ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

ASSESSMENT OF ERP POST IMPLEMENTATION SUCCESS AT HABESHA BREWERIES S.C

By

BEREKET BOGALE

SEPTEMBER, 2020

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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 Science and Systems (*Information Systems Specialization*)

By: **BEREKET BOGALE**

Advisor: **GETACHEW HAILEMARIAM** (Ph.D.)

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Name and signature of Members of the Examining Board

Getachew Hailemariam (Ph.D.) Advisor	_____ Signature	_____ Date
Lemma Lessa (Ph.D.) Examiner	_____ Signature	_____ Date
Wondwossen Mulugeta (Ph.D.) Examiner	_____ Signature	_____ Date

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 ERP POST IMPLEMENTATION SUCCESS AT HABESHA BREWERIES S.C" 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.

Signature: _____

Bereket Bogale

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

Advisor's Signature: _____

Getachew Hailemariam (Ph.D)

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ABSTRACT

Information Systems (IS) success is one of critical achievements of organizations for it has high impact on the business operation. Information is a key asset of any company; the success of the Information system management will also determine the success at the corporate level. And ERP is the application to manage and process this information that runs in the business operations. Enterprise resource planning (ERP) system is a set of integrated software modules with a central database that enables a company to manage and control the use of its information resources. The benefit of implemented ERP system to an organization needs to be known and measured so that appropriate & timely measures can be taken for performance improvement.

This research investigates the post-implementation success status of ERP at HBSC by adopting Delone and Mclean's updated IS success model as a theoretical research model for assessment. Based on the six success dimensions from model construct, a set of research Hypothesis were formulated to be tested using the quantitative data that is collected from the active ERP users of HBSC.

The target population are 135 active users, the researcher chose to census over sampling and sent the questionnaire to all users using online survey application. 68 participants (50%) respond to the survey. An exploratory quantitative research approach was applied, and the collected data was analyzed using statistical Package for Social Sciences (SPSS V23) software. Based on the collected response reliability test was done using Cronbach's Alpha test and the results shows high reliability of all used measures, where Cronbach's Alpha exceeds 0.7. Hypothesis embedded in the research model were tested using correlation, regression, and stepwise multiple regression analysis.

The Finding of the study indicates the Pearson coefficient correlation analysis test provides empirical support for the existence of a positive and significant association between the dimensions of ERP success model to some extent. The result of Stepwise regression shows that Information quality, System Use and Net Benefit explain 55.7% of the variance occurs in User satisfaction. The determinants of User satisfaction explain 20.7% of the variance in System Use, and the determinants of User Satisfaction explains 37.9% of the variance in the Net benefits. The study result indicates Information Quality, System use, User satisfaction and Net benefit have a significant positive influence on the ERP success at HBSC.

This study followed quantitative approach to identify the most determinant ERP success factors which are derived from the conceptual model based on the updated McLean and Deleon's IS success model undergoes empirical testing on the Hypothesis formulated. The researcher recommends that the Habesha Breweries S.C management consider improvement on the identified determinant success factors for better ERP system utilization. Furthermore, practical implications to HBSC, and future studies were highlighted.

Keywords: Information systems success, ERP success determinants, Delone and Mclean updated Model.

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List of Acronyms

BPR	Business Process Reengineering
CSF	Critical Success Factor
DW	Durbin Watson test
ERP	Enterprise Resource Planning
HBSC	Habesha Breweries Shared Company
ICT	Information Communication Technology
IS	Information Science
IT	Information Technology
PIS	Post Implementation Success
ROI	Return of Investment
SAP	Systems Applications and Products
SPSS	Statistical Package for the Social Sciences
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Overview of the Chapter

Chapter one will discuss the contents and parts mentioned as an introduction of the overall thesis. This chapter is divided in sections: the first section will give brief information about the background of the study and the company chosen to be studied. Then the next section will discuss why the researcher engage in the study. Describing the detail of the study: research questions of the study, Statement of the problem, Research questions, General and specific objectives of the study, hypothesis, Significance of study, Scope of study and Limitations of the study.

1.2 Background of the study

In today's business world, companies are becoming heavily dependent on the application of modern Information Technologies to run their business operations since their business scope is becoming bigger and more complicated because of local and global market competitions. Information is the key asset for companies. This information can be the company's supply chain, financial related and business workflows, Human Resources, marketing information. Clearly this information will be at center when running the business operation and it is company's number one priority to control and manage this critical asset.

In early times, companies hire Information System professionals, purchase tools and application to be used by departments to carry out the information management tasks. But companies are getting bigger, and their business operations is getting more complex. And the interdepartmental interaction is getting high which makes the legacy information system out of date and need to be replaced with powerful and multi-departmental oriented solutions.

ERP (Enterprise Resource Planning) is a business management software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, supply chain and HR. It is a suite of integrated applications sharing a common database to manage and integrate the important units of the business. Understanding the necessity and impact of ERP system on business, Companies invest huge amount of budget for purchase, implement, consultant

and to have Information System department and train their staff. This is because the return of investment of the ERP is to put their firm in the competitive edge of the market by facilitating integrated departmental modules of the business functions (Lu Zhang et al., 2012).

Like any other companies which is operating in the current highly competitive market, manufacturing sectors also will be highly beneficial by applying Enterprise Resource Planning system (ERP) in their operation for the same reason.

ERP implementation project is one of the main milestones that a company set as part of the core business operation function. It is among the highest priority for a company top management since the success and failure of the implementation has a serious impact on the company directly. Since ERP system implementation is just the beginning of a long Information System journey for the company, the success is not limited on the implementation phase only.

ERP is at the center of any organization Information System management; Since the use of ERP system is about enhancing the ability to improve performance, more efficiently and to produce more, within an appropriate time, while ensuring cost-effective manner. Companies spend huge investment in implementing it to support their business. And it is crucial for the firm to know the status of their ERP while checking their ROI.

The advantages of ERP systems are only realized if the implementation is successful. Despite several studies highlighting the crucial success elements for ERP systems, an alarming 70% of ERP implementations fail (Hajj W. EL & Serhan A, 2019).

ERP implementation is not the end of the journey, but rather, the beginning of the long roadway towards innovation, improvement, and flexibility (Zimmerman et al., 2008). Following the system's adoption, a company should engage in several actions, such as post-implementation evaluation, support, and maintenance, to reduce the chances of ERP projects failing. (Nicolaou, 2006). But not all ERP systems are successful. Despite of the big investments and expected benefits from the project, some of them didn’t go as planned and cause in catastrophic failure on the company.

HBSC invest in deploying the ERP solution to grasp all the fruit of the above benefits. Before SAP ERP, Habesha purchase and deploy a locally developed ERP solution (HillMaster ERP). With the expansion of its business and functional units. It switches to procuring the more advanced and

powerful ERP solution SAP along with the hiring of ERP implementing and consultancy firms. It also invests in training its employees on the new system. After the involvement of many stake holders and huge investment on the procurement and implementation of the new ERP system and taking into consideration of the significant reports of ERP failures, it would be necessary to investigate and assess the level of the ERP post-implementation success status for further adjustments and strategic decisions.

Conducting an assessment for the post implementation ERP success is necessary to understand whether the system is delivering the required functionalities as it is intended to be or not. And, to identify the determinant factor for success of the ERP implementation in HBSC to focus on.

1.3 Background of the Organization

Habesha Breweries S.C. have been founded in 2009 with more than eight thousand Ethiopian shareholders. HBSC brewing premium quality beer since 2015. Moved by the vision of reaching and connecting with Ethiopians, HBSC done so with interactions in communities has reached so far. HBSC uphold the Habesha culture and run activities that present Ethiopia in the best possible light. HBSC is launching Negus, a new alcohol-free dark malt drink starting February,2019.

Conveniently located in Debre Birhan, the brewery is 130kms from the capital of Ethiopia, Addis Ababa in what could be considered center of the country, from where the beers get transported to most towns in different regions. As one of the fastest growing beer companies in Ethiopia, HBSC has become a highly recognized brand in the Ethiopian Beer market.

According to the information from the company and specifically from the ERP department, Habesha Breweries S.C (HBSC) implemented the ERP system (Version: EHP7 FOR SAP ERP 6.0) since July 1, 2018, supplied by the sister company at Holland. replacing the older ERP system (HillMaster). SAP has been implemented by support of Bavaria (foreign Habesha's sister Company), Habesha Internal SAP Team and local implementer coordination teamwork. ERP Consultants are from Bavaria, internal SAP Team, and Consultants from Local Partner.

Habesha is using mainly 3 Main Modules and 13 sub-modules: Logistics (Material Management, Production Planning, Sales and Distribution, Quality Management, Plant Management) HCM

(Payroll, Time Management) and Finance and Controlling (Sap Controlling, General Ledger Accounting, Accounts Payable, Accounts Receivable, Bank Accounting, Asset Management).

It required a huge investment in purchasing, consultancy, recruitment, install and support to implement the new system aiming to put its business backed with the latest ERP system. But, implementing only do not guarantee the effectiveness/success of the system, assessment needs to be carried out to identify which success factors are key determinant for its success.

1.4 Statement of the problem

Many companies today choose to implement ERP (Enterprise Resource Planning) system not only to support the daily operations but also to handle information, building services to customers and so on (Zimmerman,2006). An ERP system is an integrated software solution that supports the integration of all the information flowing through an organization. ERP Systems are complex, and implementing one can be a difficult, time-consuming, and expensive project for a company (Davenport, 2000).

Some manufacturing company's legacy systems are replaced by ERP systems with the purpose of increasing the efficiency in their business processes. ERP can enhance a business in a way of making the process more agile, drastically increase efficiency and productivity, save on unnecessary costs, improve security and accessibility, and gain a professional partner.

As discussed in the above section, conducting a post-implementation evaluation of an ERP system's success from an overall ERP perspective is beneficial for improving the system's usability and resolving issues that make it difficult to utilize the system effectively. Thus, it needs to give attention to the factors affecting the ERP system on the post-implementation phase to evaluate the system from the user's side.

With the increasing demand due to the growing complex nature of businesses, some company in Ethiopia are implementing different ERP solutions. But literature and observations show that only few organizations are known to have acquired SAP ERP systems in Ethiopia (Saron, 2017; Abraham 2018; Sintayehu 2014; Selamawit 2018; Elias 2019). The researcher reviews some local and foreign research regarding the ERP success assessments and present them in the literature review section. There are some local research done on the ERP implementation success; but in

case of Habesha Breweries, no prior assessment conducted to validate the success factors affecting the ERP post implementation. These researchers mentioned some CSF following their studies.

Selamawit (2018) studies Factors Affecting Enterprise Resource Planning Project Post Implementation Success: The Case of Commercial Bank of Ethiopia to clarify the post implementation success (PIS) of the ERP system from project management perspective in the case of by identifying the project success factors that contribute to the PIS phase of the ERP project. The study focusses on the project management success factors scope of the ERP implementation on the financial/bank sectors which the researcher recommend the investigated CSF for banking sectors exclusively.

Sintayehu (2014) investigates the Success Factors for Implementation of Enterprise Resource Planning System at Ethiopian Airlines. He mentioned that the main significance of the study was knowledge and experience sharing about ERP systems implementation between organizations in Ethiopia for the purpose of preventing Implementation failure. He selects 15 CSF derived from Studies by different researchers such as Anil B. (2009) and others. Here he didn't put the reason how he chose those CSF specifically. Since different companies follow different approach when implementing their ERP systems, this finding cannot guaranty the successful implementation of ERP on other sectors.

Elias (2019) works on identifying Factors Affecting the Successful Implementation of Enterprise Resource Planning (ERP) Project of Ethiopian Postal Service Enterprise. The researcher adopted eight CSF from other researcher's recommendations and one CSF 'developed based on IT'. The researcher chooses these CSF subjectively and he indicate that the ERP is developed for governmental enterprise in collaboration with third party. Governmental enterprises business process affected by many factors comparing to the private manufacturing companies which also impact the implementation of the ERP solution.

In Ethiopia context, one significant research regarding the breweries sector was found which is conducted by Saron Gebremedhin regarding ERP success investigation in Brewery sector (Saron G, 2017). She had investigated ERP implementation in Heineken Ethiopia Operating Companies based on CSFs which cited as index for success of ERP implementation in others research. The study also shows all six CSFs are the most important to success of the ERP implementation at Heineken: top management support, project team competency, user training and education,

interdepartmental communication, Business Process Reengineering and Consultant Involvement. Which among these the researcher identify Top management support has been found to be important factor of successfully implementing the ERP system. These CSF may not be best suited in the testing of ERP post implementation phases since the ERP implementers (which are the main stakeholders of the project team) scope is ended in the initial implementation stage, thus we cannot fully measure the project team competency. In addition, the Heineken Ethiopia is using Ms-Dynamics ERP solution and there is difference between SAP and MS- Dynamics in terms of Functionality and Ease of Use, Cost and Pricing, Integration, Implementation, and customer service.

Most of this research are engaged in discovering and testing suggested CSF in their research domain. These domains vary in terms of company size, business nature and implemented ERP solution types.

The factor that determines the ERP system needs to be identified and clearly stated. To discover the CSF of HBSC's ERP system, this research will investigate the ERP post implementation in using a proposed ERP Success model and identify which factor matter the most for the success of the system. This research will apply the updated D&M IS Success model for the first time on investigating the SAP ERP post-implementation success on Brewery sector in Ethiopia case as per the knowledge of the researcher.

The researcher sought to validate the success of Information Systems of the HBSC and investigate the determinant success factors that have direct impact on the ERP which result in impacting the business transactions. Since the company's business activity is heavily affected by the success of the ERP and there is no prior assessment conducted before, this study aims to give insight to the managements and stake holders on the HBSC's ERP success status by measuring and presenting the extent of the ERP's CSF, and the relationship between the determinant factors using a selected IS Success measurement model.

To investigate the current ERP success status, the researcher uses the updated DeLone and McLean information systems success model as a theoretical framework to identify the factors responsible for the success of ERP implementation. The ERP system under investigation in this study is SAP Version- EHP7 FOR SAP ERP 6.0 (after this referred as SAP).

1.5 Research Questions

The study has a general objective of evaluating the ERP post implementation in Habehsa Breweries SC and answer the following question:

- What are the determinant factors affecting the ERP post-implementation success at Habesha Breweries S.C.?

1.6 Research objectives

1.6.1 General objectives

The overall objective of this research is to assess the factors affecting the ERP post-implementation success at Habesha Breweries using the updated DeLone and McLean information systems success model as theoretical model.

1.6.2 Specific objectives

- To explore the current ERP status at HBSC.
- To review the selected theoretical model.
- To explore and formulate Research Hypothesis.
- To collect and analyze primary data.
- To identify and discus the determinant success factors and their impact.

1.7 Scope of the Study

The scope of this study has been limited to the assessment of ERP implementation success in Habesha Brewery S.C, where the current SAP ERP is implemented and running, the measurement are carries out using the DeLone and McLean updated information system success model. The study covered all ERP implementation areas and departments on the company (the head office, brewery site and sales branches). This study did not measure the implementation project phases or the investment that it takes to deploy. This research is limited to only Habesha Brewery S.C. ERP post implementation phase and do not address the organizations ERP SAP project implementation phase.

1.8 Significance of the study

This research intends to help the improvement for IS of HBSC and further researchers in identifying the determinant factors that affect the success of ERP post implementation by applying the DeLone and McLean updated information system success model which is recognized as one of the most accepted IS success measurement model by researchers and academics. the result of this study will also show that how applicable and effective is it to implement the DeLone and McLean updated information system success model to assess the ERP success in the manufacturing industries in Ethiopia.

Exploring the determinant success factors of the HBSC ERP system helps to enhance the effectiveness, efficiency, productivity, and quality of the information system on the company and users' level. And this will contribute to the overall business success and competitiveness due to the positive impact on the back office, production, and sales business operations.

The finding of this study will provide useful information to fill the literature gap on ERP success assessment in Ethiopian manufacturing sector especially on the Brewery business as mentioned in the problem statement section. The study will also show the benefits achieved and the challenges after the ERP implementation, helping the management of Habesha to have the current understanding and made any necessary strategic decision. It also will help to identify problems and suggest solutions in prior of implementation of any future information systems projects. The study also can be used as a reference for future research on these areas and for similar companies looking for the most determinant success factors and work on it for improvement in their IS system.

1.9 Organization of the study

This research thesis was organized in to five chapters. Chapter one consists of the introduction section, background of the study, background of the company, Statement of the problem, general and specific objectives of the study, formulated hypothesis, Significance of the Study, Scope and Limitations of the study. Chapter two consist of literature reviews which discuss the theory of ERP, the evolution and life cycle, ERP benefits, ERP implementation, Critical success Factors, ERP implementations challenges, ERP in manufacturing companies, ERP/ IS success models and empirical review. It will be finalized by presenting the theoretical and conceptual frameworks. Chapter three will deal with the research methodology and design. the conceptual research model

will be discussed in detail including the discussing the case selection, study population, sampling, data collection methods, data analysis methods, model specifications and defining the validity and reliability measurements. The fourth chapter presents Discussion and analysis steps and tasks based on the collected data to assess the determinant success factors of ERP implementation in HBSC. The results and findings of the study were analyzed and presented here. The fifth and last chapter present the summary of the study and findings, set. conclusions and provide further recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Organization of the chapter

In this section presents the theory, background, and development of the ERP. It discusses what is ERP and information system in general, and why is it important. And it will discuss on the components and types of different IS success models available and the comparisons among them. It will be concluded discussing the selected model as theoretical framework for measuring the ERP success along with review of statistical methods used.

2.2 ERP Overview

Enterprise resource planning (ERP) is software designed to help companies store, manage, and use data regarding their daily and regular processes. Beheshti (2006) defines Enterprise Resource Planning (ERP) system as “a set of business applications or modules, which links various business units of an organization such as financial, accounting, manufacturing, and human resources into a tightly integrated single system with a common platform for flow of information across the entire business”. ERP systems are very large software programs that control every aspect of a company from sales to accounting to supply chain to human resources ERP provides a host of services for companies trying to improve how efficiently they operate. The system used is constantly updated to offer the speediest and most reliable services.

Today, ERP has prolonged to cover business intelligence (BI) while also managing "front office" functions such as sales force automation, marketing automation, and E-commerce. ERP is considered as one of the most important innovations that will allow companies to achieve substantial benefits by automatizing, standardizing, and monitoring business performance. Based on these productive features of the ERP system and its success stories, firms in a broad range of industries from wholesale distribution to e-commerce use ERP solutions (Oracle NetSuite, n.d.,2004).

As the name suggests, ERP's primary goal is to manage the various resources within the company to make sure they are being utilized in a cost-effective way. It is also designed to make sure that all resources are being used properly. ERP provides an integrated and continuously updated view of core business processes using common databases maintained by a database management system. ERP systems track business resources—cash, raw materials, production capacity—and the status of business commitments: orders, purchase orders, and payroll. The applications that make up the system share data across various departments (manufacturing, purchasing, sales, accounting, etc.) that provide the data. ERP facilitates information flow between all business functions and manages connections to outside stakeholders. ERP works particularly well for tracking and managing things such as a company's capacity for production, cash levels, raw materials at its disposal, payroll information, and purchase orders.

2.2.1 The Evolution of ERP

The history of ERP systems starts with efforts of automating inventory control systems in the 1960s following the development of the Information Technology field and when most organizations designed, developed, and implemented centralized computing systems for their inventory control systems (Rashid et al., 2002).

These were legacy systems based on programming languages such as COBOL, ALGOL, and FORTRAN. In the1970s, Material requirements planning (MRP) systems were developed which involved mainly planning the product or requirements according to the master production schedule. Next new software systems called manufacturing resource planning (MRP) were introduced in the1980s with an aim on optimizing manufacturing processes by synchronizing the materials with production requirements

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

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

Table 1. Summary of the historical events related with ERP (source Rashid, et al 2002)

2000s	Extended ERP
1990s	Enterprise Resource Planning (ERP)
1980s	Manufacturing Resources Planning (MRP2)
1970s	Material Requirements Planning (MRP)
1960s	Inventory Control Packages

ERP systems are adopted to increase organizational performance. This could relate to the objective of process improvement or BPR, seeking greater standardization, or increasing flexibility (Oliver et al., 2005). There are factors that enforce companies to implement the ERP system. These factors are both internal and external factors which the impact will decide on the staying in the competitive business world. By replacing their legacy systems since Its value does not go up in the long run instead it starts to accumulate errors, bugs and other issues that can directly contribute to customer frustration. Some of the factors that motivate companies to implement the ERP systems are (Joycelyn L.& Harrison, 2004):

• Simplify and standardize systems.

• To gain strategic advantage

• Improve interactions with suppliers and customers

• Ease of upgrading systems

• Link to global activities

• Restructure company organization

• Pressure to keep up with competitors

2.2.2 ERP system Benefits

As Abraham (2018, p25) suggest- ERP implementation becomes more popular for companies around the world in 1990s. The main reason behind the implementation of ERP system is to re-engineer business processes through a uniform information system. During the mid to late 1990s, around 30,000 companies worldwide implemented ERP system. Organizations worldwide have spent $10 billion per annual on ERP systems. From 1996 to 2003, there was a high growth in the number of ERP systems implementation as international companies have continues to implement the ERP systems which incorporate both success and failures.

