ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

THE EFFECT OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM IMPLEMENTATION ON ORGANAZATIONAL PERFORMANCE: THE CASE OF SELECTED PUBLIC SERVICE CAMPANIES IN ETHIOPIA.

A THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN ACCOUNTING AND FINANCE.

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This is to certify that the thesis prepared by Sisay Gezahegn entitled "**The effect of Enterprise Resource Planning (ERP) system implementation on organizational performance: The case of selected public service companies in Ethiopia**" and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Statement of Declaration

I, Sisay Gezahegn declare that, this thesis entitled "**The effect of Enterprise Resource Planning (ERP) system implementation on organizational performance: The case of selected public service companies in Ethiopia**" for the partial fulfillment of the requirements for MSC Degree in Accounting and Finance is my own work with close advice and supervision of my advisors Degefe Duressa (PhD) and Takele Fufa (PhD).

Name: Sisay Gezahegn

Signature _____

Date _____

CERTIFICATION

This is to certify that Ato Sisay Gezahegn has carried out this research work on the topic entitled "**The effect of Enterprise Resource Planning (ERP) system implementation on organizational performance: The case of selected public service companies in Ethiopia**" under my guidance and supervision. This research work is original in nature and is sufficient for submission for the partial fulfillment for the award of MSc. in Accounting and Finance.

Takele Fufa (PhD).

Signature_____

Date_____

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Acronyms /Abbreviations

BPM-Business Process Management

CBE-Commercial Bank of Ethiopia

CIM-Computer Integrated Manufacturing

EAL-Ethiopian Airlines

ET-Ethio Telecom

ERP-Enterprise Resource Planning

DW-Durbin Watson test

FA-ERP: Finance ERP system

HR- Human Resource

ICT-Information Communication Technology

IS-Information Systems

IT-Information Technology

MRP-Manufacturing Resources Planning

OIP- Organizational Information Processing

OP-Organizational Performance

OVtest -Omitted Variables Test

SAP - Systems Applications and Products

SF ERP - Sourcing and Facility ERP

SCM- Supply Chain Management

STS-Sociotechnical System

VIF- Variance Inflation Factor

ABSTRACT

In today's global economy, organizations implement integrated software to create smooth inter-organization integration, get competitive advantage, hold customer satisfaction, produce real time report, provide user satisfaction as operating system, and getting output from the system. Enterprise resource planning (ERP) system is a set of integrated software modules and a central database that facilitates an organization to manage the efficient and effective use of resources. The effects of ERP system implementation on organizational performance needs to be known and measured so that appropriate & timely interventions can be undertaken for improvement. The main objectives of this study is to evaluate the effects of ERP system implementation on organizational performance in the selected public service companies in Ethiopia with respect to major ERP modules finance, human resource and sourcing & facility. The research adopted both explanatory and descriptive research designs with mixed of quantitative and qualitative research approach. Both primary and secondary data were used in the study for data collection purpose. The study population was composed of management and non-management staffs of selected public service companies, which were 1270 respondents. The study applied both stratified random sampling and purposive sampling techniques so as to allow in coming up with a sample size of 604 respondents, where primary data was collected directly from the respondents by the use of a questionnaire which was composed of both close ended and open ended questions. The collected data was analyzed using descriptive and inferential statistics using powerful econometric software STATA 11. Multiple regression analysis was used in the study to determine the effect of ERP system on organizational performance. The study results were presented by the use of tables, percentages and figures. The findings of the study show that financial ERP, human resource ERP and sourcing & facility ERP have statistically significant and positive effect on organizational performance of selected public service companies. In conclusion, the management of these companies as well as other organizations must emphasize on those variables and develop strategy accordingly for efficient and effective utilization of resources, managing time and expenses, facilitating organizational survival, profitability, maintain competitive advantage and generally improved overall organizational performance. Finally, the study

recommends that the companies must implement adequate training and development programs in order to enhance the user's satisfaction and be more productive on their job.
***Keywords**: Enterprise Resource Planning (ERP), Organizational performance, selected public service companies.*

CHAPTER ONE
INTRODUCTION

1.1Background of the study

Globalization has made business more challenging by expanding markets, increasing customer expectations and competition, made additional pressure on the firms to change rapidly. As such, an integrated system is required by the business leaders, in a way that can run the whole business processes to maintain their competitive advantages and fulfill the global requirements (P. K. Dey, B. T. Clegg, & D. J. Bennett, 2010). Information systems are often used as tools to improve customer service, reduce cycle times, increase effectiveness, and decrease cost. The potential and proven ability of Information Communication Technology (ICT) and Information Systems (IS) to increase organizational performance in terms of efficiency in processes and quality is well documented (Al-Mashari, 2003; Abugabah &Sanzogni, 2009). Njihia and Mwirigi (2014) contend that Enterprise resource planning (ERP), among the principal forms of ICT applications in organizational setting, which is emerging as one of the most effective means of ensuring optimum organizational performance.

