ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

ASSESSING USER SATISFACTION WITH ERP SYSTEM USAGE: A CASE STUDY IN MESFIN INDUSTRIAL ENGINEERING (MIE)

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

By: TESFU BERHE

Advisor: RAHEL BEKELE (PhD)

October, 2018

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By: Tesfu Berhe

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

Signature: _____

Tesfu Berhe

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

Advisor's Signature: _____

Rahel Bekele (PhD)

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ABSTRACT

A review of user satisfaction with ERP system usage show that a better IS success models are required that helps to precisely identify and measure factors to boost the user satisfaction. The main objective of this study examined factors affecting user satisfaction with the ERP system usage. To address the purpose, this study developed a conceptual model based on DeLone and McLean IS success model and relevant prior studies which validated the effect of variables on the user satisfaction empirically in the local setup. A mixed research approach was used to collect data from the respondents; which supports to validate the research model and explore the in-depth understanding of the user perception. Correlation analysis and linear regression analysis was used to realize the association among constructs and to determine the predictive power of the variable respectively. The study found that the user satisfaction with ERP system usage is predicted via variables stated in the proposed conceptual research model. The results also confirm system quality, technical support, management support and social capital as significant antecedents that enhanced the user satisfaction. Besides, the findings suggest 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.

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ABBERIVATIONS

IS - Information System

ERP - Enterprise Resource Planning

ICT - Information Communication Technology

MIE - Mesfin Industrial Engineering

CRM - Customer Resource Planning

SCM - Supply Chain Management

IT - Information Technology

MRP - Material Requirement Planning

ES - Enterprise System

TAM - Technology Acceptance Model

BSC - Business Scorecard

EUCS - End User Computing Satisfaction

CHAPTER 1

INTRODUCTION

1.1. Background of the ERP System

Nowadays, the dynamic changes in information technology affecting business firms to introduce changes in their business environment. So, in order to compete with the dynamic environment, they need a system that integrates all information flows and business process in the organizations. Such as ERP system is business management software's that help organizations to integrate their information flows within the business processes and functional areas (Oracle NetSuite, n.d.). The ERP system suite helps to retrieve the information by all departments in a real time using central database.

According to (Kumar & Hillegersberg, 2000), ERP is an information system that can combined the information and information-based processes within and across functional areas in an organization. The very essence goal of a firm which introduced an ERP system is to achieve the goal of firm. So, in order to achieve these anticipated business goals of the firm it needs to enhance a user satisfaction with the ERP system usage (Gantley, 2007, & Chou H. , Chang, Lin, & Chou, 2014).

In keeping with this, MIE was founded in 1992 and a vast unrivaled metal construction and electromechanical engineering complex in Ethiopia. The firm is headquartered at Mekelle and has sub branch of Wukro, Addis Ababa, and Gelan. The firm has a staff population of about 1678 employees and most employees utilize ICT's in their work operations. MIE, before introducing the ERP system different legacy system which was developed by the local vendors and internally by MIE staffs were used to ensure prompt delivery of service and to enhance the management work flow. Since, these old systems were hard to operate and maintain it causes a hindrance to manufacture at a moderate level. Similarly, these legacy systems were not supporting the growth of the business, and were not sufficiently agile to keep pace of the changing business environment (Sinamo A. , 2012). Finally, to solve the drawbacks of the legacy system MIE recognized that the adoption of ERP system was vital outlook that could enable the company to overcome the challenges and lead to

business success. Thus, the company was successfully implemented the ERP system and besides a research has been done by (Sinamo A. , 2012) focused on ERP implementation feat.

1.1. Statement of the Problem

Conducting a post-implementation assessment of an ERP system usage from the user perspective is useful to improve the usability of system and fixing the problem that makes tough to use the system effectively. Thus, it needs to give attention to the factors affecting system usage on the post-implementation phase to evaluate the system usage from the users side. In similar manner, it helps to assess the factors affecting user satisfaction while using the system which is important to boost user satisfaction and consequently to achieve the desired goals of the firm. Melone (1990) proposes that handling task-oriented behaviors show how information technology to some extent utilized in an organization. Therefore, implementing ERP system from the technical aspect successfully is not enough to meet the anticipated business goals of an organization.

Emphasizing on user satisfaction is essential to enhance and making ongoing improvements on the system usage which leads to foster the benefits of ERP system and lessen the risks (Gallagher & Gallagher, 2012). Besides, including an end user in the evaluation of ERP system helps to identify status of the system in terms of easiness to use, usability, manage and learn (Nielsen & Coyle, 2001). To sum up, an element such as interface, functionality, management support, post-training self-efficacy, ergonomics, and concise representation of the system features have an impact on user satisfaction while using the ERP system (Chou H. W., Chang, Lin, & Chou, 2014; Hsiu-Fen, 2010; DeLone & McLean, 2003).

User satisfaction is one of the key elements in measuring the usage of ERP system (Burton-Jones & Straub, 2006). Since the use of ERP system primarily aims at enhancing users' ability to improve performance, more efficiently and to produce more, within an appropriate time, while ensuring cost-effective manner. Therefore, it is imperative to measure factors affecting a user satisfaction with the ERP system usage in the operation phase. In line with this, there are various IS success models used to measure and validate the ERP system from the users side. Among these the DeLone and McLean IS success model are one of the most cited popular information system success models used to measure the ICT success depending on the predefined interrelated factors.

Besides, the DeLone and McLean IS success model is a user-centered approach when trying to judge system success measure.

Different researcher assesses a user satisfaction with system usage using the DeLone and McLean IS success model. Islam, el at. (2012) analyzed factors affecting user satisfaction in the Malaysian income tax e-filing system. In their finding, two of the DeLone and McLean IS success models dimension which is information quality and service quality have significantly affecting user satisfaction when using the system. While, system quality has partial impact on the user satisafaction. In similar manner, Masa'deh, Al-Badi, Abu-Hlalah, Alkyal, and Zytoon (2017) examined DeLone and McLean IS success model dimensions and other factors that affect user satisfaction while using the Jordan tourism board website. The result of the study shows that the DeLone and McLean IS success model dimensions such as system quality, information quality, and service quality have a significant impact on user satisfaction with the web usage. Hassanzadeh, Kanaani, & Elahi (2012) evaluated the e-learning system success in Iranian universities using the DeLone and McLean IS success model. The result from the research shows that the dimension stated in the DeLone and McLean IS success model have significant effect in the success of the e-learning system.

MIE implemented the ERP system (Microsoft Dynamics SL solution) since 2009 in order to overcome problems of the legacy system which was used previously and to be competitive in the business environment. But, implementing only is not enough, so, it needs to assess user satisfaction while using the ERP system. Because the level of user satisfaction on using the ERP system manifests to what extent they are using the system and achievement towards the anticipated business goal of the firm via the system. Therefore, the factor affecting user satisfaction on ERP system usage needs to be identified and clearly stated. In addition, it is imperative to design the conceptual model measuring factors affecting user satisfaction with the ERP system usage by combining factors from the updated DeLone and McLean IS success model and other relevant prior studies (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995). In line with this, from organizational support (management support and social capital) and self-efficacy from individual capacity are used as a variable, in addition to, DeLone and McLean IS success model variables since they are very essential factors to leverage the predictive power of the conceptual model. This conceptual research model designed to elicit information on user

satisfaction of the ERP system, its navigability and usability. Finally, the conceptual model is measuring factors affecting a user satisfaction and needs to test and validate in the local context (MIE).

1.1.1. Research Question

- What are the determinant factors affecting user satisfaction on ERP system usage?
- Do the conceptual model measuring factors affecting user satisfaction hold on when evaluating in the local setup?

1.1.2. Hypothesis

To study the determinant factor of user satisfaction with ERP system usage; the following hypothesis formulated based on relevant prior literature. A Detail literature review has done in the literature review section (chapter 2) to articulate the following hypothesis. The hypothesis is formulated and tested for the factors affecting a user satisfaction with the ERP usage design to achieve the aims at the purpose of the study.

$\boldsymbol{H_1}$**:** A system quality is positively affecting ERP system usage

$\boldsymbol{H_2}$**:** An information quality is positively affecting ERP system usage

$\boldsymbol{H_3}$**:** A technical support is positively affecting ERP system usage

$\boldsymbol{H_4}$**:** A management support is affecting ERP system usage

$\boldsymbol{H_5}$**:** A self-efficacy is positively affecting ERP system usage

$\boldsymbol{H_6}$**:** A social capital is positively affecting ERP system usage

$\boldsymbol{H_7}$**:** A user ERP system usage is positively affecting user satisfaction

1.2. Objective of the Study

1.2.1. General Objective

The main aim of this study is assessing the user satisfaction with ERP system usage in Mesfin Industrial Engineering.

Specific Objective

The specific objectives of this study are:

- To validate and test the conceptual model measuring factors affecting a user satisfaction on the local context
- To evaluate in detail variables of organizational support (management support and social capital) and individual capacity (self-efficacy) that have an impact on the ERP system usage and in turn to the user satisfaction.
- To review the state of the art of updated DeLone and McLean IS success model from the user perspective.
- To determine the determinant factors affecting user satisfaction with ERP system usage.

1.3. Significance of the Study

The aim at this study is to determine the determinant factors affecting the user satisfaction with ERP system usage. Similarly, validating the conceptual research model measuring factors that have an impact on the user satisfaction. Thus, helps to afford a better way to improve the identified constructs and provide a comprehensive information about the user satisfaction level with the ERP system usage. Leveraging user satisfaction with the ERP system helps to improve the functionality, productivity, and an efficiency level of the users. Besides, it has positive effect on the sustainable quality product manufacturing by the firms and make them competes with the dynamic market environment as well as the community also benefited indirectly. In addition to, the finding of this study shall have beneficial to many other firms looking for to investigate user satisfaction with the usage of ERP system in their own context.

1.4. Scope of the Study

The scope of the study is to investigate the user satisfaction with ERP system usage via manipulating a conceptual model that helps to assess the factors affecting the user satisfaction based on the updated DeLone and McLean IS success model and other relevant prior studies by (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995). The study is also limited to Mesfin Industrial Engineering (MIE) and so, the results may not generalize to other firms.

CHAPTER 2

LITERATURE REVIEW

Introduction

In this section the theoretical context for evaluating the factors affecting user satisfaction with the ERP system usage were discussed. It was started by discussing information system, and importance of the ERP system. Then it continued with discussing the different IS success models that helps to figured out the factors through reviewing extent literatures about the measuring the user satisfaction while using the ERP system.

2.1. Information System

According to Buckingham (1987), an information system is a system which assembles, stores, processes and delivers information relevant to an organization (or to society), in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients, and citizens. An information system is a human endeavor which may or may not involve the use of information technology. In addition to, the information system is defined more broadly as the combination of technology (the "what"), people (the "who"), and process (the "how") that firms use to process information (Keri & Carol, 2009). Therefore, the information system is an organized system that affects the interaction between people, process, and technology in firms. In the same view, an ERP system is a business management software that allow firms to use the integrated applications to manage the business activity. ERP system integrates all facets of an operation including, human resource, finance, production, sales and marketing, and suppliers. So, ERP system can be called as a specific application of information system that supports to achieve the overall purpose of the information system which is implemented within a firm for the purpose of improving the effectiveness and efficiency of that firm.

2.2. ERP System

According to one study conducted by (Oracle NetSuite, n.d.), the term ERP was named in 1990 by Gartner, but its roots date to the 1960s. Back then, the concept applied to inventory management and control in the manufacturing sector. By the 1970s, this had evolved into Material Requirements

Planning (MRP) systems for scheduling production processes. Subsequently, in the 1980s, MRP grew to encompass more manufacturing processes, prompting many to call it MRP-II or Manufacturing Resource Planning. By 1990, these systems had expanded beyond inventory control and other operational processes to other back-office functions like accounting and human resources, setting the stage for ERP as we've come to know it. Therefore, an ERP system can be seen as an extended version of an MRP system with a highly integrated structure.

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.).

There are definitions of ERP system from different scholars when they are engaged to study the ERP system. Thus, ERP system is a software which integrates all departments and business processes across a company onto a single computer system and database. It attempts to serve the various departments and their particular needs in a compatible way and to offer even more for the entire enterprise, such as up-to-date information about the status of a specific activity (Babić & Roys, 2009). Another definition by E-Devel (2016) defined an ERP system it includes a range of features such as human resources management, accounting, internal accounting, asset and inventory management, production management, and project management, maintenance and asset management that communicate each other the department in a real time. Therefore, ERP systems are the most advanced versions of MRP systems and can handle almost any key information that are generated in an enterprise. An ERP system has been one of the most popular business management solutions, providing benefits of real-time capabilities and seamless communication for business in large organizations. Moreover, an ERP system affords various tangible and intangible benefits which helps to enhance the business growth. Some of the benefits are integrated online working of all the resources facilitating faster decision-making,

lowering inventory costs, reduction in process cycle time, productivity enhancement, customer satisfaction, manpower optimization among many other benefits (Prakash & Dixit, 2011).

The important features of the ERP system include the so-called cross-functionality, i.e. the ability to design, calculate and automate tasks between different processes. The common information system simplifies the operation between the various departments and reduces duplication of work. Simultaneously, management of the firm will be enhanced as information on the state of the company is always up to date.

In addition to ERP systems, firms advance their processes, knowledge, and decision-making via various ERP-related extensions such as CRM, SCM, and data warehousing and reporting systems (BIs). Although ERP has previously been seen as a large corporate information system, ERP has become an integral part of ERP in the 2000s also for small and medium-sized enterprises (SMEs), as well as for public administration.

2.2.1. ERP System Usage

The multi-purpose use of the internet is frequently promoting changes, development of the world's communications, and interchange of information. Since the globe is becoming an entireness, more and more enterprises are appreciating the importance of information system, and ERP systems have the potential for operational, managerial and strategic benefits if successfully implemented (Fang, Li, Lu, Sun, & Ye, 2009). Information system usage has been proposed to in several studies as a measure of the success of an information system. Lippert and Forman (2005) indicated that the information system usage paradigm provides a measure of post-implementation behaviors.

An ERP system usage refers to how users use the features of the system to do a task. System usage is a critical predictor of information system implementation success and thus for complex systems such as ERP systems. The usage behavior needs to be deep and advanced for companies to realize inherent benefits (Schwarz & Chin, 2007; Nwankpa & Roumani, 2014a). Thus, ERP system usage is an important measure the system success after ERP implementation. According to (Floyd, 1989), ERP system usage includes automating and informating. Automating refers to using ERP systems to automate business processes, so that these processes can be performed with more

continuity, consistency, and control. Informating, on the other hand, means that ERP systems are used to generate information about the processes by which an organization accomplishes its work or the comprehensibility of an information. ERP system usage in automating is a basic function of an ERP system and one of the first benefits experienced by an organization, while usage in informating is often not being carried out completely (Lorenzo, 2001). Besides, as a report by Jasperson (2005) indicated that firms need to encourage and enable utilizing the ERP system effectively to get full advantage of ERP benefits after the ERP implementation. A similar way, according to Benders (2009), empowerment is one of the organizational benefits of having an ERP system. The use of ERP system can be empowering the user because it increases a user accountability, autonomy, and feels ownership of the system.

In a study by Chang, Cheung, Cheng, and Yeung, (2008) examines the social factors, compatibility and the belief of enhancement on end-user's job responsibility have been found to positively influence ERP system usage. Similarly, Nwankpa and Roumani (2014) found that managerial commitment and user satisfaction are the main forecasters of ERP system usage.

Typically, as the ERP system usage by the end-user increases, the chances of achieving stated goals of the firm also increases. But, ERP system usage difficulties can undercut the anticipated benefit expected from the system and can also demoralize users' ability to understand and adopt new business processes featured in the ERP package. ERP system usage problems have been raised due to inadequate training, insufficient support for end-users and severity of the implementation choice (Nwankpa & Roumani, 2014).

2.2.2. ERP System Benefits

Organizations invest in ERP systems to meet important benefits. These benefits may come in the form of improved business productivity such as shortened lead time, lower cost and efficiency communication among functional boundaries (Nwankpa & Roumani, 2014; Watson & Schneider, 1999). In fact, ERP benefits can vary from industry to industry in many cases, may depend on the implementing firms (Davenport, 2000). Prior extant literature has attempted to understand the drivers of ERP benefits. In a similar way, Gattiker and Goodhue (2005) found that overall ERP

benefit was facilitated by intermediate benefits and that realizing intermediate benefits was a precondition to attaining general ERP benefit. As a report by Chou and Chang (2008) confirms that role of intermediate benefits as a predictor of overall ERP benefit but also found that customization and organizational mechanisms were strong predictors of intermediate ERP benefits.

2.2.3. ERP System Usage in Manufacturing Industry

ERP systems solve a number of challenges and provide invaluable benefits to manufacturers seeking to cut costs, manage growth, streamline processes and gain a competitive advantage. The ERP system tool helps a business to grow proactively by bridging the gaps between customers to suppliers and from suppliers to employees. ERP system improves the managerial capabilities to manage the product data. It affords the essential ability to track different activities of the manufacturing company: the numbers, bills, routes and work centers all together so that the change within a product can be managed and controlled, based on its life-cycle phase.

For manufacturing firms, ERP has the capacity to turn a complex and sophisticated manufacturing plan into one which is well systematized and easy to use with data accuracy and readiness for reproduction. The ERP system combine the Master Production Schedule (MPS) with Materials Requirement Planning (MRP) to support all the control involvements in both the discrete and continuous production lines, with room for making linear adjustments to change the result and meet changing demands from the customers.

ERP tools give the comprehensive requirements to be productive, as well as relevant operations for completing, and reworking results with quality. They create the flexibility that manufacturing companies need in their discrete and continuous production processes (Winman, 2017). ERP software integrates all areas of businesses (materials and inventory, production, operations and sales, accounting and finance, etc.) so that every business function relies on a central database. This “information hub” delivers right, real-time information crucial to the manufacturing firms.

The main reasons to adopt or use ERP in the manufacturing sector are:

- Streamline Processes. As manufacturers grow, their operations become more and more complex. ERP manufacturing software automates all business operations, providing the right, real-time information. ERP increases efficiency and productivity by helping users

navigate complex processes, preventing data re-entry, and improving functions such as production, order completion and delivery.

- Cost Reductions. With one source of exact, real-time information, ERP software reduces administrative and operations costs. It allows manufacturers to proactively manage operations, prevents disruptions and delays, breaks with information logjam and helps users make decisions more quickly.
- Flexibility. Modern ERP systems are robust, flexible and configurable. They are not a one-size-fits-all proposition but can be tailored to the unique needs of a business. ERP systems also have the ability to adapt to the ever-changing needs of a growing business (WorkWise, n.d.).
- Competition. ERP systems invest, but there's also a cost to do nothing. Manufacturers cannot afford to put off an ERP implementation while their competition invests in ERP and starts reaping the benefits.

2.3. User Satisfaction

User satisfaction is the extent to which users believe the information system available to them meets their information requirements (Ives, Olson, & Baroudi, 1983). This implies that users perceive the system regardless of its technical quality, focuses on the realizing a user need. But reports by Kim and K. (1989) describe user satisfaction in terms of information quality, system effectiveness, and user attitudes. Similarly, Doll and Torkzadeh (1988) measured user satisfaction only in term of system quality (i.e. system accuracy, reliability, maintainability, response time, ease of use) and information quality. User satisfaction can be observed from the acting, feelings and attitudes of users while dealings with the information system.

In human-centered design, the technology or business process is designed to make participants work as effective and satisfying as possible. User satisfaction is one of the dimensions measuring the success of an information system. IS researchers have long measured the success of an IS system by measuring user satisfaction. The critical success factors from the perspectives of key stakeholders including end-users is largely missing in ERP implementation (Finney & Corbett, 2007). Hence, the measurement of users satisfaction with IS remains of major alarm to researchers.

User satisfaction measures are categorized in terms of three perspectives such as user attitudes to IS, user satisfaction in terms of information quality, and user satisfaction in terms of perceived IS effectiveness (Kim & K., 1989).

DeLone and McLean (2003) included a number of related articles that address the issue of user satisfaction in their IS success model research. They conclude that user satisfaction is widely used as a measure of IS success because reliable instruments have been developed to measure a user satisfaction. Based on this, we can measure the factors affecting user satisfaction by using DeLone and McLean IS success model as a base.

2.4. User Satisfaction and IS Success Model

Currently, firms tending to switch from the legacy system into the modernized information system such as ERP system to compete with the dynamic business environment. Therefore, implementing an information system or ERP system successfully are crucial to compute with rivals. However, on the other hand, the evaluation mechanism of IS system success or ERP system success is important and challenging tasks, especially from user perspectives. The main aims at IS success model are to improve evaluation, plan implementation, and to see the easiness of the system, usability of the system from user side view. In this global competition, enterprises must make the best business resources on the configuration, which can help them to survive and sustainable their business. Besides, limited literature has focused on measuring the success of an ERP system from the user angle. But, it is very important to measure the success of ERP system from the user side since a lot of financial and human resources are invested in the ERP project implementation. Thus, the IS success model has been assessed and validated in range of IS use contexts. And the following are IS and ERP success measurement models.

2.4.1. DeLone and McLean IS Success Model

DeLone and McLean formed their novel Information System success theory back in 1992 (DeLone & McLean 1992) where they recognized the dimensions that decide whether an information system is effective or not. The model was updated in 2003. When they designed their

first IS success model, DeLone and McLean go through information system literature on various measurement of success model and addressed the interrelationship between them from 1981 to 1987 to develop the constructs of information system success (Petter & Mclean, 2009). According to DeLone and McLean (2003), information system is divided into technical, semantic and effectiveness levels in terms of success. Shannon and Weaver works used as their main reference to the definition where technical level is defined as the accuracy and efficiency of the communication system that produces information, the semantic level as the success of information in conveying the intended meaning and effectiveness as the aftermath of information on the receiver which is at the person and firm level. The original IS Success Model designed in 1992 defined the dimensions of IS success as System Quality, Information Quality, User, User Satisfaction, Individual Impact and Organizational Impact (DeLone & McLean, 1992). Systems Quality measures technical success, information quality measures semantic success and use, user satisfaction, individual impacts and organizational impact measure the effectiveness of success based on (Shanon & Weaver, 1949).

