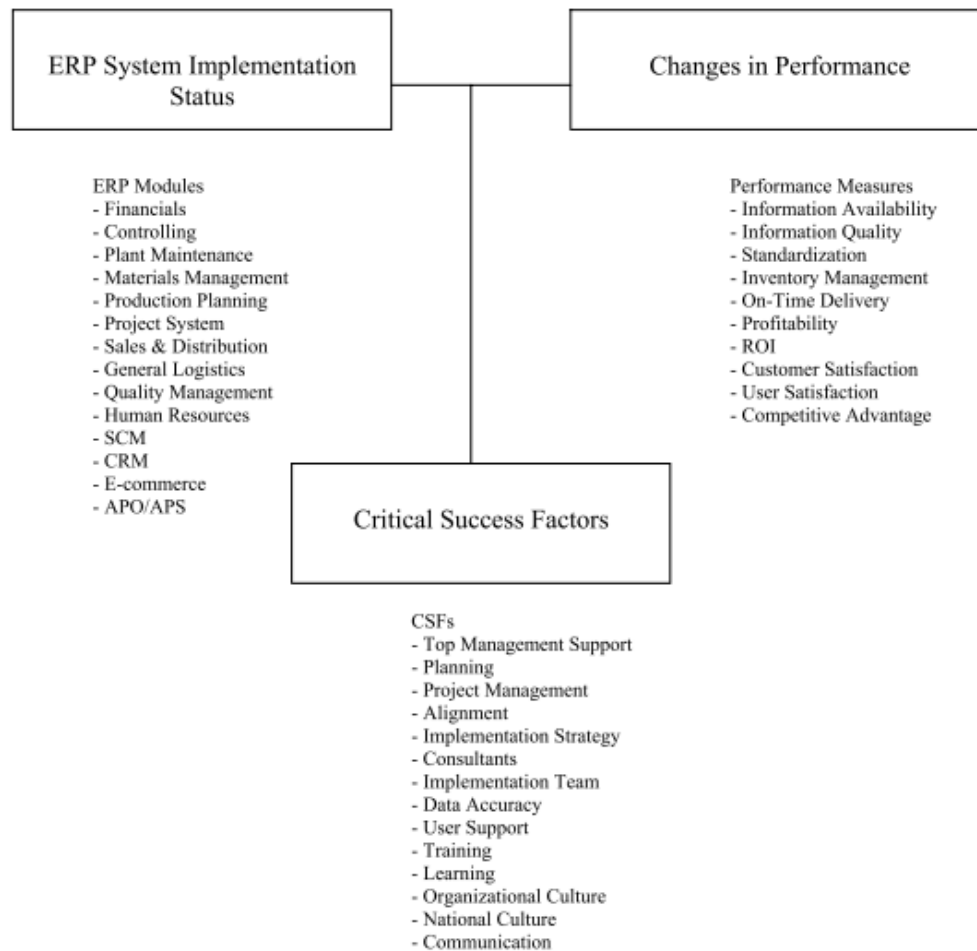


Figure 2.8 Model of ERP System Implementation

Overall, the results of the study support the relationships hypothesized in the conceptual model. The researcher has recommended future study that could explore these relationships in the context of extended ERP deployments as firms increasingly encounter business environments where supply chain competition, collaboration, and outsourcing are becoming the norm.

Shirouyehzad [41] has explored the critical success factors (CSFs) for the implementation of an ERP system both from the management perspective and technology perspective. The authors have also proposed a conceptual framework for successful implementation of an ERP system by summarizing the CSFs that need to be addressed during a whole process of ERP implementation, which are pre implementation phase, implementation phase and post-implementation phase. The propose model has a 3-stage process shown below in More specifically, implementation strategy describes plan for change that ensures alignment with overall corporate strategy, and determines organizational principles and approach of implementation.

Mahdavian's study [67] aims to investigate the effect of skills of the key users of ERP system on the success of ERP implementation. This study is the first to provide empirical support for skills in predicting ERP success through two models: one for measuring key users' skills, including technical, human and conceptual skills, and the other for measuring the amount of ERP success. Then by means of a field study and data collection from 6 Iranian Organizations, the relation between key users' skills and the ERP implementation success was investigated.

After extensive literature review, table below reported the ERP system success dimensions, their sources, and their description, which are adopted to support the goals of this research.

Dimensions of ERP Success

Dimension	Description/meaning
Systems Quality (SQ)	Performance characteristics of the ERP system with regard to ease of use, accuracy, reliability, efficiency.
Information Quality (IQ)	Characteristics of the output provided by the ERP system with respect to timeliness, relevance, availability, and understandability.
Vendor/ Consultant Quality (SerVQ)	Support that the organization receives from the ERP provider, often operational zed by reliability, dependability, quality of expertise.
Individual Impact (II)	Concerned with the effect of ERP on the individual, often assessed through increased individual's productivity, improved decision-making capability.
Workgroup Impact (WI)	The impact of the ERP system on sub-units or departments within the organization often assessed through improved inter-departmental coordination, communication, and productivity.
Organizational Impact (OI)	The benefits that the organization gets from its ERP system, often measured by the extent to which customer service, decision-making processes, and so forth have been enhanced.

Table 2.2 Dimensions of ERP Success

The main hypotheses of this research are related to the effect of the key users' skills on ERP implementation success stating that skills of key users of the ERP system affect ERP implementation success,

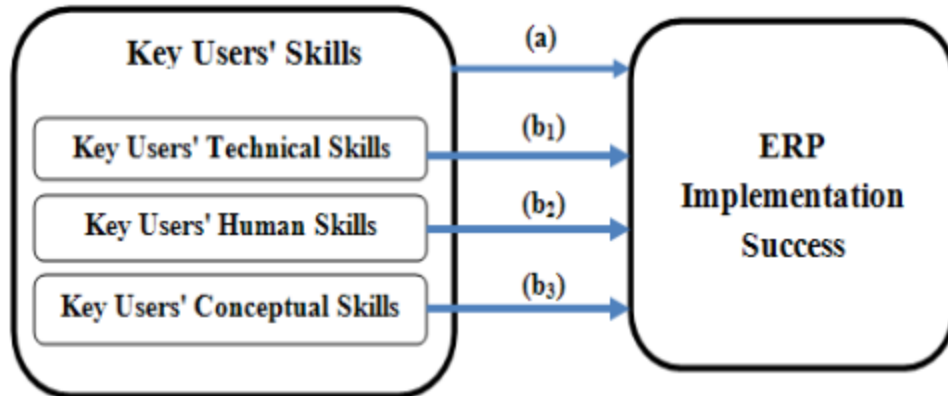


Figure 2.9 Conceptual model of the research

This study addresses the question, “Do the skills and knowledge of key users of ERP system affect ERP implementation success?” Subsequently, the following questions were proposed: Do the technical skills of key users affect ERP implementation success? Do the human skills of key users affect ERP implementation success? Do the conceptual skills of key users affect ERP implementation success? Which skills are the most important predictors of ERP success?

To measure dependent and independent variables, based on two models a two-part questionnaire was designed. The first part of the survey, operationalizes both the degree of key users' skills, and the importance of each skill, for 22 items, which will be used to create a weighted score for each skill. The second part of the questionnaire, operationalizes ERP implementation success.

Two models were used. One for measuring the existing amount as well as the importance of each index of technical, human and conceptual skills of those individuals involved in ERP implementation project, such as key users. The first model each index of technical, human and conceptual skills of those individuals involved in ERP implementation project, such as key users. The first model is shown in Figure below.

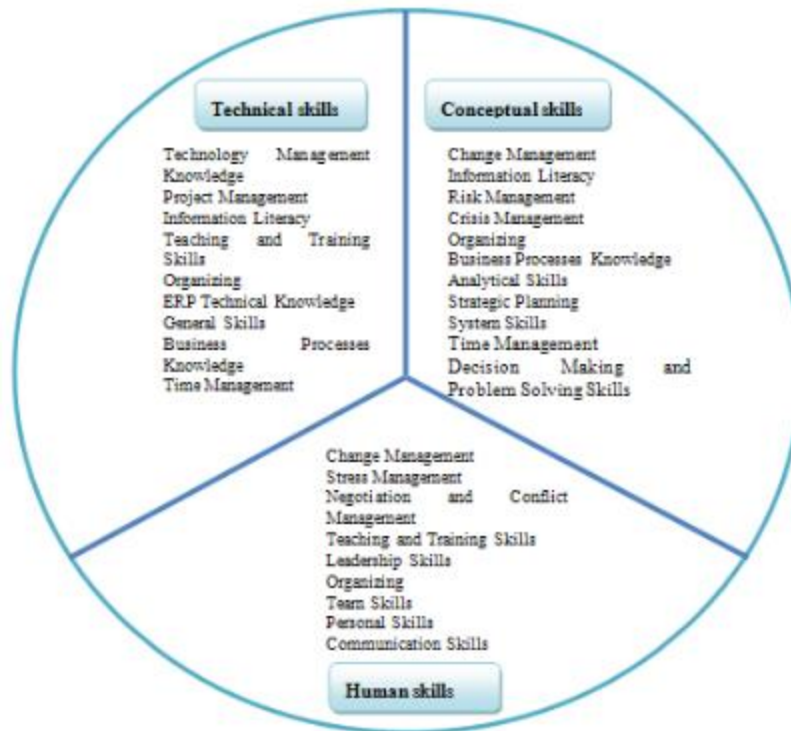


Figure 2.10 ERP Implementation Skills

. The model for measuring ERP implementation success is shown in Figure below



Figure2.11 ERP System Success Measurement

The results demonstrate that the greatest impacts on ERP success result from technical and human skills, in that order. Moreover, the most important skill items for the key users are team skills, organizing, change management, decision making and problem-solving skills, risk management, business processes

knowledge, strategic planning, communication skills, analytical skills, leadership skills, personal skills, crisis management, and system skills. Finally, via conducting interviews, some qualitative data about the importance of these introduced skills for key users are provided