Implementation of ERP system requires huge investment and takes a long time to complete. However top ERP vendors need to develop special ERP packages to meet the need of small size companies to increase the market share of ERP systems. So that these small company be able to benefit from this new emerging software. This solution also enables the global proliferation of ERP systems (Rashid et al., 2002). Implementing ERP solution system will improve and integrate the internal and external flow of information within a company. It would improve the movement of goods and services to outsource suppliers, customers, and other partners in the supply chain and finally achieve a competitive advantage and increase profitability (Wieder et al., 2006; Kremzar & Wallace, 2001).

2.2.3 Phases for Successful ERP Implementation

As AL-Sabaawi (2015) mentioned, while no two ERP projects are the same, there are some general ground rules and steps to follow to help guide the ERP project to a successful end. The 10 steps below will help stick to budgets, streamline the process, and successfully adopt ERP into the business strategy.

Phase1 Choose the ERP Selection Team

Choose essential personnel to represent significant functional areas to ensure enough representation without slowing down the selection process. Production, Maintenance, Quality, Scheduling / Planning, Customer Service, IT, Finance, and Sales / Marketing are key representation areas.

Look for an executive who has been through an ERP implementation before. A project manager, often known as a PM, should be assigned to every ERP implementation. Companies with a large IT department may be able to find someone to fill the position.

Phase2 Determine ERP Goals

Find the proper product after deciding to implement ERP. Currently, there are a lot of possibilities with over 165 different ERP choices accessible. ERP software is classified based on its core features. Accounting Management, Enterprise Asset Management, Purchasing, and Supply Chain Management are some of the most common ones. One of the first steps in a successful ERP implementation is to define goals. What are your ERP objectives? For example, better tracking of work order status or inventory management. Obtain comments from the entire ERP selection team. Prioritize after you've gathered and documented all of your objectives. Many businesses rank objectives according to their practicality (AL-Sabaawi, 2015).

The next stage is to figure out budget and a timeline. Because ERP software isn't a single large purchase, determining a budget might be challenging. Development, implementation, customization, and expansions are all included in the upfront price. User access, support, training, and mobile access may all be included in the annual fee. The simplest method is to set a budget for the first purchase as well as a recurring annual expense. Planning, trial, training, and implementation should all be included in the timeline. Remember to factor in any downtime that may occur because of the ERP implementation.

Phase3 Selecting the Best ERP System for Your Organization

You can start your search on your own, hire an ERP sales consultant, or do both. You might be able to do it alone if you have members of the selection team that are familiar with ERP systems and have time to explore choices. An ERP sales consultant may be the ideal option if you are short on time or experience. You can also gather some research and then contact a salesperson once you have narrowed down your options (Seashore, S. E., & Yuchtman,1987).

When performing research, resist the impulse to visit software websites right away. For unbiased reviews, go to a website like crowd or Capterra. Many of these resources offer side-by-side comparisons as well as product matrix comparisons. Keep an eye out for how long the reviewer has been using the app. People who have only been using the software for 9 months or less are

more likely to provide precise information regarding the implementation procedure. Don't forget to check out any program videos or screenshots.

An ERP sales consultant is usually well-versed in a variety of software applications. An expert consultant will have in-depth product knowledge that you may not be able to find on your own. They can be a valuable resource when it comes to finding the best ERP product for your company. Inquire about the success of product installations, whether users are satisfied after a year or more of use, and what type of assistance is provided by the publisher. The ERP sales consultant will be an excellent source of knowledge about software integration. Options should be reduced to a maximum of four by the end of the research session. Determine the key distinctions between each choice. Try to figure out which products appear to be the most popular.

Now is the time to dig deeper into these alternatives. A live demonstration is the simplest way to accomplish this. Demonstrations of ERP software are the finest approach to get a glimpse of what you'll be working with. Software demos, on the other hand, are a waste of time if done incorrectly. Make a list of the features you really must see. Inquire if you can provide examples of integrations with any existing systems you plan to keep following ERP deployment.

Phase4 Planning the ERP Implementation

After the selection of the ERP system, you'll need to figure out how and when you'll install it. The process you chose will have a significant impact on whether your ERP adoption is successful. There is no such thing as a "best" method. The implementation option that best fits your procedures and staff should be chosen. There are three main implementation alternatives to choose from (AL-Sabaawi, 2015).

Implementation of the Big Bang: The term "big bang" alludes to everything happening at once. The ERP system goes live in all areas on a specific day in this scenario. This is the most expedient method. Because of the compressed timescale and ability to operate from a single system, the big bang technique is frequently less expensive. This is also the most dangerous strategy. Issues in one element of the system can generate problems in other sections of the system during a big bang implementation. Maintenance is far more disruptive to business, and it's easy to overlook minor issues. As the system gets up and running, efficiency will drop noticeably.

Parallel Implementation: Running prior systems alongside the new ERP system is referred to as parallel implementation. This way is the safest because employees can continue to do their jobs

until the new ERP is ready. This allows for the most training time for your employees. Because both systems are supported, parallel ERP implementation is the most expensive alternative. Personnel will have to enter all data into two systems, which will take time and may be difficult for them to remember.

Phased Rollout: During the phased rollout method, the new ERP system is implemented in steps or sections. Personnel have time to focus on one part of the new system while maintaining previous procedures. Temporary connections are made between the old and new system, which increases costs. Problems can also occur transferring data between systems. The phased rollout method tends to take the most time to complete. The decision is predominately affected by time frame and budget. Another consideration should be personnel. The type of ERP implementation selected will affect everyone in the company. Be realistic with training time and process changes for a successful ERP implementation.

Phase5 Preparing for Successful ERP Implementation

Preparation is a multi-step process that will entail key individuals from across the company. An ERP system enables you to make better use of and comprehend your data. Make sure the data that will be entered into your new ERP system is correct. Consult your ERP professional to ensure you understand how to prepare data for ERP import. Remember to delete any data that you no longer require (AL-Sabaawi, 2015).

Maintain contact with all members of your team. Share details on any changes to processes, ERP implementation timelines, and relevant training. It makes a tremendous impact if everyone feels included throughout the process. Employees have complained that they were kept in the dark during ERP deployment, which is one of the most common concerns. Open communication can also aid in the early detection of any difficulties or concerns. You will identify what is changing in terms of business processes and responsibilities, who it will impact, and how to help them make the necessary adjustments (AL-Sabaawi, 2015). Manage process changes by creating new Standard Work Instructions or Operating Procedures. Create an outline of each process. It may seem time consuming up front, but it helps personnel get used to new processes. Make instructions as detailed as they need to be, include photos or screen shots when applicable. Designate easily accessible locations for training documents.

Phase6 Training

There are several approaches to ERP training, according to AL-Sabaawi (2015). Personnel will go through hands-on practice and troubleshooting if the company has an IT department. The most time will be spent on IT training. Most companies will only hire a few people to work as trainers. These individuals will work closely with the ERP consulting firm or internal IT experts to gain a thorough understanding of the product. The remainder of the personnel will be trained because of their efforts.

Most people will be given a shortened version of their training. Some businesses choose to review basic training at frequent staff meetings. A projector or huge screen is utilized to go over essential points in this manner. Individual or small group training for certain departments is possible. To achieve a successful ERP deployment, be patient during training. Some people will grasp the concept more quickly than others. Allow adequate time for the bulk of people to become familiar with the processes. Ascertain that at least one employee in each department is well-versed in the new ERP system and its associated processes. They can serve as a resource for those who are having difficulties. Most people will be given a shortened version of their training. Some businesses choose to review basic training at frequent staff meetings. A projector or huge screen is utilized to go over essential points in this manner. Individual or small group training for certain departments is possible. To achieve a successful ERP deployment, be patient during training. Some people will grasp the concept more quickly than others. Allow adequate time for the bulk of people to become familiar with the processes. Ascertain that at least one employee in each department is well-versed in the new ERP system and its associated processes. They can serve as a resource for those who are having difficulties.

Phase7 Testing the ERP System

Every successful ERP implementation includes extensive system testing. This phase, as much as you may want to speed it, necessitates patience and diligence. The importance of system synchronization cannot be overstated. You want to make sure that data flows smoothly between all the system's components. Routine procedures and infrequent scenarios should be included in testing. Now is the time to get rid of all the bugs, but you must first identify them. Processes that are carried out on a daily, weekly, or monthly basis are considered routine operations. These processes' flaws are frequently recognized first.

During testing, it's important not to overlook uncommon cases. Demonstrate how processes are carried out during shutdowns or inventory tally periods. Processes that would occur during a product inspection or recall are performed. Test operations that could be common human errors, such as changing an entry after it has been made or shutting down the system incorrectly.

Phase8 ERP Deployment – Going Live

Expectations and goals should be realistic. Prepare for decreased efficiency and operations interruptions, regardless of the sort of ERP deployment you choose. Pay close attention to any potential problems. The lines of communication must remain open. Check in with each department to see how they are reacting to the new system. Inquire about which processes are working well. Check to see whether anyone requires more training. Address any issues head-on (AL-Sabaawi, 2015).

Phase9 Feedback & Evaluation

For a successful ERP adoption, gathering feedback is critical. Wait until everyone has had a chance to learn how to utilize the new ERP system. This often takes one to three months. During the early stages of implementation, people frequently express discontent with change or the adoption of new methods. Take cautious not to mix this up with concerns about the system itself. This might be a formal or informal process. Begin by speaking with department heads and instructors. Are there any issues that are shared among departments or internal groups? What do they have in common? Determine whether the problem stems from a lack of training or from a flaw in the software. All remarks should be written down. Attend a meeting with the ERP selection committee. Examine whether the system satisfies all the requirements and goals established early in the process. Make a note of any process gaps. Talk to your ERP consultant once you have a clear view of the situation (AL-Sabaawi, 2015).

Phase10 ERP Support

Even if your ERP implementation is a success, you may run into problems from time to time. Keep track of the issues you wish to manage internally vs. when you need to reach out to someone. Form a bond with your team of supporters. Ascertain that your support crew is familiar with your company's operations and procedures. This can aid in the quicker identification of problems and the development of more effective solutions (AL-Sabaawi, 2015).

2.3 Modules of ERP System

There are common & basic modules of ERP found in any ERP System. Depending on organization's needs, those required components are integrated & customized in the ERP system. According to RAMAN report (RAMAN, 2020), the following mentioned modules can be found in ERP system:

Human Resource Module (HR): Human Resource module helps to HR team for efficient management of human resources. HR module helps to manage employee information, track employee records like performance reviews, designations, job descriptions, skill matrix, time & attendance tracking. One of the important submodules in the HR module is Payroll System which helps to manage salaries, payment reports etc. It can also include Travel Expenses & Reimbursement tracking. Employee Training tracking can also be managed by ERP.

Inventory Module: Inventory module can be used to track the stock of items. Items can be identified by unique serial numbers. Using that unique numbers inventory system can keep track of item and trace its current location in the organization. Inventory module includes functionalities like inventory control, master units, stock utilization reporting etc.

Sales Module: Typical sales process includes processes like Sales queries & inquiry analysis & handling, quotation drafting, accepting sales orders, drafting sales invoices with proper taxation, dispatch/Shipment of material or service, tracking pending sales order. All these sales transactions are managed by the sales module of ERP. CRM module can take the help of the Sales module for future opportunity creation & lead generation.

Purchase Module: As the name indicates, purchase modules take care of all the processes that are part of the procurement of items or raw materials that are required for the organization. Purchase module consists of functionalities like supplier/vendor listing, supplier & item linking, sending quotation request to vendors, receiving & recording quotations, analysis of quotations, preparing purchase orders, tracking the purchase items, preparing GRNs (Good Receipt Notes) & updating stocks & various reports. Purchase module is integrated with Inventory module & Engineering/production module for updating of stocks.

Finance & Accounting module: Whole inflow & outflow of money/capital is managed by the finance module. This module keeps track of all account-related transactions like expenditures, Balance sheet, account ledgers, budgeting, bank statements, payment receipts, tax management

etc. Financial reporting is an easy task for this module of ERP. Any Financial data that is required for running the business is available on one click in Finance module.

Customer Relationship Management (CRM) module: CRM department is helping to boost the sales performance through better customer service & establishing a healthy relationship with customers. All the stored details of the customer are available in the CRM module. CRM module helps to manage & track detailed information of the customer like communication history, calls, meetings, details of purchases made by the customer, contract duration etc. CRM module can be integrated with the Sales module to enhance sales opportunities.

Engineering / Production module: Production module is a great help for the manufacturing industry for delivering the product. This module consists of functionalities like production planning, machine scheduling, raw material usage, (Bill of material) preparation, track daily production progress production forecasting & actual production reporting.

Supply Chain Management (SCM): SCM module manages the flow of product items from manufacturer to consumer & consumer to manufacturer.

Common roles involved are a manufacturer, Super Stockiest, Stockiest, distributors, retailers etc. SCM involves demand & supply management, sales returns & replacing process, shipping & transportation tracking etc.

2.4 Challenges of ERP system implementation

ERP systems have some drawbacks and limitations on the other hand. These systems are usually complex, and the success depends on the skills and experience of the WORKFORCE. Regardless of their long-term benefits and reduced maintenance costs, the installation of the ERP system is costly. ERP consultants are very expensive take significant percent of the budget. disruption of company workflow and culture in the time of implementation. And even if data accuracy and integration is achieved by ERP systems, it is hard to correct or amend data once it is maintained in the system as it will affect many modules and processes. While ERP systems have more efficient methods, freedom and self-creativity practice with the system is minimal (saron g., 2017; Saudi ERP & Website Solution Blog electronic version, 2016).

According to literature review by Abel Hailemariam, Harrison (2004) mentioned that many of the factors affecting the successful implementation of new technologies like ERP are generic in nature. The most critical challenges can be ascribed to the very limited information and communication infrastructure available in most developing countries. Reasons vary widely among sectors and countries and are most related to lack of applicability to the business, preferences for established business models. (OECD, 2004)

Common challenges include enabling factors (availability of ICT skills, qualified personnel, network infrastructure); cost factors (ICT equipment and networks, software, and re-organization); security and trust factors (security and reliability of ecommerce systems, uncertainty of payment methods, legal frameworks, and intellectual property right); and challenges in areas of management skills, technological capability, productivity and competitiveness. Lack of reliable trust and redress systems and cross country legal and regulatory differences was also impeding e-commerce adoption (OECD, 2004). It is however important to note that challenge to e-commerce adoption work differently according to organizational type and culture. Areas of training and people development need to be addressed Japhet and Usman (2018) identified the following specific challenges hindering the adoption of ERP in developing countries (Japhet & Usman, 2018).

Finally, the study identified various socioeconomic characteristics as barriers hindering ERP adoption in developing countries. The most common are unfavorable economic condition, the poor state of educational system, Lack of ICT skills and business skills, unreliable and nonsecure payment Infrastructures, the inefficient logistics and distribution system and the lack of good transport (Bradford, M. & Florin, J. ,2003).

2.5 Top ten risk factors of ERP failure

User involvement and training, project management and control are the facts concerning the sample. These two aspects account for over half of the total component. In the user participation and training risk category, the main causes of ERP project failure include inadequate communications with users, failure to obtain user support, and insufficient end-user training.

Project management and control is the other primary risk category for project success. The main causes of project failure in this category are a lack of senior manager commitment to the project

and an ineffective project management approach. Conventionally, risk analysis is undertaken at the overall project level. We highlighted the top ten risk variables that affect ERP projects more than others from a total of 28 risk categories.

ERP implementation in the firm necessitates reengineering of business processes and may alter the enterprise environment. It will take a lot of effort to alleviate users' fears and eradicate their resistance. According to previous studies, user training is a critical component of ERP installation. Regarding end-user training, Davenport (1998) claimed that ERP systems can empower users by providing real-time data, while Rao (2000) suggested that ERP was linked to increased job flexibility by increasing individual awareness, creativity, and innovation. According to Robey et al. (2002), the above advantage should be based on training. Before a user could effectively use an ERP system, they must learn the business processes that have been updated because of the system's adoption. Firms could address the need for users to learn new systems by providing formal training and taking a step-by-step approach to system implementation, according to the authors. The training should cover operation skills of new system, procedural training, changed business process and management change. User training should not only cover software procedures, but also management changes and process-orientation principles (Schmidt et al., 2001).

ERP adoption entails a number of changes, which may result in departmental conflicts. No one will jeopardize the ERP reorganization until high management intervenes. According to Ewusi (1997), a key reason of project failure is senior management's failure to request and enforce regularly scheduled management review meetings to monitor project progress. According to Umble and Umble (2002), if top management is not fully committed to the system, does not anticipate and plan for the significant changes that ERP would entail, or does not actively participate in the deployment, the system will fail. The deployment of ERP must be considered as a shift in the company's business model. Besides the supports from top management, efficient project management procedures are also essential (Umble & Umble, 2002). They recommended that implementation teams use a disciplined approach to project management, which includes a clear description of objectives, the creation of a work plan, and the creation of a resource need plan. Most importantly, throughout ERP adoption, relevant project assessment measures must be included. Compensation, award, assist, responsibility, and replacement policies for incompetent employees should be maintained and monitored until the project is completed. Some of the most

significant ERP system implementation problems, according to Umble and Umble (2002), occur because the new software's capabilities and needs are misaligned with the organization's business processes and procedures. The misalignment of ERP systems, existing organizational structure, and company processes will result in widespread pandemonium. The core team and consultants, according to Robey et al. (2002), could help solve such challenges. In most firms, a core team was tasked with setting the system, and it functioned as a force for promoting new knowledge against the current organization memory's knowledge barriers. Staffing the core team with experienced business and technology managers could give the necessary business and technical knowledge. Data entered in ERP system can be accessed throughout the company's departments because of its interconnected nature. If incorrect data is placed into the common database, it may have a negative domino impact across the organization. The ERP will lose credibility because of the domino effect, which will encourage individuals to ignore the new system and continue to run the business as before (Umble & Umble, 2002).

Table 2.1 Top ten risk factors of ERP failure (Huang, Shi et al., 2004)

Priority	Name
1	Lack of senior manager commitment
2	Ineffective communications with users
3	Insufficient training of end-users
4	Failure to get user support
5	Lack of effective project management methodology
6	Attempts to build bridges to legacy applications
7	Conflicts between user departments
8	Composition of project team members
9	Failure to redesign business process
10	Misunderstanding of change requirements

2.6 SAP ERP

SAP stands for "Systems, Applications and Products in data processing" and it is in the top 10 largest software company in the world according to news.sap.com. it is also a Leader in the 2018 ERP Value Matrix. By bringing intelligence to its applications, SAP is looking to reduce or

eliminate mundane, repetitive tasks. Instead of a technology looking for a problem, SAP is targeting use-cases where customers can realize value quickly. As a result, scenarios that leverage machine learning can be role-specific, which makes it simple for the user to take advantage of the technology (Seth Lippincott, 2018). SAP provides end to end solutions for financials, manufacturing, logistics, distribution etc. Each SAP module is integrated with other modules.

ERP vendor companies such as SAP of German and Oracle from America are expanding their investment to African countries including Ethiopia (Danijel J., 2010). Conferences and workshops are hosted by the major ERP vendor SAP here in Addis Ababa recently. SAP has announced its renewed interest and focus on Ethiopian financial service to assist in improving business management and customer relations in Ethiopia (Precise Consult International, LLC, 2013).

2.7 Success of ERP Implementation

ERP Implementation is considered as one of major IT project implementations. Graeme Thomas and Walter Fernández suggests that when success criteria are formally defined and then measured, IT project outcomes are improved and project resources are better utilized (Graeme & Walter, 2008). The very act of defining and measuring IT project success contributed to success itself. Their research identifies three effective practices to define the IT project success: An agreed definition of success, Consistent measurement, and The use of results. If you know what you are looking for, track your progress and are willing to alter your path, then your chances of finding success are better (Graeme & Walter, 2008).

Successful implementation is an indication for achievement of project goals which can deliver the required results and benefits define by the owners and stake holders. An assessment on the implementation will help to measure whether the IT implementation is delivering the expected services and identify the CSF. The assessment result will use as input for the improvement of the IT project outcomes.

While ERP is remaining in higher popularity as IS management tool, the failure rate of ERP implementation is high. According to reference of Abel Hailemariam (2018), High failure rate and difficulties in implementing ERP systems have been widely cited in the literatures, furthermore,

according to Panorama-consulting solutions report (2017), it has been estimated a 13% increase in success rates compared to recent years, but in parallel there has been a 19% increase in respondents who have rated their project as a failure. According to the same report 26% of respondents estimated their project as a failure. Moreover, 75% ERP projects were considered as failure and cannot be accepted (Huang et al., 2004). Pavel Jirava and Evelyn Toseafa (2017), In their Studies, identify the vital factors, according to him the top three reasons for the failure, were poor planning or poor management, change in business goals during the project, and lack of business management support (Pavel Jirava & Evelyn Toseafa, 2017).

ERP implementation in large corporations can be a very difficult mission, always takes several years and the whole process requires usually extensive financial, human, time, material, and other resources. It follows that the TCO (total cost of ownership) is high, the period of implementation is long, and changes must be done inside the organization. ERP system acquisition and implementation generally enhance productivity and working quality, since the system offers standardization and simplification in multiple, complicated operational procedures across the company (Nah et al.,2001).