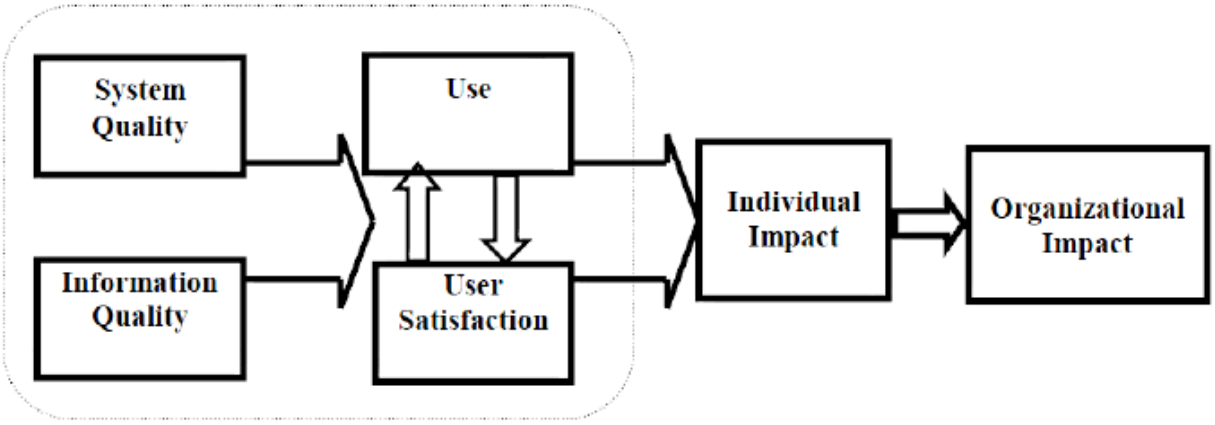


Figure 2. 1. The first DeLone and McLean IS success model (1992).

Since many researchers extended and applied in various application the original IS success model, DeLone and McLean need to update the model. After one decade updated in 2003, DeLone and McLean revised their model by adding service quality and intention to use/use as new

dimensions and by merging the personal impact and organizational impact into net benefits.

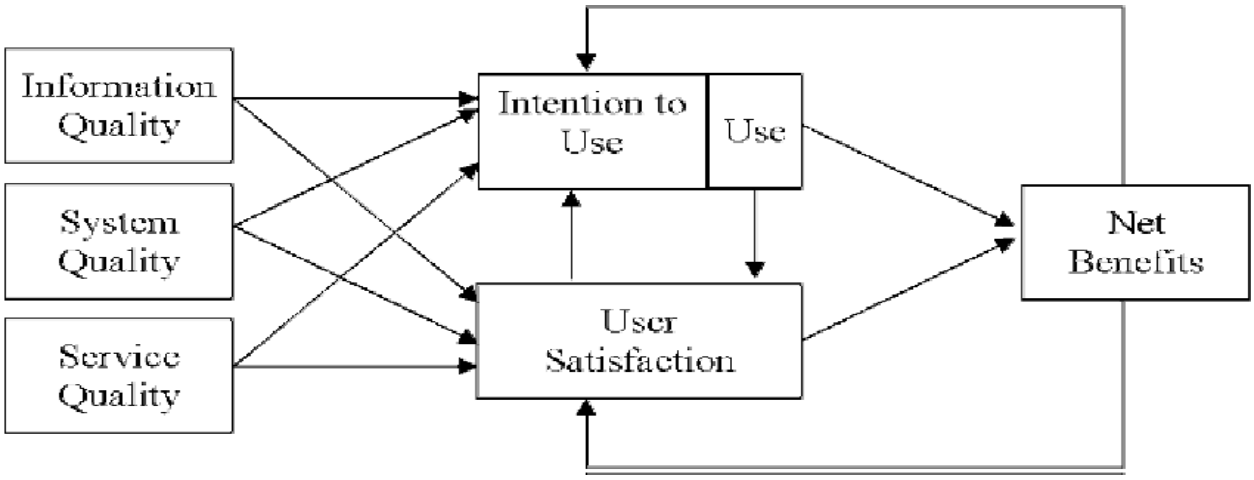


Figure 2. 2. The updated DeLone and McLean IS success model (2003).

The updated DeLone and McLean model defines the information system success via focusing on the system quality, information quality, service quality, intension to use/use, user satisfaction, and net benefits dimensions. These qualities should be measured or controlled separately, when they combined, they will affect use and user satisfaction. Intention to use is provided as an alternative measurable dimension for use, viewing intention to use as an attitude and use as a behavior. Use and user satisfaction are also interrelated, as use must precede user satisfaction in a process sense, the information system is used in order for user satisfaction to be occurred. Positive experience with use leads to greater user satisfaction which causes a causal link between use and user satisfaction. Use and user satisfaction finally affect net benefits, which captures the balance of positive and negative impacts of the IS (DeLone & McLean, 2003).

I. System Quality

System quality is generally categorized into a technical measure that is concerned with how good a system is from a technical perspective. In their study, DeLone and McLean (1992) explained that system quality considers the features wanted for a system to produce information that is useful for decision making. According to Seddon (1997), system quality is focused on the topics such as system bugs, user interface, and ease of use. While, Petter, DeLone, & McLean (2008) argued that system quality studies the performance features such as reliability, convenience,

ease of use, and functionality. From their point of view, however, DeLone & McLean (2003) proposed that system quality is an appropriate measure of the desired characteristics of an ICT system.

II. Information Quality

According to Seddon (1997), information quality refers to the quality of information produced by an information system that are suitable for firms success, and it is a vital factor for evaluating the success of the information system. Information quality also looks at content, accuracy and the format of the information generated. The most common measures that have been used in the past studies for information quality includes timeliness, completeness, availability, consistency, accuracy, and relevance (DeLone & McLean, 2003). Seddon and Kiew (1996) studied that relevance, accuracy, format, and timeliness used to measure the information quality whereas DeLone and McLean (2003) planned relevance, completeness, ease of understanding, personalization, and security as important information quality measures in an ecommerce context.

III. Service Quality

In the light of DeLone and McLean (2003), service quality is defined as the general support delivered by the service provider like a technical support. The measures used in past studies to measure system quality are quick responsiveness of the support team, efficiency of the support team, and availability of support services when needed. Thus, end users of information systems are look upon as customers and if support does not come as anticipated, this leads to users being unhappy and ultimately, poor performance and low productivity. The choice of measures used for service quality may, however, vary based on the type of study in question (DeLone & McLean, 2003).

IV. Use

System use can be defined as the extent to which the capabilities of information systems are utilized by users in task performance. Among the procedures that have been used to measure system use are frequency of use, number of accesses, dependency, usage pattern, and time of use

(DeLone & McLean, 2003). According to DeLone and McLean (2003) deals with that use and intention to use are alternatives in their model, and that intention to use may be worthwhile in the context of mandatory usage. Where the use of the system is voluntary, Use is regarded as an actual behavior and hence preferred rather than intention to use as a success variable.

V. User Satisfaction

In accordance with DeLone and McLean (2003) reflects user satisfaction to be the most important means of catching the users' view concerning the use of information systems. Various studies show that user satisfaction is frequently used as measure of the IS success (DeLone & McLean, 2003). Most commonly used measures for user satisfaction are accuracy, reliability, timeliness, relevancy, ease of use, and quality of content.

VI. Net Benefits

According to Petter (2008), this dimension is concerned with how information systems contribute to the overall success of individuals or organizations. Thus, it is related to benefits and values that reflects positively on the individual, community, or organization.

According to Seddon (1997) studies reveals that three main aspects of IS make the greatest contribution to our understanding of what makes a successful IS model. First, a successful model provides a classification system for many information system success measure which have been addressed in previous studies. Secondly, their approach begins to identify relevant stakeholder groups in the process of evaluation. And finally, the model proposes temporal and causal interdependencies between the constructs.

According to DeLone & McLean (2003), system usage is one of the determinant factors to achieve the anticipated business goals of an organization. A DeLone and McLean IS success model are one of the most cited popular information system success models used to measure the information system success depending on the predefined interrelated factors. A DeLone and McLean IS success model is a user-centered approach when trying to judge ERP success measure. These important user side performers are an end user, technical administrator, and IT executive

personnel. According to DeLone & McLean (2003) measuring the success of information system is useful if their value and contribution to the user as well as firm effectiveness are considered. Therefore, measuring ERP system usage from the user perspective based on the updated DeLone & McLean IS success model helps to assess factors affecting a user satisfaction and to enhance the anticipated business goal set by the firm. Because the user of the system reflects how the system is usable and efficient in their day to day operations.

The DeLone & McLean IS model measures the following interrelated categories of IS success measure: system quality, information quality, service quality, use/intension to use, user satisfaction and net benefits. The model postulates that system quality, information quality and service quality are the three major determinants of system use and user satisfaction, which in turn a positive effect on the net benefits (individual and firm level). Since this study focuses on examine factors affecting the user satisfaction on ERP system usage based on the updated DeLone and McLean IS success model and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995). The organizational support factors (management support and social capital) and self-efficacy as of individual capacity factor are studied in depth alongside with the DeLone and McLean IS success variables to enhance system usage and in turn enhance the user satisfaction in MIE. Therefore, management support, social capital, and self-efficacy are factors that needs to incorporate into updated Delone and Mclean IS success model variables to form the conceptual model that measuring the factors affecting the user satisfaction with ERP system usage.

2.4.2. The Gable/ A Priori Model by Gable, Sedera and Chan (2003)

A Priori Model is a model used for IS/ ERP system success measurement. The "A Priori Model" was using five constructs and 42 sub-constructs. The main aim of this model is to find out the impacts of this system on the individual and firm level. The five constructs are system quality, information quality, user satisfaction, individual impact, and organizational impacts. The DeLone and McLean variables were used as the basis of the preliminary ES success model. Variables of the DeLone and McLean model offered a holistic view of the miscellaneous roles within the organization and presented a classification of success variables. 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.

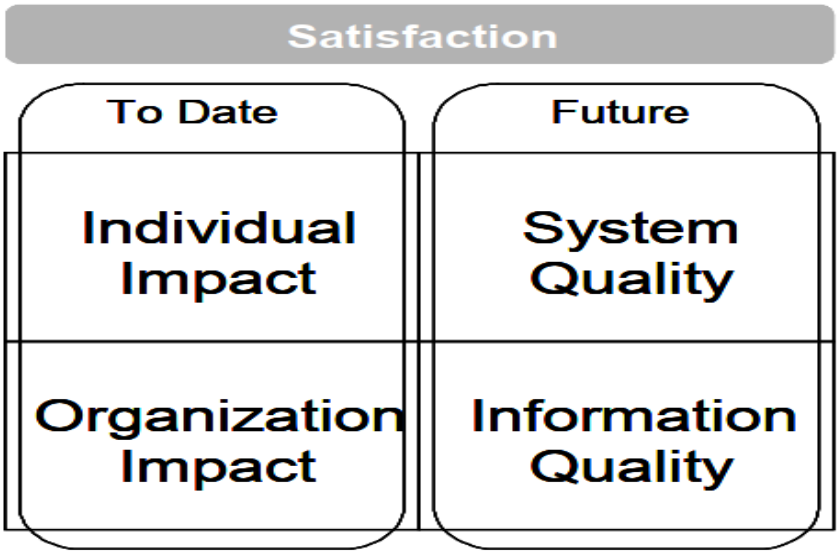


Figure 2. 3. Revised model of Gable (2003)

2.4.3. Balanced Scorecard (BSC)

Wiese & Rosemann (1999) proposed the Balanced Scorecard (BSC) and it is the supplementation of traditional financial measures with three additional perspectives; the customer perspective, the internal business process perspective and the learning and growth perspective. The BSC can be used for evaluation of these tasks and afterwards for the strategic planning of the future expansion of the system based on the assessment results. The purpose of using the Balanced Scorecard is to control the running of ERP system four standard perspectives of the novel model adjusted to the specific object of an ERP system.

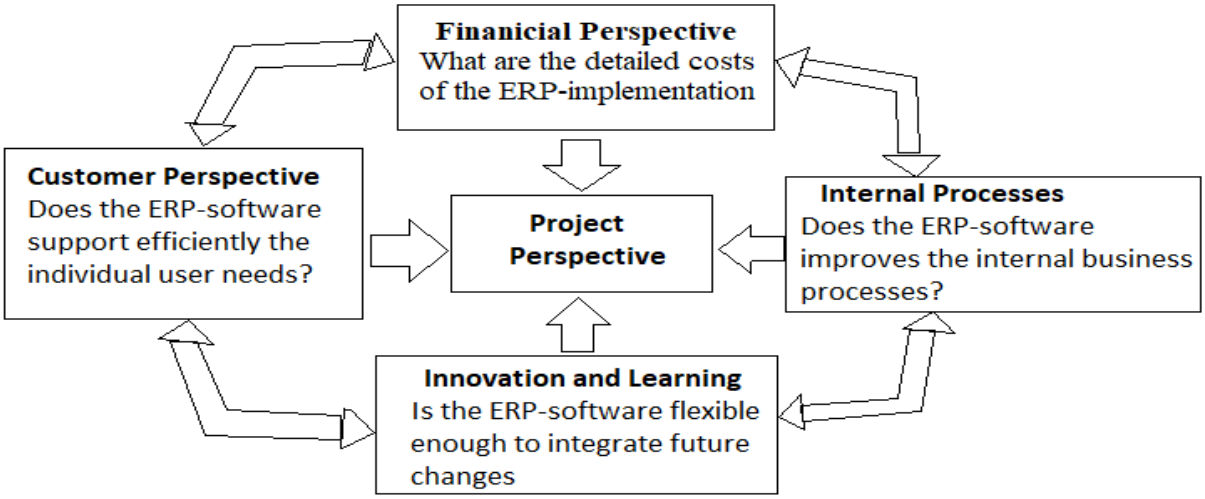


Figure 2. 4. The ERP implementation Balanced Scorecard, Wiese and Roseman (1999)

2.4.4. Technology Acceptance Model (ATM)

Davis & F. (1989) has developed technology acceptance model which is one of the prevalent models based on the theory of reasoned action that predicts use and information system acceptance by end-users. Different studies related to the TAM model examines the individual technological acceptance behavior in different information systems constructs. In TAM model, there are two factors perceived usefulness (PU) and perceived ease of uses (EoU) which are relevant in computer use behaviors. According to Davis the perceived usefulness is the prospective users subjective probability that using a specific application system will enhance his or her job or life performance. Perceive ease of use can be defined as the degree to which the prospective user expects the target system to be free from effort. According to TAM model, ease of use and perceived usefulness are the most important determinants of actual system use. These two factors are influenced by external variables. The main external factors that are usually manifested are social factors, cultural factors, and political factors. Among these social factors include language, skills and facilitating conditions. To sum up, a TAM model indicates the relationship between external variables, perceived usefulness, perceived ease of use, attitude toward use and actual usage. A TAM model provides information on how the design choices influence user acceptance of technology.

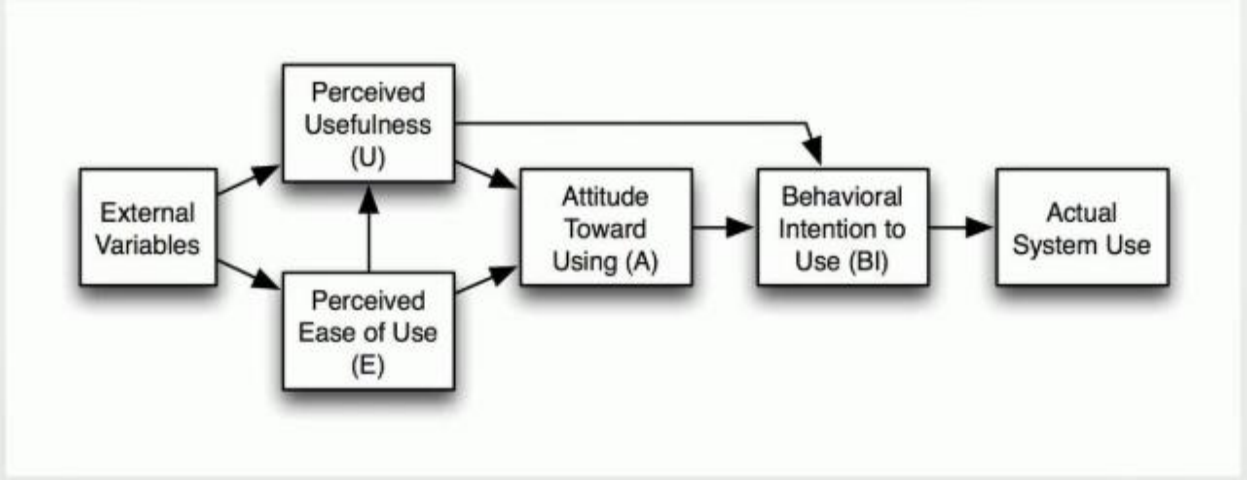


Figure 2. 5. TAM model by Davis (1989)

2.5. Comparison Between the Model

There are bunch of IS success models that helps to evaluate user satisfaction with the system usage. The IS success models have its own measurement criteria. Thus, it needs to select the appropriate information system success model based on the specific context. The TAM model, developed by Davis (1989) is used to measure the acceptance, adoption, and use of information technology. TAM model has increased its applicability and applied in various studies by different researchers and it's one of the most known influential models. Even though the acceptance of information system is a necessary precondition for system usage, but it does not measure success instead it is used to study and predict the user's intention to use information technology. The A Priori model by Gable is a model developed based on the DeLone and McLean IS success model (1992). The overall aims of this model are to address the satisfaction of users with the information system usage. But the use dimension or construct is missing in this model as well as it is not causal model like DeLone and McLean IS success model. Thus, makes difficult to measure the user satisfaction when the ERP system usage described as one dimension in the model designed to measure factors affecting user satisfaction on ERP system usage in this study. The BSC approach by Rosemann and Wiese used to measure the overall success of the information system or ERP system from various perspective comparing with DeLone and McLean IS success model it differs the dimensions they used and the way to measure IS success. In BSC approach still, the system

usage dimension is omitted and without the system usage measuring the user satisfaction is very difficult. On the other hand, in this study, the researcher wants to examine the user satisfaction on ERP system usage which related to system success from the user perspective. According to DeLone and McLean (2003), measuring the success of information systems is very important if their value and contribution to the user and organizational efficiency are to be understood. Finally, the DeLone and McLean model is widely accepted and the most popular model of IS success measurement selected as theoretical foundation for this study.

2.6. Related Works

The perceptions of the ERP system users are the core factors to enterprise resource planning (ERP) success. Thus, an ERP with no longer user satisfaction is less likely to be used by the end-users of that system (Wang & Wu, 2007). Gantley (2007) proposes the evaluation of the system that intensifies the user satisfaction and improves the understanding of usability in the post-implementation phase. Researchers focus on the ERP pre-implementation success but more emphasis needs to the stages once go-live kicked off. The study focused on in-depth case-based qualitative study approach. The findings indicate that, the factors such as an empowering user is critical task before letting them use the system. In addition, structured post-implementation evaluation needs to be incorporated in their evaluation mechanisms.

Sifat, Keju, Dari, and Kerbau (2013) proposed that the data quality contemplated as vital factor for leveraging user satisfaction while using the system. In this study, data quality describes as the information quality and defines the data that appropriate to the users desire. According to the research of Hassanzadeh (2012), a model designed to measure e-learning systems success in Iranian universities. They used DeLone and McLean IS success model of information systems as a measurement. Since e-learning systems are kinds of information system and learners use the system for learning. The result shows that a conceptual model design and customize it for e-learning. In returning to the previous point, we can conclude that this conceptual model help effectively to measure user satisfaction while using the ERP system in the manufacturing sector. Similarly, as for Calisir and Calisir (2004), the study is assessing usability characteristics of perceived usefulness, and perceived ease of use to end-user satisfaction with ERP systems over

the past few years, firms around the world have implemented ERP systems. A survey-based study, the results indicate that both perceived usefulness and learnability are determinants of end-user satisfaction with ERP systems. In addition, perceived ease of use and system capability affect perceived usefulness, while user guidance influences both perceived usefulness and learnability. From this, we can understand that the system quality capability helps to enhance user satisfaction high in the case of ERP system usage.

In a study by Sukumaran (2016), an EUCS used to measure end-user satisfaction in the ERP system usage in India. The study also attempted to find the differences in satisfaction among the employees having different work experiences and demographic characteristics. The finding shows that a positive relationship existed between the success of ERP and the length of organizational experience of the employees. Moreover, the study did not find significant differences in the levels of satisfaction based on gender, age, level of managerial position and educational background. Overall, the EUCS features are mainly targeted the information and system quality which are the most important antecedent of user satisfaction in system usage. Furthermore, according to Gelderman (1998), a user satisfaction is key factor that increase individual performance by using the system frequantly and acts as a medium to achieve the business goals of a firm.

Moshe, Nava, and Ron (2004) provide evaluation technique to measure user satisfaction and perceived usefulness in the ERP context. The finding shows that a strong correlation between perceived usefulness and user satisfaction, suggesting that perceived usefulness is one of the factors affecting user satisfaction with ERP systems. On the other hand, hypotheses testing revealed no supporting evidence for possible relationships between user satisfaction or perceived usefulness and organizational characteristics such as the department to which the respondent belonged or user characteristics such as organizational level, education, age, computing experience, and gender. From this study, we can conclude that a system quality and individual capacity are factors that foster the user satisfaction in the ERP system usage.