Wanjohi, John [64] carried out on the ERP post implementation phase of a local corporate in Kenya and it sought to investigate factors that affect post implementation success of ERP systems, investigate what management should put in place so as to achieve post implementation success for ERP Systems and investigate the relationship between factors in the organization's contextual environment and post implementation success of ERP Systems. The research approach used were quantitative and qualitative. The study made use of questionnaires, targeted interviews, focused group discussions and data from ERP project. From the findings of the study, organizational, technological and environmental factors indirectly or directly impact post implementation success. Management will be empowered to evaluate ERP post implementation success of their organization based on the ERP experiences of the organization in the study and adopt the findings to make improvements for future ERP projects. Recommendations are drawn on probable ways to overcome existing ERP post implementation challenges and also to improve on ERP post implementation success. The study recommends increased investments towards hardware and software upgrades, developing internal skilled expertise, firm policy on ERP usage, change management and proper human resource management as necessary drivers towards achieving ERP post implementation success.

2.4.4. Related work in Ethiopian Context

Abraham Tadesse [45] has conducted a study to assess ERP post-implementation success at Ethio telecom to identify the Impacts of ERP system at individual and organizational level during post-implementation phase. He used both e. combination of quantitative and qualitative methods and questionnaires and interview for data collection. in his finding is found that the implanted ERP system has brought positive impact at individual level by enhancing the employees' awareness and recall of job-related information and also ERP system has been found that it has brought big contribution for their productivity and brought significant contribution to give effective and fast decision making on their work activities during post implementation phases. And it found that the implemented ERP System has brought a positive impact at organization by increasing efficiency and productivity.

Individual Impact, most of the Employees believed that ERP system enhanced the study results of organizational Impact, most of the employees believes ERP system Implementation has resulted improved out comes & business process at organizational level. And generally, ERP at Ethio telecom has brought significant positive impact on employee's productivity & high-quality decision-making during post implementation period. And finally, it is recommended future on measuring ERP Post-implementation

success using BSC and the success of ERP post-implementation on the context of other Ethiopian organizations.

Elsa Tadele's research [62] was to investigate technical, organizational, and operational issues of ERP post-implementation management in the context of Ethiopian airlines and design a solution framework to address those issues. After extensive literature a model was established which constitutes three main themes: technical, organizational and operational concerns that influence ERP post-implementation success. And questionnaire was developed based on the model. The result of the study indicated that organizational theme constructs were the most critical determinants of ERP post-implementation success. And accordingly, continuous improvement, user involvement, training, absorptive capacity and top management championship are the major constructs of organizational theme. Technical theme is found to have significant contribution of ERP post-implementation success. The technical theme constructs are ERP attribute, IT expertise and user support level quality, and external relationship management. Hence, she recommended to execute the proposed framework by focusing on organizational theme as a priority goal in order to improve the utilization of the system and attain post-implementation success.

Another Study by Abiot, S.B. & Gomez J.M. [61] Presented experiences of a successful implementation by conducting a case study at private company called Mesfin Engineering found in Ethiopia. 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 selected organization by having an in-depth look at the issues behind the process. However, the success of the ERP adoption only considered with respect to the implementation activities that covers up to the go-live stage of the system. In this regard, the researchers also recommended further study on the issues of post-implementation period by taking into consideration the strategic needs and requirements for sustaining the effectiveness of ERP systems after the go-live stage.

2.4.5. Summary of Related Work

As a summary, the related works that are discussed above are presented in table below

Author, Title & Year	Objective/ Purpose	Approaches/ Methodologies	Key Findings	Recommendation & Future Work	Remark
Gill, A. A., Shahzad, A., & Ramalu, S. S. (2019). An examination of post-implementation success determinants of enterprise resource planning: Insights from industrial sector of Pakistan.	To investigate key determinants that ensure the post-implementation success of ERP systems	A research model was developed based on the theoretical background of TOE framework Well established Survey questioner based on the research model	The results depict the strong influence of project management, leadership involvement and external support on ERP post-implementation success	Qualitative research is recommended for future work to explore more factors in the TOE theory and find operational and managerial benefits of ERP system at the post-implementation stage.	The study was undertaken only industrial sector of Pakistan; sample size is relatively small
Madapusi, A. (2008). Post-Implementation Evaluation of Enterprise Resource Planning (ERP) Systems. Proceedings of the 2006 ACM Symposium on Applied Computing SAC 06, 1554.	To define enterprise resource planning (ERP) Systems, assess the varying performance benefits flowing from different ERP system implementation statuses, and investigate the impact of critical success factors (CSFs) on the ERP system deployment process.	conceptual model was developed and a survey instrument constructed to gather data for testing the hypothesized relationship	The results indicate that the contributions of different ERP system modules vary with different measures of changes in performance and that a holistic ERP system contributes to performance changes.	Future research could explore these relationships in the context of extended ERP deployments as firms increasingly encounter business environments where supply chain competition, collaboration, and outsourcing	The study examined ERP system implementations in the Indian predominantly of firms in the automotive sector production environment . the findings may not be equally generalizable to other

				are becoming the norm.	industries and country
Shirouyehzad, Hadi, et al. (2011) “The FMEA Approach to Identification of Critical Failure Factors in ERP Implementation.” <i>International Business Research</i> , vol. 4, no. 3, 2011, doi:10.5539/ibr.v4n3p254.	To identifies major failure causes and effect of potential defects in ERP implementation	The empirical study was done in the research with failure mode and effect analysis (FMEA) method	Unsuccessful implementation of ERP is considered as a potential failure mode in FMEA technique. Potential failure effect of ERP projects includes time exceed, cost increase and customer and employee dissatisfaction.	This study is limited to one company it is recommended that further researches comprise a more comprehensive case studies in order to adopt findings to other organizations.	The study focuses only major failure cause and effect of ERP implementation did not cover ERP post implementation success.
Mahdavian, Maryam, et al. “The Influence of Key Users’ Skills on ERP Success.” <i>Journal of Information Technology Management</i> , vol. XXVII, no. January, (2016)	To investigate the effect of skills of the key users of ERP system on the success of ERP implementation.	Survey questioner based adopted model was developed for data collection	The results demonstrate that the greatest impacts on ERP success result from technical and human skills	Future study the effects of skills of Project managers, end users, and consultants on ERP success can be investigated.	limited to only Iranian companies.
Abiot, S.B. & Gomez J.M. A Successful ERP Implementation in an Ethiopian Company: A case Study of ERP Implementation in Mesfin Industrial Engineering Pvt. Ltd. (2012)	To Examine key dimensions of ERP implementation issues with in the case company by focusing on business, technical as well as cultural issues	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.	Recommended to consider post-implementation period for sustaining the effectiveness of ERP implementation.	The study only considering the go-live of the system on time, on scope and on budget.

<p>Elsa Taddele ERP Implementation Management Framework: The case of Ethiopian Airlines. (2015)</p>	<p>Post- To investigate technical, organizational, and operational issues of ERP post- implementation management in the context of Ethiopian airlines and design a solution framework to address those issues</p>	<p>Approach of the research was a case study in which a combination of quantitative and qualitative methods has been used to collect and analyze data. A research model was established which constitutes three main themes: technical, organizational and operational concerns that influence ERP post- implementation success.</p>	<p>Organizational attribute such as continuous improvement, User involvement, Top management championship and trading are the most critical determinants of ERP post- implementation success. The technical attributes such as ERP system flexibility, comprehensiveness, Response time of the system and User satisfaction level are Important determinant of ERP system post- implementation success.</p>	<p>Future study recommended to execute the proposed framework by focusing on organizational theme as a priority goal in order to improve the utilization of the system and attain post- implementation success.</p>	<p>Accessibility of recent literatures that are published with in the last five years is limited which ultimately affects the researchers “ understanding of the area and the current research findings.</p>
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<p>Abrham Tadesse ERP post-implementation success at Ethio telecom to identify the Impacts of ERP system at individual and organizational level during post-implementation phase. (2018)</p>	<p>to assess the ERP post-implementation success in Ethio telecom and give valuable recommendation for further improvement</p>	<p>Combination of quantitative and qualitative methods has been used to collect and analyze data. A theoretical ERP success model was used to assess the success of ERP Post-implementation</p>	<p>The results of this study show the deployed ERP system has brought significant impact on individual performance organizational business process managements</p>	<p>Further study on the success of ERP post implementation on context of other Ethiopian organizations</p>
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Table 2.3 Summary of Related Work

Chapter Three

3.1 Research Design & Methodology

This chapter presents the research methods. It deals specifically on the research design, sampling procedure, data collection methods, procedures of data collection and method of data analysis to identify major factor of ERP System success and evaluate of adoption ERP (ERP Post implementation) in Ethiopia Red Cross Society.