Most of the literature reviews on CSFs and risk factors still focus on critical factors particularly in the implementation phase, some reviews are showing concern in the post-implementation phase and the whole ERP implementation course as well (Huang & Yasuda, 2016). However, the existing ERP success factors research has focused on the selection and implementation in large enterprise. It is important to study and analyze those critical factors to shed light on successful ERP implementation, to define which of them can influence, and to outline. The most previous research explores and identifies the critical success factors (CSF) of ERP adoption and shows that maintenance and support must be included as a key element from the outset and throughout the system lifecycle. Abel (2018) indicates “the main factors that the organization must consider during the implementation of the ERP, and discussed some factors such as financial performance, the user satisfaction, change management, or clarity whether it is at the level of the distinction of the ROI or the benefit of acceptance of the ERP” (Bazhair et al., 2015).

2.8 Information System Success Models Review

Enterprise Resource Planning (ERP) system is a system for the seamless integration of all the information flowing through the all the departments of the company (Yang J.B et al., 2007). For

companies to stay in the current market as a good competitor, they must make the best management of Information resources on the configuration, which enables them to continue to survive and develop. However, literature regarding multiple measuring success model of an ERP system is not that much. Although it is very important to measure the success of ERP post implementation since a lot of financial and human resources are invested and the success and failure of the implementation will impact the organization similarly.

Some of IS success models available in the literature are also used for measurement of ERP system success on the ground that ERP system is a kind of information system (IS). There are some IS success model proposed by some IS researchers. TAM (Technology Acceptance Model) by (Davis et al.,1989), which focus on how users come to accept and use a technology in terms of attitude, behavior and perceives. Criticisms of TAM as a "theory" include its questionable heuristic value, limited explanatory and predictive power, triviality, and lack of any practical value (Chuttur, 2009).

2.8.1 Balanced Scorecard (BSC) approaches by Rosemann and Wiese (1999)

Rosemann and J. Wiese (1999) proposed the Balanced Scorecard (BSC) and it is the application of traditional financial measures with three more additional perspectives which are the customer perspective, the internal business process perspective and the learning and growth perspective. The BSC used for evaluation of these tasks and afterwards for the strategic planning of the future expansion of the system based on the assessment results. For using the Balanced Scorecard to control running of ERP system, the four standard perspectives of the novel model must be adjusted to the specific object of an ERP system. Because of the bottom-up, approach measures should be considered to permit simple recognition of blockages linked with the system. As described by Abraham T. (2018) citing Rosemann Michael and Jens Wiese (Rosemann M. & J. Wiese, 1999).

Balanced Scorecard (BSC) approaches by Rosemann and Wiese (1999) which have four standard perspectives: Financial, Internal processes, Innovation & Learning, Customer, and project perspective. This model lacks the Technological and System perspectives since the Balanced Scorecards are typically designed to monitor business processes and it focuses in most cases on only one process implementation.

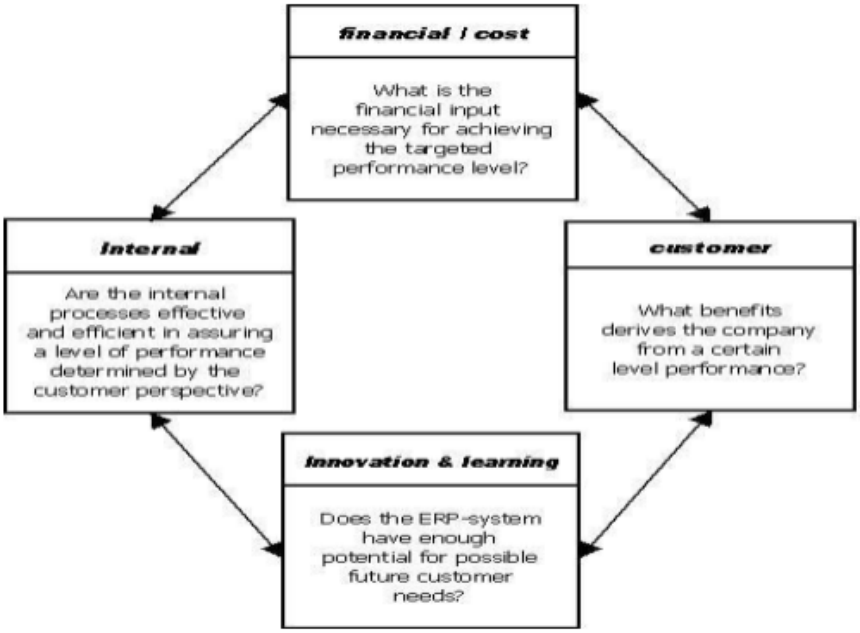

Figure 2.1 The ERP operation Balanced Scorecard by Rosemann and Wiese

2.8.2 ERP success A priori model by Sedera, Gable and Chan (2003)

A Priori Model by Sedera, Gable and Chan (2003) use 5 constructs Information quality, System quality, Individual Impact, Organizational Impact and Satisfaction (Gable et al., 2003). and 41 sub-constructs of success measures which include fifteen (15) measures of system quality, ten (10) measures of information quality, eight (8) measures of organizational impact and four (4) measures for satisfaction and four (4) measures for individual impact. The A Priori Model is simply a measurement model for assessing the multidimensional phenomenon of ES success using five separate dimensions of success (constructs): system quality, information quality, satisfaction, individual impact, and organizational impact. (Gable et al., 2003) A key difference between this model and DeLone and McLean model is that the variable “use” was missing from the A priori model and their overall evaluation success. The A priori model and their overall evaluation

success.

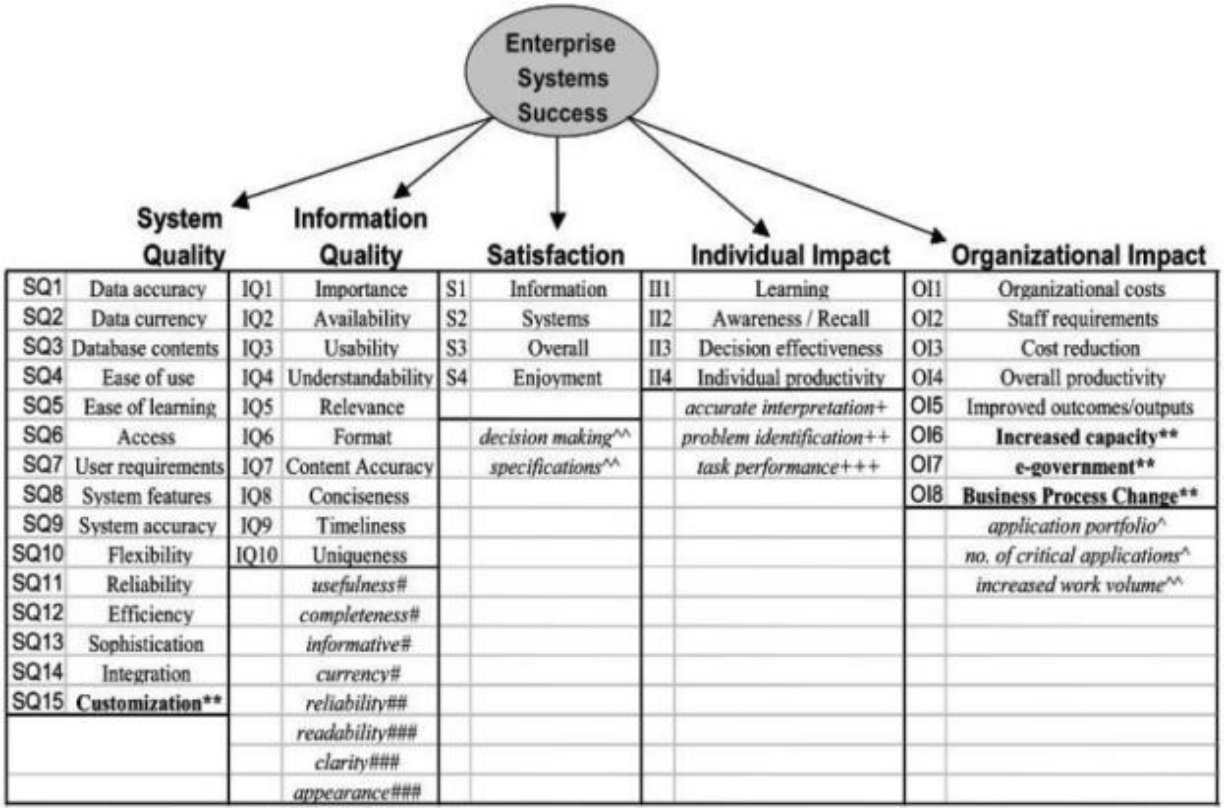

Figure 2.2 The Gable/A Priori model by Gable, Sedra and Chan (2003)

The original DeLone and McLean's Information Systems Success (D&M ISS) model (DeLone & McLean, 1992) was formulated to identify the factors responsible for defining information systems success. Six factors were identified: System quality and information quality were responsible for influencing use and user satisfaction of information systems. Use and user satisfaction influence each other, and they both have an influence on individual impact which in turn influences organizational impact.

2.8.3 DeLeon-McLean model (1992)

The original DeLone and McLean's Information Systems Success (D&M ISS) model (DeLone & McLean, 1992) was formulated to identify the factors responsible for defining information systems success. Six factors were identified, as shown in Figure 1. System quality and information quality were responsible for influencing use and user satisfaction of information systems. Use and user satisfaction influence each other, and they both have an influence on individual impact which in turn influences organizational impact.

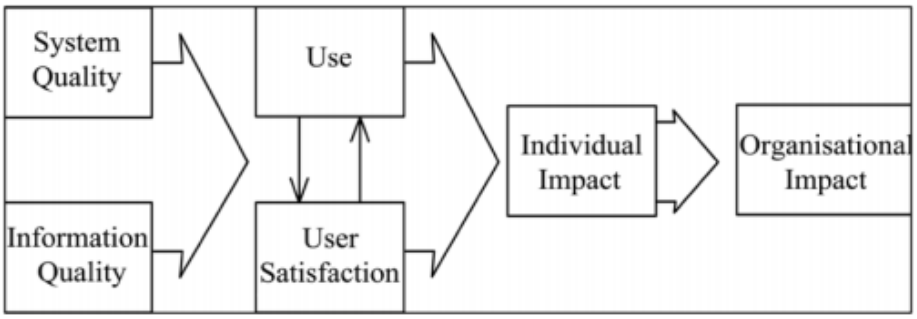

Figure 2.3 DeLone and McLean IS Success Model (DeLone & McLean, 1992)

2.8.4 Updated Deleon and Mclean Model (2003)

DeLone and McLean revised the original model (see Figure 2.5) in response to the strengths and weaknesses identified by researchers. The impact variables (individual and organizational) were grouped as net benefits. A new variable, service quality was added to the model to capture the importance of service as a contributor to IS success. Finally, the use" construct was subdivided into 2, intention to use (attitude) and actual use (resultant behavior).

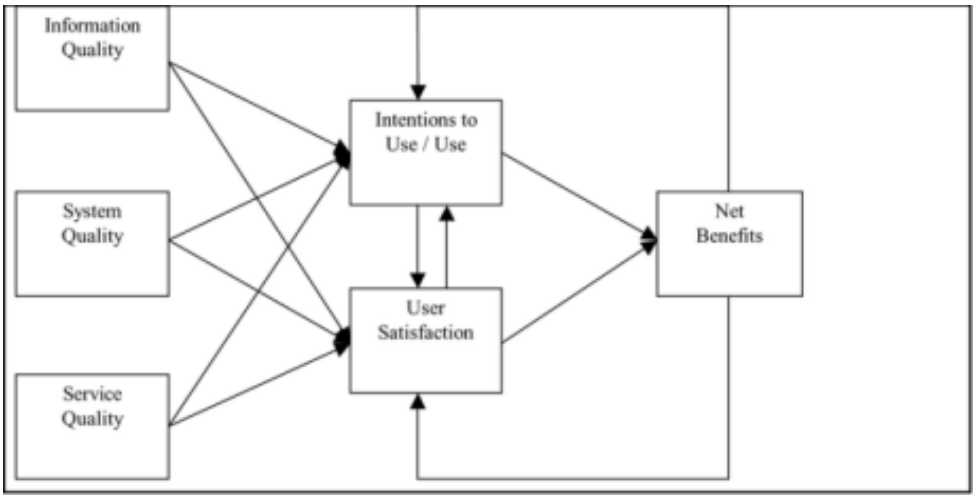

Figure 2.4 Updated DeLone and McLean IS Success Model (DeLone & McLean, 2003)

The independent constructs employed by the model, i.e., information, system, and service quality, are referred to as the quality antecedents. They measure the quality of the software or application being investigated. System quality measures the ease-of-use, functionality, reliability, flexibility, data quality, portability, integration, and importance of the system (DeLone McLean, 2002). Information quality measures the accuracy, timeliness, completeness, relevance, and consistency

of the information output of the system. Service quality measures the tangibility, reliability, responsiveness, assurance, and empathy of the service provided by the system.

These three exogenous variables were hypothesized to influence intention to use and user satisfaction of the system. The net benefits construct captures the overall impact of the system on the users of the system and was identified as the most important of the success factors by DeLone and McLean (2003). If the net benefits of using a system are positive, then there is a higher chance that the system will be used as well as an improved user satisfaction. The updated D&M IS model was developed to be used in the context of e-commerce, but it has also been used in several ways to measure different types of information systems.

After DeLone and McLean revised the original model (DeLone & McLean, 2002) in response to the strengths and weaknesses identified by researchers. The impact variables (individual and organizational) were grouped as net benefits. A new variable, service quality was added to the model to capture the importance of service as a contributor to IS success. Finally, the "use" construct was subdivided into 2, intention to use (attitude) and actual use (resultant behavior). The success dimensions of Updated D & M's IS Success Models are as follows;

System Quality

The success dimension system quality constitutes the desirable characteristics of an IS and, thus, subsumes measures of the IS itself. These measures typically focus on usability aspects and performance characteristics of the system under examination (Nils Urbach, 2011).

Information Quality

The success dimension information quality constitutes the desirable characteristics of an IS's output. Thus, it subsumes measures focusing on the quality of the information that the system produces and its usefulness for the user. Information quality is often seen as a key antecedent of user satisfaction (Nils Urbach, 2011).

ServiceQuality

The success dimension service quality represents the quality of the support that the users receive from the IS department and IT support personnel, such as, for example, training, hotline, or helpdesk. This construct is an enhancement of the updated D&M IS Success Model that was not part of the original model. The inclusion of this success dimension is not indisputable, since

system quality is not seen as an important quality measure of a single system by some authors e.g., Seddon 1997 (Nils Urbach, 2011).

Intention to Use/Use

The success dimension (intention to) use represents the degree and way an ERP is utilized by its users. Measuring the usage of an ERP is a broad concept that can be considered from several perspectives. In case of voluntary use, the actual use of an IS may be an appropriate success measure (Nils Urbach, 2011).

User Satisfaction

The success dimension user satisfaction constitutes the user's level of satisfaction when utilizing an IS. It is considered as one of the most important measures of IS success. Measuring user satisfaction becomes especially useful, when the use of an ERP is mandatory, and the amount of use is not an appropriate indicator of systems success (Nils Urbach, 2011).

Net Benefits

The success dimension net benefits constitute the extent to which IS are contributing to the success of the different stakeholders. The construct subsumes the former separate dimensions individual impact and organizational impact of the original Delone and McLean IS Success Model as well as additional IS impact measures from other researchers like work group impacts and societal impacts into one single success dimension (Nils Urbach, 2011).

As conclusion, independent constructs employed by the model, i.e., information, system, and service quality, are referred to as the quality antecedents. They measure the quality of the software or application being investigated. System quality measures the ease-of-use, functionality, reliability, flexibility, data quality, portability, integration, and importance of the system. Information quality measures the accuracy, timeliness, completeness, relevance, and consistency of the information output of the system. Service quality measures the tangibility, reliability, responsiveness, assurance, and empathy of the service provided by the system. These three exogenous variables were hypothesized to influence intention to use and user satisfaction of the system. The net benefits construct captures the overall impact of the system on the users of the system and was identified as the most important of the success factors by DeLone and McLean (2003). If the net benefits of using a system are positive, then there is a higher chance that the system will be used as well as an improved user satisfaction.

2.9 The conceptual framework of the study

After conducting a review on different IS success models, a conceptual model was formulated, Conceptual framework is an analytical tool with many variations and contexts. It guides the research by providing a visual representation of theoretical constructs (and variables). It is a set of ideas used to structure the research, a sort of a map (Kothari, 2004).

The literature review focused on evaluating various information system success models and methodologies that aid in improving system usage and, as a result, user satisfaction. Gable devised the A priori model, which is based on DeLone and McLean's success model. Both the A priori and DeLone and McLean IS success models were determined to have identical goals, but the dimensions developed differed.

The technology acceptance model (TAM) looks at how people accept new technology. The other model is the Balanced Scorecard (BSC) approach, but the system use success metric is still lacking, and assessing user satisfaction without a system is extremely difficult. As a result, the DeLone and McLean IS success model is an appropriate model for assessing user happiness based on the model's structures or dimensions.

The Delone and McLean (1992) IS success model is one of the most widely cited (Heo and Han 2002; Myers et al., 1997). According to the Wikipedia website, the IS success model has been cited in thousands of scientific papers and is one of the most influential theories in contemporary information systems research. The updated D&M model was refined by the original authors in response to feedback received from other scholars working in the area. It has a smaller number of measures used since their study findings and recommendations suggest: “an attempt should be made to reduce significantly the number of measures used to measure IS success so that research results can be compared, and findings validated” (Delone & McLean,2003).

Less Empirical testes conducted using this model in Ethiopia. For these reasons, the researcher finds the updated Delone and Mclean’s model more suitable for the investigation of the ERP success factors of HBSC. This conceptual model does not include the second part of the System use construct which is ‘Intention to use’ since the use of the ERP system in the HBSC is mandatory.

The researcher will investigate the relationship between independent variables (Quality of System, Quality of Information and Quality of Service) and Dependent variable (Use, User satisfaction and Total benefit). The researcher used the variables in these tools from the adopted Delone and Mclean's updated IS success model which are discussed in the literature. These variables are the measurement dimension of success factors that affect ERP implementation at HBSC.

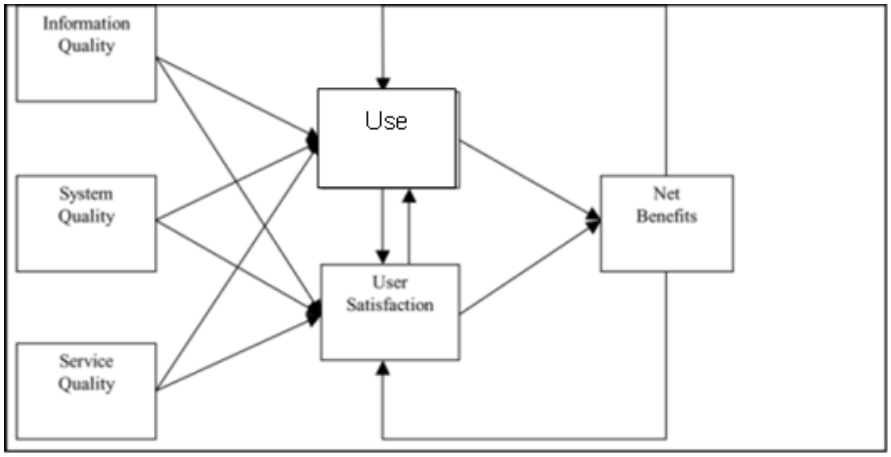

Figure 2.5 The Conceptual model based on the adopted Delone and Mclean's updated model

2.10 Hypothesis formulated from the conceptual framework

SYSTEM QUALITY: Measures the characteristics of the ERP system implemented at HBSC. It constitutes the desirable characteristics of an IS and, thus, subsumes measures of the IS itself. These measures typically focus on usability aspects and performance characteristics of the system under examination (Nils Urbach et al., 2011).

Hypothesis 1: System quality will have a positive influence on user satisfaction of the HBSC ERP users.

Hypothesis 2: System quality will have a positive influence on the HBSC ERP Usage.

INFORMATION QUALITY: The Service quality success dimension measures the quality of the Information and data processed and presented on the ERP system implemented at HBSC.

Hypothesis 3: Information quality will have a positive influence on User satisfaction of the HBSC ERP users.

Hypothesis 4: Information quality will have a positive influence on the HBSC ERP usage.

SERVICE QUALITY: The Service quality success dimension measures the quality of the support that the system users receive from the IS. the Service quality will measure the quality of the HBSC SAP department services.

Hypothesis 5: Service quality will have a positive influence on User satisfaction of the HBSC ERP users.

Hypothesis 6: Service quality will have a positive influence on the HBSC ERP Usage.

USER SATISFACTION: The success dimension user satisfaction measures the level of user's satisfaction regarding the use of IS. Measuring user satisfaction becomes especially useful, when the use of an Information System is mandatory in organization (Nils Urbach et al., 2011). the user satisfaction will be influenced by the three IS success models, the system Usage and by the outcome of the Total benefit.

Hypothesis 7: ERP Usage positively affects User Satisfaction And Vice Versa.

ACTUAL USAGE (Use): The success dimension Use shows to what extent the ERP system is being utilized by the users (Nils Urbach et al., 2011). The Use construct is affected by the three IS quality dimension, by the level of User satisfaction and by the outcome of the Total benefit. And this will measure the ERP usage in HBSC.