Brogowicz (1990) conducted a study based on the synthesized service quality model with managerial implications that management must determine both what customers expect and how they expect to get it. Management must plan, implement and control the service offering to reduce

service quality gaps and the model presents the overall service quality gap as a result of both technical and functional quality gaps. According to Bento & Costa (2013), aims at developing new ERP Measure Success Model. He defined and evaluated the effect of different models and frameworks on the entire phases of ERP system in order to achieve the success of ERP system. Finally, the report comes with a new model that especially bases on the DeLone and McLean IS success model. In addition, Mukti and Rawani (2016) investigated on the ERP system success model. They examined the existing various theories and success models. At the end of the study, the researchers come up with success factors and success indicators. The human supported organizational factors, organizational clarity and vendor related factors are categorized as success factors and the success indicators are system quality, information quality, organizational impact, project success and benefits of usage.

A research by Bhat, Shroff, & Bandi (2017), the implication of employee perceptions, motivation and use of ERP system to the anticipated business objective of firm. The approach selected for this paper is a case study based qualitative research method. The result of the study describes that ERP usage varies by the end users. The structure of the organizations, Information technology management capabilities and lack of exposure of the administrative staffs to IT are the main reasons to vary the end user's perspective towards the ERP usage. Study by Al-jabri (2015) have used the constructs of training, communication, benefits, and ease of use (EoU) as a main factor to examine user satisfaction with ERP system usage. A survey research approach was used in this study. The results of the study revealed that training, communication, benefits, and ease of use have a positive significant influence on user satisfaction.

According to Kalb (2011), a research on the identifying antecedent of end user's satisfaction with ERP system implementation. A descriptive-exploratory survey strategy followed to investigate the contemporary phenomenon of the firm. The information system theory is applied for the end-user satisfaction evaluation. The result of Kalb (2011) confirmed that it needs a detail emphasis on the service factors (dependability and support) and knowledge quality factors (user training level and system understanding) components. Thus, directs to have a more precise assessment of end-user satisfaction. Chang, Chou, Yin, and Lin (2008) examined how employees can effectively take advantage of an ERP system. It's a qualitative approach study and they used

cross-sectional mail survey to collect the data among employees who use ERP systems in their daily work. The post-implementation learning plays an important role in facilitating ERP usage and this promotes individual performance. As the result of the finding revealed that the learning role after the post-implementation phase boosts the ERP usages, individual performance, productivity, customer satisfaction and management control. Akbulut and Motwani (2005) studied to gain a deeper understanding of end-user perceptions towards the ERP system. A mixed research approach used in this case-based study. The result of investigation shows that end-users play a key role via using the ERP system in their routine activity to achieve the anticipated business goals of the firm. Besides, the user perception also helps managers, project leaders, ERP vendors and consulting companies to readjust their assumption to ERP success. The report by Dezdar (2012) investigated on one of the critical factors for the ERP project success which is user satisfaction. The research applied a quantitative approach which is a survey-based questionnaire to the user of the system. Neglecting a number of important factors in ERP project might lead to failure instead of success. And the outcome intends that more educated and younger employee are more satisfied with the ERP system.

The study report by Alhanatleh (2016), a factor that have an impact on user's attitude to using and managerial decision-making support of cloud ERP system. The study covered pre-and post-implementation phase of ERP to get the reliable result. It's a quantitative approach research design that uses a questionnaire to collect data from the users of the systems. The result from the study shows that technology, employee, perceived usefulness and perceived ease of use are the main factors that have an impact on the users attitude to use and improve decision making level via the cloud ERP. As Bai (2015) stated that the influence of ERP implementation on information exchange costs and employee motivations. A quantitative approach using the survey to collect data from users of the ERP system via questionnaire. As the finding shows that the ERP implementation has a negative effect on information exchange costs and a positive effect on employee motivation. This study show that the involvement of user has a positive impact on the ERP system operation.

According to, Wang, Greasley and Albores (2016), the informal system integrating with the ERP system in order to deliver the maximum performance of the ERP system after the post-implementation. The research is an empirical study of multiple case studies and data collected

through the semi-structured interview from IT users and managers in the different companies. The findings from the study suggest that a system consisting of informality in combination with ERP system can elicit knowledge from employee oriented leading to timely improvement in the system. And this can be achieved by facilitating collaborative working among all employees according to the study result. Shivani, Ravi, and Deepak (2013) studied predictors for user satisfaction in ERP implementation in technical university institutions. A survey-based study applied and data collected through the structured questionnaire. In general, the findings of the study show that a DeLone and McLean IS success model constructs system quality and information quality are the antecedents that predicts the user satisfaction with the ERP implementation. Then the study recommends firms to focus with stated the DeLone and McLean IS success factors to enhance the user satisfaction while implementing the ERP systems.

Mahmoud (2012) investigated that on one of the factors to fail ERP system is user resistance. The researcher main focus is to identify the factors leads to user resistance and propose a solution to fix such a problem that will happen in the post-implementation phase. To accomplish this objective, a quantitative method used to collect data via questionnaire from 95 ERP system users. Findings from the study indicate that lack of user education and training, lack of communication, lack of user involvement, usability issues and resistance to technology are factors that lead to user resistance to use the ERP system. As a solution for the stated factors is facilitating user involvement in the evaluation part, fostering communication between end-user, and user training are important tasks.

According to Ermais M. (2016), a case-based assessment on ERP utilization with special reference to SCM in Ethio telecom. The main aim of this study was to add the importance of system features and SCM performances in Ethio telecom. A mixed mode of study which is the qualitative and quantitative approach were used to investigate the study. Findings from the study shows that better management of system features, enhancing the end-to-end system integration of SCM, item standardization to avoid information duplication, real-time report availability and support team are vital for better management and smooth operation of the SCM. Finally, as a recommendation the researcher state that user participation during the implementation, user training is vital to achieving the ultimate goal of the system. Besides as the report by Mulat M.

(2016) investigated that the achievement, challenges of the integration of ERP and CRM for quality service delivery in case of Ethiopian Airlines. The mixed research approach was used to analyze the data gathered from the case base study. The study uses SERVQUAL model to assess the perception of the customer on the service quality delivered by Ethiopian Airlines. The outcomes from the research illustrate that the higher-level managers of the company need to understand the user perception towards the service delivery and employee attitudes on the system usage. Thus, helps for supplementary enhancement the system, employee satisfaction and customer service delivery in the meantime. A research by Sofia Ahmed (2017), a factor affecting the implementation of enterprise resource planning at the commercial bank of Ethiopia. The study focuses on factors influencing throughout the stage of ERP implementation. A qualitative research approach used to analyze the case-based study. The findings from the study show that the factor summarized into individual, organizational and technological aspect. Related to the technological factor the main points are such as technical requirement identification, ERP complexity and compatibility, data migration, business process re-engineering and other clarifies in detail. The organizational factor describes such as organizational political support, cultural factors, project management, organizational structure and finally the individual factors identified such as user support base for application, In-house expertise, change management, staff involvement are the main points. A similar manner, Demeke (2014) studied the success factors for implementation of ERP system at Ethiopian Airlines. The research uses a qualitative approach to identify the determinant factors for the successful implementation of ERP in the firm. The findings of the study indicate that factors such as top management support, organizational readiness, project management, consultant capabilities, are among the factors found critical for the ERP system implementation in the local setup.

2.7. Chapter Summary

The literature review focused on the evolution of factors affecting user satisfaction on ERP system usage and the user experience of ERP system usage. Above and beyond, assessing different information system success models and the methodology that helps to improve the system usage and in turn to the user satisfaction. The A priori model by Gable is a model developed based on the DeLone and McLean success model. Both A priori and DeLone and McLean IS success model where found to be similar in their purposes but differs in terms of the dimensions constructed. Technology acceptance model (TAM) examines the individual technological acceptance behavior. The other model is Balanced scorecard (BSC) approach still, the system use success measure is omitted and without a system use measuring the user satisfaction is very difficult. Therefore, DeLone and McLean IS success model is an appropriate model to assess the user satisfaction based on the constructs or dimensions featured in the model. Besides, according to relevant prior studies, the mixed approach is appropriate to this study on identifying the factors and measuring the conceptual model. Since, the quantitative approach helps to measure the hypothesis using the survey data and the qualitative one supports on contextualize the survey outcomes besides it triangulates the results. All this presented in this chapter shaped the basis for this study. The next chapter presents the rationale of research model and the research design used for this study.

CHAPTER 3

RESEARCH DESIGN AND METHODS

Introduction

The preceding chapter presented a review of pertinent literature that served as a foundation for the development of the research model in this study. This study focused on assessing factors affecting user satisfaction on the ERP system usage. By designing a conceptual model based on the updated DeLone and McLean (2003) IS Success model and relevant prior studies by (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995) to measure the factors affecting a user satisfaction on ERP system usage, tested and validated the conceptual model in a local context. This chapter presents also the rationale for the research model and the research design approach in this study. Then followed by a detailed explanation of the sampling design and the data collection procedures. Lastly, the data analysis process carried out and the ethical considerations of the study are explained.

3.1. Study Area

The study area of this paper is Mesfin Industrial Engineering (MIE). Employees who have used the ERP system in their routine tasks in the different department selected as a respondent for this case-based study.

3.2. Study Design

This study designed conceptual model to assess factors affecting user satisfaction with ERP system usage based on updated DeLone and McLean IS Success model and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995). The conceptual model is tested and validated in MIE. The independent variables used in the study were system quality, information quality, technical support, management support, self-efficacy, and social capital with the ERP system usage as dependent variable. Subsequently, ERP system usage intended as independent variable with a user satisfaction as dependent variable to see the effect. According to

Kothari (2004), a research design is the procedure of circumstances for collection and analysis of data in a manner that is appropriate to the purpose of a research. It is the theoretical structure within which a research is conducted and provides the framework for collection, measurement, and analysis of data. This study used a mixed research approach to address the objective of the study. Besides, it was adopted an updated DeLone and McLean IS success model as a theoretical framework to achieve the goal of this study. Therefore, it is a descriptive research that was employed a case-based study to test and validate the conceptual model of measuring factors affecting a user satisfaction on ERP system usage in MIE. The quantitative approach was used to infer the model and formulated hypothesis. In addition, the qualitative research approach helps to investigate a contemporary situation within its real-life context in the firm which is an in-depth explanation, user experience, personal opinion, and knowledge.

3.3. Research Model

The research model was designed by fusing the variables from the updated DeLone and McLean IS success model and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995) who focused on the dimension of (management support, social capital and self-efficacy) to enhance the system usage and business objective. Therefore, this study builds the conceptual research model to assess the factors affecting user satisfaction on ERP system usage. To achieve this purpose, this study adopted the technological, organizational support and individual capacity factor to enhance the predictive power of the conceptual model (see figure 3.1).

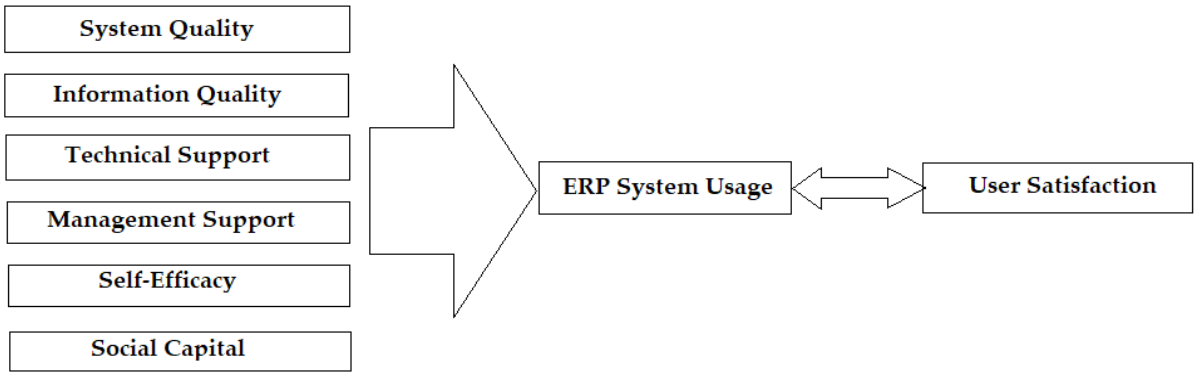


Figure 3. 1. Conceptual research model

The study was conducted based on the research model described in figure 3.1. As can be seen from the model system quality, information quality, technical support, management support, self-efficacy, and social capital jointly or separately affect ERP system usage then ERP system usagehave either a positive or negative effect on user satisfaction and vice versa. In return can have an impact in the stated anticipated business goal of the firm. To test and validate the research model in a local context, the following hypotheses were formulated:

3.3.1. System Quality

The system quality was used to assess the anticipated characteristics of the ERP system. The characteristics associated with the user satisfaction in the ERP system usage that has been used in this study are ease of use, flexibility, execution speed, reliability, consistency and availability (DeLone & McLean, 2003). Considering the importance of system quality, the researcher hypothesized as follows:

$\boldsymbol{H_{1a}}$ System Quality positively affects ERP system usage

3.3.2. Information Quality

Information quality looks at the features of the information produced by the ERP system. Typically, this success dimension is used to measure the system output considering (the report

format and semantics). The measures for information quality used in this study are availability, relevance, comprehensiveness, security, and timeliness (DeLone & McLean, 2003). The hypotheses formulated for information quality is:

$\boldsymbol{H_{2a}}$ Information Quality positively affects ERP system usage

3.3.3. Technical Support

Extant literature reveals that firms need to encourage and enable usage of ERP system to enhance user satisfaction and achieve the anticipated goal. Thus, ERP system usage is an important factor that can have an impact on user satisfaction while using the system. Therefore, IS support/IT support being an important component that influences the ERP system usage and in turn to user satisfaction. Information technology support (IT) is a service where firms offer help with support of expert to those who need support to use the system. Typically, IT support is used to help solve specific problems a person, or company may be having, rather than providing any training, qualifications or courses (Virtue Design, 2012). But, in this study technical support refers to the extent to which firms provides technical assistance and training for ERP system use-related issues.

$\boldsymbol{H_{3a}}$ Technical support is significantly affecting the ERP system usage

Based on the literature, the additional ERP system usage factors in the research model proposed in this study. Thus, helps to foster the predictive utility on user satisfaction in the ERP usage. According to Taylor and Todd (1995), factors identified to be relevant to ERP system usage and in return have an influence user satisfaction while using the system. Those can be derived from different literature perspectives such as social psychology and human-computer interaction. Therefore, the additional factors that this study validates are organizational support and individual capacity as exemplified in figure 3.1.

3.3.4. Management Support

Another one is management support; extant studies have indicated that information system use is affected by management support and external factors which helps to facilitate system use

(Premkumar et al., 1995). Management support facilitates through communications with the staff and active participation in the system activities and via resource support, which helps to reduce any psychological resistance by reinforces a positive perception linked to the system. Accordingly, if the management recognizes the potential benefits of an ERP system and shows strong support, this will create an appropriate condition for system users within the organization thus advancing the extent of system usage. From this perspective, the following hypothesis has been defined:

$\boldsymbol{H_{4a}}$ Management support is positively affecting the ERP system usage

3.3.5. Self-Efficacy

Self-efficacy refers to an individual's insight regarding his (her) own ability to execute courses of action needed to achieve designated performance. Due to prior experience in training individuals who have higher post training self-efficacy are more likely close to technology usage (Chou H. , et al., 2014; Compeau & Higgins, 1995). Therefore, a user with higher self-efficacy is closer to ERP system usage. This study proposes the hypothesis as follows:

$\boldsymbol{H_{5a}}$ Self-efficacy is positively affecting system usage

3.3.6. Social Capital

The social capital can be defined as a set of informal norms and values which is common to members of the definite group that facilitate collaboration among them. If end-users don't obtain adequate knowledge related to the ERP system, they can't execute tasks in the ERP system effectively and hard to achieve their anticipated goals. ERP system integrates the complete range of business processes in an organization, it requires users to work more tightly together. Thus, when the enterprise has a trust and good relationships, better knowledge sharing occurred which may have facilitated ERP usage (Chou H. al et., 2014; Kim & Lee, 2006).

$\boldsymbol{H_{6a}}$ Social capital is positively affecting ERP system usage.

3.3.7. ERP System Usage

ERP system usage is a measure of how users apply and use the features of an ERP System. ERP system usage is an important factor influencing user satisfaction in the ERP post-implementation phase (DeLone & McLean, 2003). Thus, using ERP system frequently and effectively helps to

foster user satisfaction while using the ERP system and helps to achieve the desired objectives of the firm (Lorenzo, 2001). Hence, the following hypothesis is formulated:

H_{7a} ERP system usage is significantly affecting user satisfaction.

3.4. Target Population

The population for this study consisted of a user of the ERP system: at the management, finance, supply, production, planning and monitoring, general service, design and marketing, human resource and information technology departments in the firm which uses the ERP system to their routine tasks.

3.5. Sample size and Sampling Techniques

As the study population was pre-determined, taking sample representative of the target population was necessary. These selected respondents have been described as being among the users of the ERP system in their routine tasks. The researcher gained an employee list from the human resource department at the MIE from various department across three branches of the firm. This was done in order to gather data from individual users who were commonly influenced by the Microsoft Dynamics SL ERP system. A list of 698 employees were therefore obtained. In view of the obtainability of the targeted respondents in various departments from the three branches which is located geographically dispersed across MIE, the researcher deemed convenience sampling to be tolerable for this study to ensure the adequate data collection in order to achieve the anticipated objective of the study. Convenience sampling is preferred due to the participant chosen based on the readily available and accessible to the researcher (Diamantopoulos & Schlegelmilch, 2006). The size of sample should neither be very large nor too small. The optimum size of sample is one that fulfill the necessities of representativeness and reliability. In a way that follows Kothari (2004) a study target that have finite population, sample size of the study is calculated by using the formula:

$$n = \frac{Z^2 \times p \times q \times N}{e^2(N-1) + Z^2 \times p \times q}$$

Where n= desired sample size

Z= the z-score at the required confidence level (93%) =1.81

P= the conservative proportion of sample size = 0.5

q= 1-p, q= 1-0.5, q= 0.5

e= marginal error (5%) = 0.05

N= population of the sample = 698

Therefore, for the population size of 698, the desired sample calculated as:

$$n = \frac{1.81^2 \times 0.5 \times 0.5 \times 698}{0.07^2(698-1) + 1.81^2 \times 0.5 \times 0.5}$$

$$n = \frac{571.67945}{4.234325} \quad , \qquad n = 135$$

Therefore, the desired sample size was 135 employees

Table 3. 1: sample size selected from the population

Department	Total number of employees	Sample	In percentage (from the population)
Finance	150	29	21.48%
Design and Marketing	83	16	11.9%
Production	120	23	17.2%
Supply	110	21	15.75%
Human resource	60	12	8.6%
General Service	30	6	4.3%
Information technology	30	6	4.3%
Planning and monitoring	115	22	16.47%
Total	698	135	100.00%

3.5.1. Data Collection Instruments

The study used questionnaire and structured interview to gather data. The researcher designed/used the interview guide and questionnaire based on the updated DeLone and McLean IS success model dimensions and from the prior research done related to this study. The questionnaires consisted of closed-ended questions to be answered by the respondents.

3.5.2. Questionnaire

Questionnaire was used to gather data in an appropriate manner from various department across branches of MIE. And they are inexpensive and can easily be administered to a large sample group. Saunders, Lewis, & Thornhill (2009) state that adopting items from prior studies allows consistency to be achieved and is more efficient than developing one's own items. Therefore, items for assessing system quality, information quality, technical support were measured by by the item developed by (DeLone & McLean, 2003). The item used to measure the top maganement support were adapted from (Premkumar & Ramamurthy, 1995). The instrument used to measure social capital were adapted from (Kim & Lee, 2006). Finally, the item used to measure the self-efficacy were adapted from (Compeau & Higgins, 1995).

3.5.3. Semi-structured Interview

In this study, interview assisted to gather evidence about the perspectives of managers, ERP project managers, and ERP system super users towards Microsoft Dynamics SL ERP system. Furthermore, the researcher interviewed three principals (manager, ERP project manager, and super user). It was useful additional techniques for the information gathering through other techniques (questionnaire).

3.6. Pilot Study

The purpose of the pilot study was two parts. The first one was to examine and validate the relevance of the questionnaire. It was also used to determine the appropriateness of the questionnaire questions. A pilot study was conducted before collecting the data in order to assess the reliability of the questionnaire by administered the questionnaire to the respondents from the

study population. It helps to know the content of the questionnaire, which involves testing the wordings of the question, to identify vagueness of the questions, and testing the techniques used to collect the data. To test the validity and reliability of the instrument, a draft of the questionnaires was distributed for ERP system users and to my advisor. They commented me that the instrument lack of clarity of the statement, and easiness. Considering their comment, correction had done to enhance the reliability of the questionnaire. After ensuring the questionnaire reliability, the researcher had administered the questionnaire to the rest of the study population. The reliability of the questionnaire is the level of consistency of the content of the questionnaire when measured what is made-up to be measuring (Pilot & Hungler, 1985). Cronbach coefficient alpha test is used to measure the reliability of the questionnaire. The regular range of Cronbach's coefficient alpha test value is between 0.0 and +1.0, and the higher values indicate that a good level of consistency. The table 3.2 below shows that the Cronbach's coefficient alpha test results. Therefore, Cronbach's coefficient alpha test can be applied to the selected respondents for the pilot testing in order to measure the consistency of the questionnaire.