3.1.1 Research Design

This study approach of this research is a case study which used mixed method of research which combination of quantitative and qualitative methods is used to collect and analyze data. In practice, most researchers agree that combining quantitative and qualitative techniques (sometimes called “mixed method” research) produces a richer and more comprehensive understanding of a research area [10].

Therefore, to achieve the specific and general objectives of the study we have used a mixed qualitative and quantitative research approach to analyze the collected data. A mixed method study involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the research process [39]. In other words, the approach helps the researcher answer questions that cannot be answered using only qualitative or quantitative methods alone. Mixed methods provide a more complete picture by noting trends and generalizations as well as in-depth knowledge of participants’ perspectives. Blending qualitative and quantitative approaches within a single study can yield more comprehensive findings than research employing only one methodological perspective.

3.1.2 Research Model

The definition and measurement of success are thorny. Success depends on the point of view from which you measure it. People often meant different things when talking about ERP success. Project managers and ERP consultants often defined success in terms of completing the project plan on time and within budget. But people whose job was to adopt ERP system and use them tended to emphasize having a smooth operation with ERP system and achieving business improvements [19]. The large success measure falls into six major categories—System Quality, Information Quality, Use, User Satisfaction, Individual Impact, And Organizational Impact [15].

After DeLone and McLean IS success model has developed their initial model other researchers has explored the research and minor refinement was done to their first model. With respect to discover three

dimensions were added to their updated model. The dimensions are Service quality, user satisfaction and net benefits.

After the extensive literature review has been done in chapter two sections, we applied the logical framework of DeLone and McLean IS success model made some modification and propose a success model for ERP systems.

For this study, the dimension Intension to use dimension were dropped and replaced by User satisfaction due to the reason for this modification is that the ERP user already must use the ERP system in their day-to-day activity and no acceptance of other ways of doing their assigned job. Therefore, we believe the D&M model more appropriate as it has relevant and off course some modification only System Quality, Information Quality, User satisfaction, dimension selected for proposed model, research model is defined as depicted in figure below.

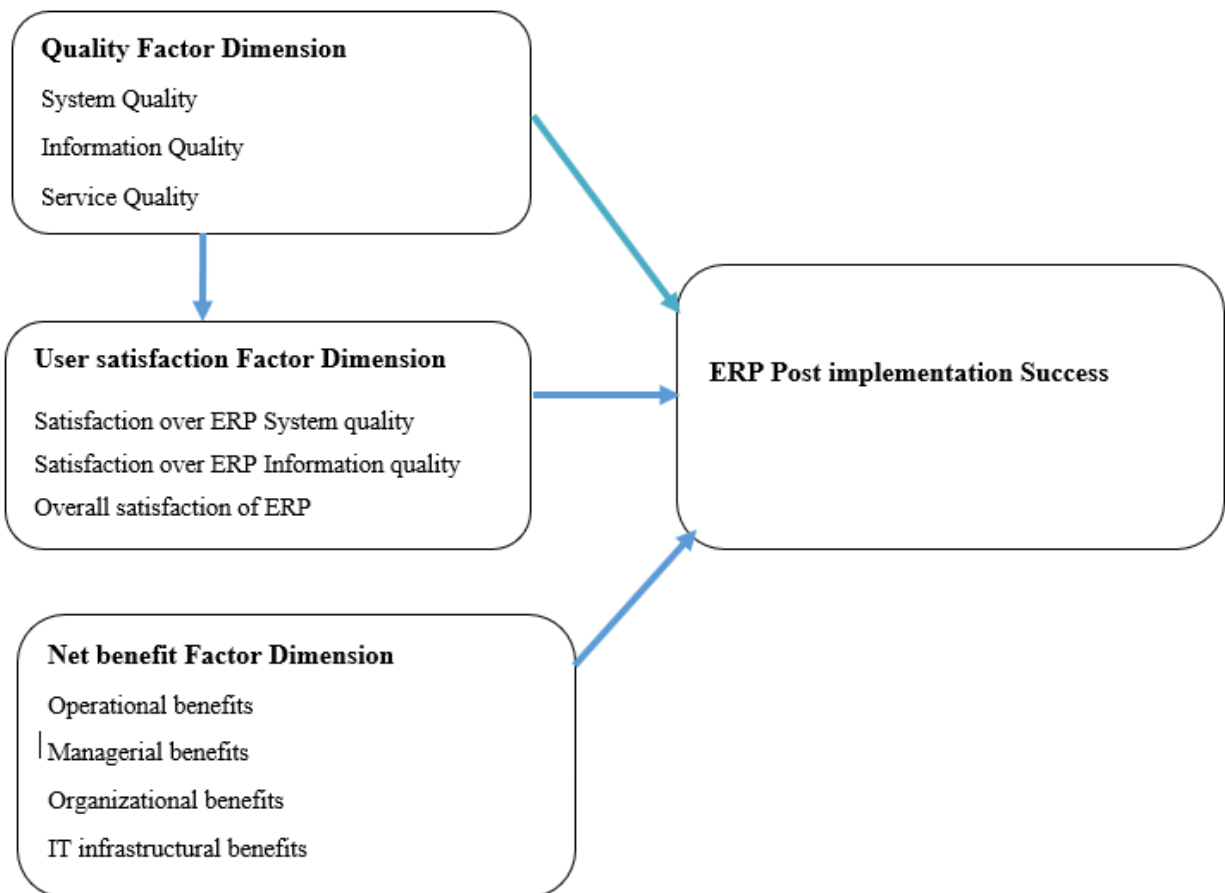


Figure 3.1 Research Model Adopted and modified from DM model

Quality Factors dimension

The quality of an ERP can be measured using three criteria. These are systems quality, information quality, and service quality. DeLone and McLean suggest that each of these dimensions should be measured separately because singularly or jointly, they will affect subsequent user satisfaction dimension.

System quality – the desirable characteristics of an information system. For example: ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times.

Information quality – the desirable characteristics of the system outputs; that is, management reports and Web pages. For example: relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability.

Service quality – the quality of the support that system users receive from the IS department and IT support personnel. For example: responsiveness, accuracy, reliability, technical competence, and empathy of the personnel staff. SERVQUAL, adapted from the field of marketing, is a popular instrument for measuring IS service quality [18]

User satisfaction factor dimension

User satisfaction is a necessary condition for repeated use and a higher level of user satisfaction towards ERP systems would implicitly imply that stakeholders are more willing to participate in information and data sharing activities prevalent throughout the system [68]. Early Satisfaction instruments (e.g., User Information Satisfaction - Bailey and Pearson 1983) have been found to mix measures of multiple dimensions of success (e.g., quality and Impact) rather than measuring satisfaction Users' level of satisfaction with reports, Web sites, and support services. [29]

User Information Satisfaction UIS is defined as the extent to which users believe the information system available to them meets their information requirement organizational support for developing and maintaining the system as well as the system product itself. This type of instrument contains items concerned with training, documentation. Development procedures, systems maintenance, etc., as well as items related to system content. Thus, it provides an indicator of the overall quality of information services provided by an information service function.

Net benefit Factor

There is an abundance of methods to measure net benefits at both the individual and organizational level of analysis. Perceived usefulness or job impact is the most common measure at the individual level. Yet, there have been occasional problems with the perceived usefulness items [15]. Segars & Grover [68] analyzed the data from the Adams et al. study using confirmatory factor analysis and eliminated an item

‘works more quickly’ in the usefulness construct and have used production economics to measure the positive impact of IT investments on firm-level productivity.

The net benefit is categorized in many IS benefit analyses and frameworks have been organized around Anthony’s trinity of operational, managerial and strategic levels of management and explained below [40].

Operational benefits are realized when there is significant reduction of turnaround time in activities such as examination processing, payroll processing, procurement, inventory management among others. The efficiency realized in such process would in turn result to cost reduction, employee productivity improvement, quality improvement, improved customer service.

Managerial benefits are realized through the use of information acquired from an ERP system to make management decisions. Managerial benefits are linked to better resource management and improvement of performance in all levels or areas of the organization.

Strategic benefits are linked with how the use of ERP systems assists in achievement of various strategic goals. ERP systems can help institutions to grow, in terms of opening and supporting new centers / campuses, enroll more students, launch more academic programs, adapt to rapid competition, comply with existing regulation, and establish new markets.

Organizational benefits are realized by building a consistent vision across the organization. This is achieved by the ERP system changing work patterns, facilitating organizational learning, and empowerment of workforce across the organization. Institutions are able to implement more efficient learning cycles like trimester system, open and distance learning, e-learning, part-time studies and so on.