Hypothesis 8: ERP Usage positively affects Net Benefit And Vice Versa.

NET BENEFIT: measuring the total impact of ERP implementation in terms of individual and organizational level (Delone & Mclean, 2003). The success dimension Total benefits, constitutes the extent to which the outcome Benefits of HBSC ERP are impacting back the User satisfaction and Use of system.

Hypothesis 9: User Satisfaction and Net Benefit has positive association

2.11 Review on Statistical Methods

The following statistical methods used to validate the hypothesis of the conceptual model.

2.11.1 Regression Diagnostics

Are statistics used for detecting problems which are encountered in model or data set. It can be tested using the following mechanisms:

Multiple regressions: Multiple regressions require the independent variables to be normally distributed. Skewness and kurtosis are statistical tools that enable the researcher to check if the data is normally distributed or not. According to Smith and Wells (2006), kurtosis is defined as "property of a distribution that describes the thickness of the tails. The thickness of the tail comes from the number of scores falling at the extremes relative to the Gaussian/normal distribution" Skewness is a measure of symmetry. A distribution or data set is symmetric if it looks the same to the left and right of the center point.

If the skewness and kurtosis test results of the data are within the acceptable range (-1.0 to +1.0), it can be concluded that the data is normally distributed. For this purpose and taste of normal distribution, the kurtosis and skewness results are shown in bellow table.

Multicollinearity: Multicollinearity refers to the situation in which the independent/predictor variables are highly correlated. The existence of multicollinearity can be checked using "Tolerance" and "VIF" values for each predictor variable. Tolerance values less than 0.10 and VIF (variance inflation factor) greater than 10 indicates the existence of multicollinearity (Robert et al., 2014).

Autocorrelation: Autocorrelation error occurs when there is a serial correlation between residuals and their own past values. In this study, Durbin-Watson Autocorrelation test is used to carry out the autocorrelation test. The Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation.

2.11.2 Correlation Analysis

Describe the strength and direction of the linear relationship between the independent variables and the dependent variable (Pallant, 2001).

Pearson Correlation analysis was incorporated to describe the strength and direction of the linear relationship between the independent variables and the dependent variable (Pallant, 2001). The

linear relationship between variables can be measured by correlation coefficient (r), which is commonly called Pearson product-moment correlation. Person's 'r' which ranged between positive one and negative one. A correlation coefficient of negative one indicates that a perfect negative(inverse) association between the two variables, while a correlation coefficient of positive one indicates that a perfect positive(direct) association between the two variables. A correlation coefficient of zero on the other hand indicates that there is no linear relationship between the two variables (Brooks, 2008).

Regression analysis is a set of statistical processes for estimating the relationships between a dependent variable (often called the 'outcome' or 'response' variable) and one or more independent variables (often called 'predictors', 'covariates', 'explanatory variables' or 'features').

- Multiple regression analysis: a statistical method used to predict the value a dependent variable based on the values of two or more independent variables.
- Stepwise Multiple Regression analysis: to test the entry of independent variables in the equation to predict the dependent variable. The multiple regression analysis was used to further explain the significance of the independent and dependent variables. Whereas R2 and its adjusted variant (R2adj) were used to assess the total contribution of the independent variables. The ANOVA table presented the F-test and level of significance for each step generated, reporting the degree to which the relationship was linear.

Finally, the set of coefficients was examined to consider the standardized coefficients (ß), the 't' values and significance values. And significance level of the path coefficients. Whereas the size of the Beta, weights indicate the strength of their independent relationships.

2.12 Related work on ERP Critical Success Factors

Kyung-K, Young-Gul (2002) investigate the critical success factors for ERP implementation on an organizational fit perspective. They select Implementation success, organizational fit of ERP, ERP adaptation level, Process adaptation level and Organizational resistance (which was not found to have a moderating effect) CSFs and the research found out that Organizational fit of ERP has a significant effect on ERP implementation success. It was also found that while ERP adaptation is a quasi-moderator of the base relationship between organizational fit of ERP and ERP

implementation success, process adaptation work as a pure moderator of the base relationship. Organizational resistance was not found to have a moderating effect.

Yakubu et al (Yakubu et el., 2018) conducted research on Assessment of E-learning systems success in Nigeria using an application of the Delone and Mclean Information Systems success model. The study is intended to determine the success factors responsible for the acceptance of an e-learning system called Canvas by students at a Nigerian University.

The study was built on the premise that system quality, service quality and information quality are determinants of behavioral intention to use Canvas and user satisfaction of system, both of which in turn influence the actual usage of Canvas. AMOS 22 software used by the researchers to analyst responses from 366 participating students using structural equation model to investigate the relationships between the constructs of the proposed model.

The study results partially supported the effect of the quality dimension on behavioral intention and user satisfaction of the system users. There association between behavioral intention and user satisfaction of students on their actual usage of system is fully confirmed by the result.

Ismail R. (Ismail M.Romi , 2013) conduct research by testing DeLone and McLean success model Palestine Financial institutions. The research data were collected from IS users in Palestinian financial institutions. 189 usable surveys were collected for data analysis. Using Cronbach's Alpha test, Construct validity and the internal consistency reliability of the measures were tested, and the results show high reliability of all used success measures, where Cronbach's Alpha exceeds 0.7. Hypothesis embedded in the research model were tested using correlation, regression, and stepwise multiple regression analysis.

The researcher’s findings support Delone and Mclean’s model and shows that the model offers good explanation of IS success in Palestinian financial institutions, where most of the hypothesis were accepted.

Raija H. et al., (Raija et al., 2021) conduct a study on Delone & Mclean Success Model as A descriptive tool in evaluating a Virtual Learning environment. The concept of distance learning and its different approaches are introduced. they explain how the DeLone and McLean IS success model (D & M, 1992; 2003) has been used and developed over time and in different settings. They highlight its use in e-learning environments; and introduce their empirical case and describe their

application of the D&M. Their finding shows that the model can be used as a descriptive tool because the six dimensions offer possibilities to explore and describe the environment from several approaches (Raija et al., 2021).

Kwang Su Wei and Dr. Alain ChongYee Loong (Kwang S. & Alain C., 2009) conduct research on measuring ERP system success to respecify the Delone and Mclean's IS success model. They proposed a conceptual model after comprehensive review of IS success literature on ERP system success measurement models. They identify Four dependent variables (system quality, information quality, vendor/consultant's quality, and perceived ERP benefits) to evaluate the ERP system success. Their conceptual model and relationships then tested and validated using data gathered from small and medium enterprises in Malaysia. The researchers added the new variable 'vendor/consultant's quality' from Sedera et al., (2003), which is not in the construct of the D & M model.

Their model proposes that factors such as system quality, information quality and vendor/consultant quality will have a positive association with ERP perceived benefits. The perceived benefits of ERP will also have a positive influence on the ERP system success of Malaysian small and medium enterprises.

Dr. Ali Bakhit J (Ali Bakhit, 2017) conduct research on Evaluation Information System Success in Context of Banking System in Kingdom of Saudi Arabia (KSA) using Applied DeLone and McLean Information System Success Model. The research is intended to expand the impact of information system success dimensions as a critical factor for information systems puts its influences on the banking sector.

The sample of the study consisted of employees of the banking sector in KSA. Only 145 questionnaires responses used for analysis of 38% of total respondents. The study adopted measurement items from related studies of IS success.

The finding of his study provides empirical support for the existence of a positive relationship between the dimensions of IS success model. IS quality dimensions (information system, system quality, service quality) have a significant positive influence on user satisfaction and use. Just information quality has a significant positive influence on intention to use, but system quality and service quality, not signification. Also use and intention to use have a significant positive influence

on user satisfaction. User satisfaction, Use, and intention to use have a significant positive influence on net benefit.

Mulia Dewi (Mulia D., 2010) conduct research on applying a re-specification of the DeLone and McLean's model to measure the success of Accounting Information System in Sragen. The researcher chooses system quality, information quality, user satisfaction, net benefit and use as factors affecting the Accounting Information System Success Model in the research.

The researcher found that net benefits had a positive influence on user satisfaction and that user satisfaction had a direct positive effect on system use but system use had no significantly positive effect on net benefits.

The researcher couldn't find much local research on the empirical test of DeLone and McLean success model on the manufacturing sectors except of Tesfu Berhe (Tesfu B,2018).

Abraham Tadesse assesses the success of ERP post-implementation at Ethio-telecom (Abraham, 2018). He uses ERP success "A priori model" by Sedera, Gable and Chan (2003) as a guidance for assessing the multi-dimensional phenomenon of ERP post-implementation success in Ethio-telecom. The model consists of 5 constructs (Information quality, System quality, Individual Impact, Organizational Impact and Satisfaction) and 41 sub-constructs. The research finding shows that the employee 's awareness about ERP system and job-related information at good level of understanding and the ERP system has significant positive impact on individual productivity and decision making. Regarding Over all ERP Post – implementation satisfaction the result from findings shows, over all ERP Information quality and system satisfaction, most of the respondents have good level of satisfaction.

Elsa T. (Elsa, 2015) conduct research on ERP post-implementation management framework on Ethiopian Airlines. The purpose of her study is to investigate technical, organizational, and operational issues of ERP post-implementation success in the context of Ethiopian airlines and design a solution framework to address those issues. The framework/model illustrates the three main themes: technical, organizational, and operational that influences the ERP post-implementation success. In each of the themes, 14 relevant constructs are identified. The result of the study indicated that organizational theme constructs were the most critical determinants of ERP post-implementation success.

Tesfu B. (Tesfu, 2018) conducted research to assess user satisfaction with ERP system usage on Mesfin Industrial Engineering. The main objective of his study is to examined factors affecting user satisfaction with the ERP system usage. He developed conceptual model based on DeLone and McLean IS success model and relevant prior studies to develop the conceptual framework. Correlation analysis and linear regression analysis was used to investigate the association among constructs and to find the predictive power of the variables.

The study found confirm system quality, technical support, management support and social capital as significant antecedents that enhanced the user satisfaction. Besides, the researcher suggests that in addition to DeLone and McLean IS success model constructs, a social capital and management support play a vital role in boosting user satisfaction with the ERP system usage.

Saron G. (Saron, 2017) conducted research on Assessment of ERP implementation at Heineken breweries s.c Ethiopia. The aim of the study was to evaluate the success of ERP implementation in Heineken Breweries S.C. her evaluation was based on CSFs which cited as index for success of ERP implementation in others research. The study shows all six CSFs the most determinant success of the ERP implementation at Heineken are top management support, project team competency, user training and education, interdepartmental communication, Business Process Reengineering and Consultant Involvement CSFs has significant relationship with successful ERP implementation at Heineken Ethiopia operating company.

The literature review covers IS success measuring models and discusses some CSF mentioned by local and abroad researchers. A Balanced Scorecard (BSC) approaches by Rosemann and Wiese (1999) is traditional financial measures with three more additional perspectives which are the customer perspective, the internal business process perspective and the learning and growth perspective. This model lacks the Technological and System perspectives since the Balanced Scorecards are typically designed to monitor business processes and it focuses in most cases on only one process -implementation. A Priori Model by Gable et al (2003) uses 5 constructs Information quality, System quality, Individual Impact, Organizational Impact and Satisfaction (Gable et al., 2003). It mostly like the Mclean and Delone's model but the variable "use "was missing and it is difficult not to consider the system use in measuring the system. The updated model by the Mclean and Delone is a highly cited model and found suitable to be used as the theoretical model of this research.

Most reviewed local research are engaged in exploring and testing a selected CSFs or formulating an ERP implementation framework in their research domain. Research by Abraham T. (Abraham, 2018) select the 'APriori model' IS success model which didn't consider the System Usage as CSF which leads to reduce the impact of Usage of the system on the Success of the ERP. Saron G. (Saron, 2017) had investigated ERP CSF. The studied ERP solution was Ms-Dynamics and there is difference between SAP and MS- Dynamics in terms of Functionality and Ease of Use, Cost and Pricing, Integration and Implementation and customer service.

The researcher sought to validate the success of Information Systems (SAP ERP) on the HBSC and investigate the determinant success factors that have direct impact on the business transactions. Since the company's business activity is heavily affected by the success of the ERP and there is no prior assessment conducted before. This study aims to give insight to the management and stake holders on the ERP success status by measuring and presenting the extent of ERP post implementation success at the company, and the relationship between the determinant factors using a selected success model.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview of the chapter

This chapter consisted of the research design and methodological descriptions that are going to use in this paper such as deciding on data collection method for the study, collection and uses of primary data, types of the research and sampling techniques.

3.2 Introduction

Research Methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically (Kothari, 2004). In this chapter, the Research Design, Sampling, Data Collection Methods, and Data Analysis methods are discussed in detail. It is also about the procedural steps of how the study is conducted. It presents an approach to specific problem that will be set in the study process which can be described as operational framework within which the right procedures are placed so their meaning may be observed clearly (Bryman and bell, 2007).

All the elements in this chapter are constructed based upon the conceptual framework presented in chapter two. and the proposed methodology and research design serves the purpose of the research which is assessing and identifying the determinant CSF of ERP implementation. Primary data will be mainly used for this research.

3.3 Research design

This research uses a quantitative approach. The researcher mainly chooses this since the research is intended to find out the determinant ERP success factors of HBSC by testing the research hypothesis formulated from the IS success dimensions of the conceptual model based on the updated DeLone and McLean (2003). Alain and Kraemer (1993) state that quantitative research attempt to answer questions of ‘what’, 'how much' or 'how many'. It is intended to explore the level of success status of HBSC’s ERP and identify the most determinant success factors using the descriptive and inferential approach.

The researcher uses experimental research approach since it attempts to investigate HBSC's ERP and determinant success factors to study causal relationships among independent and dependent variables using the descriptive and inferential approach.

The quantitative strategy is more convenient than the qualitative approach as research method for reaching a larger number of people in a shorter amount of time. The researcher applied quantitative method to collect and analyze the data. The quantitative research method constructs the measurement tools to collect and analyze data using the proposed conceptual model and provide the findings which will give answer to the research questions.

3.4 The Research Model

This research uses the modified DeLone and McLean's updated information system success model as research model to measuring the ERP post implementation success at HBSC. From this model dimensions, the questionnaire was derived to address and test the formed hypothesis.

The DeLone and McLean's model consisted of six dimensions, The independent constructs employed by the model, i.e., Information, System and Service quality, are referred to as the Quality antecedents. These three variables were hypothesized to influence System use and User satisfaction of the system. The net benefits construct captures the overall impact of the system on the users of the system and was identified as the most important of the success factors by DeLone & McLean (2003).

And this study was conducted based on the research model described and hypotheses were developed to evaluate and validate the research model which is discussed in the previous chapter:

3.5 Research Population

The population for this study consisted of those individuals who have direct interaction with the system and use it for their daily task. There is a total of 135 SAP active users located at all the company's departments and duty stations. The population consist of ERP system users from all departments with differentlevel of duties, educational backgrounds, work experiences and duty stations.

3.6 Sampling and Sampling Technique

Sampling methods provide a range of techniques that help the researcher to reduce the amount of data need to collect from by considering data from a reduced size rather than all possible cases (Saunderset al., 2000).

The total population of project target group is 135 ERP users which has been distributed into all departments including HR, Finance, Supply chain, marketing and sells, administration, legal and shareholders affairs at the back office and Brewing, packaging quality control and warehousing at the factory site and warehouses.

In this study, the researcher choose census over sampling. The advantages of a census are that: Data for small areas and sub-populations may be available, assuming satisfactory response rates are achieved. And in census, the estimates are not subject to sampling error.

3.7 Method of data collection

The primary data which is firsthand data gathered by the researcher was collected through questionnaires using the Google form online survey tool. Because online survey is the faster, cheaper, and easy to use for the researcher and the respondent. The survey form sent to the respondent's trough their company mail address and, they were well informed about the survey. Once the responses submitted the participant cannot send another survey.

3.8 Data collection Procedures

After receiving the permission to collect and conduct the research from the management of HBSC, first a pilot study was conducted on purposively selected ten respondents. After analyzing the response, the necessary adjustment conducted on the main questionnaires. Next collecting the list of active ERP users from the ERP department along with email address of the listed users from the IT department and finally start to compose the questionnaires online and send it along with link to the online form and instructions on how to use. All responses will be collected from the Google Form platform and organized for the next phase of analysis.

3.9 Sources of data

The primary data was acquired from questionnaires to the current SAP ERP system users of HBSC from all departments. And the secondary data gathered from previous comments, manuals, and ERP related documents.

Primary Data

The primary data are data that was collected by the researcher for the first time and be the original in character (Kothari, 2004). In this research, the primary data will be collected using questionnaires derived from the measuring instruments of the six success dimensions of the selected research model.

Questionnaire

A questionnaire is a series of questions asked to individuals to obtain statistically useful information about a given topic (Roopa, S & Menta S., 2012).

All the questionnaire items used to measure success dimensions were adapted from the updated DeLone & McLean's IS success framework and referenced some other researchers (Nils U. & Benjamin M. 2011) on constructing of the instrument.

The questionnaire is directly related with the research hypotheses which is designed from the research model. The response options for the research questions are based on the five-point Likert-scale type (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree). All the questionnaires are closed-ended questions type. After the introduction and guideline, the questionnaire presented in two sections, the first section asks the general demographic information of the respondents. The second section holds the main part about the six success dimensions.

Secondary data

Secondary data are the data that are already present and already have been collected other researchers (Kothari, 2004). Data obtained from secondary sources such as books, published sources, journals, websites and records. The researcher uses the available ERP documents of the company as the main source for the secondary data.

3.10 Methods of Data Analysis

This study uses the quantitative approach to measure the collected data. Using the descriptive analysis including frequency, percentage and average values, the collected data was presented in tabular form along with the description of the result. Inferential statistics used for the analysis of correlation and multiple regression analysis and testing the formulated hypothesis in regard of descriptive analysis result. SPSS V23 was used as the analysis application for both descriptive and inferential statistic operation.

3.10.1 Descriptive statistical Analysis

As discussed by Susanna L. et al., (2017), Descriptive analysis characterizes the world or a phenomenon; it identifies patterns in data to answer questions about who, what, where, when, and to what extent. Good descriptive analysis presents what we know about capacities, needs, methods, practices, policies, populations, and settings in a manner that is relevant to a specific research or policy question. Frequency, percentage, and mean will be used as the Descriptive analysis (Susanna Loeb et al., 2017).

This research describes the data collected using this statistical analytic mechanism to describe the detailed information of the collected data.

3.10.2 Inferential statistical Analysis

Inferential statistics describe by Richard & Bruce Y. (2008) “Inferential statistics helps to suggest explanations for a situation or phenomenon. It allows you to draw conclusions based on extrapolations and is in that way fundamentally different from descriptive statistics that merely summarize the data that has been measured.” The researcher uses Inferential statistics as techniques for processing the collected quantitative data to generalize about the target populations from which the samples were drawn and processing the variables associations on one another. The analysis was performed using the SPSS V23 application. Mainly, Correlations and Multiple linear regression methods were used to understand the level of association and effect.

3.11 Pilot Study

Conducting pilot study helps the researcher to examine and validate the relevance of the questionnaire as well as to determine the appropriateness. A pilot study was conducted before

starting to collect the data to check the reliability of the questionnaire by distributing the questionnaire to the selected respondents from the study population. Here the researcher used slightly different approach the qualitative questions are included for the feedback purpose.

3.12 Reliability and Validity Test

Reliability of the pilot study

A reliability test is used to test the consistency in measurement items. The greater the degree of consistency and stability in the measuring instrument, the greater its reliability of the research. Bhattacherjee (2012) defined reliability as the degree to which the measure of a construct is consistent or dependable. Internal consistency reliability test was used to determine reliability of the questionnaire by calculating Cronbach's Alpha which is used to measure the internal consistency of the measurement items. If a coefficient alpha is between 0.6 and 0.7 it indicates that there is fair reliability, Higher Alpha coefficients indicate higher scale reliability (Joseph, 2005).

Reliability test of the pilot study using the Cronbach's coefficient test

Table 3.1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.937	43

Table 3.2 Reliability test at variable level.

Scale: Information Quality

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.781	8

Scale: System Quality

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.600	8

Scale: Service Quality

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.847	8

Scale: User Satisfaction

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.775	5

Scale: Net Benefit

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.841	10

Scale: Use

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.711	4

The above reliability test of the pilot study shows that the reliability test pass at all variables level also.

Validity of the research

According to Kerlinger and Lee (2000), validity can be measured in the form of content and construct. Content validity assesses how well the survey instrument items address the problem being investigated. To assess the content validity of this research, ERP subject matter experts evaluated the items of the survey questions.

After the questionnaires were fully developed and prepared on the online form, the researcher chooses ten ERP users from different departments based on purposive selection. and send them an invitation email describing the intention and purpose along with the link of the survey form. They were strongly advised to carefully investigate the questions and send their feedback regarding the overall survey.

After receiving the feedbacks all necessary adjustments and corrections were done on the questionnaires and finalize it for the final delivery.