Table 3. 2: Cronbach's coefficient alpha test

Reliability Statistics Using Cronbach Coefficient Alpha Test	
Cronbach's Alpha	N of Items
.852	45

3.7. Variables

For this study, the researcher designed dependent and independent variable. At the first level, all of variables fostering system usage: system quality, technical support, management support, social capital was found to be significant factors of the ERP system usage. In turn, ERP system usage was found to have a positive effect on user satisfaction.

3.8. Procedures of Data Collection

Based on the pilot testing result, the questionnaire readjusted and then go-ahead was requested from the administrative position of MIE to collect the data from the respondents. Supervision's was given, on the distribution and gathering of the survey and how to handle question raised from the respondents to the assistance of the data collector. Also, data collected for the qualitative section via structured interview by setting an appointment with respondents.

3.9. Data Analysis

Data analysis infers that measuring and finding the relationship among the data component (Kothari, 2004). This study adopted mixed research approach as it is a systematic way to examine and measured developed research model. Two kinds of data analysis method were used. For the quantitative one, the returned questionnaires from the respondent were validated, coded and tabulated for analysis. For qualitative one the analysis was done by coding, categorizing, and make sense of the essential meanings of the phenomenon once interviewed the target interviewee. Thus, the data was classified according the major themes. These themes were used to support and validate the survey findings. Correlation analysis was used to establish the relationship between formulated hypothesis. Linear regression analysis was used to evaluate the effect of independent variable on the dependent variable and validate the conceptual model. Finally, a comparative analysis was done using the mixed approach result and the research question was addressed based on the analysis result.

3.10. Ethics and Human Subjects Issues

The study was done under the recognition of MIE. And the confidentiality of the information from the respondent was secured. The confidentiality was secured by using only collecting information that was necessary to achieve the study objective that means develop the data collection instrument must not contain information that could identify the participant. The participants were advised that under the ethical rule, they were participating voluntarily and with no specific risks anticipated with participation in this study, such as psychological, moral, legal or

other risks, would occur with them. When required, the assistance of the data collector clarified to the respondent that their participation in the study was voluntary. To avoid such confusion, the questionnaire added an introductory page which describes the aim of the research, and the researcher identity. It advised the respondent to refer any queries or complaints they may have about the way the study was conducted to the ERP project manager office. In addition, a telephone number and Email was provided on the cover page of the (see appendix B).

CHAPTER 4

DATA ANALYSIS, DISCUSSION OF RESULTS & INTERPRETATION

Introduction

In the preceding chapter, the rationale for the development of the research models and the research methods employed in this study were presented. To complete this study properly, it was necessary to analyze the collected data in order to test the hypothesis and answer the research questions. As explained previously, questionnaires were used to evaluate the factors affecting user satisfaction with ERP system usage at MIE. The use of questionnaires was backed up by qualitative data collected through interview. The collected data was used to validate the conceptual research model in Mesfin Industrial Engineering (MIE). In this section, the result obtained from questionnaire and interview were analyzed. To supplement and enrich the information that was drawn using questionnaire, the data onto interviews were illustrated and narrated in plain text whereas the quantitative data analyzed by the support of Statistical Package for the Social Science (SPSS) tool. Therefore, the first part of this chapter discusses the respondent's demographic data whilst the second section deals with the analysis of the findings of the study in relation to the formulated hypothesis and research question.

4.1. Demographic Characteristics of Respondents

The data onto this research was used from the questionnaire administered to the ERP system users from different department across three branches of MIE. The ERP project manager assisted the researcher to contact with data collector assistance and helped to administer the questionnaire and return this favorable response from the respondents. At first, a total of 150 questionnaires were administered to various respondent out of which 102 questionnaires filled and returned. Among the returned questionnaire, 5 were unusable because of missing data. As a result, 97 returned questionnaires used for the analysis.

Figure 4.1 presents the gender distribution of the users of the ERP system and shows that 69.00 % of the respondents were male whereas 31.00 % were female. From this, the researcher understands that male users have an experience with ERP system in their work compared to female.

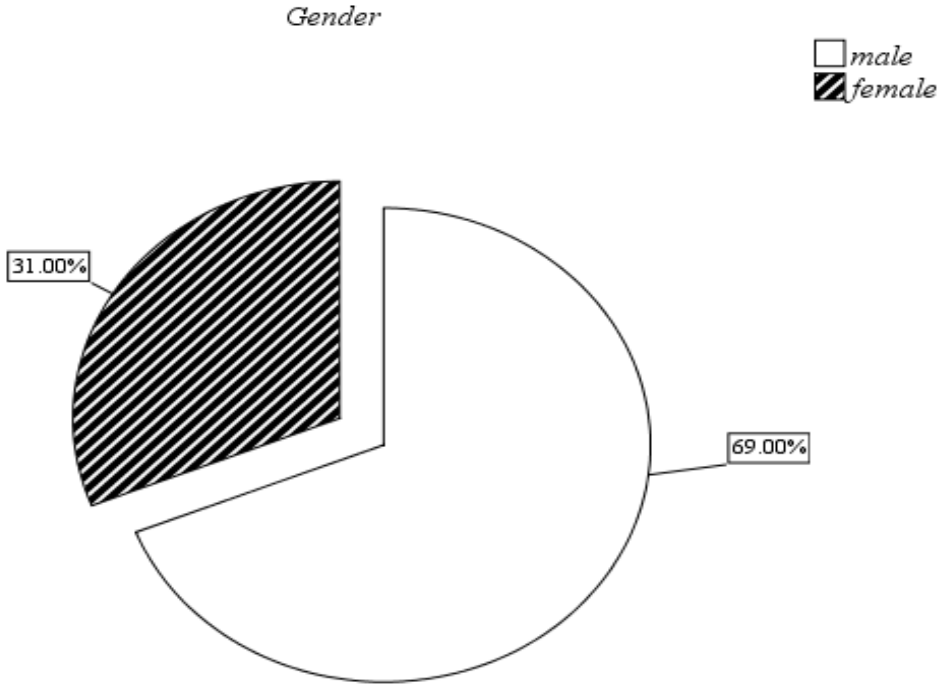


Figure 4. 1. Percentage of Male and Female who use ERP system

The features of the sample for the data analysis were constructed on age, department and work experience (ERP system usage) at MIE as presented in table 4.1. Respondents age group were as follows: 20-24 years (4%), 25-29 years (42.4%), 31-34 years (31.3%), and above 35 years (22.2%). As can be seen from the table 4.1 most respondent who uses the ERP system were aged between 25 and 29 years of age. And the less percentage (4.0%) respondents were aged 20 to 24 years.

Concerning to department, the majority respondents were finance (27.7%) compared to planning and monitoring (16.8%), supply (13.9%), information technology (12.9%), design and marketing (10.9%), human resource (7.9%), production (7.9%), and general service (2.0%). 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. 1: Characteristics of Respondents

Characteristics	Content	Frequency (%)
Age	20 - 24 years	4(4.0%)
	25 – 29 years	42(42.4%)
	30 – 34 years	31(31.3%)
	Above 35 years	22(22.2%)
Department	Human resource	8(7.9%)
	Finance	28(27.7%)
	Information Technology	13(12.9%)
	Supply	14(13.9%)
	Production	8(7.9%)
	Planning and Monitoring	17(16.8%)
	Design and Marketing	11(10.9%)
	General Service	2(2.0%)
Work Experience (ERP system)	Less than one year	12(11.9%)
	1 year to 5 years	69(68.3%)
	6 years to 10 years	16(15.8%)
	Greater than 10 years	4(4.0%)

4.2. Statistical Analysis for the Hypothesis Variables

In this section, the researcher analyzes 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 a number of questionnaire items in each dimension or variables. In this study, as we can see in table 4.2, 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), but in order to ease to understand and simplify the data analysis the Likert scale derived in to three levels: Agree composed of SA (strongly agree) and A(agree), Disagree made of SD (Strongly Disagree) and D (Disagree), and Neutral remained as Neutral.

Table 4. 2: Derived Likert scale

Likert Scale	
Strongly Agree	Combined to form "**Agree**"
Agree	
Disagree	Combined to form "**Disagree**"
Strongly Disagree	

4.2.1. System Quality

Table 4.3 presents the result of findings with regards to the respondents feeling for the system quality constructs. Of all the response obtained, 82% of respondent either highly satisfied or satisfied with the easiness of ERP system to use. While approximately 16% unsure about the ERP system easiness to use, and around 2% got it difficult to use the system. From the findings related to the practicality of the ERP system, about 95% of the respondents were either satisfied or highly satisfied with the practicality of the ERP system though around 5% only unconfident with the practicality of the system. As far as the speed of the system in terms of execution, the task was concerned, approximately 89% of the respondents were either satisfied or highly satisfied while 10% unsure and 1% were disappointed with system speed of execution. Regarding the availability of system to compute a task, around 69% of the respondents indicated that the system was available for their daily tasks while 22% of the respondents unsure and 9% have indicated that, the availability of system was low. The result depicts as a whole constructive response for the items used to measure the system quality dimensions.

Table 4. 3: Percentage response for System Quality items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
Using the ERP system is easy for me	2.09	15.61	82.30
Functions provided by the ERP system are useful for my work	0	5.21	94.79
The use of ERP system speeds up my work operations	1.04	10.42	88.54
The service of the ERP system is always available for my work	9.37	21.88	68.75

4.2.2. Information Quality

The table 4.4 below shows the percentages of the response for the information quality dimensions. Considering to the ERP system information availability, about 19% of the respondents indicated that satisfied or highly satisfied while 50% of the respondents were unsure and around 31% have indicated that unsatisfied with the availability of system for their routine tasks. Regarding the importance of the information retrieved via the ERP system, 58% were satisfied whereas 11% were displeased with the relevance of information accessed through the system and 31% were unsure. Referring to the information reliability, around 28% of the respondent were satisfied or highly satisfied while nearly 28% were dissatisfied with reliability of the information accessed through the system and 44% were unsure. The findings in the table 4.4 shows that 23% were feel confident with security aspects of system while 51% were unsure and 26% were dissatisfied with security part of the ERP system. Finally, approximately 49% were satisfied with the timely access of information while 36% were self-doubting and 15% were displeased with timely access of the information through the ERP system.

Table 4. 4: Percentage response for Information Quality items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
The ERP system ensures information availability	31.25	50.00	18.75
The ERP system provides me with relevant information	10.42	31.25	58.33
The ERP system guarantees reliability of information	28.09	43.75	28.16
The ERP system allow me to access information securely	26.04	51.04	22.92
The ERP system provides me with timely information.	14.58	36.46	48.96

4.2.3. Technical Support

The researcher sought to find out if there was technical support and if there had been improved users their technical support needs. Table 4.5 below indicates the respondent's response on technical support dimensions. From the results, in terms of getting good ERP system technical support around 70% were highly satisfied or satisfied. 22% were unconfident about getting ERP system technical support in order to perform their daily tasks while 8% were dissatisfied with getting good ERP system support. Regarding to training on time, about 54% were satisfied with the training provided by the ERP project team. Around 19% were unsure about the training given by the ERP project team while a similar number 27% were disagreed that had been trained on time. Concerning to using organizational forum, approximately 31% were agreed on frequently referring the forum in order to get support. From the results, 32% were unsure while 37% were dissatisfied in terms of the availability of the discussion on how to get support for solving problems related to the ERP system. Approximately 58% were agreed that a technical support made ERP system easy

for them. But from the findings, 30% were uncertain about the technical support expertise that ease an ERP system for them while 12% were disagreed. As shown in table 4.5, the results show 53% were happy with easily getting a technical support while in need. Around 37% were unconfident while 10% were disagreed with getting technical support expertise easily.

Table 4. 5: Percentage response for Technical Support items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
Are you getting good ERP system technical support?	8.32	21.88	69.80
Are you or your department being trained on time?	27.08	18.75	54.17
Are you regularly using your organization e-mail, and forum that focused on technical support?	36.46	32.29	31.25
The technical support staff makes it easier for me to use the ERP system	11.46	30.21	58.33
It is easy to get technical support when I used ERP system	10.38	36.46	53.16

4.2.4. Management Support

The findings in table 4.6 shows that respondents answer to the management support questionnaire items. Concerning to the support of management, about 61% of the respondents indicated that management support to use the ERP system. Of the 23%, were unsure about the top management support whereas 16% were disagreed with top management support to use ERP system. On the other hand, 59% respondents were agreed with the eagerness of the manager to see a user's happy while using the ERP system, around 29% respondents were unsure, and the remaining 12% of the respondents were unsatisfied. Approximately 55% of the respondents were satisfied with the necessary resource and support allowed by the manager to run properly the ERP system. Of the 27%, the respondents were unsure about the willingness of the manager legalize support while 18% of the respondent were disagreed. Finally, 71% of the respondents were agreed

the manager awareness of the benefits that can be achieved while using ERP system. About 20% of the respondent were unconfident whereas 9% of the respondents were disagreed.

Table 4. 6: Percentage response for Management Support items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
The manager always supports the use of the ERP system	15.62	22.92	61.46
The manager is really keen to see that staff is happy with using the ERP system	11.45	29.17	59.38
The manager provides me with necessary help and resource to use the ERP system	17.71	27.08	55.21
The manager is aware of the benefits that can be achieved with using the ERP system	9.38	19.79	70.83

4.2.5. Self-Efficacy

The researcher sought to understand the self-efficacy of employee and its effect on ERP system usability. As the findings in table 4.7 shows that, 74% of the respondent were indicated that they can perform their routine tasks if someone shows them how to do it first. Of the 18%, indicated that unsure while 8% of the respondent weren't able to perform their routine tasks as some body shows them for the first time. Besides, the findings also specify that 26% of the respondent were agreed doing their jobs well if they have the manual how to use the system. About 34% of the respondent were not sure whereas 40% were not able to perform their daily activity with the support of the manual come up with the system. In similar manner, regarding to the capability of users to complete their job by referencing built-in help facility, around 44% of the respondent were agreed or they can able to compete their jobs through the support of built-in help in the system. Of the 35% of the respondent were unsure to respond this question while 21% were disagreed. Finally, concerning to the capability of the users without any help for the first time, 23% of the respondent were agreed. The respondent who were not sure to answer this question item were 26%, and 51% of the respondent were disagreed or not able to perform smoothly their jobs using the system without any help for the first time.

Table 4. 7: Percentage response for Self-Efficacy items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
I could complete the job using the ERP system if someone else showed me how to do it first	8.33	17.71	73.96
I could complete the job using the ERP system if I have only the software manuals for reference	39.58	34.38	26.04
I could complete the job using the ERP system if I have only just the built-in help Facility for assistance.	20.83	35.42	43.75
I could complete the job using the ERP system if I have never used the package like it before.	51.04	26.04	22.92

4.2.6. Social Capital

As shown in table 4.8, it indicated that percentage answer of respondent for the social capital dimension. Regarding the communicating with other users in the firm through formal or informal meeting to improve the usability, 64% of the respondents were agreed with the statement. The respondent who were unsure to answer this question item were 15% while about 22% were disagreed or were not participated in a such meetings. Furthermore, 36% of the respondent were agreed or discussed with other users outside the firm through informal meetings to foster their knowledge on ERP system. Of the result obtained, 23% of the respondent who were unconfident while 41% were disagreed or not participated in such a session. The results in table 4.8 reveals that 52% of the respondent were participated in overall discussion focused on ERP system. The respondent who were unconfident to answer this item were 20% while about 28% of the respondent were disagreed.

Table 4. 8: Percentage response for Social Capital items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
I communicate with other employees through informal meetings within the organization related to the ERP system usage	21.88	14.58	63.54
I interact and communicate with other people or groups outside the organization to get help how to use ERP system	40.63	22.91	36.46
I actively participate in communities of practice related to the ERP system	28.13	19.79	52.08

4.2.7. ERP System Use

The researcher ought to evaluate user's usability of the ERP system and its effect on user satisfaction. Table 4.9 presents the result of findings with regards to the respondents feeling for the ERP system use constructs. from the findings, 92% of the respondent were used the ERP system frequently in their daily work. The respondent who were not sure to answer question frequently applying the ERP system in their daily jobs were 6% while 2% of the respondent were disagreed. In similar manner, 95% of the respondent were indicated that they access the ERP system for their routine tasks several times in a day. Of the 5%, were disagreed or not frequently used the system in their routine activities. Concerning the use of ERP system improves their performance, about 93% of the respondent were described that improved their performance while using the system. And around 6% were unconfident to answer the question while around 1% of the respondent were disagreed or using ERP system didn't improve their performance. Looking at improved productivity through using ERP system, 96% of the respondent were satisfied while 3% were unsure, and the rest of them 1% were disagreed with improved their productivity via using ERP system.

Table 4. 9: Percentage response for ERP System use items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
I use the ERP system frequently for my work	2.08	6.25	91.67
I access the ERP system several times in a day for my work	5.21	0.00	94.79
Using the ERP system improves my performance in a term of my job	1.04	6.25	92.71
Using the ERP system in my job increases my productivity	1.04	3.13	95.83

4.2.8. User Satisfaction

On whether the use of ERP system satisfies users, 76% of the respondent were satisfied while 19% uncertain and the rest 5% dissatisfied with the system as depicted below in the table 4.10. In terms of easiness to understand and a self-guidance to perform their routine tasks, 82% of the respondent were satisfied while 13% were uncertain regarding to the interface of the system and around 5% of the respondent were dissatisfied. From the last item, concerning the ERP system improves their work competence, approximately 83% of the respondent were agreed while 11% were unsure. The respondent who were disagreed with the ERP system improves their efficiency in their routine tasks or jobs were 6%.

Table 4. 10: Percentage response for User Satisfaction items

Question items	Percentage(%)		
	Disagree	Neutral	Agree
Are you satisfied with the ERP system	5.21	18.75	76.04
I find it easy to use the ERP system interface provided	5.21	12.50	82.30
Using the ERP system improves the quality of my work life	6.20	10.47	83.33

4.3. Hypothesis Testing

In order to investigate the relationship between variables of the model with respect to ERP system usage which has an impact on user satisfaction. Pearson coefficient analysis was done for better understanding of association between the dimensions. Besides, partial coefficient analysis was done to see the effect of each variable on another which is described on the model. Linear regression analysis was used to measure how much the impact of independent variables on dependent variable. More importantly, it helps to presents the results of hypothesis testing and interpretation of the results.

The main theme of this hypothesis testing was to measure independent variables that have effect on dependent variable (ERP system usage) which was system quality, information quality, technical support, management support, self-efficacy, and social capital. Correspondingly, testing the ERP system usage variable effect on user satisfaction. The level of significant varied among variables as we can see from the table 4.18 but overall, they all were significant except information quality and self-efficacy. The stated hypothesis accepted considering the P- value less than 0.05.

4.3.1. Pearson Correlation Analysis

4.3.1.1. System Quality

Table 4. 11: Correlation analysis between System quality and ERP system usage

Correlation

		System_ Quality	ERP_ Usage
System_Quality	Pearson Correlation	1	.330**
	Sig. (2-tailed)		.001
	N	100	100
ERP_Usage	Pearson Correlation	.330**	1
	Sig. (2-tailed)	.001	
	N	100	101

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

A Pearson coefficient analysis used to examine the relationship between the system quality and ERP system usage. And it describes the impact of system quality on the ERP system usage. The following statistical hypothesis were tested:

$\boldsymbol{H_{1(a)}}$**:** A system quality is positively associated with the ERP system usage

As can be seen from the table 4.11**,** the p-value less than our chosen significance level $\alpha = 0.05$, then the null hypothesis rejects and conclude that there is association between system quality and ERP system usage. Based on the result, the researcher concludes that. the association with system quality and ERP system usage, $r(97) = .33$, p=.001. Thus, asserts that there was a strong relationship between the system quality and ERP system usage.

Based on the descriptive analysis results, the quality of system can be a conceivable moderator of the ERP system usage, due to this the quality of the system could be providing comprehensive information that influences the user satisfaction. The survey results reflect similar findings with

the study of (Olumide, 2016; Lin, 2010; DeLone et al.,1992,2003) who founds that system quality constructs significantly impact the ERP system usage.

4.3.1.2. **Information Quality**

Table 4. 12: Correlation between Information quality and ERP system usage

Correlation

		ERP_Usage	Information_Quality
ERP_Usage	Pearson Correlation	1	.188
	Sig. (2-tailed)		.060
	N	101	101
Information_ Quality	Pearson Correlation	.188	1
	Sig. (2-tailed)	.060	
	N	101	101

A Pearson coefficient analysis used to examine the relationship between the information quality and ERP system usage. And it describes the impact of information quality on the ERP system usage. The following statistical hypothesis was tested:

$\boldsymbol{H_{2(a)}}$**:** An information quality is positively associated with the ERP system usage

According to results of table 4.12, the p-value greater than our chosen significance level α = 0.05, which indicates that a researcher has reason to accept the null hypothesis and reject the alternative hypothesis. And conclude that there is no relationship between information quality and ERP system usage, $r(97) = .18,\ p = .06$.

Regarding the information quality study of (DeLone et al.,1992, 2003; Shagari, Abdullah, & Saat, 2015) stated opposite ideas to this finding because they stated that information quality which, is one dimensions of IS success that had a positive and significant relationship with information quality and ERP system usage. In the same manner, Marinagi, Trivellas, and Reklitis (2015) stated that information quality neglected in firms. So, in order to get optimal benefits from the system

deployed by the firm the top management should give attention to the quality of information generated by the systems.