IT infrastructural benefits are reduction of IT related costs, increased IT infrastructure capability, and flexibility [29]. The cost of maintaining legacy systems, multiple data centers, multiple applications, and consequently, the cost of a bloated IT workforce, can be reduced by implementing an integrated ERP system. Well implemented ERP systems, delivers reliable platforms, transforms information management, and increases the capability of IT resources. Finally, ERP systems adapt well with modern technology, integrate with a wide range of applications, and are highly customizable and configurable

3.2 Data Collection

The study used interviews, and questionnaires as method of data collection. The data collection instrument was primarily developed from a synthesis of ERP system as well as other relevant research considered pertinent to this study’s objectives. The questionnaire was distributed in the form of both paper form and online survey system

3.2.1 Target Population

As it explained in chapter one ERCS SAP are implemented for to enhance its business process especially in Finance, HR, logistic Department in HQ and regional branch. The target group of this study is mainly comprised of all staff of the mention department in ERCS HQ and Regional branch who directly interacted with the ERP systems and had been in the organization prior to the ERP system go-live. These employees included Junior, middle level, senior and managerial/coordinator level of employees. The total size of ERP SAP in ERCS is 120.

3.2.2 Sample Size

Since the population is relatively small, we have used the entire population 120 as sample size. Homogeneous purposive sampling Homogeneous sampling is used when the goal of the research is to understand and describe a particular group in depth[16].ERP users for the various departments and modules, ERP support team, selected users of the ERP system from various departments and the management staff. IS, Finance and HR department had more respondents due to having most of the ERP project and implementation team members and interview the ERP project managers. These departments were also identified as the departments that are the major users of the ERP system. And accordingly, the sample listed below

ERP SAP USER	Number of User	Percentage of the strata from the total sample size
Finance	44	37%
Logistic	31	26%
HR	25	21%
IT	6	5%
Other (Fleet management and properties management)	13	11%

Table 3.0 Sample Size table

3.2.3 Questionnaire

The questionnaire is selected based on the research question in such a way that that is expected address the research question that are raised. This is done by adopted and developed from widely known model in literature [36], and distributed to selected ERP user through online plate form i.e., Google questionnaire form in order to reach respondent easily and allows you to collect information efficiently.

3.2.4 Interview

Interviews have been conducted with the IT Manager Finance Department and ERP consultant for ERCS, to gather data regarding ERP system post-implementation and to discuss ERP system related issues that ERCS encountered during post-implementation phase.

3.2.5 Pilot Study

Survey that is conducted with few individuals of the target population or the sample of a survey, in order to test and refine the survey instruments i.e., questionnaire before the main data collection across the target population or the full sample.

Pilot studies provide an opportunity to adjust and revision prior to use in a large study [70]. According to Baker [69] a sample size of 10% of the actual study sample size is sufficient for the pilot study. For this study, 14 participants were sufficient to examine the integrity and reliability of the survey items. Therefore, pilot study was conducted with a sample of 14 purposively selected ERP users to test the validity and reliability of the questionnaire.

Table: Reliability Statistics based on the Pilot test data

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.932	.937	31

Figure 3.1 Reliability Statistics over all dimension

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.962	.971	13

Figure 3.2 Reliability Statistics on quality dimension

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.898	.897	11

Table 3.3 Reliability Statistics on User Satisfaction Dimension

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.882	7

Table 3.4 Reliability Statistics on Net benefit Dimension

3.2.6 Validity

Validity is the extent to which the scores from a measure represent the variable they are intended to. Validity is also defined as the extent to which a concept is accurately measured in a quantitative study.

Test validity of the questionnaire was conducted using Pearson product moment correlation using SPSS. The validity test was product moment Pearson correlation done by correlating each item questionnaire scores with total score item-item questionnaire that significantly correlated with total score indicates that the items are valid as shown below. The detail of validity using Pearson correlation found in Appendix 2

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

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

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

3.2.7 Reliability

Reliability refers to whether or not you get the same answer by using an instrument to measure something more than once. In simple terms, research reliability is the degree to which research method produces stable and consistent results [23]

A specific measure is considered to be reliable if its application on the same object of measurement number of times produces the same results.

3.2.8. Internal Consistency

Internal consistency, which is the consistency of people's responses across the items on a multiple-item measure. In general, all the items on such measures are supposed to reflect the same underlying construct, so people's scores on those items should be correlated with each other

Cronbach's α is the most commonly used test to determine the internal consistency of an instrument [8]. Instruments with questions that have more than two responses can be used in this test. The Cronbach's α result is a number between 0 and 1. An acceptable reliability score is one that is 0.7 and higher [43].

Chapter Four

4. Data Presentation, Results and Discussion

4.1. Over view of the Chapter

This chapter is concerned with data presentation, of the findings obtained through the study. In the quantitative, the respondent's demographic characteristic and their response in the questionnaire to the three-dimension factor will be analyzed and discussed. And then qualitative data will also be presented. The findings are presented in tabular form after being analyzed with SPSS version 20 to facilitate readings and understanding. Finally, Finding and discussion of the results were presented.

4.2. Quantitative Data Presentation, Analysis

4.2.1 Demographic characteristics

The respondents' place of work, working unit, level of education. Position and service years in ERCS are considered as demographic characteristics that may have effects in our findings on ERP post-implementation success.

As explained in earlier chapter in ERCS SAP user HR, finance, logistic IT department which are frequent user of the system. The questionnaire is also designed to get information of the position level, service years and academic qualification of the respondent. And result of demographic information of the respondent are summarized in the table below.

	Description	Frequency	Percentage %
Working place	Head Quarter	70	73.7%
	Regional Office	25	26.3%
Working Unit	Finance	35	36.8%
	HR	25	26.3%
	IT	5	5.3%
	Logistic/Store	20	21.1%
	Other	10	10.5%

Position level	Junior	15	15.8%
	Managerial or coordinator level	5	5.3%
	Middle	30	31.6%
	Senior	45	47.4%
Service years in ERCS	>10 years	15	15.8%
	0-2 years	30	31.6%
	2-5 years	20	21.1%
	5-8 years	25	26.3%
	8-10 years	5	5.3%
Academic Qualifications	Degree	60	63.2%
	Diploma	20	21.1%
	Master	15	15.8%

Table 4.1 Demographic characteristics

From the demographic data, it is found that 73.7 % respondent are working from in head quarter and 26.3% regional branch. Moreover, 36.8% from Finance department, 26.3% from HR, 21.1% from logistic/store department, 5.3% from IT department and 10.5% from another department.

Regarding position level of the respondent, 47.4% of the respondent are at senior level, 31% are at middle level, 5.3% are at managerial level and 15.8 % are at junior level. Thus, the majority of respondent (84.2%) are above middle level. Which in turn shows that most respondent have knowledge of the business process of the thereby they have better understanding of ERP SAP. System of the company.

The demographic information related service year in ERCS is designed to get information of familiarization of the respondent with ERP SAP System of the organization. From the result is found that 5.3% of the respondent has 8-10 service years, 26.3% of the respondent has 5-8 service year, 21.1% of the respondent has 2-5 service year, 31.6% of the respondent has 0-2 service year and 15.8% of the respondent has greater than 10 service years. Therefore, majority of the employees (70%) have 2 years and above experience. Thus, majority of the respondent have familiarization with ERP SAP system of the organization.

Regarding academic qualification 63.2% of the respondents have first degree, 21.1% of the respondent have diploma and 15.8 % have master's degree.

Therefore, majority of the employees (78.9%) have at least first degree and above. Therefore, it can be concluded majority of the respondent have good education status. Which in turn imply the respondent have better potential of using ERP system.

4.2.2 Assessment of ERP Post-Implementation success

The evaluation success of ERP post implementation at Ethiopian Red Cross Society in quality, user satisfaction, and net benefit dimension is accessed and analyzed as below.

4.2.3 ERP post implementation in Quality Factors dimension

As it is discussed in previous chapter, the quality of an ERP can be measured using three criteria. These are systems quality, information quality, and service quality [14].