CHAPTER FOUR

DATA ANALYSIS, DISCUSSION OF RESULTS INTERPRETATION

4.1 Overview of the chapter

In the previous chapter I present the methods and research design selected and used in this research. In the next chapter, the analysis and application of the selected model will be presented, analysis of the collected data to test the declared hypothesis using the selected inferential approach and answer the research questions according to the main objectives. As explained previously, the primary data collected from online questionnaires were analyzed to evaluate the independent and dependent variables (factors) affecting the success of the ERP implementation at HBSC. The collected data was used to test the conceptual research model provided. The quantitative data is analyzed using the Statistical Package for the Social Science (SPSS) software. This chapter mainly presents the demographic information of the respondent, detailed descriptive statistics and frequency result of the variables, correlation analysis, diagnostic test, model specification test, analysis of regression and Hypothesis test findings with final summery results.

4.2 Response Rate

Using the Google Form online survey tool, A total of 135 questionnaires were sent for the selected employees from every department and site. Out of 135 questionnaires, 68 have been responses were received which makes the response rate 50%.

4.3 Reliability of the research

Reliability tests check the internal consistency of the constructs in the survey. If an item is measured multiple times using the same instrument, nearly the same result should be found each time with little or no measurement error (Kerlinger and Lee, 2000). Cronbach's coefficient is mainly used as reliability measurement.

In this study, The Cronbach's alpha coefficient result of all constructs are above (.745) indicated that the survey questionnaire is reliable since it is greater than 0.7 which is the minimal alpha value. Thus, the study is reliable based on the obtained result of the reliability tests.

Table 4.1: Reliability Analysis of the model constructs items

Scale	Cronbach's Alpha	N of Items
System Quality	.792	8
Information Quality	.745	8
Service Quality	.812	8
Usage	.758	4
User Satisfaction	.800	4
Net Benefit	.835	10

4.4 Results and Findings

Demographics Information

The data that shows the demographic information composed of from range of their age, sex, education qualification, experience, duty station and their departments of the SAP ERP system users in all the company premises.

Gender of respondents

Table 4.2 shows the gender distribution of the HBSC SAP ERP system users and shows that 69.1 % of the respondents were males and 30.9 % were females.

Table 4.2 Gender of respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	47	69.1	69.1	69.1
Female	21	30.9	30.9	100.0
Total	68	100.0	100.0	

Age of respondent

Table 4.3 shows the respondents age group show as follows: 39.7% of the respondents were aged between 20 to 30 years. 40% of the respondents were aged between 31 to 40 years. 1% of the respondents were aged between 41 to 50 years. There is no respondent above the age of 50. This result shows that majority of respondents age group was between 31-40.

Table 4.3 Age group of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	27	39.7	39.7	39.7
	31-40	40	58.8	58.8	98.5
	41-50	1	1.5	1.5	100.0
	Total	68	100.0	100.0	

Department of Respondents

Table 4.4 shows the majority respondents were in finance (26) and Commercial (13) departments. And the rest: Packaging (7), supply chain (5), Brewing (4), Material control and planning (3), Sales (3), human resource (3), Engineering (2%), Legal and shareholder (CEO) (1) and Electrical and Automation (1). At the time of survey, respondents who had used the ERP system at MIE for about 1- 5 years were in the majority (68.3%), compared to 6- 10 years (15.8%), less than one year (11.9%), and greater than 10 years (4.0%).

Table 4.4: department of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CEO	1	1.5	1.5	1.5
	Commercial	13	19.1	19.1	20.6
	Sales	3	4.4	4.4	25.0
	Finance	26	38.2	38.2	63.2

Human Resource	3	4.4	4.4	67.6
Brewing	4	5.9	5.9	73.5
Electrical and Automation	1	1.5	1.5	75.0
Supply chain	5	7.4	7.4	82.4
Engineering	2	2.9	2.9	85.3
Material control and planning	3	4.4	4.4	89.7
Packaging	7	10.3	10.3	100.0
Total	68	100.0	100.0	

Academic qualification of respondent

Table 4.5 shows the Academic status of the respondent. Most of the respondents are bachelor's degree holders (45%). And the rest (23%) are master's degree holders. This shows the SAP ERP users have convenient level of education to work with the ERP systems and can understand all the questionnaires regarding the ERP system.

Table 4.5 Academic status of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	45	66.2	66.2	66.2
	Masters	23	33.8	33.8	100.0
	Total	68	100.0	100.0	

Service year of the respondent in HBSC Table 4.6 shows only one respondent has less than one year of service year in Habesha (1.5%) and 32% of the respondents have one to three years of service years. And 51.5% of the respondents have four to seven years of experience in HBSC.

Table 4.6 Service year in Habesha

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	1	1.5	1.5	1.5
	1-3	32	47.1	47.1	48.5
	4-7	35	51.5	51.5	100.0
	Total	68	100.0	100.0	

Duty station of the respondent in HBSC

Table 4.7 shows only 67.6% of the respondents are currently working at the head office (Addis Ababa), 26.5% of the respondents are located at the factory site (Debre Birhan) and the rest 5.9% are working at different warehouses of HBSC.

Table 4.7 duty station of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Head Office	46	67.6	67.6	67.6
	Debrebirhan /Factory	18	26.5	26.5	94.1
	Warehouse	4	5.9	5.9	100.0
	Total	68	100.0	100.0	

DESCRIPTIVE ANALYSIS OF MEASURING CONSTRUCTS

This section presents the analysis of the collected data from the questionnaire. These findings here discussed and interpreted to deliver a summary of responses and to intensify the understanding of the study variables. Furthermore, the conceptual research model designed to assess the factors affecting user satisfaction were evaluated using several questionnaire items in each dimension or

variables. In this study, as we can see in table 4.8, the responses were summarized and evaluated based on the derived 5 Likert scale. The original Likert scale had five levels which are SA (Strongly Agree), A(Agree), N(Neutral), D(Disagree), and SD (Strongly Disagree), in order to make the data analysis more understandable and simpler the Likert scale organized in to three categories: Agree formed from Strongly agree and Agree, Disagree formed from Strongly Disagree and Disagree, and Neutral remains as it is (Tesfu B.,2018, p.38).

4.5 Summary of variables analysis result

Independent variables

- System Quality
- Information Quality
- Service Quality
- Information Quality

Table 4.8 shows the percentages of the response for the information quality dimension measurement statements. The response in regard of the SAP-ERP System Provide Accurate Information, total 85.3% of the respondents chose to Agree while 11.8% of the respondents were chose Neutral on the choice and 2.9% have indicated that they Disagree that the SAP ERP is providing accurate information. Regarding The response in regard of measuring that Required information is available on the SAP-ERP System when requested, total 79.4% of the respondents chose to Agree while 19.1% of the respondents were choose Neutral on the choice and 1.5% have indicated that they Disagree that the SAP ERP system is providing available information when requested. Regarding The Reliability of information processed in SAP ERP, total 72% of the respondents chose to Agree while 13.2% of the respondents were choose Neutral on the choice and 14.7% have indicated that they Disagree that Information processed in SAP ERP system is Reliable enough.

Regarding the Understandability of the Information presented in the SAP ERP, total 83.8% of the respondents chose to Agree while 10.3% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree that Information processed in SAP ERP system is Understandable. Regarding the Consistency of the Information presented in the SAP ERP, total 86.7% of the respondents chose to Agree while 13.2% of the respondents were choose Neutral on

the choice and none of the respondents have indicated that they Disagree that Information processed in SAP ERP system is consistent enough. Regarding the Relevancy of the Information presented in the SAP ERP, total 88.2% of the respondents chose to Agree while 10.3% of the respondents were choose Neutral on the choice and 1.5% have indicated that they Disagree that Information processed in SAP ERP system is Relevant enough.

Regarding the Completeness and Comprehensiveness of the Information presented in the SAP ERP, total 70.5% of the respondents chose to Agree while 20.6% of the respondents were choose Neutral on the choice and 8.8% have indicated that they Disagree and saying that Information processed in SAP ERP system is lacking Completeness and Comprehensiveness. Regarding the Information Formats presented in the SAP ERP, total 63.2% of the respondents chose to Agree while 26.5% of the respondents were choose Neutral on the choice and 10.3% have indicated that they Disagree that Information processed in SAP ERP system is in good formats.

Summary

The total average mean shows that 6.13% of the respondent shows they are not satisfied with the Information Quality features of SAP ERP. 16.17% of the respondents are neutral regarding the agreement and 77.69% of the respondents are satisfied with the Information Quality features of SAP ERP of HBSC. So, the researcher concludes that the Information Quality from the current SAP ERP system is fairly acceptable.

Table 4.8. Response related to Information Quality

	Measuring scales							
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev	N
The SAP-ERP System Provide Accurate Information	0	2.9	11.8	58.8	26.5	4.09	0.707	
Required information is available on the SAP-ERP System when requested	0	1.5	19.1	61.8	17.6	3.96	0.656	

Information processed in SAP ERP system is Reliable enough	0	14.7	13.2	52.9	19.1	3.76	0.932	
Information presented on the SAP ERP is Understandable	0	5.9	10.3	69.1	14.7	3.93	0.698	
Information processed and generated by the SAP ERP is Consistent	0	0	13.2	73.5	13.2	4	0.518	
The SAP ERP system at Habesha process and generate Relevant Information	1.5	0	10.3	70.6	17.6	4.03	0.646	
Information processed and provided by the SAP ERP system is Complete and Comprehensive	0	8.8	20.6	52.9	17.6	3.79	0.839	
Information and data presented in SAP ERP system are in good formats	2.9	7.4	26.5	48.5	14.7	3.65	0.927	
Average response value	0.62857	5.47143	16.1714	61.32857	16.35714	3.87429	0.74038	

System quality

Table 4.9 shows the percentages of the response for the information quality dimension measurement statements. The response1 in regard of Easy accessibility of SAP ERP, total 79.4% of the respondents chose to Agree while 11.8% of the respondents were chose Neutral on the choice and 8.8% have indicated that they Disagree that the SAP ERP is easily accessible. Regarding The response in measuring that SAP-ERP System is Flexible to use, total 66.1% of the respondents chose to Agree while 17.6% of the respondents were choose Neutral on the choice and 16.2% have indicated that they Disagree that the SAP ERP system is flexible to use. Regarding The Availability of SAP ERP system, total 77.9% of the respondents chose to Agree while 11.8%

of the respondents were choose Neutral on the choice and 10.3% have indicated that they Disagree that SAP ERP system is always available.

Regarding the Integration of SAP ERP system according with the business, total 75% of the respondents chose to Agree while 13.2% of the respondents were choose Neutral on the choice and 11.7% have indicated that they Disagree that SAP ERP system is not well integrated with the business. Regarding the required features and functionalities of the SAP ERP, total 76.4.7% of the respondents chose to Agree while 11.8% of the respondents were choose Neutral on the choice and 11.8 of the respondents have indicated that they Disagree that SAP ERP system don't have all the required features and functionalities.

Regarding whether SAP ERP system has good Response time, total 85.3% of the respondents chose to Agree while 8.8% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree that SAP ERP system don't have a good Response time. Regarding the level of SAP ERP system Dependability and Reliability, total 85.2% of the respondents chose to Agree while 10.3% of the respondents were choose Neutral on the choice and 4.4% have indicated that they Disagree and saying that SAP ERP system is lacking Dependability and Reliability. Regarding the Consistent performance of SAP ERP system, total 73.5% of the respondents chose to Agree while 14.7% of the respondents were choose Neutral on the choice and 11.8% have indicated that they Disagree that SAP ERP system is not consistent enough all the time.

Summary

The total average mean shows that 10.29% of the respondent shows they are not satisfied with the System Quality features of SAP ERP. 12.60% of the respondents are neutral regarding the agreement and 77.05% of the respondents are satisfied with the System Quality features of SAP ERP of HBSC. From this, the researcher concludes that the System Quality from the current SAP ERP system is acceptable.

Table 4.9 Response related to System Quality

	Measuring scales						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
The SAP ERP System can be accessed Easily	2.9	5.9	11.8	58.8	20.6	3.88	1.05
The SAP ERP System Is Flexible to use	4.4	11.8	17.6	48.5	17.6	3.63	0.907
The SAP ERP system is always up and running (Available)	1.5	8.8	11.8	54.4	23.5	3.9	0.917
The SAP system is integrated well with the business operation	2.9	8.8	13.2	52.9	22.1	3.82	0.976
The SAP ERP system includes features and functionalities to address the business requirements	1.5	10.3	11.8	63.2	13.2	3.76	0.866
The SAP ERP System has good Response Time	4.4	1.5	8.8	66.2	19.1	3.94	0.862
The Habesha SAP ERP System is Dependable and Reliable to work with	1.5	2.9	10.3	67.6	17.6	3.97	0.732
The SAP ERP system always consistent (do what it is supposed to do)	1.5	10.3	14.7	58.8	14.7	3.75	0.887
Average (mean) response value	2.52101	7.77311	12.605	58.82353	18.27731	3.82429	0.89963

Service quality

Table 4.10 shows the percentages of the response for the information quality dimension measurement statements. The response in regard of measuring whether Habesha ERP department have the adequate knowledge on the overall SAP functionalities, total 75% of the respondents chose to Agree while 17.6% of the respondents were chose Neutral on the choice and 7.3% have indicated that they Disagree that the Habesha ERP department have not the adequate knowledge on the overall SAP functionalities. Regarding The response in measuring that whether ERP department of Habesha is cooperative and supportive, total 94.1% of the respondents chose to Agree while 2.9% of the respondents were choose Neutral on the choice and 2.9% have indicated that they Disagree that the ERP department of Habesha is not cooperative and supportive enough.

Regarding the Habesha SAP- ERP department Dependability and Reliability, total 83.8% of the respondents chose to Agree while 16.2% of the respondents were choose Neutral on the choice and 14.7% have indicated that they Disagree that Habesha SAP- ERP department is Dependable and Reliable. Regarding the measure of Habesha SAP department response to requested services /support/ is good, total 88.2% of the respondents chose to Agree while 5.9% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree Habesha SAP department response to requested services /support/ is good. Regarding the measure whether Habesha SAP (ERP) department has good understanding toward the user's interaction with the systems, total 75% of the respondents chose to Agree while 20.6% of the respondents were choose Neutral on the choice and 4.4 of the respondents have indicated that they Disagree that The Habesha SAP (ERP) department has good understanding toward the user's interaction with the systems.

Regarding whether There are up-to-date Hardware and Software to run SAP- ERP System at Habesha, total 75% of the respondents chose to Agree while 23.5% of the respondents were choose Neutral on the choice and 1.5% have indicated that they Disagree that There are up-to-date Hardware and Software to run SAP- ERP System at Habesha. Regarding the measure of whether there is adequate Training available on SAP ERP System, total 35.3% of the respondents chose to

Agree while 31% of the respondents were choose Neutral on the choice and 23.5% have indicated that they Disagree and saying that there is not enough adequate Training available on SAP ERP System. Regarding whether the HBSC SAP -ERP department is always ready for Prompt service (request from the SAP ERP users), total 73.5% of the respondents chose to Agree while 20.6% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree that SAP ERP system is not consistent enough all the time.

Summary

The total average mean shows that 9.87% of the respondent shows they are not satisfied with the service Quality of SAP ERP. 17.23% of the respondents are neutral regarding the agreement and 73.5% of the respondents are satisfied with the Service Quality features of SAP ERP of HBSC. From this, the researcher concludes that the Service Quality from the current SAP ERP system is also acceptable.

Table 4.10 Response related to Service Quality

	Measuring scales						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
The Habesha ERP department have the adequate knowledge on the overall SAP functionalities.	2.9	4.4	17.6	52.9	22.1	3.87	0.913
The ERP department of Habesha is cooperative and supportive.	0	2.9	2.9	45.6	48.5	4.4	0.694
The Habesha SAP- ERP department is Dependable and Reliable in its service delivery related to SAP ERP system.	0	14.7	16.2	66.2	17.6	4.01	0.586

The Habesha SAP department response to requested services /support/ is good	0	5.9	5.9	58.8	29.4	4.12	0.764
The Habesha SAP (ERP) department has good understanding toward the user's interaction with the systems	0	4.4	20.6	61.8	13.2	3.84	0.704
There are up-to-date Hardware and Software to run SAP- ERP System at Habesha.	0	1.5	23.5	63.2	11.8	3.85	0.629
There is adequate Training available on SAP ERP System	10.3	23.5	31	33.8	1.5	2.93	1.027
Habesha's SAP -ERP department is always ready for Prompt service (request from the SAP ERP users)	0	5.9	20.6	50	23.5	3.91	0.824
Average value (mean) response	1.47143	8.4	17.2286	54.2	20.78571	3.86571	0.76763

Dependent Variables

- System Usage
- User satisfaction
- Net Benefit
- System usage

Table 4.11shows the percentages of the response for the System Usage dimension measurement statements. The response in regard of Having positive experience using SAP-ERP system, total 85.3% of the respondents chose to Agree while 13.2% of the respondents were chose Neutral on the choice and 15% have indicated that they Disagree that they don't have positive experience using SAP-ERP system. Regarding the response in measuring that they are using the SAP-ERP system fully to the scope of their job, total 69.1% of the respondents chose to Agree while 16.2%

of the respondents were choose Neutral on the choice and 14.7% have indicated that they Disagree that they are not using the SAP-ERP system fully to the scope of their job.

Regarding the measurement of how frequently they are using the SAP-ERP in daily basis, total 77.9% of the respondents chose to Agree while 11.8% of the respondents were choose Neutral on the choice and 10.3% have indicated that they Disagree that they don't use SAP-ERP frequently in daily basis. Regarding the how Dependent is their job on SAP ERP System, total 72% of the respondents chose to Agree while 13.2% of the respondents were choose Neutral on the choice and 14.7% have indicated that they Disagree that their work is not dependent on the SAP ERP system.

Summary

The total average mean shows that 14.7% of the respondent shows they are not satisfied with the System Usage features of SAP ERP. 11.27% of the respondents are neutral regarding the agreement and 73.97% of the respondents are satisfied with the System Usage features of SAP ERP of HBSC. From this, the researcher concludes that the System Usage from the current SAP ERP system is acceptable.

Table 4.11 Response related to System Usage

	Measuring scales						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
I am having a positive experience using SAP- ERP System	1.5	0	13.2	63.2	22.1	4.04	0.7
I am using SAP- ERP System fully to the scope of my job	1.5	13.2	16.2	54.4	14.7	3.68	0.937
I am using SAP- ERP System frequently in daily work basis.	2.9	11.8	4.4	42.6	38.2	4.01	1.086
My work is ERP system dependent.	5.9	8.8	13.2	33.8	38.2	3.9	1.186
Average value (mean) response	3.43333	11.2667	11.2667	43.6	30.36667	3.86333	0.97725

User satisfaction

Table 4.12 shows the percentages of the response for the User Satisfaction dimension measurement statements. The response in regard of measuring how the SAP ERP makes the users work Enjoyable, total 60.3% of the respondents chose to Agree while 29.4% of the respondents were chose Neutral on the choice and 10.3% have indicated that they Disagree that SAP ERP does not make their work Enjoyable. Regarding the response in measuring that The SAP ERP system in Habesha is Effective when caring out their tasks, total 79.4% of the respondents chose to Agree while 14.7% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree that The SAP ERP system in Habesha is not Effective when caring out their tasks. Regarding the response in measuring that The SAP ERP system in Habesha is Efficient when caring out their tasks, total 66.2% of the respondents chose to Agree while 23.5% of the respondents were choose Neutral on the choice and 10.3% have indicated that they Disagree that The SAP ERP system in Habesha is not Efficient when caring out their tasks.

Regarding the how Satisfied are the users with the overall performance of The SAP ERP system in Habesha, total 83.8% of the respondents chose to Agree while 8.8% of the respondents were

choose Neutral on the choice and 7.4% have indicated that they Disagree that they are not satisfied with the overall performance of The SAP ERP system in Habesha.

Summary

The total average mean shows that 7.87% of the respondent shows they are not satisfied with the User Satisfaction features of SAP ERP. 15.67% of the respondents are neutral regarding the agreement and 76.47% of the respondents are satisfied with the User Satisfaction features of SAP ERP of HBSC. From this, the researcher concludes that the User Satisfaction from the current SAP ERP system is acceptable.

Table 4.12 Response related to User Satisfaction

	Measuring scales						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev

The SAP ERP system in Habesha makes my work Enjoyable	1.5	8.8	29.4	51.5	8.8	3.57	0.834
The SAP ERP system in Habesha is Effective when caring out my tasks	0	5.9	14.7	69.1	10.3	3.84	0.683
The SAP ERP system in Habesha is Efficient when caring out my tasks	2.9	7.4	23.5	55.9	10.3	3.63	0.879
I am satisfied with the overall performance of The SAP ERP system in Habesha	0	7.4	8.8	75	8.8	3.85	0.675
Average (mean)value response	0.97	6.9	15.67	66.67	9.8	3.777	0.77

Net benefit

Table 4.13 shows the percentages of the response for the Net Benefit dimension measurement statements. The response in regard of measuring whether the SAP- ERP System in Habesha enhanced Decision making, total 73.5% of the respondents chose to Agree while 20.6% of the respondents were chose Neutral on the choice and 5.9% have indicated that they Disagree that the SAP- ERP System in Habesha has not enhanced Decision making. Regarding the response in regard of measuring whether the SAP- ERP System in Habesha enhanced their Job Effectiveness, total 79.4% of the respondents chose to Agree while 14.7% of the respondents were choose Neutral on the choice and 5.9% have indicated that they Disagree that the SAP- ERP System in Habesha do not enhanced their Job Effectiveness.