Enterprise resource planning (ERP) is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete business processes. ERP system is a set of integrated software modules and a central database that facilitates an organization to manage the efficient and effective use of resources (materials, human resources, finance etc.) by automating and incorporating business processes, data sharing throughout the enterprise and enabling information access in real-time environment (Laudon and Laudon, 2013).

ERP systems play a fundamental important supporting role in several industries for instance the service industries such as the telecommunications, financial institutions, as well as airline industries. When ERP systems are fully realized in a business organization, they can yield many benefits: reduce cycle time, enable faster information transactions, facilitate better financial management, lay groundwork for e-commerce, and make tacit knowledge explicit (Davenport,2011). In general, the benefits of ERP system can be classified into five different dimensions: Operational benefits, by automating business processes and enabling process changes, they can offer benefits in terms of cost reduction, cycle time reduction, productivity

improvement, quality improvement, and improved customer service. Managerial benefits, with centralized database and built-in data analysis capabilities, they can help an organization achieve better resource management, improved decision making and planning, and performance improvement. Strategic benefits, with large-scale business involvement and internal/external integration capabilities, they can assist in business growth, alliance, innovation, cost differentiation, and external linkages. IT infrastructure benefits, with integrated and standard application architecture, they support business flexibility, reduced IT cost and marginal cost of business units' IT, and increased capability for quick implementation of new applications. And finally organizational benefits, they affect the growth of organizational capabilities by supporting organization structure change, facilitating employee learning, empowering workers, and building common visions.

One specific aspect of management control is the area of performance management. Talking about managing performance, the next question that presents itself is: what exactly is meant by performance and how can performance be measured. In the context of performance management, the term "performance" means continually achieving the preferred results in a manner that is as effective and efficient as possible. According to Gavrea et al. (2011), there are two dimensions to measuring performance in organization. This is done by assessing either the financial or the non-financial indicators. Glova and Gavurova (2012) stated that financial indicators include net profit, profitability, return on assets, share prices and installation and maintenance costs of a system. The non-financial indicator of performance can be further conceived into two categories, organizational effectiveness and efficiency, in other word operational/managerial and strategical benefits.

According to Elragal & Al-Serafi (2011) the adoption of ERPs injects efficiency in organizational processes through the reduction of coordination costs and enhancing tighter cording between and among departments, which allow organizations to react promptly and simultaneously to certain environmental turbulences and opportunities. Organizations expect that ERP will create competitive advantages. In assuming that ERP create advantages, it is necessary to know what effects it has on an organizational performance. Now a days the performance of service industries like Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia are highly dependent on modern technologies, the implementation of ERP System has a big role on

their business performances. Hence, the purpose of this study is to evaluate the effect of ERP implementation on organizational performance in case of selected public service companies in Ethiopia.

1.2 Statement of the Problem

In today's global economy, organizations face a number of challenges, such as severe competition, greater market intensity, and more demanding customer expectations. In this competitive situation, organizations can survive only if they improve quality, decrease costs in their whole supply chain, reduce inventories lead time, diversify their products and services, and provide more reliable delivery service in better ways in comparison to their competitors. Rapid changes in social, economic, and political forces together with daily advances in technology are making business markets even more intensely competitive, which fact is having a profound influence on the way businesses are managed. In such environment, it becomes increasingly imperative that managers create new and different strategies to maintain market position and meet customer needs (Umble, 2003).

In light of these challenges, more and more organizations are seeking technologies that have the ability, essentially, to manage every aspect of their business and, at the same time, make their internal processes more efficient, effective and professional. Thus, information technology (IT) and information system (IS) have changed the lives of both individuals and organizations and play a crucial role in today's business world (Chung et al., 2008). Specially for those firms that their business activities are highly dependent on modern information Technology (IT) and Information System (IS) such as Ethio-telecom has mission to provide world class, modern and high quality telecom service for all citizens, Ethiopian Airlines has vision named as "Vision 2030", "There will be new planes and new destinations, and we will increasingly transform the airline into an aviation group". Ethiopian Airlines will set up its own aviation production and Commercial Bank of Ethiopia envision is to become a world-class commercial bank by the year 2025. In order to achieve their vision and mission and create competitive advantages, the companies must implement modern technology to run their business activities efficiently and effectively and thus enhance organizational performance as a whole. ERP systems are among those spreading technologies which take strategic advantages in competitive market through enhancing organizational performance by facilitating transaction processing capabilities of the

firm, record keeping, decision-making, operational cost reduction, coordination of internal processes, information sharing and communication. The advantages of using ERP system spread broadly to the organizations worldwide for which organizations may enjoy benefits such as better customers satisfaction, increased flexibility of operations, reduced quality costs, increased company profits, improved information accuracy and improved decision-making capability for top management (Dirisu et al., (2013).