4.3.1.3. Technical Support

Table 4. 13: Correlation analysis between Technical support and ERP system usage

Correlation

		ERP_Usage	Technical_Support
ERP_Usage	Pearson Correlation	1	.308**
	Sig. (2-tailed)		.002
	N	101	101
Technical_ Support	Pearson Correlation	.308**	1
	Sig. (2-tailed)	.002	
	N	101	101

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

A Pearson coefficient analysis used to examine the relationship between the technical support and ERP system usage. And it describes the impact of technical support on the ERP system usage. The following statistical hypothesis was tested:

$\boldsymbol{H_{3(a)}}$**:** A technical support is positively associated with the ERP system usage

From table 4.13**,** the p-value less than our chosen significance level α = 0.05, then the null hypothesis rejects and conclude that there was association between technical support and ERP system usage. Based on the result, the researcher concludes that, the association between technical support and ERP system usage, $r(97) = .30$, p=.002. Thus, implies that technical support positively influenced ERP system usage.

A consistent and reliable technical support removes the hindrance to use the system and make it possible for users to better leverage their use of the system as well as it increases their level

satisfaction. In line with this Ramadhana, Govindaraju, and Wibisono, (2016) pointed out that the technical support construct have a significanlt effect on ERP system usage.

4.3.1.4. Management Support

Table 4. 14: Correlation analysis between management support and ERP system usage

Correlation

		ERP_Usage	Management_Support
ERP_Usage	Pearson Correlation	1	.418**
	Sig. (2-tailed)		.000
	N	101	101
Management_ Support	Pearson Correlation	.418**	1
	Sig. (2-tailed)	.000	
	N	101	101

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

A Pearson coefficient analysis used to examine the relationship between the management support and ERP system usage. And it describes the impact of management support on the ERP system usage. The following statistical hypothesis was tested:

$\boldsymbol{H_{4(a)}}$**:** A management support is positively associated with the ERP system usage

As can be seen from the table 4.14**,** the p-value less than our chosen significance level $\alpha = 0.05$, then the null hypothesis rejects and conclude that there was a strong association with management support and ERP system usage. Based on the result, the researcher concludes that there was an association between management support and ERP system usage, $r(97) = .42$, $p<.001$. Thus, asserts that management support positively influenced the ERP system usage.

As a consequence, management support has a significant effect on ERP system usage as well as user satisfaction and enhanced user satisfaction in turn positively impacted the ERP system usage and with optimal ERP system usage, there are sustainable benefits for the firms. This is

consistent with the study of (Lin el at., 2010; Ramadhana et al., 2016) who founds that top management support significantly influenced the ERP system usage.

4.3.1.5. Self-Efficacy

Table 4. 15: Correlation analysis between Self-efficacy and ERP system usage

Correlation

		Self_Efficacy	ERP_Usage
Self_ Efficacy	Pearson Correlation	1	.134
	Sig. (2-tailed)		.183
	N	100	100
ERP_ Usage	Pearson Correlation	.134	1
	Sig. (2-tailed)	.183	
	N	100	101

A Pearson coefficient analysis used to examine the relationship between the self-efficacy and ERP system usage. And it describes the impact of self-efficacy on the ERP system usage. The following statistical hypothesis was tested:

$\boldsymbol{H_{5(a)}}$**:** A self-efficacy is positively associated with the ERP system usage

The result of analysis summarized in table 4.15 depicts that the p-value greater than our chosen significance level α = 0.05**,** which implies that a researcher has reason to accept the null hypothesis and reject the alternative hypothesis. And conclude that there was no relationship between self-efficacy and ERP system usage, $r(97) = .13,\ p = .18$.

Therefore, the researcher deduces that, the effect of self-efficacy on ERP system usage exhibited a non-significant effect according to the quantitative results analysis. However, the effect of self-efficacy on ERP system usage has been shown a significant effect in a study by (Higgins, 1995; Ariff, Yeow, Zakuan, Jusoh, & Bahari, 2012).

4.3.1.6. Social Capital

Table 4. 16: Correlation analysis between Social capital and ERP system usage

Correlation

		ERP_ Usage	Social_ Capital
ERP_Usage	Pearson Correlation	1	.331**
	Sig. (2-tailed)		.001
	N	101	101
Social_ Capital	Pearson Correlation	.331**	1
	Sig. (2-tailed)	.001	
	N	101	101

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

A Pearson coefficient analysis used to examine the relationship between the social capital and ERP system usage. And it describes the impact of social capital on the ERP system usage. The following statistical hypothesis was tested:

$\boldsymbol{H_{6(a)}}$**:** A social capital is positively associated with the ERP system usage

As can be seen from the table 4.16**,** the p-value less than our chosen significance level $\alpha = 0.05$, then the null hypothesis rejects and conclude that there was a strong association with social capital and ERP system usage. Based on the result, the researcher concludes that there was association between social capital and ERP system usage, $r(97) = .33$, p=.001. Thus, asserts that social capital certainly influenced ERP system usage.

Besides, the institutionalized social networks formed by users who joined together to advance their common interest were vital to share the information which helped them to enhanced their knowledge on the system usage. In favor of this, Nahapiet and Ghoshal (2011) stated that the way individuals acquiring a knowledge how to handle tasks through knowing others and being parts of social networks.

4.3.1.7. ERP system Usage

Table 4. 17: Correlation analysis between ERP system usage and User Satisfaction

Correlations

		ERP_ Usage	User_ satisfaction
ERP_ Usage	Pearson Correlation	1	.451**
	Sig. (2-tailed)		.000
	N	101	101
User_ Satisfaction	Pearson Correlation	.451**	1
	Sig. (2-tailed)	.000	
	N	101	101

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

A Pearson coefficient analysis used to examine the relationship between the ERP system usage and user satisfaction. And it describes the impact of ERP system usage on user satisfaction. The following statistical hypothesis was tested:

$\boldsymbol{H_{7(a)}}$**:** An ERP system usage is positively associated with the user satisfaction

According to results of table 4.17**,** the p-value less than our chosen significance level α = 0.05. Therefore, the association with ERP system usage and user satisfaction, $r(97) = .33$, p=.001. Thus, implies that there was significant relationship between the social capital and ERP system usage. In lines with this study result (Sukumaran, 2016) discussed that the user satisfaction increased as the usability of ERP system extended for the period of time. The effectiveness of the ERP system in terms of user satisfaction that a user may gained should be observed in their frequently usage of the system as well as via overall organizational efficiency. Respectively, an encouraged ERP system usage has a significant effect on user satisfaction and enhanced user satisfaction in turn positively impacted the ERP system usage and with optimal ERP system usage, there are sustainable benefits for the firms.

Table 4. 18: The SPSS output of the Pearson coefficient analysis of the seven dimensions

Correlation Analysis

		System_Quality	Information_ Quality	Technical_ Support	management_ support	Self_Efficacy	Social_ Capital	ERP_Usage	User_ satisfaction
System_Quality	Pearson Correlation	1	.433**	.171	.155	.054	.202*	.330**	.208*
	Sig. (2-tailed)		.000	.089	.125	.598	.044	.001	.038
	N	100	100	100	100	99	100	100	100
Information_ Quality	Pearson Correlation	.433**	1	.194	.286**	.364**	.195	.188	.071
	Sig. (2-tailed)	.000		.052	.004	.000	.051	.060	.481
	N	100	101	101	101	100	101	101	101
Technical_ Support	Pearson Correlation	.171	.194	1	.519**	.166	.477**	.308**	.229*
	Sig. (2-tailed)	.089	.052		.000	.100	.000	.002	.021
	N	100	101	101	101	100	101	101	101
management_ support	Pearson Correlation	.155	.286**	.519**	1	.197*	.199*	.418**	.333**
	Sig. (2-tailed)	.125	.004	.000		.049	.046	.000	.001
	N	100	101	101	101	100	101	101	101
Self_Efficacy	Pearson Correlation	.054	.364**	.166	.197*	1	.281**	.134	-.065
	Sig. (2-tailed)	.598	.000	.100	.049		.005	.183	.522
	N	99	100	100	100	100	100	100	100
Social_ Capital	Pearson Correlation	.202*	.195	.477**	.199*	.281**	1	.331**	.087
	Sig. (2-tailed)	.044	.051	.000	.046	.005		.001	.389
	N	100	101	101	101	100	101	101	101
ERP_Usage	Pearson Correlation	.330**	.188	.308**	.418**	.134	.331**	1	.451**
	Sig. (2-tailed)	.001	.060	.002	.000	.183	.001		.000
	N	100	101	101	101	100	101	101	101
User_ satisfaction	Pearson Correlation	.208*	.071	.229*	.333**	-.065	.087	.451**	1
	Sig. (2-tailed)	.038	.481	.021	.001	.522	.389	.000	
	N	100	101	101	101	100	101	101	101

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

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

4.3.2. Partial Correlation Analysis

A partial correlation was used to evaluate the level of association between the system quality and ERP system usage after controlling the effects of information quality. There was moderately, strong correlation between the system quality and ERP system usage, controlling for information quality, $r(96)$=.29, p=.004. results of the zero order correlation yields that there was strong, positive correlation between the system quality and ERP system usage, $r(97)$=.33, p=.001, indicating that controlling for the information quality had a moderate effect on the strength of the relationship between the two variables (As depicted in the table 4.19).

Table 4. 19: Partial Correlation Analysis between System Quality and ERP System Usage by Controlling Information Quality

Control Variables			ERP_ Usage	System_ Quality	Information__ Quality
-none-[a]	ERP_Usage	Correlation	1.000	.330	.180
		Significance (2-tailed)	.	.001	.074
		Df	0	97	97
	System_Quality	Correlation	.330	1.000	.433
		Significance (2-tailed)	.001	.	.000
		Df	97	0	97
	Information_Quality	Correlation	.180	.433	1.000
		Significance (2-tailed)	.074	.000	.
		Df	97	97	0
Information__ Quality	ERP_Usage	Correlation	1.000	.285	
		Significance (2-tailed)	.	.004	
		Df	0	96	
	System_Quality	Correlation	.285	1.000	
		Significance (2-tailed)	.004	.	
		Df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the system quality and ERP system usage after controlling the effects of technical support. There was moderately, strong,

correlation between the system quality and ERP system usage, controlling for technical support, $r(96)$=.30, p=.003. results of the zero order correlation yields that there was strong, positive correlation between the system quality and ERP system usage, $r(97)$=.33, p=.001, indicating that controlling for the technical support had a moderate effect on the strength of the relationship between the two variables (As depicted in the table 4.20).

Table 4. 20: Partial Correlation Analysis between System Quality and ERP System Usage by Controlling Technical Support

Control Variables			ERP_ Usage	System_ Quality	Technical_ Support
-none-[a]	ERP_Usage	Correlation	1.000	.330	.308
		Significance (2-tailed)	.	.001	.002
		Df	0	97	97
	System_Quality	Correlation	.330	1.000	.171
		Significance (2-tailed)	.001	.	.089
		Df	97	0	97
	Technical_Support	Correlation	.308	.171	1.000
		Significance (2-tailed)	.002	.089	.
		Df	97	97	0
Technical_ Support	ERP_Usage	Correlation	1.000	.296	
		Significance (2-tailed)	.	.003	
		Df	0	96	
	System_Quality	Correlation	.296	1.000	
		Significance (2-tailed)	.003	.	
		Df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the system quality and ERP system usage after controlling the effects of management support. There was moderately, strong, correlation between the system quality and ERP system usage, controlling for management support, $r(96)$=.30, p=.003. results of the zero-order correlation yield that there was strong, positive correlation between the system quality and ERP system usage, $r(97)$=.33, p=.001, indicating that controlling for the management support had a moderate effect on the strength of the relationship between the two variables (As depicted in the table 4.21).

Table 4. 21: Partial Correlation Analysis between System Quality and ERP System Usage by Controlling Management Support

Control Variables			ERP_ Usage	System_ Quality	Management Support
-none-[a]	ERP_Usage	Correlation	1.000	.330	.414
		Significance (2-tailed)	.	.001	.000
		df	0	97	97
	System_Quality	Correlation	.330	1.000	.155
		Significance (2-tailed)	.001	.	.125
		df	97	0	97
	Management Support	Correlation	.414	.155	1.000
		Significance (2-tailed)	.000	.125	.
		df	97	97	0
Management Support	ERP_Usage	Correlation	1.000	.296	
		Significance (2-tailed)	.	.003	
		df	0	96	
	System_Quality	Correlation	.296	1.000	
		Significance (2-tailed)	.003	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the system quality and ERP system usage after controlling the effects of social capital. There was moderately, strong, correlation between the system quality and ERP system usage, controlling for social capital, $r(96)$=.28, p=.004. results of the zero-order correlation yield that there was strong, positive correlation between the system quality and ERP system usage, $r(97)$=.33, p=.001, indicating that controlling for the social capital had a strong effect on the strength of the relationship between the two variables (As depicted in the table 4.22).

Therefore, the results from the table 4.22 shows that when the social capital variable controlled the level of association between the system quality and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 22: Partial Correlation Analysis between System Quality and ERP System Usage by Controlling Social Capital

Correlations

Control Variables			ERP_Usage	System_ Quality	Social Capital
-none-[a]	ERP_Usage	Correlation	1.000	.330	.343
		Significance (2-tailed)	.	.001	.000
		df	0	97	97
	System_Quality	Correlation	.330	1.000	.202
		Significance (2-tailed)	.001	.	.044
		df	97	0	97
	Social Capital	Correlation	.343	.202	1.000
		Significance (2-tailed)	.000	.044	.
		df	97	97	0
Social Capital	ERP_Usage	Correlation	1.000	.284	
		Significance (2-tailed)	.	.004	
		df	0	96	
	System_Quality	Correlation	.284	1.000	
		Significance (2-tailed)	.004	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the system quality and ERP system usage after controlling the effects of self-efficacy. There was moderately, strong, correlation between the system quality and ERP system usage, controlling for self-efficacy, $r(96)$=.32, p=.001. results of the zero-order correlation yield that there was strong, positive correlation between the system quality and ERP system usage, $r(97)$=.33, p=.001, indicating that controlling for the self-efficacy had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.23).

Therefore, the results from the table 4.23 shows that when the self-efficacy variable controlled the level of association between the system quality and ERP system usage has minimum effect on the relationship.

Table 4. 23: Partial Correlation Analysis between System Quality and ERP System Usage by Controlling Self-Efficacy

Correlations

Control Variables			ERP_ Usage	System _Quality	Self-Efficacy
-none-[a]	ERP_Usage	Correlation	1.000	.330	.114
		Significance (2-tailed)	.	.001	.261
		Df	0	97	97
	System_Quality	Correlation	.330	1.000	.054
		Significance (2-tailed)	.001	.	.598
		Df	97	0	97
	Self-Efficacy	Correlation	.114	.054	1.000
		Significance (2-tailed)	.261	.598	.
		Df	97	97	0
Self-Efficacy	ERP_Usage	Correlation	1.000	.319	
		Significance (2-tailed)	.	.001	
		Df	0	96	
	System_Quality	Correlation	.319	1.000	
		Significance (2-tailed)	.001	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the technical support and ERP system usage after controlling the effects of system quality. There was moderately, strong, correlation between the technical support and ERP system usage, controlling for system quality, $r(96)$=.27, p=.007. results of the zero-order correlation yield that there was strong, positive correlation between the technical support and ERP system usage, $r(97)$=.31, p=.002, indicating that controlling for the system quality had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.24).

Therefore, the results from the table 4.24 shows that when the system quality variable controlled the level of association between the technical support and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 24: Partial Correlation Analysis between Technical Support and ERP System Usage by Controlling System Quality

Control Variables			ERP_ Usage	Technical _ Support	System_ Quality
-none-[a]	ERP_Usage	Correlation	1.000	.308	.330
		Significance (2-tailed)	.	.002	.001
		df	0	97	97
	Technical_Support	Correlation	.308	1.000	.171
		Significance (2-tailed)	.002	.	.089
		df	97	0	97
	System_Quality	Correlation	.330	.171	1.000
		Significance (2-tailed)	.001	.089	.
		df	97	97	0
System_Quality	ERP_Usage	Correlation	1.000	.270	
		Significance (2-tailed)	.	.007	
		df	0	96	
	Technical_Support	Correlation	.270	1.000	
		Significance (2-tailed)	.007	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the technical support and ERP system usage after controlling the effects of information quality. There was moderately, strong, correlation between the technical support and ERP system usage, controlling for information quality, $r(96)$=.28, p=.005. results of the zero-order correlation yield that there was strong, positive correlation between the technical support and ERP system usage, $r(97)$=.31, p=.002, indicating that controlling for the information quality had a strong effect on the strength of the relationship between the two variables (As depicted in the table 4.25).

Therefore, the results from the table 4.25 shows that when the information quality variable controlled the level of association between the technical support and ERP system usage affected by the controlled variable which is social capital.

Table 4. 25: Partial Correlation Analysis between Technical Support and ERP System Usage by Controlling Information Quality

Control Variables			ERP_ Usage	Technical Support	Information _Quality
-none-[a]	ERP_Usage	Correlation	1.000	.308	.188
		Significance (2-tailed)	.	.002	.068
		df	0	97	97
	Technical Support	Correlation	.308	1.000	.194
		Significance (2-tailed)	.002	.	.052
		df	97	0	97
	Information_Quality	Correlation	.188	.194	1.000
		Significance (2-tailed)	.068	.052	.
		df	97	97	0
Information Quality	ERP_Usage	Correlation	1.000	.281	
		Significance (2-tailed)	.	.005	
		df	0	96	
	Technical Support	Correlation	.281	1.000	
		Significance (2-tailed)	.005	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the technical support and ERP system usage after controlling the effects of management support. There was moderately, strong, correlation between the technical support and ERP system usage, controlling for management support, $r(96)$=.12, p=.248. results of the zero-order correlation yield that there was strong, positive correlation between the technical support and ERP system usage, $r(97)$=.31, p=.002, indicating that controlling for the management support had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.26).

Therefore, the results from the table 4.26 shows that when the management support variable controlled the level of association between the technical support and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 26: Partial Correlation Analysis between Technical Support and ERP System Usage by Controlling Management Support

Control Variables			ERP_ Usage	Technical Support	Management Support
-none-[a]	ERP_Usage	Correlation	1.000	.308	.418
		Significance (2-tailed)	.	.002	.000
		df	0	97	97
	Technical Support	Correlation	.308	1.000	.519
		Significance (2-tailed)	.002	.	.000
		df	97	0	97
	Management Support	Correlation	.418	.519	1.000
		Significance (2-tailed)	.000	.000	.
		df	97	97	0
Management Support	ERP_Usage	Correlation	1.000	.117	
		Significance (2-tailed)	.	.248	
		df	0	96	
	Technical Support	Correlation	.117	1.000	
		Significance (2-tailed)	.248	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the technical support and ERP system usage after controlling the effects of social capital. There was moderately, strong, correlation between the technical support and ERP system usage, controlling for social capital, $r(96)$=.18, p=.073. results of the zero-order correlation yield that there was strong, positive correlation between the technical support and ERP system usage, $r(97)$=.31, p=.002, indicating that controlling for the social capital had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.27).

Therefore, the results from the table 4.27 shows that when the social capital variable controlled the level of association between the technical support and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 27: Partial Correlation Analysis between Technical Support and ERP System Usage by Controlling Social Capital

Control Variables			ERP_ Usage	Technical Support	Social_ Capital
-none-[a]	ERP_Usage	Correlation	1.000	.308	.331
		Significance (2-tailed)	.	.002	.001
		df	0	97	97
	Technical Support	Correlation	.308	1.000	.477
		Significance (2-tailed)	.002	.	.000
		df	97	0	97
	Social_Capital	Correlation	.331	.477	1.000
		Significance (2-tailed)	.001	.000	.
		df	97	97	0
Social_Capital	ERP_Usage	Correlation	1.000	.180	
		Significance (2-tailed)	.	.073	
		df	0	96	
	Technical Support	Correlation	.180	1.000	
		Significance (2-tailed)	.073	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the technical support and ERP system usage after controlling the effects of self-efficacy. There was moderately, strong, correlation between the technical support and ERP system usage, controlling for self-efficacy, $r(96)$=.31, p=.002. results of the zero-order correlation yield that there was strong, positive correlation between the technical support and ERP system usage, $r(97)$=.31, p=.002, indicating that controlling for the self-efficacy had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.28).

Therefore, the results from the table 4.28 shows that when the self-efficacy variable controlled the level of association between the technical support and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 28: Partial Correlation Analysis between Technical Support and ERP System Usage by Controlling Self-Efficacy

Control Variables			ERP_ Usage	Technical Support	Self-Efficacy
-none-[a]	ERP_Usage	Correlation	1.000	.308	.134
		Significance (2-tailed)	.	.002	.183
		Df	0	97	97
	Technical Support	Correlation	.308	1.000	.166
		Significance (2-tailed)	.002	.	.100
		Df	97	0	97
	Self-Efficacy	Correlation	.134	.166	1.000
		Significance (2-tailed)	.183	.100	.
		Df	97	97	0
Self-Efficacy	ERP_Usage	Correlation	1.000	.309	
		Significance (2-tailed)	.	.002	
		Df	0	96	
	Technical Support	Correlation	.309	1.000	
		Significance (2-tailed)	.002	.	
		Df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the management support and ERP system usage after controlling the effects of system quality. There was moderately, strong, correlation between the management support and ERP system usage, controlling for system quality, $r(96)$=.39, p=.004. results of the zero-order correlation yield that there was strong, positive correlation between the management support and ERP system usage, $r(97)$=.42, p<.001, indicating that controlling for the system quality had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.29).