Regarding measuring whether the SAP- ERP System in Habesha enhance and simplify Job Performance, total 69.1% of the respondents chose to Agree while 19.1% of the respondents were choose Neutral on the choice and 11.8% have indicated that they Disagree that the SAP- ERP System in Habesha did not enhance and simplify Job Performance. Regarding the measure of whether the SAP- ERP System brings better Management control, total 82.4% of the respondents chose to Agree while 16.2% of the respondents were choose Neutral on the choice and 1.5% have

indicated that they Disagree The SAP- ERP System doesn't bring better Management control. Regarding the measure whether SAP- ERP System reduce Operational costs in Habesha, total 52.9% of the respondents chose to Agree while 30.9% of the respondents were choose Neutral on the choice and 16.2 of the respondents have indicated that they Disagree that SAP- ERP System did not reduce Operational costs in HBSC.

Regarding whether the SAP- ERP System enhance communication and collaboration at Habesha, total 73.5% of the respondents chose to Agree while 19.1% of the respondents were choose Neutral on the choice and 7.4% have indicated that they Disagree that the SAP- ERP System did not enhance communication and collaboration at HBSC. Regarding the measure of whether the SAP- ERP System enhance coordination at Habesha, total 79.4% of the respondents chose to Agree while 19% of the respondents were choose Neutral on the choice and 1.5% have indicated that they Disagree and saying that there the SAP- ERP System did not enhance coordination at Habesha. Regarding whether the SAP- ERP System enhance internal operations in Habesha, total 92.6% of the respondents chose to Agree while 2.9% of the respondents were choose Neutral on the choice and 4.4% have indicated that they Disagree that SAP- ERP System did not enhance internal operations in HBSC. Regarding the measure of whether the Implementation of SAP- ERP System at Habesha has improved customer satisfaction, total 50% of the respondents chose to Agree while 42.6% of the respondents were choose Neutral on the choice and 7.4% have indicated that they Disagree and saying that the Implementation of SAP- ERP System at HBSC has not improved customer satisfaction. Regarding whether the SAP- ERP System implementation at HBSC was successful overall, total 83.8% of the respondents chose to Agree while 16.2% of the respondents were choose Neutral on the choice and 0% have indicated that they Disagree that SAP- ERP System implementation at HBSC was not successful overall.

Summary

The total average mean shows that 6.23% of the respondent shows they are not satisfied with the Net Benefit of SAP ERP. 20.09% of the respondents are neutral regarding the agreement and 73.67% of the respondents are satisfied with the Net Benefit features of SAP ERP of HBSC. From this, the researcher concludes that A Net Benefit from the current SAP ERP system is achieved.

Table 4.13. Response related to Net Benefit

	Measuring scales						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
The SAP- ERP System in Habesha enhanced Decision making	0	5.9	20.6	60.3	13.2	3.81	0.738
The SAP- ERP System in Habesha enhanced my Job Effectiveness	0	5.9	14.7	66.2	13.2	3.87	0.71
The SAP- ERP System in Habesha enhance and simplify Job Performance	0	11.8	19.1	54.4	14.7	3.72	0.861
The SAP- ERP System brings better Management control	0	1.5	16.2	57.4	25	4.06	0.689
SAP- ERP System reduce Operational costs in Habesha	1.5	14.7	30.9	44.1	8.8	3.44	0.904
The SAP- ERP System enhance communication and collaboration at Habesha	0	7.4	19.1	55.9	17.6	3.84	0.803
The SAP- ERP System enhance coordination at Habesha	0	1.5	19	60.3	19.1	3.97	0.668
The SAP- ERP System enhance internal operations in Habesha	0	4.4	2.9	73.5	19.1	4.07	0.63
The Implementation of SAP- ERP System at Habesha has improved customer satisfaction	0	7.4	42.6	42.6	7.4	3.5	0.743

Overall, The SAP- ERP System implementation at Habesha was successful	0	0	16.2	64.7	19.1	4.03	0.598
Average (mean) response value	0.16667	6.06667	20.0889	57.67778	16	3.83333	0.7344

4.6 Correlation analysis

Correlation analysis was incorporated to describe the strength and direction of the linear relationship between the independent variables and the dependent variable (Pallant, 2001). The linear relationship between variables can be measured by correlation coefficient (r), which is commonly called Pearson product-moment correlation. Person's "r" which ranged between positive one and negative one. A correlation coefficient of negative one indicates that a perfect negative(inverse) association between the two variables, while a correlation coefficient of positive one indicates that a perfect positive(direct) association between the two variables. A correlation coefficient of zero on the other hand indicates that there is no linear relationship between the two variables (Brooks, 2008).

Correlation matrix analysis between independent variables

Table 4.14 Correlation table

		System Quality	Information Quality	Service Quality
System Quality	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	68		
Information Quality	Pearson Correlation	.565**	1	
	Sig. (2-tailed)	.000		
	N	68	68	

Service Quality	Pearson Correlation	.283*	.257*	1
	Sig. (2-tailed)	.019	.034	
	N	68	68	68

In the above table of correlation, association among the three independent variables (System Quality, Information Quality and Service Quality) was tested and found to be positive and significantly correlated to each other at the level of significance of 0.01 and 0.05.

Table 4.15 Correlation analysis between independent and dependent variables

		System Quality	Information Quality	Service Quality	Usage	User Satisfaction	Net Benefit
SystemQuality	Pearson Correlation	1	.565**	.283*	.129	.361**	.314**
	Sig. (2-tailed)		.000	.019	.295	.003	.009
	N	68	68	68	68	68	68
Information Quality	Pearson Correlation	.565**	1	.257*	.181	.588**	.513**
	Sig. (2-tailed)	.000		.034	.141	.000	.000
	N	68	68	68	68	68	68
Service Quality	Pearson Correlation	.283*	.257*	1	.181	.321**	.317**
	Sig. (2-tailed)	.019	.034		.141	.008	.008
	N	68	68	68	68	68	68
Usage	Pearson Correlation	.129	.181	.181	1	.455**	.284*

	Sig. (2-tailed)	.295	.141	.141		.000	.019
	N	68	68	68	68	68	68
User Satisfaction	Pearson Correlation	.361**	.588**	.321**	.455**	1	.616**
	Sig. (2-tailed)	.003	.000	.008	.000		.000
	N	68	68	68	68	68	68
Net Benefit	Pearson Correlation	.314**	.513**	.317**	.284*	.616**	1
	Sig. (2-tailed)	.009	.000	.008	.019	.000	
	N	68	68	68	68	68	68

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

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

4.7 Model Diagnostic Test

Regression diagnostics are statistics used for detecting problems which are encountered in model or data set. The objective of model diagnostic test is that to test and contain statistically significant explanatory variable and to test either the classical linear regression model assumptions violated or not. Thus, if the data fits the basic assumptions of classical linear regression model it is confirmation for the acceptability of the regression result since it enhances the reliability of the regression input and output at hand. Based on these objectives the common diagnostic test was done and presented as follows.

Normality Distribution Test

Multiple regressions require the independent variables to be normally distributed. Skewness and kurtosis are statistical tools that enable the researcher to check if the data is normally distributed or not. According to Smith and Wells (2006), kurtosis is defined as “property of a distribution that describes the thickness of the tails. The thickness of the tail comes from the number of scores

falling at the extremes relative to the Gaussian/normal distribution" Skewness is a measure of symmetry. A distribution or data set is symmetric if it looks the same to the left and right of the center point. If the skewness and kurtosis test results of the data are within the acceptable range (-1.0 to +1.0), it can be concluded that the data is normally distributed. For this purpose and taste of normal distribution, the kurtosis and skewness results are shown in bellow table.

Normality test

Table 4.16 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic c	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic c	Std. Error
SystemQuality	68	1.00	5.00	3.8327	.57692	-1.823	.291	7.851	.574
InformationQuality	68	2.63	5.00	3.9007	.45124	.073	.291	.541	.574
ServiceQuality	68	2.38	5.00	3.8658	.51258	-.775	.291	1.177	.574
Usage	68	1.00	5.00	3.9081	.75669	-1.074	.291	2.213	.574
UserSatisfaction	68	2.00	5.00	3.7243	.61106	-.831	.291	.885	.574
Net Benefit	68	2.70	5.00	3.8309	.47008	-.130	.291	.157	.574
Valid N (listwise)	68								

The acceptable range for normality for both statistics is between -1.0 and + 1.0. as shown in table 4.15, all variables for both skewness and kurtosis statistics fall in the acceptable standard of

normality (-1.0 -, +01.0) except the variable SystemQuality and Usage is fall outside the region of skewness and variables ServiceQuality, SystemQuality and Usage is fall outside the region of kurtosis.

Multicollinearity Test

Multicollinearity refers to the situation in which the independent/predictor variables are highly correlated. When independent variables are multicollinear, there is "overlap" or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fits the data well, but none of the predictor variables has a significant impact in predicting the dependent variable. This is because when the predictor variables are highly correlated, they share essentially the same information. Thus, together, they may explain a great deal of the dependent variables but may not individually contribute significantly to the model. Meaning, they can be considered as one variable than two separate variables. The existence of multicollinearity can be checked using "Tolerance" and "VIF" values for each predictor variable. Tolerance values less than 0.10 and VIF (variance inflation factor) greater than 10 indicates the existence of multicollinearity (Robert et al, 2014).

As can be seen from the table below, multicollinearity is not an issue for this current data. As it is stated above for the assumption to be met values of Variance Inflation Factor (VIF) scores must be below 10, and tolerance scores to be above 0.1, which is the case in as shown in the above table, the tolerance and VIF of User satisfaction, System Usage, and communication. This shows, the research model passes the Multicollinearity test.

Table 4.17 Multicollinearity test result

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	InformationQuality	.490	2.043
	ServiceQuality	.847	1.181
	UserSatisfaction	.511	1.956
	SystemQuality	.660	1.515
	TotalBenefit	.574	1.744

a.Dependent Variable: Usage

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	InformationQuality	.555	1.802
	ServiceQuality	.854	1.170
	SystemQuality	.660	1.515
	TotalBenefit	.671	1.490
	Usage	.909	1.100

a. Dependent Variable: UserSatisfaction

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Usage	.793	1.261
	UserSatisfaction	.793	1.261

Dependent Variable: TotalBenefit

Autocorrelation

It is assumed that the distribution errors are uncorrelated with one another and that the errors are linearly independent of one another. Autocorrelation error occurs when there is a serial correlation between residuals and their own past values. In this study, Durbin-Watson Autocorrelation test is used to carry out the autocorrelation test. The Durbin-Watson test statistic tests the null hypothesis that the residuals from an ordinary least-squares regression are not autocorrelated against the alternative that the residuals follow an AR1 process. The Durbin-Watson statistic ranges in value

from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation.

Autocorrelation test result

Table 4.18 Result of Autocorrelation test

<table>
<tr>
<td>Model Summaryb

<table><tr><td>Model</td><td>Durbin-Watson</td></tr><tr><td>1</td><td>1.525a</td></tr></table>
a. Predictors: (Constant),TotalBenefit, SystemQuality, ServiceQuality, UserSatisfaction, InformationQuality

b. Dependent Variable: Usage</td>
<td>Model Summaryb

<table><tr><td>Model</td><td>Durbin-Watson</td></tr><tr><td>1</td><td>1.608a</td></tr></table>
a.Predictors:(Constant),Usage,SystemQuality, ServiceQuality, TotalBenefit,InformationQuality

b. Dependent Variable: UserSatisfaction</td>
</tr>
<tr>
<td>Model Summaryb

<table><tr><td>Model</td><td>Durbin-Watson</td></tr><tr><td>1</td><td>1.198a</td></tr></table>
Predictors: (Constant),

UserSatisfaction, Usage

B. Dependent Variable: TotalBenefit</td>
<td></td>
</tr>
</table>

From the above table, it can be concluded that this research Durbin-Watson result is 1.525, 1.608 and 1.198 respectively for the three model summaries based on the dependent variables. Thus, it can be concluded that the model does not consist of autocorrelation problem.

4.8 Hypothesis Test and Findings

Hypothesis Testing

Based on the research model, this hypothesis testing is aiming to test the effect of independent variables which are System Quality, Information Quality and Service Quality have on the dependent variables (ERP system usage and User Satisfaction) and then testing the effect of the ERP system usage and User Satisfaction on the Net benefit of the ERP of HBSC. The researcher uses Pearson coefficient analysis to investigate the relationship between Independent and dependent variables which has an impact on ERP Success and to have a better understanding of association between the success dimensions. Then Stepwise Multiple Regression analysis was used to measure the impact of independent variables on dependent variable. The stated hypothesis accepted considering the P- value less than 0.05.

PEARSON CORRELATION ANALYSIS

System Quality

Table 4.18 Correlation analysis between System Quality and ERP Usage

		SystemQuality	Usage
SystemQuality	Pearson Correlation	1	.129
	Sig. (2-tailed)		.295
	N	68	68
Usage	Pearson Correlation	.129	1
	Sig. (2-tailed)	.295	
	N	68	68

The result of Pearson coefficient analysis used to examine the relationship between the System quality and ERP usage shows the impact of system quality on the ERP system usage. The hypothesis to be tested here is:

$\boldsymbol{H1}(\boldsymbol{a})$: A system quality positively affects ERP system usage

Table 4.18 shows the p-value (2.95) is greater than the chosen acceptable significance level α = 0.05, then the null hypothesis will be accepted and the alternative hypothesis ($\boldsymbol{H1}(\boldsymbol{a})$) will be rejected. So, the conclusion will be there is No significant association between system quality and ERP usage at HBSC. As a result, the researcher concludes the association of system quality and ERP usage, r = .129, p=.295 shows that there is no significant relationship between the system quality and ERP usage.

Table 4.19 Correlation analysis between System Quality and User satisfaction

		SystemQuality	UserSatisfaction
SystemQuality	Pearson Correlation	1	.361**
	Sig. (2-tailed)		.003
	N	68	68
UserSatisfaction	Pearson Correlation	.361**	1
	Sig. (2-tailed)	.003	
	N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the System quality and ERP usage shows the impact of system quality on the ERP system usage. The hypothesis to be tested here is:

$\boldsymbol{H}2$ ($\boldsymbol{a}$): A system quality positively affects User satisfaction

Figure 4.2 shows the p-value (.003) is greater than the chosen acceptable significance level α = 0.05, then the null hypothesis will be rejected and the alternative hypothesis ($\boldsymbol{H}2$ ($\boldsymbol{a}$)) will be accepted. So, the conclusion will be there is positive significant association between system quality

and User satisfaction at HBSC. As a result, the researcher concludes the association of system quality and ERP usage, r= .36, p=.003 shows that there is significant positive relationship between the system quality and User satisfaction.

Information Quality

Table 4.20 Correlation analysis between Information quality and Usage

		InformationQuality	Usage
InformationQuality	Pearson Correlation	1	.181
	Sig. (2-tailed)		.141
	N	68	68
Usage	Pearson Correlation	.181	1
	Sig. (2-tailed)	.141	
	N	68	68

The result of Pearson coefficient analysis used to examine the relationship between the Information quality and ERP usage shows the impact of system quality on the ERP system usage. The hypothesis to be tested here is:

$\boldsymbol{H}3$ ($\boldsymbol{a}$): Information quality positively affects Usage

Table 4.20 shows the p-value (.14) is greater than the chosen acceptable significance level α = 0.05, then the null hypothesis will be accepted and the alternative hypothesis ($\boldsymbol{H}3$ ($\boldsymbol{a}$)) will be rejected. So, the conclusion will be there is No significant association between Information quality and ERP usage at HBSC. As a result, the researcher concludes the association of information quality and ERP usage, r = .18, p=.141 shows that there is no significant positive relationship between the Information quality and Usage.

Table 4.21 Correlation analysis between Information quality and User satisfaction

		InformationQualit y	UserSatisfaction
InformationQuality	Pearson Correlation	1	.588**
	Sig. (2-tailed)		.000
	N	68	68
UserSatisfaction	Pearson Correlation	.588**	1

	Sig. (2-tailed)	.000	
	N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the Information quality and user satisfaction shows the impact of system quality on the ERP system usage. The hypothesis to be tested here is:

($\boldsymbol{H}4$ ($\boldsymbol{a}$)): Information quality positively affects User satisfaction

Table 4.21 shows the p-value (.000) is less than the chosen acceptable significance level α = 0.05, then the null hypothesis will be rejected and the alternative hypothesis ($\boldsymbol{H}4$ ($\boldsymbol{a}$)) will be accepted. So, the conclusion will be there is positive significant association between information quality and User satisfaction at HBSC. As a result, the researcher concludes the association of system quality and ERP usage, r = .58, p=.000 shows that there is significant positive relationship between the information quality and User satisfaction.

Service Quality

Table 4.22 Correlation analysis between Service quality and Usage

		ServiceQuality	Usage
ServiceQuality	Pearson Correlation	1	.181
	Sig. (2-tailed)		.141
	N	68	68
Usage	Pearson Correlation	.181	1
	Sig. (2-tailed)	.141	
	N	68	68

The result of Pearson coefficient analysis used to examine the relationship between the service quality and ERP usage shows the impact of service quality on the ERP system usage. The hypothesis to be tested here is:

$\boldsymbol{H}5$ ($\boldsymbol{a}$): Service quality positively affects Usage

Table 4.22 shows the p-value (.14) is greater than the chosen acceptable significance level α = 0.05, then the null hypothesis will be accepted and the alternative hypothesis (***H***5(***a***)) will be rejected. So, the conclusion will be there is No significant association between Service quality and ERP usage at HBSC. As a result, the researcher concludes the association of Service quality and ERP usage, r= .18, p=.141 shows that there is no significant positive relationship between the service quality and Usage.

Table 4.23 Correlation analysis between Service quality and User Satisfaction

		ServiceQuality	UserSatisfaction
ServiceQuality	Pearson Correlation	1	.321**
	Sig. (2-tailed)		.008
	N	68	68
UserSatisfaction	Pearson Correlation	.321**	1
	Sig. (2-tailed)	.008	
	N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the service quality and user satisfaction shows the impact of service quality on the ERP system usage. The hypothesis to be tested here is:

H6 (***a***): Service quality positively affects User satisfaction

Table 4.23 shows the p-value (.008) is less than the chosen acceptable significance level α = 0.05, then the null hypothesis will be rejected and the alternative hypothesis (***H***6 (***a***)) will be accepted. So, the conclusion will be there is positive significant association between service quality and User satisfaction at HBSC. As a result, the researcher concludes the association of service quality and ERP usage, r = .32, p=.008 shows that there is service positive relationship between the service quality and User satisfaction.

ERP Usage

Table 4.24 Correlation analysis between ERP usage and User Satisfaction and vice versa

		Usage	UserSatisfaction
Usage	Pearson Correlation	1	.455**
	Sig. (2-tailed)		.000
	N	68	68
UserSatisfaction	Pearson Correlation	.455**	1
	Sig. (2-tailed)	.000	
	N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the Usage and user satisfaction shows the impact of Usage on the ERP system usage. The hypothesis to be tested here is:

$\boldsymbol{H}7$ ($\boldsymbol{a}$): ERP Usage positively affects User satisfaction and vice versa

Table 4.24 shows the p-value (.000) is less than the chosen acceptable significance level $\alpha = 0.05$, then the null hypothesis will be rejected and the alternative hypothesis ($\boldsymbol{H}7$ ($\boldsymbol{a}$)) will be accepted. So, the conclusion will be there is positive significant association between ERP Usage and User satisfaction at HBSC. As a result, the researcher concludes the association of ERP Usage and user satisfaction, r= .455, p=.000 shows that there is service positive relationship between the ERP Usage and User satisfaction.

Table 4.25 Correlation analysis between ERP usage and Net Benefit and vice versa

		Usage	Net Benefit
Usage	Pearson Correlation	1	.284*
	Sig. (2-tailed)		.019
	N	68	68
Net Benefit	Pearson Correlation	.284*	1
	Sig. (2-tailed)	.019	

N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the Usage and Net Benefit shows the impact of Usage on the Net Benefit. The hypothesis to be tested here is

$\boldsymbol{H}8\ (\boldsymbol{a})$:: ERP Usage positively affects Net Benefit and vice versa

Table 4.25 shows the p-value (.019) is less than the chosen acceptable significance level $\alpha = 0.05$, then the null hypothesis will be rejected and the alternative hypothesis ($\boldsymbol{H}8\ (\boldsymbol{a})$) will be accepted. So, the conclusion will be there is positive significant association between ERP Usage and Net Benefit at HBSC. As a result, the researcher concludes the association of ERP Usage and user satisfaction, r = .284, p=.019 shows that there is service positive relationship between the ERP Usage and Net Benefit.

User Satisfaction

Table 4.26 Correlation analysis between User satisfaction and Net Benefit

		UserSatisfaction	Net Benefit
UserSatisfaction	Pearson Correlation	1	.616**
	Sig. (2-tailed)		.000
	N	68	68
Net Benefit	Pearson Correlation	.616**	1
	Sig. (2-tailed)	.000	
	N	68	68

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

The result of Pearson coefficient analysis used to examine the relationship between the User satisfaction and Net Benefit shows the impact of User satisfaction on the Net Benefit. The hypothesis to be tested here is:

$\boldsymbol{H}9\ (\boldsymbol{a})$: User Satisfaction and Net Benefit has positive association

Table 4.26 shows the p-value (.000) is less than the chosen acceptable significance level $\alpha = 0.05$, then the null hypothesis will be rejected and the alternative hypothesis ($\boldsymbol{H}9\ (\boldsymbol{a})$) will be accepted. So, the conclusion will be there is positive significant association between User satisfaction and

Net Benefit at HBSC. As a result, the researcher concludes the association of ERP Usage and user satisfaction, r = .616, p=.000 shows that there is positive relationship between the User satisfaction and Net Benefit.