Quality Dimension		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation
SAP system has quality of Easy use		20.0	70.0	0.0	5.0	0	1.894	.64369
	%	21.1	73.7	0.0	5.3	0		
SAP system has quality of reliability (example no fear of data loss)		5	75	10	5	0	2.157	.58919
	%	5.3	78.9	10.5	5.3	0		
SAP system has quality of ease of learning		20.0	55.0	20.0	0	0	2.000	.65233
	%	21.1	57.9	21.1	0	0		
SAP system has quality of response times (fast response)		20.0	45.0	20.0	10.0	0	2.210	.89793
	%	21.1	47.4	21.1	10.5	0		
The information generated by an SAP system has the quality of accuracy		15.0	70.0	0.0	10.0	0	2.052	.76309
	%	15.8	73.7	0.0	10.5	0		
The information generated by an SAP system has the quality of completeness		15.0	55.0	20.0	0.0	5.0	2.210	.89793
	%	15.8	57.9	21.1	0	5.3		

The information generated by an SAP system has the quality of timeliness		25.0	60.0	10.0	0	0	1.842	.58919
	%	26.3	63.2	10.5	0	0		
The information generated by an SAP system has the quality of understandability		10.0	65.0	10.0	10.0	0	2.210	0.770
	%	10.5	68.4	10.5	10.5	0		
The information generated by an SAP system has the quality of usability		15.0	65.0	5.0	5.0	5.0	2.157	.93758
	%	15.8	68.4	5.3	5.3	5.3		
The quality of reliability of SAP support that you receive from the ICT department		15.0	20.0	30.0	30.0	0	2.789	1.06086
	%	15.8	21.1	31.6	31.6	0		
The quality of technical competence of IT Experts in SAP system support		10.0	35.0	40.0	10.0	0	2.526	.82310
	%	10.5	36.8	42.1	10.5	0		
How do evaluate responsiveness of IT support Experts when called for SAP Support		5	60	10	0	20	2.684	1.26544
	%	5.3	63.2	10.5	0	21.1		

Table 4.2 ERP post implementation in Quality Factors dimension

According to survey for responding the respondent asked their reflection whether the ERP SAP system easy to use. And their response is; 21.1 % strongly agreed, 73.7% agreed while the rest 5.3% system

disagreed. From this we can see that the majority of the respondents (94.7%) agreed that the system has quality of easy use.

For the questionnaire for quality of SAP system on reliability construct, the response was 5.3% strongly agreed, 78.9% agreed, 10.5% neutral and 5.3% disagreed. From over all response on this construct 95% are agreed that the ERP system has quality of reliability.

The respondent 's reflection about SAP system has quality of ease of learning are 21.1% strongly agreed 57.9%agreed, 21.1% and neutral. And 78.9% in agreed category (i.e., either in strongly agree or agree).

The response for quality of completeness of SAP system the respondent rated 15.8% strongly agreed, 57.9% agreed, 21.1% neutral and 5.3% strongly disagree.

Regarding SAP system quality of response times 21.1% rated strongly agree, 47.4% agreed, 21.1% neutral the rest 10.5%of the respondent disagreed. And 68.4% believes that has quality of response time. But 31.6% of the respondent believes the system has a problem of response time.

The respondents were asked about has the quality of accuracy of ERP system and 15.8% agreed strongly, 73.7% agreed others 10.5 disagreed. And 89.5% believes it has quality accuracy.

On the reflection of the respondent about quality of completeness of the information generated by an SAP system, it found that 15.8% strongly agreed, 57.9%agreed and 21.1% neutral. And majority 94.7% in agree category.

The quality of timeliness of information generated by an SAP system has response rate of 26.3% agreed, 63.2% strongly agree and 10.5% neutral. And we can see 89.5% agreed on timeliness of information generated by an SAP system.

Concerning quality of understandability of the information generated by an SAP system, 10.5% strongly agree, 68.4%agree, 10.5% neutral and 10.5% disagree and 89.5% are agree category.

The quality of usability of information generated by ERP SAP system has been rated 15.8% strongly agree, 68.4% agree, 5.3% neutral and 5.3% disagree. Majority (89.5%) rated ERP SAP system has quality of usability.

The quality of reliability of SAP support that receive from the ICT department is one of attribute of measuring the quality of the ERP system. Therefore, in this research the 15.8 % respondent strongly agreed on the reliability of SAP support that receive from the ICT department, 21. % agree,31.6% neutral and 31.6% disagree. And 64.4% of respondent are in neutral and disagree category

The other construct that describes quality ERP system is the quality of technical competence of IT Experts in SAP system support. The respondent has rated 10.5% strongly agree, 36.8% agree, 42.1% neutral, and 10.5% disagree. I.e., 47.4% in agreed category and others 52.6% either neutral or disagree category.

The last evaluation measurement of ERP system was done by measuring responsiveness of IT support Experts when called for SAP Support. And respondent has rated 5.3% strongly agree, 63.2% agree, 10.5% neutral, and 21.1% strongly disagree. And 68.4 % in agreed category and the rest 31.6% in neutral and disagree.

From analysis of the questionnaire for evaluation ERP post implementation success in Quality Factors dimension.it is found that generally most employee in ERCS responded in most constructs of quality dimension of the ERP post implementation has succeeded. But the in last three construct of measurements (The quality of reliability of SAP support that given from the ICT department, and the quality of technical competence of IT Experts in SAP system support) the employee response are showing that they are agreed EPR post implementation in this dimension has some kind of issue needs to be addressed. And Regarding SAP system quality of response times dimension unlike other dimension which falls agree category this construct not highly rated for post implantation success of the ERP (68.4% in agreed category but 31.6% not agreed that ERP system has quality of response times)

Generally, from the statistics we can conclude that ERP system has succeeded in quality dimension factors of in the post implementation.

ERP post implementation in Net benefit Factor Dimension

Net benefit Dimension factor		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation
SAP has benefited ERCS by improving customer service.		15	50	6	20	4	2.4526	1.11821
	%	15.8	52.6	6.3	21.1	4.2		
SAP has benefited ERCS by cost reduction.		15	50	5	20	5	2.4737	1.14708
	%	15.8	52.6	5.3	21.1	5.3		

SAP has benefited ERCS by employee productivity improvement		15	65	10	0	5	2.1053	.85644
	%	15.8	68.4	10.5	0	5.3		
SAP has benefited ERCS by quality improvement		16	48	13	18	0	2.3474	.97597
	%	16.8	50.5	13.7	18.9	0.0		
SAP has brought Managerial benefits to ERCS by improving resource management		5	55	20	15	0	2.4737	.82310
	%	5.3	57.9	21.1	15.8	0		
SAP has brought Managerial benefits to ERCS by improving of performance in all levels in the areas of Finance HR Logistic inventory and asset management		8	49	25	13	0	2.4526	.83499
	%	8.4	51.6	26.3	13.7	0		
SAP has empowered workers and create feeling of ownership of the system build common vision.		10	55	10	20	0	2.4211	.94056
	%	10.5	57.9	10.5	21.1	0		
SAP system has increased work integration and interaction across the organization (i.e., Harmonization of interdepartmental processes.)		10	55	20	10	0	2.3158	.80243
	%	10.5	57.9	21.1	10.5	0		

SAP systems has supported the organizational growth and innovations.		15	55	10	15	0.0	2.2632	.91338
	%	15.8	57.9	10.5	15.8	0.0		
SAP System has decreased information technology cost (i.e. costs maintaining and integrating systems by eliminating separate data centers and applications, as well as their supporting costs.)		15	49	13	18	0	2.3579	.96663
	%	15.8	51.6	13.7	18.9	0		
SAP system Increased IT infrastructure capability (i.e., Reliable platforms which is Stable and flexible support for the current and future business changes in process and structure.)		10	55	30	0.0	0	2.2105	.61704
	%	10.5	57.9	31.6	0.0	0		

Table 4.3 ERP post implementation in Net benefit Factor Dimension

ERP post implementation in Quality User Satisfaction dimension

In previous chapter it has explain that Information Satisfaction UIS is defined as the extent to which users believe the information system available to them meets their information requirement organizational support for developing and maintaining the system as well as the system product itself [29]

Therefore, the assessment was conducted to evaluate User satisfaction of the ERCS employee based the questionnaire that is adopted from literature review and research model. The assessment is intended to measure Satisfaction over ERP System Quality Satisfaction over ERP Information quality.

User Satisfaction Dimension		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation
I am satisfied with reliability of output information		10	55	25	5	0	2.2632	.71772
	%	10.5	57.9	26.3	5.3	0		
I am satisfied with the function of SAP		10	60	10	10	5	2.3684	.98987
	%	10.5	63.2	10.5	10.5	5.3		
I am satisfied with easy and enjoyable to use		10	55	10	20	0	2.4211	.94056
	%	10.5	57.9	10.5	21.1	0		
I am satisfied with organizational support for maintaining the system as well as the system product itself.		15	30	35	15	0	2.5263	.94353
	%	15.8	31.6	36.8	15.8	0		
I am satisfied with Training provided to SAP system		15	30	15	30	5	2.7895	1.20190
	%	15.8	31.6	15.8	31.6	5.3		
I am satisfied with support services from IT department/Vendor		15	40	10	30	0	2.5789	1.09718
	%	15.8	42.1	10.5	31.6	0		

Table 4.4 ERP post implementation in Quality User Satisfaction dimension

As shown in the above table I the user satisfaction dimension attribute found that 68% of the respondents satisfied with reliability of output information of ERP, 73.7% satisfied with the function of SAP, 68.4% satisfied with organizational support for maintaining the system as well as the system product itself. But regarding training provided to SAP system support services from IT department/Vendor 15.8% are neutral, 36.9% disagree and 47.4% agreed on Training provided to SAP system. And 10.5% neutral 31.6% disagree and 42.1% are satisfied with support services from IT department/Vendor.