Therefore, the results from the table 4.29 shows that when the system quality variable controlled the level of association between the management support and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 29: Partial Correlation Analysis between Management Support and ERP System Usage by Controlling System Quality

Control Variables			ERP_ Usage	Management _Support	System_ Quality
-none-[a]	ERP_Usage	Correlation	1.000	.418	.033
		Significance (2-tailed)	.	.000	.001
		df	0	97	97
	Management Support	Correlation	.418	1.000	.155
		Significance (2-tailed)	.000	.	.125
		df	97	0	97
	System_Quality	Correlation	.033	.155	1.000
		Significance (2-tailed)	.001	.125	.
		df	97	97	0
System_ Quality	ERP_Usage	Correlation	1.000	.389	
		Significance (2-tailed)	.	.004	
		df	0	96	
	Management Support	Correlation	.389	1.000	
		Significance (2-tailed)	.004	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the management support and ERP system usage after controlling the effects of information quality. There was moderately, strong, correlation between the management support and ERP system usage, controlling for information quality, $r(96)$=.39, p=.004. results of the zero-order correlation yield that there was strong, positive correlation between the management support and ERP system usage, $r(97)$=.42, p<.001, indicating that controlling for the information quality had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.30).

Therefore, the results from the table 4.30 shows that when the information quality variable controlled the level of association between the management support and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 30: Partial Correlation Analysis between Management Support and ERP System Usage by Controlling Information Quality

Control Variables			ERP_ Usage	Management Support	Information_ Quality
-none-[a]	ERP_Usage	Correlation	1.000	.418	.188
		Significance (2-tailed)	.	.000	.060
		df	0	97	97
	Management Support	Correlation	.418	1.000	.286
		Significance (2-tailed)	.000	.	.004
		df	97	0	97
	Information_ Quality	Correlation	.188	.286	1.000
		Significance (2-tailed)	.060	.004	.
		df	97	97	0
Information_ Quality	ERP_Usage	Correlation	1.000	.387	
		Significance (2-tailed)	.	.004	
		df	0	96	
	Management Support	Correlation	.387	1.000	
		Significance (2-tailed)	.004	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the management support and ERP system usage after controlling the effects of technical support. There was moderately, strong, correlation between the management support and ERP system usage, controlling for technical support, $r(96)$=.32, p=.001. results of the zero-order correlation yield that there was strong, positive correlation between the management support and ERP system usage, $r(97)$=.42, p<.001, indicating that controlling for the technical support had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.31).

Therefore, the results from the table 4.31 shows that when the technical support variable controlled the level of association between the management support and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 31: Partial Correlation Analysis between Management Support and ERP System Usage by Controlling Technical Support

Control Variables				ERP_ Usage	Management Support	Technical Support
-none-[a]	ERP_Usage	Correlation		1.000	.418	.308
		Significance (2-tailed)		.	.000	.002
		df		0	97	97
	Management Support	Correlation		.418	1.000	.519
		Significance (2-tailed)		.000	.	.000
		df		97	0	97
	Technical Support	Correlation		.308	.519	1.000
		Significance (2-tailed)		.002	.000	.
		df		97	97	0
Technical Support	ERP_Usage	Correlation		1.000	.318	
		Significance (2-tailed)		.	.001	
		df		0	96	
	Management Support	Correlation		.318	1.000	
		Significance (2-tailed)		.001	.	
		df		96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the management support and ERP system usage after controlling the effects of social capital. There was moderately, strong, correlation between the management support and ERP system usage, controlling for social capital, $r(96)$=.38, p<.001. results of the zero-order correlation yield that there was strong, positive correlation between the management support and ERP system usage, $r(97)$=.42, p<.001, indicating that controlling for the social capital had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.32).

Therefore, the results from the table 4.32 shows that when the social capital variable controlled the level of association between the management support and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 32: Partial Correlation Analysis between Management Support and ERP System Usage by Controlling Social Capital

Control Variables			ERP_ Usage	Management Support	Social Capital
-none-[a]	ERP_Usage	Correlation	1.000	.418	.331
		Significance (2-tailed)	.	.000	.001
		df	0	97	97
	Management Support	Correlation	.418	1.000	.199
		Significance (2-tailed)	.000	.	.046
		df	97	0	97
	Social Capital	Correlation	.331	.199	1.000
		Significance (2-tailed)	.001	.046	.
		df	97	97	0
Social Capital	ERP_Usage	Correlation	1.000	.381	
		Significance (2-tailed)	.	.000	
		df	0	96	
	Management Support	Correlation	.381	1.000	
		Significance (2-tailed)	.000	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the management support and ERP system usage after controlling the effects of self-efficacy. There was moderately, strong, correlation between the management support and ERP system usage, controlling for self-efficacy, $r(96)$=.43, p<.001. results of the zero-order correlation yield that there was strong, positive correlation between the management support and ERP system usage, $r(97)$=.42, p<.001, indicating that controlling for the self-efficacy had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.33).

Therefore, the results from the table 4.33 shows that when the self-efficacy variable controlled the level of association between the management support and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 33: Partial Correlation Analysis between Management Support and ERP System Usage by Controlling Self-Efficacy

Control Variables				ERP_ Usage	Management Support	Self-Efficacy
-none-[a]	ERP_Usage	Correlation		1.000	.418	.134
		Significance (2-tailed)		.	.000	.183
		df		0	97	97
	Management Support	Correlation		.418	1.000	.197
		Significance (2-tailed)		.000	.	.049
		df		97	0	97
	Self-Efficacy	Correlation		.134	.197	1.000
		Significance (2-tailed)		.183	.049	.
		df		97	97	0
Self-Efficacy	ERP_Usage	Correlation		1.000	.425	
		Significance (2-tailed)		.	.000	
		df		0	96	
	Management Support	Correlation		.425	1.000	
		Significance (2-tailed)		.000	.	
		df		96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the social capital and ERP system usage after controlling the effects of system quality. There was moderately, strong, correlation between the social capital and ERP system usage, controlling for system quality, $r(96)$=.30, p=.003. results of the zero-order correlation yield that there was strong, positive correlation between the social capital and ERP system usage, $r(97)$=.34, p<.001, indicating that controlling for the system quality had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.34).

Therefore, the results from the table 4.34 shows that when the system quality variable controlled the level of association between the social capital and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 34: Partial Correlation Analysis between Social Capital and ERP System Usage by Controlling System Quality

Control Variables				ERP_ Usage	Social Capital	System Quality
-none-[a]	ERP_Usage	Correlation		1.000	.343	.330
		Significance (2-tailed)		.	.000	.001
		Df		0	97	97
	Social_Capital	Correlation		.343	1.000	.202
		Significance (2-tailed)		.000	.	.044
		Df		97	0	97
	System Quality	Correlation		.330	.202	1.000
		Significance (2-tailed)		.001	.044	.
		Df		97	97	0
System Quality	ERP_Usage	Correlation		1.000	.299	
		Significance (2-tailed)		.	.003	
		Df		0	96	
	Social_Capital	Correlation		.299	1.000	
		Significance (2-tailed)		.003	.	
		df		96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the social capital and ERP system usage after controlling the effects of information quality. There was moderately, strong, correlation between the social capital and ERP system usage, controlling for information quality, $r(96)$=.31, p=.002. results of the zero-order correlation yield that there was strong, positive correlation between the social capital and ERP system usage, $r(97)$=.34, p<.001, indicating that controlling for the information quality had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.35).

Therefore, the results from the table 4.35 shows that when the information quality variable controlled the level of association between the social capital and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 35: Partial Correlation Analysis between Social Capital and ERP System Usage by Controlling Information Quality

Control Variables				ERP_ Usage	Social Capital	Information_ Quality
-none-[a]	ERP_Usage	Correlation		1.000	.343	.188
		Significance (2-tailed)		.	.000	.060
		Df		0	97	97
	Social_Capital	Correlation		.343	1.000	.195
		Significance (2-tailed)		.000	.	.051
		Df		97	0	97
	Information_Quality	Correlation		.188	.195	1.000
		Significance (2-tailed)		.060	.051	.
		Df		97	97	0
Information_ Quality	ERP_Usage	Correlation		1.000	.306	
		Significance (2-tailed)		.	.002	
		Df		0	97	
	Social_Capital	Correlation		.306	1.000	
		Significance (2-tailed)		.002	.	
		Df		97	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the social capital and ERP system usage after controlling the effects of technical support. There was moderately, strong, correlation between the social capital and ERP system usage, controlling for technical support, $r(96)$=.22, p=.027. results of the zero-order correlation yield that there was strong, positive correlation between the social capital and ERP system usage, $r(97)$=.34, p<.001, indicating that controlling for the technical support had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.36).

Therefore, the results from the table 4.36 shows that when the technical support variable controlled the level of association between the social capital and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 36: Partial Correlation Analysis between Social Capital and ERP System Usage by Controlling Technical Support

Control Variables				ERP_ Usage	Social Capital	Technical Support
-none-[a]	ERP_Usage	Correlation		1.000	.343	.302
		Significance (2-tailed)		.	.000	.002
		Df		0	97	97
	Social_Capital	Correlation		.343	1.000	.477
		Significance (2-tailed)		.000	.	.000
		Df		97	0	97
	Technical Support	Correlation		.302	.477	1.000
		Significance (2-tailed)		.002	.000	.
		Df		97	97	0
Technical Support	ERP_Usage	Correlation		1.000	.221	
		Significance (2-tailed)		.	.027	
		Df		0	96	
	Social_Capital	Correlation		.221	1.000	
		Significance (2-tailed)		.027	.	
		df		96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the social capital and ERP system usage after controlling the effects of management support. There was moderately, strong, correlation between the social capital and ERP system usage, controlling for management support, $r(96)$=.28, p=.005. results of the zero-order correlation yield that there was strong, positive correlation between the social capital and ERP system usage, $r(97)$=.34, p<.001, indicating that controlling for the management support had very strong effect on the strength of the relationship between the two variables (As depicted in the table 4.37).

Therefore, the results from the table 4.37 shows that when the management support variable controlled the level of association between the social capital and ERP system usage highly affected by the controlled variable which is social capital.

Table 4. 37: Partial Correlation Analysis between Social Capital and ERP System Usage by Controlling Management Support

Control Variables			ERP_ Usage	Social Capital	Management Support
-none-[a]	ERP_Usage	Correlation	1.000	.343	.418
		Significance (2-tailed)	.	.000	.000
		df	0	97	97
	Social_Capital	Correlation	.343	1.000	.199
		Significance (2-tailed)	.000	.	.046
		df	97	0	97
	Management Support	Correlation	.418	.199	1.000
		Significance (2-tailed)	.000	.046	.
		df	97	97	0
Management Support	ERP_Usage	Correlation	1.000	.278	
		Significance (2-tailed)	.	.005	
		df	0	96	
	Social_Capital	Correlation	.278	1.000	
		Significance (2-tailed)	.005	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was used to evaluate the level of association between the social capital and ERP system usage after controlling the effects of self-efficacy. There was moderately, strong, correlation between the social capital and ERP system usage, controlling for self-efficacy, $r(96)$=.31, p=.002. results of the zero-order correlation yield that there was strong, positive correlation between the social capital and ERP system usage, $r(97)$=.34, p<.001, indicating that controlling for the self-efficacy had very little effect on the strength of the relationship between the two variables (As depicted in the table 4.38).

Therefore, the results from the table 4.38 shows that when the self-efficacy variable controlled the level of association between the social capital and ERP system usage has a minimum effect by the controlled variable which is social capital.

Table 4. 38: Partial Correlation Analysis between Social Capital and ERP System Usage by Controlling Self-Efficacy

Correlations

Control Variables			ERP_Usage	Social Capital	Self-Efficacy
-none-[a]	ERP_Usage	Correlation	1.000	.343	.134
		Significance (2-tailed)	.	.000	.184
		df	0	97	97
	Social Capital	Correlation	.343	1.000	.281
		Significance (2-tailed)	.000	.	.005
		df	97	0	97
	Self-Efficacy	Correlation	.134	.281	1.000
		Significance (2-tailed)	.184	.005	.
		df	97	97	0
Self-Efficacy	ERP_Usage	Correlation	1.000	.310	
		Significance (2-tailed)	.	.002	
		df	0	96	
	Social Capital	Correlation	.310	1.000	
		Significance (2-tailed)	.002	.	
		df	96	0	

a. Cells contain zero-order (Pearson) correlations.

4.3.3. Conceptual model Correlation Analysis Result

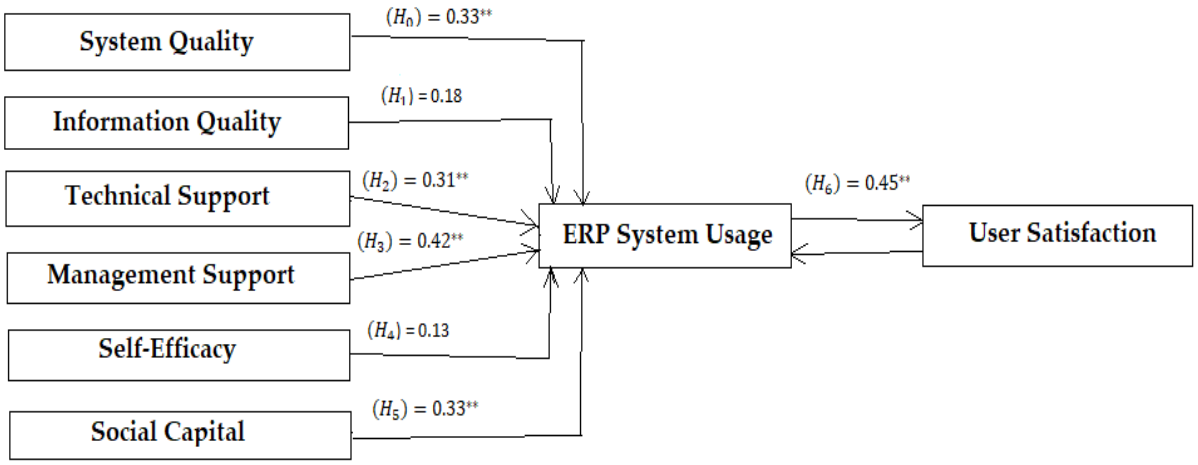


Figure 4. 2: Hypothesis testing results.

The results of hypothesis testing were presented in the figure 4.2, with significant paths depicted by the lines. All the hypothesized pathways, other than self-efficacy and information quality, were found to be significant. Thus, means the system quality, technical support, management support, and social capital were found to have a significant association with ERP system usage. In a similar case, the ERP system usage constructs was found to have a positive association with user satisfaction.

The association among the variable defined using the Pearson coefficient correlation analysis. Then, the researcher analyzed the effect of independent variables on the dependent variable using linear regression as stated in the next section.

4.4. Linear Regression Analysis

A linear regression analysis is a modeling technique, which can be understand the impact of one or more independent variables on a dependent variable. A linear regression tells that what contribution have those independent variables make to the variance in the dependent variable or how much variance do the independent variables explained in the dependent variable. The R-

square analysis (linear regression) was used to test the impact of the predictor variables on the dependent variable as depicted below in the figure.

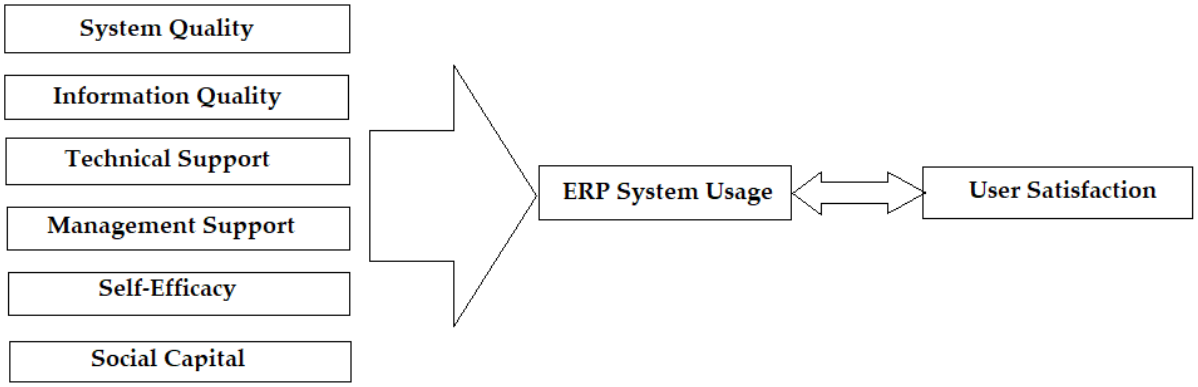


Figure 4. 3: The relationship between the dimensions

The relationship between ERP system usage dependent (output variable) and the independent (predictor variable) were tested using the linear regression as explained below.

Table 4. 39: R-Square analysis for ERP system usage

Model Summary

				Change Statistics				
R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
.557[a]	.310	.265	.31558	.310	6.903	6	92	.000

a. Predictors: (Constant), Social_Capital, Information_Quality, management_support, Self_Efficacy, System_Quality, Technical_Support

The R-square is the amount of variance in the dependent variable (ERP usage) explained by movement on the predictor variables were setting together (Social_Capital, Information_Quality, management_support, Self_Efficacy, System_Quality, Technical_Support). According to the result of table 4.39, $R^2 = .31$; Taken as a set, the predictors Social_Capital, Information_Quality, management_support,

Self_Efficacy, System_Quality, and Technical_Support account for 31% of the variation in ERP usage (dependent variable).

Table 4. 40: ANOVA analysis for ERP system usage

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.125	6	.687	6.903	.000[b]
	Residual	9.163	91	.100		
	Total	13.287	97			

a. Dependent Variable: ERP_Usage

b. Predictors: (Constant), Social_Capital, Information_Quality, management_support, Self_Efficacy, System_Quality, Technical_Support

The reliability of the result statistically significant as we can see from the ANOVA table 4.40 above. Since the **α** level of the significance was less than 0.05. Therefore, the researcher concludes that the overall regression model was significant, $F(6,91) = 6.90$, p<.001, $R^2 = .31$.

Table 4. 41: Coefficient analysis for ERP system usage

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.122	.276		4.066	.000
	System_Quality	.237	.090	.257	2.623	.010
	Information_Quality	-.111	.115	-.102	-.966	.337
	Technical_Support	.213	.059	.198	3.103	.021
	management_support	.238	.065	.380	3.644	.000
	Self_Efficacy	-.002	.048	-.005	-.051	.959
	Social_Capital	.101	.043	.242	2.333	.022

a. Dependent Variable: ERP_Usage

Based on table 4.41 coefficients, the researcher checks the contribution of each predictor variable makes to the variance in the dependent variable. Therefore, the regression line is:

$$ERP\_Usage = 1.12 + B\ value\ of\ each\ independet\ variable\ \times value\ of\ independet\ varaible$$

Based on the regression line equation, the researcher finds that for each 1% change in System_Quality dimension leads to a 23.7% increases ERP system usage, a 1% change in management support helped ERP system usage to increase by 23.8%. Similarly, a 1% change in social support leads to a 10.1% increases ERP system usage.

According to the table 4.41 result, the direct interpretation of the negative sign of information quality indicates that users were not felt confident with the information quality attributes. The inconvenience of information quality such as format and appearance of the report, comprehensibility, lack of trust in sharing sensitive information with their suppliers were made difficult to use the ERP system in an approachable manner. Similarly, the negative sign of self-efficacy reveals that users that manifest low self-efficacy experiences to give up more easily and exhibit low level of mastery. This problem was due to the shortage of a sophisticated guidance manual and inadequate training provide to all users throughout the firm that guides them how to operate their routine tasks using the ERP system.

The relationship between user satisfaction dependent (output variable) and the ERP system usage independent (predictor variable) was tested using the linear regression as explained below.

Table 4. 42: R-Square analysis for User satisfaction

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.451[a]	.204	.196	.55554	.204	25.323	1	97	.000

a. Predictors: (Constant), ERP_Usage

Based on the table 4.42 result, $R^2 = .20$; Taken as a set, the predictor ERP_Usage account for 20% of the variation in ERP usage (dependent variable).

Table 4. 43 ANOVA analysis for User satisfaction

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.816	1	7.816	25.323	.000[b]
	Residual	30.554	97	.309		
	Total	38.370	98			

a. Dependent Variable: User_Satisfaction
b. Predictors: (Constant), ERP_Usage

The reliability of the result statistically significant as we can see from the ANOVA table 4.43. Since the **α** level of the significance was less than 0.05. Therefore, the researcher concludes that the overall regression model was significant, $F(1,96) = 25.32$, p<.001, $R^2 = .20$.

Table 4. 44: Coefficient analysis for user satisfaction

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.223	.349		.639	.524
	ERP_Usage	.752	.150	.451	5.032	.000

a. Dependent Variable: User_Satisfaction

Based on table 4.44 of coefficients, the researcher checks the contribution of each predictor variable make to the variance in the dependent variable. Therefore, the regression line is:

$$ERP\_Usage = .22 + B\ value\ of\ each\ independet\ variable\ \times value\ of\ independet\ varaible$$

Based on the regression line equation, the researcher finds that for each 1% change in ERP_Usage dimension leads to a 75.2% increases user satisfaction. Therefore, from this, the researcher concludes that fostering ERP system usage leads to increase user satisfaction and vice versa.

4.5. Results from Interview

To supplement the survey results and to gain deeper understanding the reaction of the respondents about the dimension of research model were analyzed through the qualitative approach. (via structured interview below). The researcher completed interviews for the four respondents that had offered to be interviewed, the interview completed face-to-face. The personal details of the respondent removed to allow for anonymity in response. The interview guide is included in this report as Appendix C. The discussion of interview outcome follows next and the information collected was presented in a narrative form that includes descriptions and analysis of the data. All interviewees had experienced in their fields of work, and interviewees profile data summarized below in table 4.45**.**

Table 4. 45: Interviewees' Profile Summary

Respondent	Sex	Experience	Job Position
Interviewee 1	Male	10 and above	Delegate vice manager in Mekelle
Interviewee 2	Male	5-10 years	ERP project manager
Interviewee 3	Male	10 and above	Operation manager in Gelan Branch
Interviewee 4	Male	10 and above	Head of supply department in Addis Ababa

Concerning the system quality dimension, the interviewed respondent agreed that the ERP system helps them to easily manage the complexity of the workflow in the firm, enhance efficiency, productivity, and delivering comprehensive report. It was also agreed that attributes such as accuracy, timeliness, and consistency of the system were improved in the system. Since MIE was implemented the ERP system (Microsoft Dynamics Solutions) with only cosmetic changes done when the system implemented. It reduces the challenges facing while mapping a business process from the previous legacy system to the adopted new work perspective of ERP system. As pointed out by one of the respondents, the system fosters efficiencies and effectiveness in their daily works. The improved interoperability and speed of the system resulted according to the respondents in better compatibility with their routine activities. Therefore, from the dialogue the researcher understands that the system quality was found to predict the ERP system usage.