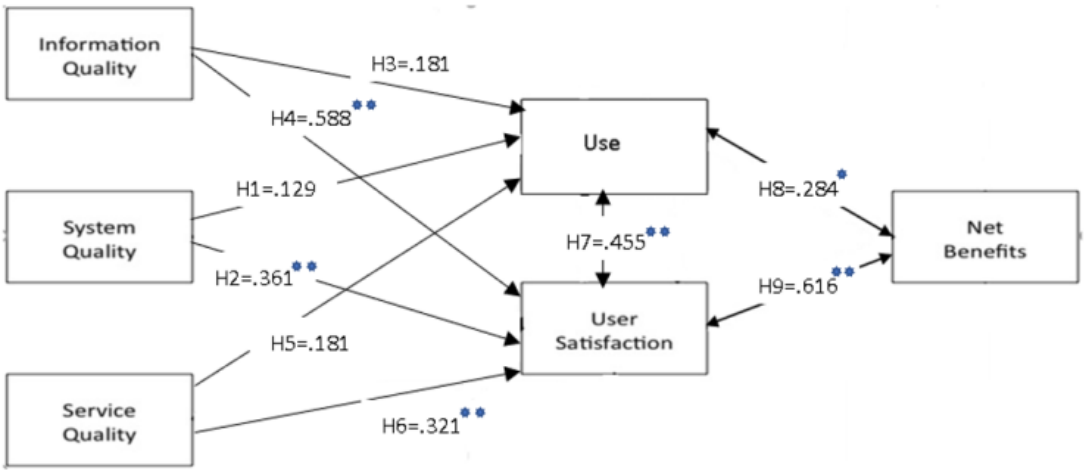

Figure 5. Hypothesis test result based on Correlation Analysis

Hypothesis test result based on Correlation Analysis

The Hypothesis test presented in the figure 5, shows the relationship of the dependent and independent variable with significant paths depicted by the lines and the association among the variable defined using the Pearson coefficient correlation analysis.

The result shows the hypothesized pathways of the variables. The System quality, Information Quality and Service quality have significant association with User satisfaction but not with the Usage. User satisfaction has positive significant association with Usage and vice versa. Net Benefits has positive significant association with User satisfaction and Usage and vice versa.

The association among the variable defined using the Pearson coefficient correlation analysis were discussed so far. next, the researcher analyzed the effect of independent variables on the dependent variable using Multiple regression in the next section.

4.9 Regression Analysis with Model Summary

Regression analysis is an inferential statistical tool for the investigation of relationships between variables and the level of determination among them. Regression is used to analyze the relation between two variables; However, regression is better suited for studying functional dependencies between factors. The term functional dependency implies that the independent variable determines to some degree the level of the dependent variable. In this study, multiple regression analysis was carried out to get the predictive value of the constructs considered.

The study conducted a multiple regression analysis for the independent variables and the dependent variable. Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (Usage, User satisfaction and Total Benefit) that is explained by all the three independent variables (System Quality, Information Quality and Service quality), as the appropriate indicators of the variable used to identify the ERP success factor were explore. That is, the value of Adjusted R square used to identify how much of the variance in the dependent variables identified by the model.

MULTIPLE REGRESSION ANALYSIS

Testing the Hypotheses using multiple linear regression

Multiple Regression Analysis used to test the validity of the research model and the impact of the independent variable on the dependent variable. And used to test the hypothesized associative relationships.

Stepwise Multiple Regression Analysis used to test the entry of independent variables in the equation to predict the dependent variable. The multiple regression analysis was used to further explain the significance of the independent and dependent variables. Whereas R2and its adjusted variant (R2adj) was used to assess the total contribution of the independent variables. The ANOVA table presented the F-test and level of significance for each step generated, reporting the degree to which the relationship was linear. Finally, the set of coefficients was examined to consider the standardized coefficients (ß), the t values and significance values. And significance level of the path coefficients. Whereas the size of the Beta, weights indicate the strength of their independent relationships.

Stepwise Multiple Regression Analysis

The study methodology includes three stepwise multiple regression models, which include system use, user satisfaction, and net benefits. The importance of the research variables, as well as their ability to explain variance in the independent variables, will be specified by these models. When the independent variable is significant (p=0.05), it will be included in the regression equation. The model and its significant variables will subsequently be changed (adjusted r square and beta) to fit the new circumstance, in which significant variables are included and non-significant variables are eliminated.

Stepwise Multiple Regression Analysis for the Systems Use

System quality, Information quality, Service quality, User satisfaction, and net benefits are variables that have an impact on system use, according to the study model and correlation analysis. The stepwise multiple regression analysis for System use includes all those factors and this will test the following Alternative hypothesis:

$\boldsymbol{H1}(\boldsymbol{a})$: A System Quality positively affects ERP System Usage

$\boldsymbol{H}3(\boldsymbol{a})$: Information Quality positively affects Usage

$\boldsymbol{H}5(\boldsymbol{a})$: Service Quality positively affects Usage

$\boldsymbol{H}7(\boldsymbol{a})$: ERP Usage positively affects User Satisfaction And Vice Versa

$\boldsymbol{H}8(\boldsymbol{a})$: ERP Usage positively affects Net Benefit And Vice Versa

Table 4.27 Stepwise Multiple Regression Analysis for the Usage Determinants

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.455[a]	.207	.195	.67900

a. Predictors: (Constant), UserSatisfaction

The R-square is the amount of variance in the dependent variable (Usage) explained by movement on the predictor variable (User Satisfaction). According to the model summary, $R2 = .207$ which shows the total variance explained by the model is 20.7%.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.935	1	7.935	17.210	.000b
	Residual	30.428	66	.461		
	Total	38.363	67			

a. Dependent Variable: Usage

b. Predictors: (Constant), UserSatisfaction

The reliability of the result statistically significant as we can see from the ANOVA table above. Since the α level of the significance was less than 0.05. Therefore, the overall regression model has significant impact on the dependent variable, $p<.001$, $R2 = .207$

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.811	.512		3.535	.001
	UserSatisfaction	.563	.136	.455	4.149	.000

a. Dependent Variable: Usage

Based on the above coefficients table shows the contribution of each predictor variable makes to the variance in the dependent variable. The researcher finds that for each 1% change in UserSatisfaction dimension leads to a 45.5% increases Usage.

Excluded Variables[a]

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics

						Tolerance
1	SystemQuality	-.041[b]	-.342	.733	-.042	.870
	InformationQuality	-.133[b]	-.978	.332	-.120	.655
	ServiceQuality	.039[b]	.331	.741	.041	.897
	TotalBenefit	.006[b]	.044	.965	.006	.621

a. Dependent Variable: Usage

b. Predictors in the Model: (Constant), UserSatisfaction

The stepwise regression model rejects the four variables (TotalBenefit p=.965 and InformationQuality p=.332, SystemQuality p=.733 and ServiceQuality p=.741) for they don't have significant explanation value in the model, therefore those variables excluded from the regression equation. This implies that the results support H7, where H1, H5, H3 and H8 doesn't support, and thus will be rejected.

Stepwise Multiple Regression Analysis for the User Satisfaction

System quality, Information quality, Service quality, Usage, and Net benefits are variables that have an impact on User satisfaction, according to the study model and correlation analysis. The stepwise multiple regression analysis for User Satisfaction includes all those factors and this will test the following Alternative hypothesis:

$\boldsymbol{H}2$ ($\boldsymbol{a}$): A System Quality positively affects User Satisfaction

$\boldsymbol{H}4$ ($\boldsymbol{a}$): Information Quality positively affects User Satisfaction

$\boldsymbol{H}6$ ($\boldsymbol{a}$): Service Quality positively affects User Satisfaction

$\boldsymbol{H}7$ ($\boldsymbol{a}$): ERP Usage positively affects User Satisfaction and vice versa

$\boldsymbol{H}9$ ($\boldsymbol{a}$): User Satisfaction and Net Benefit has positive association

Table 4.28 Stepwise Multiple Regression Analysis for the User Satisfaction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.616[a]	.379	.370	.48502

2	.692[b]	.479	.463	.44759
3	.746[c]	.557	.536	.41604

a. Predictors: (Constant), TotalBenefit

b. Predictors: (Constant), TotalBenefit, InformationQuality

c. Predictors: (Constant), TotalBenefit, InformationQuality, Usage

The R-square is the amount of variance in the dependent variable (User Satisfaction) explained by movement on the predictor variables were setting together (TotalBenefit, InformationQuality, Usage). According to the model summary, $R2 = .557$; Taken as a set which shows the total variance explained by the model is 55.7%.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	13.940	3	4.647	26.845	.000d
	Residual	11.078	64	.173		
	Total	25.017	67			

a. Dependent Variable: UserSatisfaction

d. Predictors: (Constant), TotalBenefit, InformationQuality, Usage

The reliability of the result statistically significant as we can see from the ANOVA table above. Since the α level of the significance was less than 0.05. Therefore, the overall regression model has significant impact on the dependent variable, $p<.001$, $R2 = .557$

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
3	(Constant)	-.817	.513		-1.592	.116
	TotalBenefit	.456	.129	.351	3.528	.001
	InformationQuality	.481	.131	.355	3.659	.001

Usage	.235	.070	.291	3.352	.001
a. Dependent Variable: UserSatisfaction					

Based on the above coefficients table shows the contribution of each predictor variable makes to the variance in the dependent variable. The researcher finds that for each 1% change in TotalBenefit dimension leads to a 35.1% increases UserSatisfaction, a 1% change in InformationQuality increases 35.5% in UserSatisfaction. Similarly, a 1% change in Usage leads to a 29.1% increases UserSatisfaction.

Excluded Variables[a]

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
SystemQuality	.018d	.181	.857	.023	.680
ServiceQuality	.075d	.841	.404	.105	.879
a. Dependent Variable: UserSatisfaction					
d. Predictors in the Model: (Constant), TotalBenefit, InformationQuality, Usage					

The stepwise regression model rejects the two independent variables (TotalBenefit p=.857 and InformationQuality p=.404) for they don't have significant explanation value in the model, therefore those variables excluded from the regression equation. This implies that the results support H4, H9, and H7, where H2 and H6 does not support, and thus will be rejected.

Stepwise Multiple Regression Analysis for the Net Benefit

User satisfaction and Usage are variables that have an impact on Net benefits, according to the study model and correlation analysis. The stepwise multiple regression analysis for Net benefits includes all those factors and this will test the following Alternative hypothesis:

$\boldsymbol{H}8\ (\boldsymbol{a})$: ERP Usage positively affects Net Benefit And Vice Versa

$\boldsymbol{H}9\ (\boldsymbol{a})$: User Satisfaction and Net Benefit has positive association

Table 4.29 Stepwise Multiple Regression Analysis for the Total Benefit

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.616a	.379	.370	.37312

a. Predictors: (Constant), UserSatisfaction

The R-square is the amount of variance in the dependent variable (TotalBenefit) explained by movement on the predictor variable (UserSatisfaction). According to the model summary, $R2$ = .379, which shows the total variance explained by the model is 37.9%.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.617	1	5.617	40.346	.000b
	Residual	9.188	66	.139		
	Total	14.805	67			

a. Dependent Variable: TotalBenefit

b. Predictors: (Constant), UserSatisfaction

The reliability of the result statistically significant as we can see from the ANOVA table above. Since the α level of the significance was less than 0.05. Therefore, the overall regression model has significant impact on the dependent variable, p<.001, $R2$ = .379

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.066	.281		7.340	.000
	UserSatisfaction	.474	.075	.616	6.352	.000

a. Dependent Variable: TotalBenefit

Based on the above coefficients table shows the contribution of each predictor variable makes to the variance in the dependent variable. The researcher finds that for each 1% change in UserSatisfaction dimension leads to a 61.6% increases TotalBenefit.

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Usage	.005[b]	.044	.965	.006	.793

a. Dependent Variable: TotalBenefit

b. Predictors in the Model: (Constant), UserSatisfaction

The stepwise regression model rejects one independent variables (Usage p=.965) for it didn't have significant explanation value in the model, therefore that variable is excluded from the regression equation. This implies that the results support H9, and does not support H8, and thus will be rejected.

4.10 Findings of The Regression Analysis

Stepwise Multiple Regression Analysis for the Systems Use

The total variance explained by the model was 20.7%, p=.000. where 1% change in UserSatisfaction measure explained an additional 45.5% of the variance in Usage. The stepwise regression model rejects four statistically not significant variables: TotalBenefit p=.965 and InformationQuality p=.332, SystemQuality p=.733 and ServiceQuality p=.741. This implies that the results support H7, where H1, H5, H3 and H8 doesn't support, and thus will be rejected. This leads to the conclusion that increased user satisfaction provide significant enhancement in terms of increased System usage.

Stepwise Multiple Regression Analysis for the User Satisfaction

The total variance explained by the model was 55.7%, p=.000. where 1% change in TotalBenefit measure explained 35.1% increases in UserSatisfaction, a 1% change in InformationQuality increases 35.5% in UserSatisfaction. Similarly, a 1% change in Usage leads to a 29.1% increases

UserSatisfaction. The stepwise regression model rejects the two statistically not significant variables TotalBenefit p=.857 and InformationQuality p=.404. This implies that the results support H4, H9, and H7, where H2 and H6 does not support, and thus will be rejected. This led to conclusion there is significant impact on user satisfaction following the effective usage of the ERP system and the total impact of the ERP system also increase the users' satisfaction toward the system use.

Stepwise Multiple Regression Analysis for the Net Benefit

The total variance explained by the model was 37.9%, p=.000. where 1% change in UserSatisfaction measure explained an additional 61.6% of the variance in TotalBenefit. The stepwise regression model rejects one independent variable, Usage p=.965. This implies that the results support H9, and does not support H8, and thus will be rejected. This leads to the conclusion that increased user satisfaction provide highly significant enhancement in the Total benefit of the ERP system.

Table below presents a summary of testing results for the hypothesis using correlations and stepwise multiple regressions. The results of hypothesis testing show that; most hypotheses were rejected, and three significant relations were Accepted. This result shows in general the selected research model explanation of information systems success in HBSC.

Table 4.30 summary of testing results for the hypothesis

Research model hypothesis	Correlation Support	Stepwise Regression Support	Result
H1: A System Quality positively affects ERP System Usage	Accepted	Rejected	Rejected
H2: A System Quality positively affects ERP System Usage	Accepted	Rejected	Rejected
H3: Information Quality positively affects Usage	Accepted	Rejected	Rejected
H4: Information Quality positively affects User Satisfaction	Accepted	Accepted	Accepted
H5: Service Quality positively affects Usage	Accepted	Rejected	Rejected
H6: Service Quality positively affects User Satisfaction	Accepted	Rejected	Rejected

H7: ERP Usage positively affects User Satisfaction And Vice Versa	Accepted	Accepted	Accepted
H8: ERP Usage positively affects Net Benefit And Vice Versa	Accepted	Rejected	Rejected
H9: User Satisfaction and Net Benefit has positive association	Accepted	Accepted	Accepted

The following findings are drawn from the statistical analysis of the data gathered from the respondents:

The Hypothesis testing results, where the Information quality, Usage and Net Benefit explain 55.7% of the variance occurs in User satisfaction. User satisfaction explain 45.5% of the variance in Usage, and 61.6% of the variance in the Net benefits.

The result shows the three dimensions: Information Quality, Usage and Net Benefit has the most influential determinacy on the User satisfaction and Net benefit factors.

The results support the DeLone-McLean model as a predictive model. the results also confirm the previous research results regarding variables in IS success models. The next chapter discuss the findings in detail.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction and Summary of the chapters

This chapter will present the summary and conclusion of the research. Discussing the result of the research questions of the study, research findings. Followed by recommendations for the HBSC and for further research. This research conducted for the purposes mentioned in the chapter one. its main purpose was to investigate the success factors of Information System of HBSC using the theoretical framework of Delones and Mclean updated IS success mode. And to Identify the most affecting success factors.

The findings of this research were able to answer the research questions and meet the objectives mentioned in chapter one. Bellow the findings are summarized according to the research objectives.

The researcher implements the research methodology which are suitable for the selected model. The questions are designed according to the selected model success dimensions which are extracted from related studies and articles. The overall status of the current implemented ERP was explored and discussed in the chapter four.

The research instrument was tested using Pilot studies to check for the validity and the run Cronbach alpha for the reliability test in which cases pass both tests.

After conducting minor changes and fixes based on the feed backs from the pilot study, the survey was distributed to the SAP active users using the online survey tool along with the guidance. There was sent one reminder for all participants before the final analysis starts.

The collected data then a tested for reliability using Cronbach alpha and all the constructs are at acceptable level. Descriptive statistics were used in presenting the demographical information of the respondent and for the measuring constructs. Likert scale (from strongly agree to strongly disagree) used for the questions. And the summary of the descriptive analysis for each construct are presented.

5.2 Summary of Major Findings

The correlation analysis was performed to describe the strength and direction of the linear relationship between the independent and dependent variables. The correlation result shows except the 'Usage' construct, all are positively correlated with one or more variables.

Model diagnostic test was conducted to study the appropriateness of the model and to test whether the selected model assumptions hold against the collected data. Normality distribution test, Multicollinearity test and Autocorrelation test was done, and all shows the model is fit for applicability.

Hypothesis test done based on correlation coefficient and the result shows there is strong and significant relation between. 'Information Quality' and 'User satisfaction', 'System Quality' and 'User satisfaction', 'Service Quality' and 'User satisfaction', 'Usage' and 'User satisfaction', 'Usage' and 'Net Benefit' and 'Net Benefit' and 'User satisfaction'.

And it also shows variables with insignificant relationships: 'Information Quality' and 'Usage', 'System Quality' and 'Usage', 'Service Quality' and 'Usage'. This shows the "usage' construct is not affected by the Quality constructs.

Using the quantitative inferential statistics to study the effect and influence of the independent variables on the dependent one, Stepwise multiple regression analysis was conducted on the three dependent variables: Usage, User Satisfaction and Total Benefit. and the result shows:

For the Usage variable, User Satisfaction found to explain 45.5% of the variance occurs in System usage, and this result is significant ($p<=0.01$). This indicates, System Usage is influenced by User Satisfaction.

For the Total Benefit variable, only User Satisfaction explain 61.6% of the variance occurs in Total Benefit, and this result is significant ($p<=0.01$). This indicates, the influence of User satisfaction and total benefit is highly significant and strongly correlated.

For the User satisfaction Variable, Information quality; Usage and Total benefit explain 55.7% of the variance occurs in user satisfaction, and this result is significant ($p<=0.01$). The explanation of those variables where 1% change in TotalBenefit measure explained 35.1% increases in UserSatisfaction, a 1% change in InformationQuality increases 35.5% in UserSatisfaction.

Similarly, a 1% change in Usage leads to a 29.1% increases UserSatisfaction. This indicates, User satisfaction is influenced by Information Quality, ERP Usage and Total Benefit. The result affirms the findings of researches done to test the Delone and Mclean's IS success model in measuring the success of different Information Systems (Raija et al., 2021; Yakubu, M & Dasuki 2018; Kwang S. & Alain C. 2009; Mulia D. 2010; Ismail M. 2013 and Ali B. 2017).

5.3 Conclusions

The main objective of this study is to assess ERP post-implementation success at Habesha Breweries S.C and identify the Critical Success factors based on the theoretical model of Mclean and Delone's updated IS success model. The general approach of this research was an experimental quantitative approach to investigate HBSC's ERP and determinant success factors to study causal relationships among independent and dependent variables The quantitative research method constructs the measurement tools to collect and analyze data using the proposed conceptual model and provide the findings which will give answer to the research questions. The data was collected using online questionnaires from population of 135 SAP ERP active users located at all the company's departments and duty stations with different job positions, roles, and work experience. Descriptive and Inferential statistical analysis and reporting conducted on the collected data using SPSS software.

The analysis report shows Usage variable is only affected by the User satisfaction variable and not by the three quality measures. the User satisfaction variable is affected by Information Quality, Usage and Total Benefit, and not affected by System quality and Service quality constructs. And the Total benefit is affected significantly by the User satisfaction variable.

To conclude, this research has identified the impacts of the CSF derived from the theoretical model at individual and organizational level and identifies which factors has the most dominance in determining the ERP-Post implementation success at HBSC. Concerning ERP Usage, most of the Employees believed that their satisfaction level of the ERP system usage enhanced their use of the system to be more productive. The study result also indicates the Information quality produced by the ERP system along with their daily usage of the system also affects their experience and satisfaction of the system usability, which impact the total Benefit from the ERP system.

The result shows four variables from theoretical model of this study found to be the major determinant of ERP post-implementation success at HBSC. Information Quality, System Usage, User satisfaction and Total Benefit shows they have positive and significant effect on the Success of ERP implementation at HBSC which answers the research question of this study "What are the determinant factors affecting the ERP post-implementation success at Habesha Breweries S.C.".