4.2.4 ERP Post-Implementation Success – Correlation Analysis

Descriptive Statistics

	Mean	Std. Deviation	N
SAP system has quality of Easy use	1.8947	.64369	95
SAP system has quality of reliability (example no fear of data loss)	2.1579	.58919	95
SAP system has quality of ease of learning	2.0000	.65233	95
SAP system has quality of response times (fast response)	2.2105	.89793	95
SAP system has the quality of flexibility	2.1579	.58919	95
The information generated by an SAP system has the quality of accuracy	2.0526	.76309	95
The information generated by an SAP system has the quality of completeness	2.2105	.89793	95
The information generated by an SAP system has the quality of understandability	2.2105	.77039	95
The information generated by an SAP system has the quality of usability	2.1579	.93758	95
The information generated by an SAP system has the quality of timeliness	1.8421	.58919	95
The quality of reliability of SAP support that you receive from the ICT department	2.7895	1.06086	95
The quality of technical competence of IT Experts in SAP system support	2.5263	.82310	95
How do evaluate responsiveness of IT support Experts when called for SAP Support	2.6842	1.26544	95
SAP has benefited ERCS by improving customer service.	2.4526	1.11821	95
SAP has benefited ERCS by cost reduction.	2.3368	1.13560	95
SAP has benefited ERCS by employee productivity improvement	2.1053	.85644	95
SAP has benefited ERCS by quality improvement	2.3474	.97597	95
SAP has brought Managerial benefits to ERCS by improving resource management	2.4737	.82310	95
SAP has brought Managerial benefits to ERCS by improving of performance in all levels in the areas of Finance HR Logistic inventory and asset management	2.4526	.83499	95
SAP has empowered workers and create feeling of ownership of the system build common vision.	2.4211	.94056	95

SAP system has increased work integration and interaction across the organization (i.e., Harmonization of interdepartmental processes.)	2.3158	.80243	95
SAP systems has supported the organizational growth and innovations.	2.2632	.91338	95
SAP System decreased information technology (i.e., costs maintaining and integrating systems by eliminating separate data centers and applications, as well as their supporting costs.)	2.3579	.96663	95
SAP system Increased IT infrastructure capability (i.e., Reliable platforms which is Stable and flexible support for the current and future business changes in process and structure.)	2.2105	.61704	95
I am satisfied with reliability of output information	2.2632	.71772	95
I am satisfied with the function of SAP	2.3684	.98987	95
I am satisfied with easy and enjoyable to use	2.4211	.94056	95
I am satisfied with organizational support for maintaining the system as well as the system product itself.	2.5263	.94353	95
I am satisfied with Training provided to SAP system	2.7895	1.20190	95
I am satisfied with support services from IT department/Vendor	2.5789	1.09718	95

Table 4.5 Descriptive Statistics

From the above results, it is evident that we can see *ERP success experiences*. This was noted from the mean scores received in each of the three dimensions of success that were used in this study. As The result from questionnaire analysis (mean) support generally response form respondent indicate has success in three dimensions.

As depicted in the Table below the approximate significance value for each correlation measure is less than 0.01. From the table, it is evident that the quality of an ERP system is highly correlated (0.854) with User Satisfaction, then with net benefits factor (0.648). This implies that the User Satisfaction factor of an ERP system is largely influenced by the quality of the system. Similarly, use is more significantly correlated with benefits (0.6189). This indicates that the benefits of an ERP system are largely influenced by its user satisfaction.

Variable		Quality Factor Dimension	User Satisfaction dimension	Net benefit Factor Dimension	Success
Quality Factor Dimension	Correlation	1	0.854	0.624	0.624
	Sig. (2-tailed)		0	0	0
User Satisfaction dimension	Correlation	0.854	1	0.348	0.548
	Sig. (2-tailed)	0		0	0
Net benefit Factor Dimension	Correlation	0.648	0.618	0.413	0.613
	Sig. (2-tailed)	0	0	0	0
	N	95	95	95	95

All correlation is significant at the 0.01 level

Table 4.6 correlation analysis

In brief, the results of correlation analysis shows that the three dimensions of ERP success are significantly related with the dependent variable, and also are inter-related.

4.3. Qualitative data analysis

As it is explained in methodology section the study employed qualitative data collection method in addition to quantitative data. Hence qualitative question was added in the questionnaire as open-ended question to receive additional qualitative data and, interviews have been conducted with IT Manager Finance Department and ERP consultant for ERCS, to gather data regarding ERP system post-implementation and analyzed as below. The open-ended question in the questionnaire and the interview question designed to find out the major challenge/issue ERP system in utilization in ERCS and collect opinion/Suggestion that used for maximizing SAP system utilization in ERCS.

Regarding major challenge/issue ERP system in utilization in ERCS, majority of the response from employee shows there is issue of system availability due to lack of sufficient internet connectivity. Form the trend of response it is observed particularly from regional office responded same type of issue they believe major issue of the ERP post implementation since ERP is fully dependent internet connectivity. And they also complaining even in the presence of internet connectivity dalliance of the system is another problem to use the system smoothly.

Another challenge/issue ERP system in utilization in ERCS observed from respondents in the open-ended questionnaire is lack of effective ERP training to the employees helps them do their work more efficiently and competently. According to the respondent only one time training was given without refreshing training. Furthermore, newly joined employee has complained they never received any formal training but simply there is only transfer skill for senior employee specific to task with limited functionality of the system.

For the question of “Opinion/Suggestion for maximizing SAP system utilization in ERCS” most respondents have suggested better internet connection should be available by upgrading the current connection to high-speed internet connection there by increase the performance of the system and in parallel it will empower them to become more efficient at their work

The second opinion/suggestion from respondents are appropriate training should be periodically given so as to improve their performance there by enables them to complete tasks more quickly, resulting in an overall increase in productivity.

4.3.1 Interviews

Interview is undertaken with IT Manager Finance Department and ERP consultant for ERCS, to gather data regarding ERP system post-implementation issue and explained as follows.

The interviewees were asked to point out the major ERP system post-implementation issue. The ERP consultant focal person said he has been supporting the ERCS in both pre and post implementation the ERP phases, as per the agreement of the project. He believes the major challenge both in pre and post implementation the ERP phases is “Resistance to change of Employee”. He stated Starting from implementation of the system some employees were highly resistance to accept the system as they don't need change their trend of work. And this has impact on post implementation phase of the project to fully utilize the system efficiently. According to the consultant focal person, since the ERP web-based system availability of the system is challenge especially in regional office due to internet connectivity issue.

The finance department process one of organization unit that is work process highly dependent on ERP system of the organization. And hence the finance department was selected and asked in the interview to mention major ERP system post-implementation issue. He believes the major challenge is mainly in regional level. one the challenge in most regional office turnover of employee who was working in ERP system. Since ERCS regional office has few employees, it is difficult to replace this expert when resigned. The consultant sent to train the replaced employee but it was easy to cope up with converge system for new employee. The network infrastructure problem is also a big challenge due to week speed of internet

connection. And he said to solve this problem they are working on it for allocation of budget with donors to establish high inter speed so as to alleviate system availability problem due to network infrastructure.

Last the IT manager of ERCS was interviewed to explain the post implementation of the system and the solution they are working on it. IT department responsible for different IT system management including such as ERP-SAP system which includes system installation, system upgrade providing end user support.

HOD of IT department stated the one of issue of post implementation of the ERP system is the ERP user support issue. He said there is some user complaining on IT Support they are receiving from IT department. They saying response not fast when need urgently. The common problem is client software crashing. This problem usually happens when power interruption occurs while the client software is up and running. And this issue needs reinstallation as a solution of the system which might takes some times. In ERCS there is only expert assigned for end user support of the system including for regional branch. Since the expert is also responsible for deferent IT system, there is limitation in addressing all issue as effective as expected.

4.3. The major findings and discussion of the study

From analysis of the quantitative data, the major findings and results of the research assessments on ERP post-implementation success in Ethiopia Red Cross Society is presented below.

- ERP SAP system easy to use. And their response is; 21.1 % strongly agreed, 73.7% agreed while the rest 5.3% system disagreed. (94.7%) agreed that the system has quality of easy use.
- SAP system reliability 5.3% strongly agreed, 78.9% agreed, 10.5% neutral and 5.3% disagreed. 95% are agreed that the ERP system has quality of reliability.
- SAP system has quality of ease of learning are 21.1% strongly agreed 57.9% agreed, 21.1% and neutral. 78.9% in agreed on ease of learning
- The response for quality of completeness of SAP system 15.8% strongly agreed, 57.9% agreed, 21.1% neutral and 5.3% strongly disagree 73.7% agreed
- SAP system quality of response times 21.1% rated strongly agree, 47.4% agreed, 21.1% neutral the rest 10.5% of the respondent disagreed. And 68.4% believes that has quality of response time
- Regarding quality of accuracy of ERP system, quality of timeliness of information understandability of the information generated by an SAP system majority (>89.5%) agreed has good quality accuracy.