Regarding the information quality from the discussions and interview held on the information quality constructs, the researcher able to deduce that the system provides the anticipated information as per requested by the users. In addition to, the information quality forth a versatile decision making according to the respondents. Nevertheless, two respondents noted that, the complex screen layout format of the report challenging to understand and interpret in a comprehensive manner. And fear of sharing sensitive information among divisions makes the usage of ERP system less and not as required. These issues reported having a negative impact on ERP system usage. Consequently, the users with such hindrances made the information quality construct insignificant effect to the ERP system usage. Regarding the information quality the study of (DeLone el at.,1992,2003; Shagari, Abdullah, & Saat,2015) stated opposite ideas to this finding because they stated that information quality which is one dimension of IS success that found positive and significant relationship with ERP system usage.

Relating to the technical support construct, among the interviewee 75% of them were happy with the value of technical support accessibility for the users to help them effectively use the ERP system. But among the respondent, one said that "*it is important in my work to have the ERP system that can provide reliable, accurate, and up to date vital information that helps me in taking crucial financial decision making. But I could not use as I planned due to some technical support problems such as fixing temporarily system problem, network infrastructure down, and manual documentation how to use the system, and preparing written instruction to repair a fault.*" In general, the overall investigation of the interview data revealed that an availability of the helpline had a positive impact on ERP system usage. From the discussion the researcher able to deduce that adequate availability of technical support has a positive impact on users to use the ERP system properly. Therefore, user satisfaction indirectly boosted as the ERP system usability was positively affected by the availability of quality technical support that has the capacity to solve system problem that requires fixing.

Regarding the management support construct, to a large extent, the interviewee indicated that top management supported was good in terms of financial, resources and ensuring intensive follow-up for activities that need management support. Since the continuity of the usability of the ERP system without the support of top management is impossible and difficult let it materialize,

it has a positive impact on ERP system usage and in turn to user satisfaction. But, in the other side one of the respondents said that "*It is very important the support of the top management to leverage the usage of the ERP system and in turn to user satisfaction. But, there is problems encouraging and reinforcing to ERP system managers that have a great role to facilitate the system usage. The ERP manager spent more than office hour in order to sustain the system in a well manner and to work effectively. So, they need a support from top management.*" Hence, from the dialogue, the researcher understands that management support helps to leverage ERP system usage and in turn to foster the user satisfaction.

The self-efficacy construct aims on whether it leverages ERP system usage or not. The interview and observation revealed that participants were unperceptive of built-in helper on the ERP system and a manual that guided how to use the ERP system. Therefore, the researcher understands that only manuals and built-in help are not enough in terms of developing self-initiated manner for the purpose of fostering ERP system usage. A report by (Bandura, 1997;Bueno & Salmeron, 2008) point out that a better environment such as social persuasions, participation in more training, prior experience, and resource such as good internet connection is also valued in terms of allowing users to teach each other, which if properly facilitated, can help to foster user's self-efficacy in that they can see how similar colleagues are able to understand and use the system.

Regarding the social capital construct, respondents were overall happy based on the evidence of moderate level of beneficiaries' norms of communication and working, open flow of information, diverse (in terms of department) social connection, and high-level trust. One of the respondents said that "*by strengthening activity such as high-quality social connection within and outside of the firm, robust, open flow of knowledge, and high level of trust will create a better environment for encouraging ERP system usage and at the same time to enhance the user satisfaction.*" Henceforth, from the dialogue, the researcher understands that creating social capital decidedly needed to leverage the ERP system usage and in turn to foster the user satisfaction.

On the aspect of ERP system usage, the respondent indicated that their usage behavior of the system was high. As the respondent explained that since the mandatory of the system to use in their daily activity and the effect of ERP system dimension features lead to enhance the usage of

the ERP system. Although their view on ERP system usage was good, there was a feeling that needs to make sure continuous improvement on the system. As one respondent said that "*his usability was facing difficulty due to the sometimes inaccessibility of the system and not fixing the problems on time.*" The researcher perceived that the respondent ERP system usage was high due to the respondent believed that the system would enrich and helps to perform tasks of their jobs. Therefore, from the dialogue the researcher understands that the usage of the ERP system was high and in turn to user satisfaction. This finding is supported by Sukumaran (2016) discussed that the user satisfaction increased as the usability of ERP system extended for the period of time.

Finally, considering to the user satisfaction, the respondent expressed their satisfaction with the usage of ERP system. The respondent principally agreed that using ERP system has improved the value of their work in a good way. Besides, one of the respondents said that "*It is important in my work to have ERP system that can provide effective, accurate, consistence, and up to date information that helps to effectively perform my routine activities. I don't have a problem with the system and I am satisfied.*" Hence, the researcher concludes based on the qualitative results, the ERP system usage positively influenced the user satisfaction. In conformity with these findings the study of (DeLone et al., 2003; Jaspers, Peute, Lauteslager, and Bakker, 2008) founds that the extent of usability of the system influenced the level of user satisfaction.

4.6. Triangulation

In this compartment presents the triangulation of the quantitative and qualitative method analysis results. The triangulation approach was used that mixed data and methods to in-depth the understanding of the study. Employing both quantitative and qualitative analysis in this study to validate the hypothetical model and the relationship between the different variables. This mixed method approach was allowed triangulation of findings for a more robust confirmation of the results. The researcher has collected the intended data for a quantitative approach via questionnaire and through interview for the qualitative approach from the Mesfin Industrial Engineering (MIE) different branches located at different places. And as the findings depicted that, the triangulation manifests the factor that have strong effect on user satisfaction. Table 4.46 depicts a summary of findings in the quantitative and qualitative approach analysis.

Variables	Quantitative results	Qualitative results	Significant level	Remark
System quality	Based on the quantitative approach results, the system quality has a highly significant effect on the ERP system usage and in turn to user satisfaction	Based on the qualitative approach similar result has been found	Significant	
Information Quality	Based on the quantitative approach results, the effect of information quality is insignificant.	The results from the qualitative analysis shows that it is crucial while in the case of quantitative analysis the association was insignificant.	Insignificant	Based on the quantitative approach the association between information quality and the ERP system usage is trivial. Difficulty to understand the format of the report and fearing of sharing sensitive information were described as a reason. But can be solved via easing to understand the report format and facilitating awareness on the security aspect of the information while sharing with their work partners or colleagues.
Technical Support	The association between technical support and ERP system usage is high and in turn indirect positive effect on user satisfaction	A similar result is shown for the technical support via qualitative approach	Significant	Increasing the availability of technical supporters to fix bugs and help users will be evident via providing a better environment and facilities.
Management Support	There is a desired association between management support and ERP system usage and in turn indirect effect to user satisfaction	Similar results with the quantitative analysis, there is strong relationship among top management and ERP system usage.	Significant	The involvement of leadership is vital that helps to foster the user satisfaction as supported by both methods.
Self-Efficacy	The result depicted that insignificant association among self-efficacy and ERP system usage	Similar results with the quantitative analysis depicted that a weak association between self-efficacy and ERP system usage.	Insignificant	The techniques that will help to boost self-efficacy of the user is enriching training and social persuasion.
Social capital	The results show that there is a significant correlation among social capital and ERP system usage and in turn user satisfaction	Social capital and ERP system usage have a strong association among them.	Significant	Enhancing social capital activities helps to improve the use of ERP system usage and in turn user satisfaction as described by both methods.
ERP system usage	The usability of the ERP system has a significant correlation with user satisfaction.	Results show that there is desired significant between ERP system usage and user satisfaction and vice versa.	Significant	

Table 4. 46: Triangulation of quantitative and qualitative analysis

4.7. Chapter Summary

This chapter presented the results of statistical analysis that have been conducted on quantitative data and supported by interview results for the study were also presented. The descriptive statistics and qualitative result have shown that the antecedent that has a significant effect on ERP system usage except for information quality and self-efficacy. The linear regression analysis shows that, the independent variable (system quality, information quality, technical support, management support, social capital, and self-efficacy) have a positive impact on ERP system usage, and in turn enhanced ERP system usage had positive effect on user satisfaction and vice versa. Respondent from the interview confirmed that, there is needs for continuous improvement on information quality antecedent as well as self-efficacy to boost more the ERP system usage and subsequently to user satisfaction.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATION

5.1. CONCLUSIONS

This study assesses the factors affecting user satisfaction with ERP system usage based on DeLone and McLean IS success model and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995). User satisfaction measures the extent to which a user feels that ERP system has enhanced their routine activity. The major problem addressed within this study was assessing the factors affecting user satisfaction with the ERP system usage in MIE. The findings of this study were able to answer the research questions addressed in chapter one. Here, it is valuable in reviewing the research questions addressed in this study.

1. What are the determinant factors affecting user satisfaction on ERP system usage?
2. Do the conceptual research model that measure factors affecting user satisfaction with ERP system usage hold on when evaluating in the MIE?

So, to answer the above questions a mixed research approach was employed. Therefore, the data applicable to the study were collected via a questionnaire and interview. Analyzing data for the quantitative method were through using statistical analysis techniques: Pearson coefficient analysis and linear regression analysis. And for the qualitative method, the data gained using a structured interview were analyzed and described in words. Thus, the following findings were obtained based on the analyzed data.

The first objective of this study resulted in identifying factors that have effect on the users satisfaction with the ERP system usage. As the result shows from the previous chapter, the DeLone and McLean IS success model dimensions system quality, information quality, technical support were looked in depth related to system usage and in turn that enhanced user satisfaction. Furthermore, the conceptual research model measure factors affecting user satisfaction with ERP

system usage was developed based on DeLone and McLean IS success model (2003) and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995) who focused on the dimension of (management support, social capital and self-efficacy). In this model, it was proposed that user satisfaction was directly correlated to the ERP system usage. Next, it was hypothesized that the ERP system usage, in turn, would be predicted by the system quality, information quality, technical support, management support, self-efficacy, and social capital. The results from this evaluation study showed that users overall were satisfied with the research model that test factors affecting user satisfaction with ERP system usage. Besides, the dimension indicated as a factor are summarized as follow.

The first factor was a system quality and to measure if system quality directly influenced ERP system usage. The result indicated that system quality positively influenced with estimated Pearson coefficient 0.33 and p-value of 0.01 implying that, the process of improved ERP system usage and in turn positively influenced user satisfaction. In addition, interviewees as well agreed that, they were comfortable and satisfied with system quality. This suggesting that, the feature of system quality such as availability, consistency, and accuracy influenced the extent of the ERP system usage by MIE staffs.

The second factor or hypothesis was to determine the effect of information quality on ERP system usage and in turn to user satisfaction. The testing of this dimension revealed that insignificant association between the information quality and ERP system usage based on the statistical analysis results with estimated Pearson coefficient 0.19 and p-value of 0.06. But, results from the qualitative method via an interview indicated that information quality construct was important to use the system. But the problem for users to effectively use information quality was the format of reports, comprehensiveness, user interface design, and in manufacturing sector, especially in MIE there would be lacking trust to share a vital information with their suppliers. Respondent from the interview mentions that information quality construct will help foster ERP system usage if the users gain more experience working (use it more often) and efficient training. Since training ensures that all contents of the information quality will be understanding and used

as was intended and efficiently. Regarding the information quality study of (DeLone et al.,1992, 2003; Omar, Ramayah, Lo, Sang, and Siron, 2010;Shagari, Abdullah, & Saat, 2015) stated opposite ideas to this finding because they stated that information quality which, is one dimensions of IS success that had a positive and significant relationship with information quality and ERP system usage. This means that in order to improve information quality to leverage usage of ERP system and in turn user satisfaction, the information quality attributes and issues stated above must be addressed.

The third factor or hypothesis sought to examine if technical support directly influenced ERP system usage that has also in turn effect on user satisfaction. The results indicated that there was a significant association between the technical support dimension and ERP system usage with estimated Pearson coefficient 0.31 and p-value of 0.02. Besides, result supported by the qualitative analysis. This finding implies that technical support resources and chances available to the MIE ERP system users impact the extent of such system usage and indirect effect on user satisfaction. Therefore, this dimension must be kept up and improved in order to leverage user satisfaction while using the system in MIE.

The fourth factor or hypothesis was to determine whether management support directly influenced ERP system usage. The outcome from the analysis shows that management support influenced with estimated Pearson coefficient 0.42 and p-value of less than 0.001. Interviewees as well agreed that they were comfortable and satisfied with support of managements and would need to strengthen the support (interviews supported the survey's findings). Thus, result implying that continuous provision of ERP system support and encouragement from the management was improved ERP system usage of MIE staffs.

The fifth factor or hypothesis was the effect of self-efficacy on ERP system usage. The result indicates that there was no relationship between self-efficacy and ERP system usage with approximated Pearson coefficient 0.13 and p-value of 0.18. In addition, one interviewee out of four said that they have adequate self-efficacy awareness that helps to use the ERP system wisely,

but others indicated that current MIE level of providing multi-purpose training, social persuasions, and prior experience and resource such as good internet connection are not adequate to build post-training self-efficacy momentum so that to enhance the usage of ERP system. Similarly, a study by Chou, Chang, Lin, and Chou, (2014) focused on the effect of self-efficacy on coping with the system even it is challenging to handle. Besides, result specifies that it needs to improve training and social persuasions to enhance self-efficacy of the users. Since the level of users self-efficacy will increase after post-training and post social persuasions. Consequently, enhanced self-efficacy will help to increase ERP system usage and in turn a positive effect on user satisfaction.

The sixth factor or hypothesis was the effect of social capital on ERP system usage. The result indicated that positively influenced with the approximated Pearson coefficient of 0.33 and a p-value of less than 0.01. The result shows that social capital exhibited a significant correlation with ERP system usage and found to be positively associated, succeeding to support the hypothesis. The effect of social capital such as informal communication among users in the firm helps to lubricate prior knowledge, experience with ERP system usage, and capable to captivate the skills needed by ERP system. Besides, the interviews results found a positive and significant relationship between social capital and ERP system usage. Therefore, in order to improve the ERP system usage, it is important to improve social capital activities that have in turn a positive effect on user satisfaction.

The last factor or hypothesis was to examine if ERP system usage directly influenced user satisfaction and in turn to ERP system usage. The outcome of testing this hypothesis indicated that ERP system usage positively impacted user satisfaction with the approximated Pearson coefficient 0.45 and p-value of less than 0.001. This implying that the level of user satisfaction improved with healthy ERP system usage by MIE staffs. The descriptive statistics analysis result was further supported by qualitative analysis which was information obtained through an interview. Besides, in order to foster user satisfaction, it needs to enhance ERP system usage through enlightening the system quality, information quality, technical support, management support, self-efficacy, and social capital to ERP system users. Likewise, this result suggests that ERP system usage strongly

determines the results of user satisfaction and in turn a significant effect on ERP system usage in MIE.

5.2. Validating the Conceptual Model Measure Factors Affecting User Satisfaction at MIE

The second aim of this study was to test the conceptual model that measures factors affecting user satisfaction based on DeLone and McLean IS success model and the study of (Compeau & Higgins, 1995; Kim & Lee, 2006; Premkumar & Ramamurthy, 1995) who focused on the dimension of (management support, social capital and self-efficacy) on local setup. To test the association among variables a Pearson correlation coefficient and partial correlation coefficient analysis were used and to test the effect of the independent variable on dependent variable a linear regression was used. According to the table 4.18 result, the tested outcome shows that a significant association among the variables except an information quality and self-efficacy variables. And the overall results of linear regression show that the effect of independent variables on dependent variable was significant. This implying that the conceptual model supports the ideas of overall flow of constructs that stated with DeLone and McLean IS success model when tested on local setup.

5.3. Recommendations

Based on the above findings the following recommendations were forwarded for increasing the likelihood of enhancing user satisfaction while using the ERP system usage.

The factors of system quality, information quality, service quality (technical support, management support, self-efficacy, and social capital) were found to have a direct influence on ERP system usage and in turn to user satisfaction. The implication of this study is to improve user satisfaction with ERP system usage in MIE. Thus, it needs to pay attentions to the construct of system quality, information quality, and service quality (technical support, management support, self-efficacy, and social capital).

Furthermore, improving system quality and information quality such as handling the difficulty of effectiveness in its use and user-friendly will increase ERP system usage and in turn a positive effect on user satisfaction. The department of information communication technology (ICT) which provides line support at the MIE has documented the importance of technical support for sorted technical problems. Sometimes, the delay to fix users problems faced while using the system which leaves users frustrated. Therefore, it's obvious that more still has to be done to address the issues of technical support.

Examine top management effect on user satisfaction revealed that it's was strongly significant. Therefore, it's recommended that top management support should remain consistent in order to provide adequate and continuous resources needed by the ERP system at the operation phase. So that, it helps to strengthen ERP system usage and in turn to user satisfaction. And it helps to achieve the anticipated business goals of the firm.

The findings of the study revealed that the overall effect of self-efficacy on ERP system usage was less. But it is a fact that self-efficacy can be a major contributor to ERP system usage and in turn to user satisfaction (Compeau & Higgins, 1995). It is therefore recommended to give training and education since training develop the user perception of ERP system compatibility with users routine activity and emphasize the benefits of system in the firm. Thus, boosts a user post training self-efficacy and helps to strengthen user ability to realize how to effectively use ERP system and in turn positively affected user satisfaction.

The respectable social capital culture in MIE staffs are key factors in shaping ERP system usage. Therefore, it's recommended that the practice of social capital such as informal group communication with and across departments, forums, and discussion groups needs to keep up and improve. So that, a good communication competence focused on system will help to drive up users commitment to ERP system usage and in turn, positively influenced user satisfaction.

5.5. Recommendation for Future Work

This study managed to give an in-depth understanding of the challenges and issues related to measuring user satisfaction while using ERP system in MIE. A number of limitations in this study should be plainly stated. The explanation and interpretation of the findings were based on descriptive statistical analysis and four interviews with respondents. It was indistinct what the reason among respondents selected for survey some of them were not responded the questionnaire. The results of this study may be influenced due to not entirely participating the targeted survey respondents. Another limitation was since the availability of the number of interviewees were less (limited in access to some of the targeted respondents due to buzzy schedule), it wouldn't provide more depth to the interpretation of quantitative findings. Another possible restraint was that findings from this one firm evaluation study may not be generalized to other manufacturing firms assessing user satisfaction with ERP system usage.

Opportunities for further empirical research emerge from this study: The first opportunity of this study is related to the further investigation of the hypothesis (information quality and self-efficacy) not supported by the quantitative analysis in this study. Therefore, through further research, the worth of the hypothesis be fully identified. The second opportunity of this study focused on DeLone and McLean IS success model dimensions and furthermore, another three factors that have an effect on ERP system usage and in turn effect on user satisfaction. Future studies may, based on their respective concepts and situation, further investigate other system usage factors that have to enhance user satisfaction. For example, among the dimensions that have significant effect to the user satisfaction while using the ERP system were social capital and through looking in-depth the social capital dimension (relational, and cognitive), and another factors like compatibility and training helps the future study more comprehensive.

Since this study evaluating factors affecting user satisfaction with ERP system usage based on DeLone and McLean IS success model. And the model clearly manifests factors that affect the target study but it may difficult to state all contextual factors and business firms are also tough to predict in this study only. Therefore, the last opportunity would be to use the other IS success model that can offer a diverse assessment of the factors affecting user satisfaction with the ERP system usage.

REFERENCES

Ahmed, F. (2017). *Factors affecting the implemetation of enterprise resource planning at commercial bank of Ethiopia.* Master Thesis : AAU.

Akbulut, Y. A., & Motwani, J. (2005). The road to ERP success: understanding end-user perceptions. *Journal of International Technology and Information Management, 14*(4).

Alhanatleh, H. (2016). *Factors affecting the cloud ERP usages.* Keyrenia: Girne American Univesrisy.

Al-jabri, I. M. (2015). Antecedents of user satisfaction with ERP systems : mediation analyses. *Emerald Insight, 44*(1), 107-123.

Ariff, M. S., Yeow, S., Zakuan, N., Jusoh, A., & Bahari, A. Z. (2012). The Effects of Computer Self-Efficacy and Technology Acceptance Model on Behavioral Intention in Internet Banking Systems. *Procedia - Social and Behavioral Sciences, 57*, 448-452.

Babic, V., & Roys, D. (2009). *Implementing Microsoft Dynamics NAV* . Packt Publishing.

Bai, Y. (2015). How does ERP implementation affect information exchanging costs and employee motivation. *Erasmus University of Rotterdam*.

Benders, J., Schouteten, R., & Mohamed, A. (2009). ERP-systems and job content: a case study of HR-assistants. *Personnel Review, 38*(6), 641-654.

Bento, F., & Costa, C. J. (2013). ERP measure success model; A new perspective. *ACM*.

Bhat, J., Shroff, B., & Bandi, R. (2012). User perceptions, motivations and implications on ERPUsage: An Indian higher education context. *CONFENIS*, (pp. 90-105). Ghent.

Buckingham. (1987). *Information System Curriculum.* Cambridge University Press New York, NY, USA.

Bueno, S., & Salmeron, J. L. (2008). TAM-based success modeling in ERP. *Interacting with Computers, 20*(6), 515-523.