5.4 Implications of the study

Exploring the determinant success factors of the HBSC ERP system helps to enhance the effectiveness, efficiency, productivity, and quality of the information system experience on the company and users' level. And the findings of this study will contribute to the overall business success and competitiveness by pointing the positive impact on the user's perception and usage of the system, Information quality produced by the System, and the overall benefit the system brings to the company.

The finding of this study will provide useful information to fill the literature gap on ERP success assessment in Ethiopian context. It Gives insight on the applicability of the Mcleone and Delone IS success model testing. The study will be helping the management of Habesha to have good understanding on the current ERP system success factors and made any necessary adjustments for better outcomes of the system.

It will help IS departments by considering these findings in prior of implementation or upgrading of any future information systems projects. The study also can be used as a reference for further research on the similar studies which looks for identifying the most determinant success factors for improvement in the IS system implementation.

5.5 Recommendations

This study along with others literature regarding the ERP systems indicate the high importance of ERP as it brings the competitive advantages to different organizations with complex type of business nature. And it is important to identify and measure the most influential factor of ERP to determine its success. This study contributes by identifying the major determinants of ERP system success by studying the IS at HBSC using a conceptual research model derived from the Delone and Mclean's updated success model as a theoretical model.

Based on the results the researcher gives the following recommendations:

HBSC should improve the quality aspects of the ERP system in terms of the enhancement on the availability and reliability of the running system, the information processed in the system should be more accurate, understandable, and relevant and the IS department need to be equipped more with adequate knowledge on the overall SAP functionalities, have up-to-date infrastructure to run the system, and be more ready for prompt service requests from the ERP users.

As the User satisfaction is one of the most determinant of ERP system success at HBSC. The ERP department should highly deal to increase the satisfaction of ERP users in terms of ensuring the functionalities of ERP are meeting user's expectations, ensuring the users use ERP in Effective and Efficient ways in caring out their tasks.

The Total Benefit from the ERP system is also determining the success factors of User Satisfaction and ERP usage, HBSC ERP department should discuss with the Habesha's management in preserving and enhancing the ERP system benefits in terms of enhanced Decision making, employees job effectiveness and performance, departmental coordination, and collaborations, and reducing operational cost.

5.6 Suggestion for Future Research

There is few research conducted on the application of McLean and Delone IS success model to assess the effectiveness of the ERP in Ethiopia contexts. Since the analysis result of this study shows the identified CSF do not address 100% of the ERP system success at HBSC, further study should be done to discover and address the success of ERP system that are not addressed by this research model. Since this research is intended in evaluating the determinant factors of ERP system success based on the updated DeLone and McLean IS success model, it shows the major factors that affect the ERP success at HBSC, but it may be difficult to state all contextual factors of HBSC on other companies to predict based on findings in this study only. Therefore, the researcher recommends further research to use other IS success model that may affirm the findings from this study or bring additional factors affecting the success of ERP implementations in other organizations implementing the ERP system.

5.7 Limitation of the Study

The study is limited to ERP post-implementation success measures, and it did not include the implementation phase assessment due to time and availability constraint. Very limited availability of information resources related to ERP post implementation in context of Ethiopian manufacturing sector. And the number of the respondents are not as much as the expected.

References

Abel Hailemariam, (2018). Factors Affecting the Effectiveness Of Enterprise Resource Planning (ERP) Project The Case Of Commercial Bank Of Ethiopia, AAU.

Abraham Tadesse (2018), Assessment of ERP Planning Post implementation success: the Case of Ethio Telecom.AAU.

Alain Pinsonneault & Kenneth Kraemer (1993) Survey Research Methodology in Management Information Systems: An Assessment, Journal of Management Information Systems, 10:2, 75-105, DOI: 10.1080/07421222.1993.11518001.

Ali Bakhit Jaafrek, (2017). Evaluation Information System Success: Applied DeLone and McLean Information System Success Model in Context Banking System in KSA, International Review of Management and Business Research.

AL-Sabaawi, M. Y. (2015). "Critical Success Factors for Enterprise Resource planning Implimentation", International Journal of Advances in Engineering & Technology.

Anil Bhagwani, “Critical Success Factors in Implementing SAP ERP Software”, Fall Semester, 2009 .

Anol Bhattacherjee,2012. Social Science Research: Principles, Methods, and Practices (book).

Bazhair, Ayman, and Kamaljeet Sandhu. “Factors for the Acceptance of Enterprise Resource Planning (ERP) Systems and Financial Performance.” Journal of Economics, Business and Management 3, no. 1 (2015): 1–10.doi:10.7763/JOEBM.2015.V3.146.

Beheshti, H. M. (2006). What managers should know about ERP/ERP II. Management Research News, 29(4), pp. 184-193.

Bradford, M. and Florin, J. (2003), “Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems”, International journal of Accounting Information Systems, Vol. 4, pp. 205-225.

Brooks, Chris. (2008). Introductory Econometrics for Finance. 10.1017/CBO9780511841644.

Bryman, A., Bell, E., Collis, J., Fisher, C., Jankowitcz, A. D., Sekaran, U., ... & Howard, K. (2007). Research methods for business students.

Chuttur, Mohammad. (2009). Overview of the Technology Acceptance Model: Origins, Developments and Future Directions. Sprouts: Working Papers on Information Systems. 9.

Danijel Jozic. (2010) ERP as an enabler for economic growth in developing countries: A proposal for a large-scale and sustainable project in Ethiopia- Druck und Bindung: Books on Demand.

Davenport, Thomas. (2000). Mission critical: realizing the promise of enterprise systems.

Davis, Fred & Bagozzi, Richard & Warshaw, Paul. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science. 35. 982-1003. 10.1287/mnsc.35.8.982.

Delone, William & McLean, Ephraim. (1992). Information Systems Success: The Quest for the Dependent Variable. Information Systems Research. 3. 60-95. 10.1287/isre.3.1.60.

Delone, William & McLean, Ephraim. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. J. of Management Information Systems. 19. 9-30. 10.1080/07421222.2003.11045748.

Dewi, M. (2010). Applying a respecification of the Delone and Mclean's model to measure the success of Accounting Information System in Sragen (Doctoral dissertation, UNS (Sebelas Maret University)).

Elias Woldemariam (2019), Factors Affecting The Successful Implementation Of Enterprise Resource Planning (Erp) Project: The Case Of Ethiopian Postal Service Enterprise.

Elsa Taddele, (2015). ERP Post-Implementation Management Framework: The case of Ethiopian Airlines.

Ewusi (1997) Ewusi, M.K. (1997), "Critical issues in abandoned information systems development projects", Communications of the ACM, Vol. 40 No. 9, pp. 74-80.

Gable, Guy & Sedera, Darshana & Chan, Taizan. (2003). Enterprise Systems Success: A Measurement Model.. 576-591.

Hajj, W.E., & Serhan, A. (2019). Study on the Factors that Determine the Success of ERP Implementation. Proceedings of the International Conference on Business Excellence, 13, 298 - 312.

Halonen, Raija & Thomander, Heli & Laukkanen, Elisa. (2010). DeLone & McLean IS Success Model in Evaluating Knowledge Transfer in a Virtual Learning Environment. IJISSC. 1. 36-48. 10.4018/jissc.2010040103.

Harrison, Joycelyn Lorraine, "Motivations For Enterprise Resource Planning (erp) System Implementation In Public Versus Private Sector Organizations" (2004). Electronic Theses and Dissertations. 31.

Heo, Jaeho & Han, Ingoo. (2003). Performance measure of information systems (IS) in evolving computing environments: An empirical investigation. Information & Management. 40. 243-256. 10.1016/S0378- 7206(02)00007-1.

Huang, Shi & Chang, I-Chu & Li, Shing-Han & Lin, Ming-Tong. (2004). Assessing risk in ERP projects: Identify and prioritize the factors. Industrial Management and Data Systems. 104. 681-688. 10.1108/02635570410561672.

Huang, Tingting & Yasuda, Kazuhiko. (2016). Reinventing ERP Life Cycle Model: From Go-Live To Withdrawal. Journal of Enterprise Resource Planning Studies. 2016. 1-21. 10.5171/2016.331270.

Hong, Kyung-Kwon & Kim, Young-Gul. (2002). The Critical Success Factors for ERP Implementation: An Organizational Fit Perspective. Information & Management. 40. 25-40. 10.1016/S0378-7206(01)00134-3.

Jirava, Pavel & Toseafa, Evelyn. (2017). An Illustrative Case Study of the Integration of Enterprise Resource Planning System. Journal of Enterprise Resource Planning Studies. 1-9. 10.5171/2017.176215.

Joseph, Stephen & Linley, P. & Harwood, Jake & Lewis, Christopher & McCollam, Patrick. (2005). Rapid assessment of well-being: The Short Depression-Happiness Scale (SDHS). Psychology and psychotherapy. 77. 463-78. 10.1348/1476083042555406.

Kerlinger, F. N., & Lee, H. B. (2000). Foundations of behavioral research. Fort Worth, TX: Harcourt College Publishers.

Kothari, C.R. (2004) Research Methodology: Methods and Techniques. 2nd Edition, New Age International Publishers, New Delhi.

L. Zhang, J. Huang and X. Xu, "Impact of ERP investment on company performance: Evidence from manufacturing firms in China," in Tsinghua Science and Technology, vol. 17, no. 3, pp. 232-240, June 2012, doi: 10.1109/TST.2012.6216752.

Lawrence, Japhet & Tar, Usman. (2018). Factors that influence teachers' adoption and integration of ICT in teaching/learning process. Educational Media International. 55. 1-27. 10.1080/09523987.2018.1439712.

Nah, Fiona & Lau, Janet & Kuang, Jinghua. (2001). Critical Factors for Successful Implementation of Enterprise Systems. Business Process Management Journal. 7. 285-296. 10.1108/14637150110392782.

Nicolaou, A. I. And Bhattacharya, S. 2006. “Organizational performance effects of ERP systems usage: The impact of post-implementation changes”. International Journal of Accounting Information Systems, vol. 7, no. 1, pp. 18-35, 2006.

Nils Urbach (2011), The Updated DeLone and McLean Model of Information Systems Success, Researchgate publications, 6-7.

O'Leary, Daniel. (2001). How Knowledge Reuse Informs Effective System Design and Implementation. Intelligent Systems, IEEE. 16. 44 - 49. 10.1109/5254.912384.

Oliver, Dave & Whymark, Greg & Livermore, Celia. (2005). Researching ERP adoption: An internet-based grounded theory approach. Online Information Review. 29. 585-603. 10.1108/14684520510638052.

Oracle NetSuite. (n.d.). (2004), Enterprise Resource Planning Systems Transform, Integrate and Scale Organisation For Economic Co-Operation And Development (OECD).

Pallant, Julie. (2001). SPSS survival manual. 10.4324/9781003117407.

Panorma-consulting solutions report, (2017). Report on ERP Systems & Enterprise Software.

Precise Consult International, LLC. (2013), from [https://preciseethiopia.com/].

RAMAN:The national conference on Recent Advancements in Materials science And Nanotechnology (RAMAN),(July 30 to August 01, 2020) at Institute of Technology, Nirma University, Ahmedabad, Gujarat. From [https://sites.google.com/view/raman2020nu].

Rao, S.S. (2000), “Enterprise resource planning: business needs and technologies”, Industrial Management & Data Systems, Vol. 100 No. 2, pp. 81-90.

Rashid, M. A., Hossain, L., & Patrick, J. D. (2002). The evolution of ERP systems: A historical perspective.

Richard Chin, Bruce Y. Lee (2008). Principles and Practice of Clinical Trial Medicine.

Robert, Katleen & Jones, Daniel & Tyler, Paul & Rooij, David & Huvenne, Veerle. (2014). Robert et al. 2014 Supp.

Robey, D., Ross, J.W. and Bordereau, M. (2002), “Learning to implement enterprise systems: An exploratory study of the dialectics of change”, Journal of Management Information systems, Vol. 19 No. 1, pp. 17-46.

Romi, Ismail. (2013). Testing Delone and Mclean’s Model in Financial Institutions. American Academic & Scholarly Research Journal. 5. 121-129.

Roopa, S & Menta Satya, Rani. (2012). Questionnaire Designing for a Survey. The Journal of Indian Orthodontic Society. 46. 37-41. 10.5005/jp-journals-10021-1104.

Rosemann, Michael & Wiese, Jens. (1999). Measuring the Performance of ERP Software: a Balanced Scorecard Approach. 10th Australasian Conference on Information Systems.

Saron Gebremedhin . Ethiopia (2017) Assessment of ERP Implementation: the case of Heinken Breweries S.C.

Saudi ERP & Website Solution Blog electronic version, 2016, https://solutiondots.com/blog/.

Saunders, Mark & Lewis, Philip & Thornhill, Adrian & Bristow, Alex. (2019). "Research Methods for Business Students" Chapter 4: Understanding research philosophy and approaches to theory development.

Schmidt, R., Lyytinen, K., Keil, M. and Cule, P. (2001), "Identifying software project risks: an international Delphi study", Journal of Management Information Systems, Vol. 17 No. 4, pp. 5-36.

Seashore, S. E., & Yuchtman, E. (1967). Factorial Analysis of Organizational Performance. Administrative Science Quarterly, 12(3), 377–395. https://doi.org/10.2307/2391311.

Selamawit Nibret (2018). Factors Affecting Enterprise Resource Planning Project Post Implementation Success: The Case of Commercial Bank of Ethiopia.

Seth Lippincott, (2018) ERP TECHNOLOGY VALUE MATRIX (analysis).

Sintayehu Demeke (2014). Success Factors for Implementation of Enterprise Resource Planning System at Ethiopian Airlines.

Smith, Andrew & Wells, Gary & Lindsay, R. & Penrod, Steve. (2016). Fair Lineups Are Better Than Biased Lineups and Showups, but Not Because They Increase Underlying Discriminability. Law and Human Behaviour. 41. 10.1037/lhb0000219.

Susanna Loeb et al., (2017). Descriptive analysis in education: A guide for researcher, National Center for Education Evaluation and Regional Assistance, 39-40.

Tesfu Berhe, (2018). Assessing User Satisfaction with Erp System Usage: A Case Study In Mesfin Industrial Engineering (MIE), AAU.

Thomas, Graeme & Fernandez, Walter. (2008). Success in IT projects: A matter of definition?

International Journal of Project Management - INT J PROJ MANAG. 26. 10.1016/j.ijproman.2008.06.003.

Umble, E.J. and Umble, M.M. (2002), “Avoiding ERP implementation failure”, Industrial Management, Vol. 44 No. 1, pp. 25-33.

Wallace, Thomas F - Kremzar, Michael H [Hardcover (2001). ERP II - Making It Happen, Wiley, Hardcover.

Wei, K. S., Loong, A. C., Leong, Y. M., & Ooi, K. B. (2009, December). Measuring ERP system success: a respecification of the Delone and McLean’s IS success model. In Symposium on progress in information & communication technology (Vol. 2009, p. 7).

Wieder, R. & Vitt, Dale & Benscoter, Brian. (2006). Peatlands and the Boreal Forest. 10.1007/978-3-540- 31913-9_1.

Wikipedia, [https://en.wikipedia.org/]

YAKUBU, M N and DASUKI, Salihu (2018). Assessing eLearning systems success in Nigeria: an application of the DeLone and McLean Information Systems Success Model. Journal of Information Technology Education: Research, 17, 183-203.

Yang, J. B., Wu, C. T., & Tsai, C. H. (2007). Selection of an ERP system for a construction firm in Taiwan: A case study. Automation in construction, 16(6), 787-796.

Zimmerman, Barry. (2008). Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. American Educational Research Journal - AMER EDUC RES J. 45. 166-183. 10.3102/0002831207312909.

APPENDICES

Appendix A: Survey Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES COLLEGE OF NATURAL SCIENCE

DEPARTMENT OF INFORMATION SCIENCE

Dear respondent.

My name is Bereket Bogale and I am a post graduate student at Addis Ababa University, School of Information Science, who is conducting a research on: "Assessment of ERP Implementation Success at Habesha Breweries S.C.". The research is conducted in partial fulfillment of the requirement for the master's degree in Information Science.

The questioner contains 8 sections and will take about 5 -7 minutes. You are kindly requested to complete this questionnaire. Your responses will be kept confidential and used for academic purpose only. I want to thank you in advance for your time, willingness, and participation.

Bereket Bogale

Tel. 0911 36 08 46

Email: bereketb@habeshabreweries.com

Direction: Please put a thick mark (√) in the box that corresponds to your response.

Section 1: DEMOGRAPHIC INFORMATION

This section is about general information about the Habesha's ERP System users.

Gender: ☐ Male ☐ Female

2. Age ☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ Above 45

Qualification ☐ Diploma ☐ Degree ☐ Masters ☐ PhD

Service year in Habesha ☐ Less than 1 year 1-3 ☐ 4-7 >8

Department

CEO Supply chain

Commercial Engineering

Sales General Service

Finance Material control and planning

Human Resource Packaging

Brewing Safety

Electrical and Automation

6. Your duty stations

☐ Head Office ☐ Debrebirhan/Factory ☐ Warehouse ☐ Field

Section 2: Survey Questions

The following section contains the Main Assessment Questions to measure the six success dimensions.

Please read each Descriptions and statements carefully and show the extent of your agreement on the statements by selecting the options based on a five-point Likert scale with the following values:

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

SYSTEM QUALITY of the SAP ERP System						
These measures typically focus on usability aspects and performance characteristics of the SAP ERP System at Habesha						
#	Statements	1	2	3	4	5
1	The SAP ERP System can be accessed Easily					
2	The SAP ERP System Is Flexible to use					
3	The SAP ERP system is always up and running (Available)					

4	The SAP system is integrated well with the business operation					
5	The SAP ERP system includes features and functionalities to address the business requirements					
6	The SAP ERP System has good Response Time					
7	The Habesha SAP ERP System is Dependable and Reliable to work with					
8	The SAP ERP system always consistent (do what it is supposed to do)					

INFORMATION QUALITY of the SAP-ERP System at Habesha						
These measures focusing on the quality of the information that the SAP ERP system at Habesha produces and its usefulness for the user.						
#	Statements	1	2	3	4	5
1	The SAP-ERP System Provide Accurate Information					
2	Required information is available on the SAP-ERP System when requested					
3	Information processed in SAP ERP system is Reliable enough					
4	Information presented on the SAP ERP is Understandable					
5	Information processed and generated by the SAP ERP is Consistent					
6	The SAP ERP system at Habesha process and generate Relevant Information					
7	Information processed and provided by the SAP ERP system is Complete and Comprehensive					
8	Information and data presented in SAP ERP system are in good formats					

USER SATISFACTION Regarding to the SAP ERP System at Habesha						
This is to assess to what extent do you agree on the following statements regarding USER SATISFACTION regarding SAP ERP system in Habesha system.						
#	Statements	1	2	3	4	5
1	The SAP ERP system in Habesha system meet the required functionalities to my expectations					
2	The SAP ERP system in Habesha makes my work					
3	The SAP ERP system in Habesha is Effective when caring out my tasks					
4	The SAP ERP system in Habesha is Efficient when caring out my tasks					
5	I am satisfied with the overall performance of The SAP ERP system in Habesha					

SERVICE QUALITY of the SAP ERP System at Habesha						
This measures the quality of the support that the users receive from the Information System (the SAP department and IT department).						
#	Statements	1	2	3	4	5
1	The Habesha ERP department have the adequate knowledge on the overall SAP functionalities.					
2	The ERP department of Habesha is cooperative and supportive.					
3	The Habesha SAP- ERP department is Dependable and Reliable in its service delivery related to SAP ERP system.					
4	The Habesha SAP department response to requested services /support/ is good					
5	The Habesha SAP (ERP) department has good understanding toward the user's interaction with the systems					
6	There are up-to-date Hardware and Software to run SAP- ERP System at Habesha.					
7	There is adequate Training available on SAP ERP System					
8	Habesha's SAP -ERP department is always ready for Prompt service (request from the SAP ERP users)					

USAGE of the SAP ERP System in Habesha						
This is to examine to what extent do you agree on the following statements regarding your SAP USAGE						
#	Statements	1	2	3	4	5
1	I am having a positive experience using SAP- ERP System					
2	I am using SAP- ERP System fully to the scope of my job					
3	I am using SAP- ERP System frequently in daily work basis.					
4	My work is ERP System dependent.					

NET BENEFIT of the Habesha's SAP ERP System on Individual and Organizational level						
This is to assess to what extent do you agree on the following statements regarding NET BENEFIT of SAP to define the Success of SAP ERP System implementation in Habesha.						
#	Statements	1	2	3	4	5
1	The SAP- ERP System in Habesha enhanced Decision making					
2	The SAP- ERP System in Habesha enhanced my Job Effectiveness					
3	The SAP- ERP System in Habesha enhance and simplify Job Performance					
4	The SAP- ERP System brings better Management control					
5	SAP- ERP System reduce Operational costs in Habesha					
6	The SAP- ERP System enhance communication and collaboration at Habesha					
7	The SAP- ERP System enhance coordination at Habesha					
8	The SAP- ERP System enhance internal operations in Habesha					
9	The Implementation of SAP- ERP System at Habesha has improved customer satisfaction					
10	Overall, The SAP- ERP System implementation at Habesha was successful					