- The quality of reliability of SAP support that receive from the ICT department, technical competence of IT Experts in SAP system support and responsiveness of IT support Experts 64.4%, 52.6% and 31.6% respectively either neutral or disagree category, (not agree category) improving customer service.
- Regarding improving customer service, 15%, 50%, 6%, 20% and 4% of respondent are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively
- cost reduction 15.8%, 52.6%, 5.3%, 21.1% and 5.3% of respondent are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively
- employee productivity improvement 15.8%, 68.4%, 10.5%, 0% and 5.3% of respondent are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively
- improving resource management 5.3%, 57.9%, 21.1%, 15.8% and 0% of respondent are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively
- improving of performance in all levels in the areas of Finance HR Logistic inventory and asset management 8.4%, 51.6%, 26.3%, 13.7% and 0% respondent are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively
- User Satisfaction dimension Analysis found that 68% of the respondents satisfied with reliability of output information of ERP, 73.7% satisfied with the function of SAP, 68.4% satisfied with organizational support for maintaining the system as well as the system product itself. But regarding training provided to SAP system support services from IT department/Vendor 15.8% are neutral, 36.9% disagree (52.7% not agree) and 47.4% agreed on Training provided to SAP system (57.9% disagree.).

Major challenges of ERP Post- Implementation in Ethiopian Red Cross Society

The open-ended question in the questioner and the interview question designed to find out the major challenge/issue ERP system in utilization in ERCS and collect opinion/Suggestion that used for maximizing SAP system utilization in ERCS. Thus, Major challenge/issue ERP system in utilization in ERCS found in the majority of the response from employee shows there is issue of system availability due to lack of sufficient internet connectivity. (Regional office). Lack of effective ERP training to the employees helps them do their work more efficiently and competently. IT Support they are receiving from IT department/ limitation in addressing all issue to be solved by Expert due to unavailability of dedicated assigned expert for SAP System Support.

Chapter Five

5. Summary, Conclusion and Recommendation

5.1 Summary

In this study we assessed the relationship between ERP SAP success of Ethiopian Red Cross Society with quality user satisfaction and net benefit dimension ERCS. This study approach of this research is a case study which used mixed method of research which combination of quantitative and qualitative methods is used to collect and analyze data. Interviews, and questionnaires as method of data collection form target group such Finance, HR, logistic and IT Department in HQ and regional branch. The study was done by synthesizing different lecture review and also supported by adopting research model. The questionnaire was developed using google form and distributed for all ERP user in ERCS. Total number of returned responded questionnaire was 95 (79.1% of total distributed).

The study identified the majority quality dimension construct has positively affect in the ERP post implementation of Ethiopian Red Cross Society. However, regarding the quality of reliability of SAP support that receive from the ICT department, technical competence of IT Experts in SAP system support and responsiveness of IT support Experts has negatively affected the Ethiopian Red Cross Society's ERP post implementation. in the other word, the response from user of the ERP system have no satisfaction in ERP support provided from IT department.

Another construct of quality dimension that has negatively affect the Ethiopian Red Cross Society's ERP post implementation Training provided to SAP system. The employees do not believe adequate training is provided for ERP System usage.

From analysis of net benefit dimension of all construct the result shows. it has positively affect post implementation of the ERP system.

In the open-ended question of the questionnaire lack of refreshment training was found to be one of the major issues. Another major the challenge in post implementation of the ERP system was in regional branch which have a big problem in availability the ERP system due less connectivity of internet

Therefore, study found it that the ERCS-SAP system of ERCS has generally successful post implantation by evaluation with the three dimensions of the measures.

The study also identified there is positive relationship between the independent variable (dimension of variable) and dependent variable (ERP success)

5.2 Conclusion

This research has identified the impacts of the quality, user satisfaction and net benefit dimensions on ERP post implementation. In quality dimension, the construct such as Easy use, reliability, ease of learning, response times, flexibility, accuracy, completeness, understandability, usability and timeliness has positively affected the ERP post implementation. On the other side reliability of SAP support, of technical competence of IT Experts and responsiveness of IT support Experts has negative affected the ERP post implementation.

In Net benefit Factor Dimension such as improving customer service, cost reduction. Employee productivity improvement, quality improvement, improving resource management, Managerial benefits, Empowering workers and create feeling of ownership, work integration and interaction, organizational growth and innovations and Increasing IT infrastructure capability have positively affected ERP post implementation.

In user satisfaction dimension construct such as, reliability of output information function of SAP easy and enjoyable to use organizational support for maintaining has positively affected the ERP post implementation.

Therefore, from the study it can be conclude that the three-dimension construct has positively affected the Ethiopian Red cross Society's ERP post implementation. In the other word most of the Employees believed that most constructs of quality dimension of the ERP post implementation have succeeded.

However, some construct of measurements (The quality of reliability of SAP support that given from the ICT department, and the quality of technical competence of IT Experts in SAP system support and responsiveness of IT support Experts when called for SAP Support,) i.e. Employee response is showing that they are agreed EPR post implementation in this dimension has some kind of issue needs to be addressed. It also found construct of user satisfaction dimension which is Training provided to SAP system has negatively affected the ERP post implementation.

In addition to this in the open-ended question network connectivity problem is found to be the major challenge in regional branches as it affects the availability of the system.

However generally, can be concluded the post implemented ERP in ERCS is positively affected by quality, user satisfaction and net benefit dimension construct. And it is also found there is positive relationship between the three dimensions of ERP post implementation Successes

5.3 Recommendations

Based on the investigation of study on the major challenge of the ERP post implementation and limitation of the study, the research recommends the following idea for solution of ERP post implementation issue ERCS and future work.

- Regarding Network connectivity issue the organization should upgrade the band width the network in regional branch so as to have smooth operation of ERP system.
- The ERP support should be improved by employing additional IT expert.
- Periodical refreshment training for employee should be provide.
- Further research is recommended to conduct the ERP post implementation in others sector of the organization because there is limited research is under taken in the ERP post implantation especially in Ethiopia. And investigating others factor affecting the ERP post implementation are recommend for future study as it will give us wide and comprehensive study result regarding ERP post implementation.

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Appendix 1: Survey Questions

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

Dear Sir / Madam:

In partial fulfillment of the requirements for the Degree of Master of Science in Information System, I am undertaking research on “Assessment of Post-Implementation of Enterprise Resource Planning System (ERP) with *Quality, User Satisfaction and net benefit Dimension*: case of Ethiopia Red Cross Society.” at Addis Ababa University. I have accordingly prepared this survey questionnaire. The objective of the survey is to Evaluate and investigate success of adoption ERP in quality, user satisfaction, and net benefit dimension.

This research is believed to produce results that can improve the utilization of SAP ERP in Ethiopian Red Cross Society. Your honest responses to each question and statement are extremely valuable to the outcome of this research.

I would like to take this opportunity to thank you in advance for your kind participation, genuine and on time response to the questionnaire.

Thank you!

Shimelis Tadesse

Part I. Demographic characteristic of the Respondents

Where is the working place in ERCS?

- HQ
- Regional Office

Which unit you are working?

- Finance
- HR
- Logistic
- Finance and Admin
- IT
- Other please Specify the unit you are working _____

What is the position level?

- Junior
- Middle
- Senior
- Managerial or coordinator level

Academic Qualifications

- Degree
- Diploma
- Master

Part II Assessments of the Three Dimension of ERP Post-Implementation

Please mark \surd or X on the appropriate responses to the questions

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

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Quality Dimension Factor					
SAP system has quality of Easy use					
SAP system has quality of reliability (example no fear of data loss)					

SAP system has quality of ease of learning					
SAP system has quality of response times (fast response)					
SAP system has the quality of flexibility					
The information generated by an SAP system has the quality of accuracy					
The information generated by an SAP system has the quality of completeness					
The information generated by an SAP system has the quality of understandability					
The information generated by an SAP system has the quality of usability					
The information generated by an SAP system has the quality of timeliness					
The quality of reliability of SAP support that you receive from the ICT department					
The quality of technical competence of IT Experts in SAP system support					
How do evaluate responsiveness of IT support Experts when called for SAP Support,					
Net benefit Factor Dimension					
SAP has benefited ERCS by improving customer service.					
SAP has benefited ERCS by cost reduction.					
SAP has benefited ERCS by employee productivity improvement,					
SAP has benefited ERCS by quality improvement,					
SAP has brought Managerial benefits to ERCS by improving resource management					

SAP has brought Managerial benefits to ERCS by improving of performance in all levels in the areas of Finance HR Logistic inventory and asset management					
SAP has empowered workers and create feeling of ownership of the system build common vision.					
SAP system has increased work integration and interaction across the organization (i.e., Harmonization of interdepartmental processes.)					
SAP systems has supported the organizational growth and innovations.					
SAP System decreased information technology (i.e., costs maintaining and integrating systems by eliminating separate data centers and applications, as well as their supporting costs.)					
SAP system Increased IT infrastructure capability (i.e., Reliable platforms which is Stable and flexible support for the current and future business changes in process and structure.)					
User satisfaction Factor					
I am satisfied with reliability of output information					
Training provided user					
I am satisfied with the function of SAP					
I am satisfied with easy and enjoyable to use					
I am satisfied with organizational support for maintaining the system as well as the system product itself.					
I am satisfied with Training provided to SAP system					
I am satisfied with support services from IT department/Vendor					
What do you think the major challenge/issue SAP system in utilization in ERCS?					