Burton-Jones, & Straub. (2006). Reconceptualizing System Usage: An Approach and Empirical Test. *Information System Research*.

Calisir, F., & Calisir, F. (2004). The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems. *Computers in Human Behavior, 20*, 505-515.

Chang, M., Cheung, W., Cheng, C., & Yeung, J. (2008). Understanding ERP system adoption from the user ' s perspective. *Int. J. Production Economics, 113*, 928-942.

Chou, H. W., Chang, H. H., Lin, Y. H., & Chou, S. B. (2014). Drivers and effects of post-implementation learning on ERP usage. *Computers in Human Behavior, 35*, 267-277.

Chou, H., Chang, H., Lin, Y., & Chou, S. (2014). Drivers and effects of post-implementation learning on ERP usage. *Computers in Human Behavior, 35*, 267-277.

Chou, S., & Chang, Y. (2008). A decision support system for supplier selection based on a strategy-aligned fuzzy SMART approach. *Expert Systems with Applications, 34*, 2241-2253.

Compeau, R. D., & Higgins, A. C. (1995). Computer Self-Efficacy: Development of a Measure and Initial Test. *Management Information Systems Quarterly, 19*(2), 189-211.

Davenport, T. (2000). *Mission critical : Realizing the promise of Enterprise systems.* Boston: Harvard Business School Press.

Davis, & F., D. (1989). "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology". *MIS Quarterly, 13*, 319-339.

DeLone, W. H., & McLean, E. R. (2003). The Delone and Mclean model of information systems success: A ten-year update. *Journal of Management of Information System, 19*(4), 9-30.

DeLone, W., McLean, E., & Petter, S. (2008). Measuring information systems success : models , dimensions , measures , and interrelationships. *European Journal of Information System, 17*, 236-263.

Demeke, S. (2014). *Success factors for implementation of enterprise resource planning system at Ethiopian Airlines.* Master thesis : AAU.

Dezdar, S. (2012). User satisfaction issues in ERP project. *International Journal of Computer and Systems Engineering, 6*.

Diamantopoulos, A., & Schlegelmilch, B. B. (2006). *Taking the fear out of data analysis* . London: Thomson Learning.

Doll, W. J., & Torkzadeh, G. (1988). The Measurement of End-user Computing Satisfaction. *MIS Quarterly, 12*, 259-273.

E-Devel. (2016). *Business management (ERP).* Retrieved December 06, 2017, from http://www.toiminnanohjaustieto.com/toiminnanohjaus-erp/

Ermias, M. (2016). *Assessment on enterprise resource planning system utilization with Special reference to spply chain management: in case of Ethio telecom sourcing.* Master Thesis : AAU.

Fang, A.-r., Li, Y.-j., Lu, Q., Sun, B.-n., & Ye, Q. (2009). The Process of ERP Usage in Manufacturing Firms in China: An Emperical Investigation. *International Conference on Management Science & Engineering, 16.* Moscow.

Finney, S., & Corbett, M. (2007). ERP Implementation: A Compilation and Analysis of Critical Success Factors. *Journal of Business Management, 13*, 329-347.

Floyd, S. W. (1989). In the Age of the Smart Machine: The Future of Work and Power . *The Academy of Management Executive, 3*, 76-79.

Gallagher, & Gallagher, K. (2012). Organizing for Post-Implementation ERP: A Contingency Theory Perspective. *Journal of Enterprise Information Management*.

Gantley, C. (2007). *Enhancing end-user satisfaction in the post-implementation phase of ISD.* Waterford Institute of Technology : .

Gattiker, T., & Goodhue, D. (2005). What happens after ERP implementation: Understanding the impact of interdependence and differentiation on plant-level outcomes. *MIS Quarterly, 29*(3), 559-585.

Gebreyes, M. M. (2016). *Integration of ERP and CRM for quality service: challenges, achievemnets, and prospects in case of Ethiopian Air lines.* Master Thesis: AAU.

Gelderman, M. (1998). The relation between user satisfaction, usage of information systems and performance. *Information and Management, 34*(1), 11-18.

Gelderman, M. (1998). The relation between user satisfaction, usage of information systems and performance. *Information and Management, 34*(1), 11-18.

Hassanzadeh, A., Kanaani, F., & Elahi, S. (2012). A model masuring e-learning systems success in universities. *Expert System with Applications, 39*, 10956-10966.

Hsiu-Fen, L. (2010). An investigation into the effects of IS quality and top management support on ERP system usage. *Total Quality Management, 2*, 335-349.

Islam, M. A., Yusuf, D. H., Yusoff, W. S., & Johari, A. N. (2012). Factors affecting user satisfaction in the Malaysian income tax e-filing system. *African Journal of Business Management, 6*(21), 6447-6455.

Ives, B., Olson, M. H., & Baroudi, J. J. (1983). The Measurement of User Information Satisfaction. *Communication of ACM, 26*.

Jasperson, J. S., Carter, P. E., & zmud, R. W. (2005). A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems. *MIS Quarterly, 29*(3), 525-557.

Kalb, L. R. (2011). Antecedents of End User Satisfaction with an ERP System in a Transnational Bank: Evaluation of User Satisfaction with information systems. *Journal of Information Systems and Technology Management*.

Keri, E. P., & Carol, S. S. (2009). *Managing and Using Information Systems: A strategic Approach.* Wiley, 2009.

Kim, S., & Lee, H. (2006). The Impact of Organizational Context and Information Technology on Employee Knowledge-Sharing Capabilities. *Public Administration Review, 4*.

Kothari, C. R. (2004). *Research methodology : methods and techniques.* New Age International Publishers.

Kumar, K., & Hillegersberg, J. (2000). ERP Experience and Evolution. *Communication of ACM*.

Lin, H. (2010). An investigation to the effect of IS quality and top management support ERP system usage. *Total Quality Management & Business Excellence*.

Lin, H. (2010). An Investigation to the Effect of IS Quality and Top Management Support ERP System Usage. *Total Quality Management & Business Excellence*.

Lippert, S. K., & Forman, H. (2005). Utilization of information technology : Examining cognitive and experiential factors of post-adoption behavior. *IEEE Transactions on Engineering Management, 52*(3).

Lorenzo, O. (2001). Human, contextual, and processual issues influencing enterprise system use. *Americas Conference on Information Systems (AMCIS).*

Mahmoud, S. H. (2012). User resistance factors in post-implementation. kuala Lumpur: Universiti Teknologi Malaysia.

Marinagi, C., Trivellas, P., & Reklitis, P. (2015). Information Quality and Supply Chain Performance: The Mediating Role of Information Sharing. *Procedia - Social and Behavioral Sciences, 175*, 473-479.

Masa'deh, R., Al-Badi, A., Abu-Hlalah, A., Alkyal, R., & Zytoon, S. (2017). Factors affecting user satisfaction of tourism board website and its impact on continuous intention to use. *International Journal of Business Management, 8*(4).

Melone, N. (1990). A Theoretical assessment of the user satisfaction construct in information systems research. *Management Science*.

Melone, N. (1990). A Theoretical Assessment of the User Satisfaction Construct in Information Systems Research. *Management Science*.

Moshe, Z., Nava, P., & Ron, L. (2005). Measuring user satisfaction and perceived usefulness in the ERP context. *Journal of Computer Information Systems, 45*(3), 43-52.

Mukti, S. K., & Rawani, A. M. (2016). ERP system success models: A literature review. *ARPN Journal of Engineering and Applied Sciences, 11*(3).

Nahapiet, J., & Ghoshal, S. (2011). Capital , Social Capital , Intellectual Advantage and the Organizational. *Management, 23*(2), 242-266.

Nielsen, & Coyle. (2001). Emerging technology. *CIO Magazine* .

Nwankpa, & Roumani. (2014). The Influence of organizational trust and organizational mindfulness on ERP Systems usage. *Commmunications of Association for Information Systems*.

Olumide, D. (2016). Technology Acceptance Model as a predictor of using information system' to acquire information literacy skills. *Library Philosophy and Practice*, 1-27.

Omar, R., Ramayah, T., Lo, M.-c., Sang, T. Y., & Siron, R. (2010). Information sharing , information quality and usage of information technology (IT) tools in Malaysian organizations. *African Journal of Business Management, 4*(12), 2486-2499.

Oracle NetSuite. (n.d.). *Enterprise Resource Planning Systems Transform, Integrate and Scale Businesses*. Retrieved 01 23, 2018, from Oracle NetSuite: http://www.netsuite.com/portal/resource/articles/erp/what-is-erp.shtml

Petter, S., & Mclean, E. (2009). A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management, 46*, 159-166.

Pilot, D., & Hungler, B. (1985). *Essentials of nursing research; Methods and applications.* J. B. Lippincott Company.

Prakash, O., & Dixit, A. K. (2011). A study of issues affecting ERP implementation in SMEs. *Researchers World, 2*(2).

Premkumar, G., & Ramamurthy, K. (1995). The Role of Interorganizational and Organizational Factors on the Decision Mode for Adoption of Interorganizational Systems. *Decision Sciences*.

Ramadhana, B. A., Govindaraju, R., & Wibisono, Y. Y. (2016). ERP System Usage and Panoptic Control : The Role of Perceived Organizational Support. *In Industrial Engineering and Engineering Management (IEEM), 2016 IEEE International Conference*, (pp. 1814-1818).

Saunders, T., & Lewis. (2009). *Research Methods for Business Students* (5th ed.). Prentice Hall.

Schwarz, A., & Chin, W. (2007). Looking forward : Toward understanding of the nature and definition of IT acceptance. *AIS Journals, 8*(4).

Seddon, B. P. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research, 8*, 240-253.

Seddon, P. B., & Kiew, M. (1996). A partial test and development of Delone and Mclean model of IS success. *AJIS, 4*(1).

Sedera, D., Gable, G., & Chan, T. (2003). Measuring enterprise systems success: A preliminary model. *AMCIS 2003 Prroceedings.*

Shagari, S. L., Abdullah, A., & Saat, M. R. (2015). The influence of system quality and information quality on accounting information system (AIS) effectiveness in Nigerian banks. *IPBJ, 7*(2), 58-74.

Shanon, C. E., & Weaver, W. (1949). *The Mathematical Theory of Communication.* Urbana, IL: The University of Illinois Press.

Shivani, G., Ravi, K., & Deepak, G. (2013). Predictors of user satisfaction in enterorise resource planning implementation in technical educational institutions. *Information Japan, 16*(5), 2885-2894.

Sifat, T., Keju, K., Dari, M., & Kerbau, S. (2013). Predictors for User Satisfaction in Enterprise Resource Planning Implementation in Technical Educational Institutions. *International Information Institute, 16*(5), 1885-2894.

Sinamo, A. (2012). A Successful ERP Implementation in an Ethiopian Company: A Case Study of ERP Implementation in Mesfine Industrial Engineering Pvt. Ltd. *ScienceDirect, 5*.

Sinamo, A. (2012). A Successful ERP Implementation in an Ethiopian Company: A Case Study of ERP Implementation in Mesfine Industrial Engineering Pvt. Ltd. *Science Direct*.

Sukumaran, A. K. (2016). Measuring end user satisfaction in enterprise resource planning in India. *Business Information System, 21*(3).

Taylor, S., & Todd, A. P. (1995). Understanding information technology usage: A test of computing models. *Information Systems Research, 6*(2).

Wang, Y., & Wu, J. H. (2007). "Measuring ERP Success: The Key Users' Viewpoint of the ERP to Produce a Viable IS in the Organization,". *Computers in Human Behavior*.

Wang, Y., Greasley, A., & Albores, P. (2016). Do manufacturing firms needs informality in ERP post-implementation? A study of Chinse manufacturing sites. *Journal of Manufacturing Technology Management*.

Wanjohi, J. K. (2016). *Assesssing ERP systems post-implemetation success in Kenya* . Nairobi: University of Nairobi.

Watson, E., & Schneider, H. (1999). Using ERP systems in education. *AIS Journals, 1*.

Wiese, & Rosemann. (1999). *Measuring the Performance of ERP Software – a Balanced Scorecard Approach.*

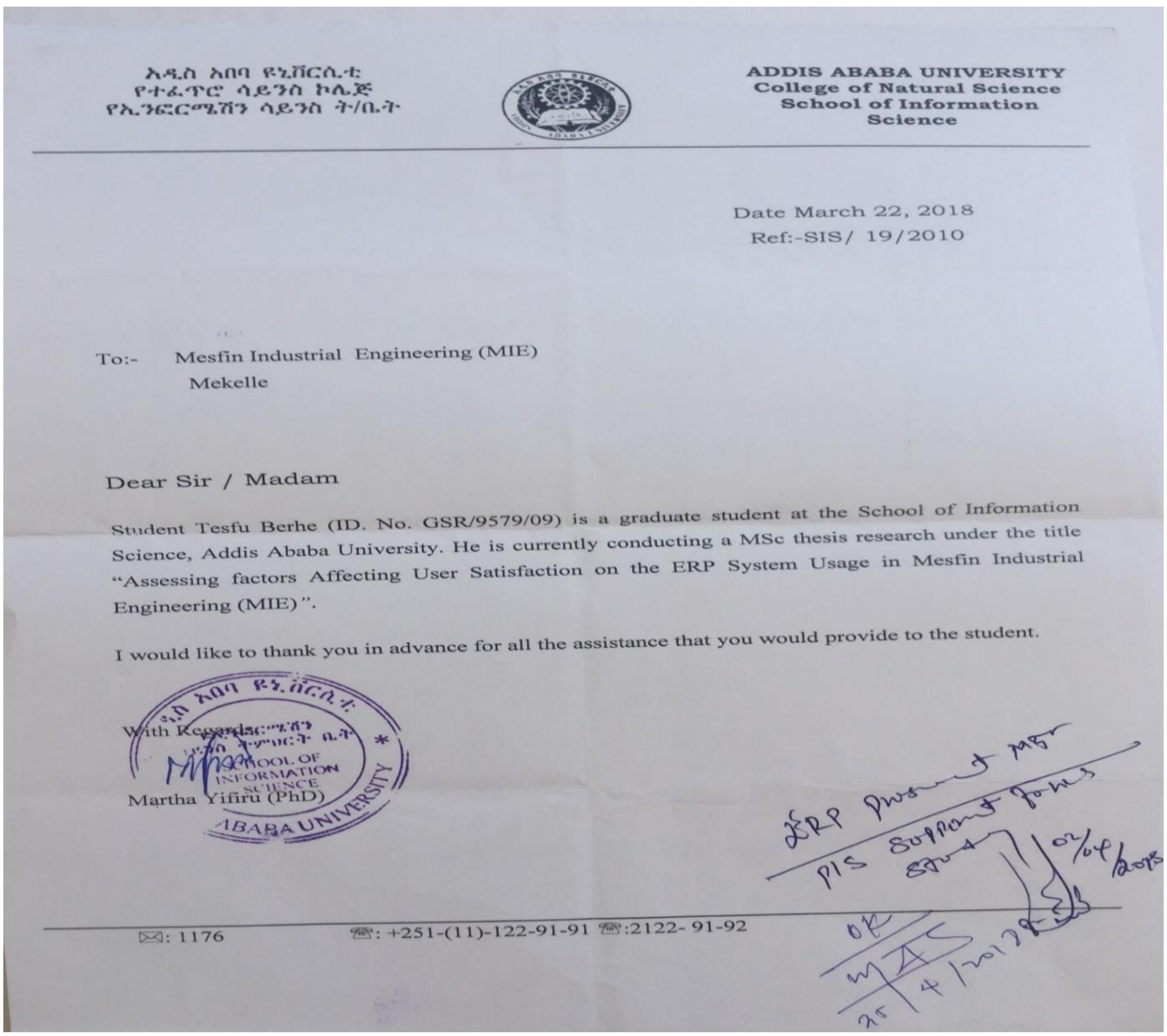
Winman. (2017). *ERP Systems for Manufacturing Companies.* Retrieved December 06, 2017, from http://www.winman.com/blog/bid/304660/erp-systems-for-manufacturing-companies

WorkWise. (n.d.). *Why Today's Manufacturers Need a Modern ERP System*. Retrieved December 06, 2017, from WorkWise Software: https://www.workwisellc.com/erp-software/the-need-for-a-modern-erp-system/

APPENDICES A: CONSENT FORM

Addis Ababa University

Seek Wisdom, Elevate your Intellect and Serve Humanity



ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date March 22, 2018
Ref:-SIS/ 19/2010

To:- Mesfin Industrial Engineering (MIE)
Mekelle

Dear Sir / Madam

Student Tesfu Berhe (ID. No. GSR/9579/09) is a graduate student at the School of Information Science, Addis Ababa University. He is currently conducting a MSc thesis research under the title "Assessing factors Affecting User Satisfaction on the ERP System Usage in Mesfin Industrial Engineering (MIE)".

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

With Regards

Martha Yifiru (PhD)

✉: 1176 ☎: +251-(11)-122-91-91 ☎:2122- 91-92

APPENDICES B: QUESTIONNAIRE

Questionnaires for Employees of Mesfin Industrial Engineering (MIE):

Dear respondents, this is a research titled "**Assessing User Satisfaction with ERP system usage: A case study in Mesfin Industrial Engineering**" The research is carried out in order to fulfill the requirement of Addis Ababa University for the Master's degree in Information Science (Information system track).

This questionnaire will gather data about the ERP system usage in Mesfin Industrial Engineering (MIE). The data will be used to assess the factors affecting user satisfaction in the ERP system usage. Thus, identifying the impact of factors effectively will help to enhance ERP system usage and user satisfaction. Besides, it will help to achieve the anticipated business goal of the firm.

You have been selected as a respondent to this questionnaire because I believe the information that you will provide will be very useful in enabling me to realize the objectives of the study. In answering the questions, you may be requested to put a tick (✓) mark inside the box that indicates your level of agreement with each statement. I highly appreciate the fact that you have taken time to fill in this questionnaire.

Please Note: The term **ERP system** referred to in this questionnaire is the **Microsoft dynamics ERP system** implemented in Mesfin Industrial Engineering (MIE).

General Information

1. Please indicate your age:

20-24 years	O	30-34 years	O
25-29 years	O	35 years and above	O

2. Please indicate your gender:

Male	O	Female	O

3. Please indicate your department:

Human Resource	O	Production	O
Finance	O	General Service	O
Information Technology	O	Design & Marketing	O
Planning	O	Other: _____	

4. Please indicate your experience in using ERP system in MIE:

Month	☐	Year	☐

5. **Please work through each part of the questionnaire stated below by reading each statement and ticking (✓) the appropriate response.**

	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5.1	Using the ERP system is easy for me					
5.2	Functions provided by the ERP system are useful for my work					
5.3	The use of ERP system speeds up my work operations					
5.4	The service of the ERP system is always available for my work					
5.5	Using ERP system is not necessary					
5.7	The ERP system ensures information availability					
5.8	The ERP system provides me with relevant information					
5.9	The report provided by the ERP system is not important for me					
5.10	The ERP system guarantees reliability of information					
5.11	The ERP system allow me to access information securely					
5.12	The ERP system provides me with timely information.					
5.13	Overall, information quality is not necessary.					
5.14	Are you getting good ERP system technical support?					
5.15	Are you or your department being trained on time?					
5.16	Are you regularly using your organization e-mail, and forum that focused on technical support?					
5.17	The technical support staff makes it easier for me to use the ERP system					
5.18	It is easy to get technical support when I used ERP system					
5.19	The manager always supports the use of the ERP system					
5.20	The manager is really keen to see that staff is happy with using the ERP system					
5.21	The manager provides me with necessary help and resource to use the ERP system					
5.22	The manager is aware of the benefits that can be achieved with using the ERP system					

5.23	Management support is not useful with using ERP system					
5.24	I could complete the job using the ERP system if someone else showed me how to do it first					
5.25	I could complete the job using the ERP system if I have only the software manuals for reference					
5.26	I could complete the job using the ERP system if I have only just the built-in help Facility for assistance.					
5.27	I could complete the job using the ERP system if I have never used the package like it before.					
5.28	I communicate with other employees through informal meetings within the organization related to the ERP system usage					
5.29	I interact and communicate with other people or groups outside the organization to get help how to use ERP system					
5.30	I actively participate in communities of practice related to the ERP system					
5.31	I use the ERP system frequently for my work					
5.32	I access the ERP system several times in a day for my work					
5.33	Using the ERP system improves my performance in a term of my job					
5.34	The ERP system implemented in Mesfin Industrial Engineering is not necessary					
5.35	Using the ERP system in my job increases my productivity					
5.36	Are you satisfied with the ERP system					
5.37	I find it easy to use the ERP system interface provided					
5.38	Using the ERP system improves the quality of my work life					

APPENDICES C: SEMI- STRUCTURED INTERVIEW GIUDLINES

The following questions which are used to guide the interview to get detail understanding the factors affecting user satisfaction in the ERP system usage:

1. What is your general feeling regarding the quality of the ERP system?
2. How has the ERP system been of help to you?
3. In what ways do you feel that the ERP system falls short of your expectation?
4. What would you say about the services of the ERP system? Are they useful?
5. What is your comment about the execution speed? Does the ERP system speed up your operations?
6. What would be your comment regarding the quality of information generated by the ERP system?
7. How available are the ERP system services for you?
8. In what ways do you feel the quality of information fails to meet your expectation?
9. Does the quality of information affect your frequency of using the ERP system?
10. What is your experience with the quality of support services offered for the ERP system?
11. We would now like to hear about your use of the ERP system.
12. What in your opinion discourages you from using the ERP system?
13. Is management support important to facilitate ERP system usage?
14. What would be your comment regarding improving the efficiency of the decision process?
15. What in your opinion creating the social capital to enhance ERP system usage?
16. Do you believe that you could do your job if you have only the software manuals for reference?
17. Do you believe that you could do your job if you have only the built-in help facility for assistance?