Appendix 2 Pearson Correlation Correlations for Validity

Pearson Correlation Correlations for Validity																															
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P C	1	-.096	.633**	.315**	.921**	.185	.336**	.131	.260	-.325**	.096	-.422**	.507**	.351**	.140	.140	-.076	.433**	.396**	.088	.338**	.271**	.229	.346**	.324**	-.055	-.089	-.077**	-.171	-.098	.087
Si g. (2- tail ed)		.355	.002	.000	.073	.001	.207	.011	.001	.355	.000	.000	.000	.175	.465	.000	.000	.000	.394	.001	.008	.026	.001	.001	.600	.067	.006	.098	.346	.401	
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	-.096	1	.277**	.640**	.067	.540**	.573**	.238	.512**	.340**	.532**	.479**	.156	.638**	.518**	.518**	-.139	.247	.283**	.569**	.263	.231	.317**	.629**	.347**	.781**	.811**	.647**	.519**	.573**	.515**
Si g. (2- tail ed)	.355		.007	.000	.516	.000	.000	.020	.000	.001	.000	.000	.131	.000	.000	.180	.016	.005	.000	.010	.024	.002	.000	.001	.000	.000	.000	.000	.000	.000	.000
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
P C	.633**	.277**	1	.636**	.623**	.415**	.534**	.182	.423**	-.087	.415**	-.077	.396**	.387**	.142	.142	-.095	.346**	.297**	.184	.260	.203	.268**	.346**	.132	.454**	.165	.000	.346**	.149	
Si g. (2- tail ed)	.000	.007		.000	.000	.000	.000	.078	.000	.402	.000	.459	.000	.000	.169	.169	.359	.001	.003	.074	.011	.048	.009	.001	.202	.000	.111	1.000	.090	.151	
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
P C	.315**	.640**	.636**	1	.361**	.238	.527**	.076	.320**	-.040	.566**	.047	.280**	.621**	.315**	.315**	-.306**	.069	.223	.342**	.020	.054	.191	.572**	.207	.573**	.331**	.209	.433**	.288**	.253
Si g.	.002	.000	.000		.020	.000	.000	.462	.002	.701	.000	.651	.006	.000	.002	.002	.003	.504	.029	.001	.848	.601	.064	.000	.044	.000	.001	.042	.000	.005	.013

P C	.5 07 ..	.1 56	.3 96	.2 80	.5 60	.3 75	.2 94	- 0	.4 94	- .1 78	.0 64	.2 50	1	.4 17	.01 5	.01 5	- .1 55	.4 97	.3 35	.3 11	.3 29	.0 68	.0 97	.2 23	.4 08	.3 03	.0 86	.3 29	.1 87	.1 13	.3 66	
Si g. (2- tail ed)	.0 00	.1 31	.0 00	.0 06	.0 00	.0 04	.4 44	.0 00	.0 85	.5 41	.0 15	.0 00	.88 7	.88 7	.1 34	.0 00	.0 01	.0 02	.0 01	.5 14	.3 51	.0 29	.0 00	.0 03	.4 08	.0 01	.0 69	.2 75	.0 00			
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	.3 51	.6 38	.3 87	.6 21	.5 79	.2 82	.4 58	.2 46	.5 05	.0 42	.2 89	.1 08	.4 17	1	.72 7	.72 7	- .1 16	.4 83	.6 05	.7 05	.5 15	.5 18	.6 25	.8 84	.5 63	.6 78	.5 19	.3 81	.2 74	.4 45	.4 78	
Si g. (2- tail ed)	.0 00	.0 00	.0 00	.0 00	.0 06	.0 00	.0 16	.0 00	.6 83	.0 04	.2 96	.0 00	.00 0	.00 0	.2 62	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 07	.0 00	.0 00		
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	.1 40	.5 18	.1 42	.3 15	.3 57	.2 82	.2 75	.7 28	.2 47	.5 73	.1 12	.3 01	.0 15	.7 27	1	1.0 00	.4 36	.5 28	.7 74	.6 67	.7 01	.8 18	.8 44	.8 72	.6 84	.4 93	.5 47	.3 55	.1 11	.4 20	.2 45	
Si g. (2- tail ed)	.1 75	.0 00	.1 69	.0 02	.0 00	.0 06	.0 07	.0 00	.0 16	.0 00	.2 81	.0 03	.8 87	.0 00	.00 0	.00 0	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.2 83	.0 00	.0 17	
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	.1 40	.5 18	.1 42	.3 15	.3 57	.2 82	.2 75	.7 28	.2 47	.5 73	.1 12	.3 01	.0 15	.7 27	1	1.0 00	.4 36	.5 28	.7 74	.6 67	.7 01	.8 18	.8 44	.8 72	.6 84	.4 93	.5 47	.3 55	.1 11	.4 20	.2 45	
Si g. (2- tail ed)	.1 75	.0 00	.1 69	.0 02	.0 00	.0 06	.0 07	.0 00	.0 16	.0 00	.2 81	.0 03	.8 87	.0 00	.00 0	.00 0	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.2 83	.0 00	.0 17	
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	- 0	- .1 39	- .0 95	- .3 06	- .0 14	.1 78	- .1 71	.6 63	- .1 15	.7 08	- .1 78	.3 17	- .1 55	- .1 16	.43 6	.43 6	1	.2 01	.4 57	.2 14	.4 07	.4 07	.6 48	.5 08	.1 35	.4 61	- .0 46	- .0 46	.0 10	- .0 69	.0 22	- .2 35

Si g. (2- tail ed)	.4 63	.1 80	.3 59	.0 03	.8 91	.0 85	.0 97	.0 00	.2 69	.0 00	.0 85	.0 02	.1 34	.2 62	.00 0	.00 0	.0 51	.0 00	.0 37	.0 00	.0 00	.0 00	.1 92	.0 00	.6 61	.6 56	.9 20	.5 05	.8 34	.0 22	
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	
P C	.4 33 ..	.2 47 .	.3 46 ..	.0 69	.5 57 ..	.5 34 ..	.4 08 ..	.6 34 ..	.5 20 ..	.2 75 ..	.0 40	.3 66 ..	.4 97 ..	.4 83 ..	.52 8" 8"	.52 8" 8"	.2 01	1	.7 35 ..	.5 56 ..	.8 52 ..	.6 43 ..	.6 56 ..	.5 22 ..	.5 58 ..	.4 42 ..	.4 95 ..	.4 92 ..	.3 14 ..	.2 30 .	.5 03 ..
Si g. (2- tail ed)	.0 00	.0 16	.0 01	.5 04	.0 00	.0 00	.0 00	.0 00	.0 00	.0 07	.6 98	.0 00	.0 00	.0 00	.00 0	.00 0	.0 51	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 02	.0 25	.0 00
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
P C	.3 96 ..	.2 83 ..	.2 97 ..	.2 23	.5 68 ..	.5 02 ..	.3 83 ..	.7 27 ..	.4 28 ..	.5 22 ..	.0 46	.2 37	.3 35 ..	.6 05 ..	.77 4" 4"	.77 4" 4"	.4 57 ..	.7 35 ..	1	.6 38 ..	.9 08 ..	.8 18 ..	.8 23 ..	.6 67 ..	.7 44 ..	.4 17 ..	.4 36 ..	.2 89 ..	.1 55	.2 63 ..	.1 64
Si g. (2- tail ed)	.0 00	.0 05	.0 03	.0 29	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.6 57	.0 21	.0 01	.0 00	.00 0	.00 0	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 04	.1 34	.0 10	.1 12
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
P C	.0 88	.5 69 ..	.1 84	.3 42 ..	.2 66 ..	.4 67 ..	.2 78 ..	.3 42 ..	.4 76 ..	.2 93 ..	.0 43	.5 04 ..	.3 11 ..	.7 05 ..	.66 7" 7"	.66 7" 7"	.2 14	.5 56 ..	.6 38 ..	1	.6 52 ..	.6 86 ..	.5 68 ..	.6 84 ..	.5 94 ..	.8 06 ..	.7 09 ..	.3 33 ..	.5 90 ..	.5 95 ..	.5 91 ..
Si g. (2- tail ed)	.3 94	.0 00	.0 74	.0 01	.0 09	.0 00	.0 06	.0 01	.0 00	.0 04	.6 80	.0 00	.0 02	.0 00	.00 0	.00 0	.0 37	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 01	.0 00	.0 00
N	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
P C	.3 38 ..	.2 63 .	.2 60	.0 20	.5 03 ..	.5 51 ..	.3 39 ..	.7 13 ..	.4 64 ..	.4 67 ..	- 0 71	.3 03 ..	.3 29 ..	.5 15 ..	.70 1" 1"	.70 1" 1"	.4 07 ..	.8 52 ..	.9 08 ..	.6 52 ..	1	.8 09 ..	.7 98 ..	.6 12 ..	.6 71 ..	.4 64 ..	.5 74 ..	.3 39 ..	.2 27 ..	.4 09 ..	.2 77 ..
Si g. (2- tail ed)	.0 01	.0 10	.0 11	.8 48	.0 00	.0 00	.0 01	.0 00	.0 00	.0 00	.4 96	.0 03	.0 01	.0 00	.00 0	.00 0	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 00	.0 01	.0 27	.0 00	.0 07