A significant aspect for developing an ERP system is to evaluate and measure its performance. Evaluating the effect of ERP implementation helps in analyzing the contribution of ERP systems to organizations. The sectors that fully implemented ERP systems does not realize whether the use and deployment of an ERP system enhances their employees' productivity, service quality and innovation (Al-Mashari et al., 2003). The effects of ERP modules implementation on organizational performance needs to be known, categorized, and measured so that appropriate & timely interventions can be undertaken for improvement.

ERP implementation, however, brings not only business gain but also business pain (Cissna, 1998). Although ERP systems have many advantages and become a focal point of business and technology planning, implementing ERP systems is expensive and time consuming (Sweat, 1998). The cost associated with ERP implementation is often greater than planned because of many hidden costs such as training, customization, integration, and data conversion. The business managers of organizations with significant ERP experience suggest that the cost of introducing ERP systems is close to the cost to rebuild the firm’s information infrastructure (Trott and Hoecht, 2004).

A lot of studies are conducted regarding ERP system implementation success and failure factors in Ethiopian context. For instance: Abiot & Jorge (2012) tried to assess successful ERP implementation in an Ethiopian Company: A case Study of ERP Implementation in Mesfin Industrial Engineering Pvt. Ltd. Engidayehu Getachew (2014) studied an assessment of Enterprise Resources Planning (ERP) Implementation in Ethio telecom, practice and challenges of ERP system. Elsa Taddele (2015) has conducted study on ERP post-implementation management framework: The case of Ethiopian Airlines. Markos Mulat (2016) integrating Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) and analyze their impact on quality service delivery in Ethiopian Airlines. Foziya Ahmed (2017)

factors affecting the Implementation of Enterprise Resource Planning at Commercial Bank of Ethiopia. Globally studied research has established that there exists a positive correlation between adoption of ERP systems and organizational performance (Al-Mashari, 2003; Abugabah & Sanzogni, 2009; Njihia & Mwirigi, 2014). Empirical evidence suggested that ERP adoption facilitate organizational processes and activities including sales, billing, marketing, human resource management, quality control and production thus ensuring general performance (Motwani, 2016; Al-Mashari, 2003).

All the above-mentioned researches were conducted on ERP system implementation issues and success and failure factors by considering a single case organization in Ethiopian context. To the best of the knowledge of the researcher no sufficient empirical study has been conducted regarding the impact of ERP systems implementation on organizational performance focusing on three organizations namely: Ethio telecom, Ethiopian Airlines and Commercial Bank of Ethiopia collectively. Because these companies' business activities are highly dependent on modern information Technology (IT) and Information System (IS) hence, they invest huge amount of money for implementing ERP systems and providing service to the general publics and also are the prime supporter of rapid growth and development of the country's economy. Additionally , instead of single case, conducting an assessment of ERP implementation on organizational performance on different organizations can give a holistic (all rounded) picture of the impact of ERP implementation success in business performance of these service sectors but are in different working environment, Ethio telecom (Telecom service),Ethiopian Airlines (Transportation service) and Commercial Bank of Ethiopia (Financial service).

Therefore, in this research the researcher attempts to show how implementation of ERP system affect performance of organization and generally aims to fill the above stated gap in the literature focusing on three selected public service companies namely- Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia picking major automated ERP Module areas such as Finance, Human Resource and Sourcing and facility divisions as main variables.

1.3 Research Questions

Ethio-Telecom, Ethiopian Airlines and Commercial Bank Ethiopia are Ethiopia's large state-owned service companies established for the purpose of providing telecom, transportation and financial services respectively to the public throughout the country. Hence, they have great

contribution to the overall growth and devotement of the country. Therefore, knowing the effect of ERP system on business performance of these companies has its own merits, hence this paper is conducted to address the following research questions:

1. What are the effects of Financials ERP system implementation on organizational performance?
2. What are the effects of Human Resource ERP system implementation on organizational performance?
3. What are the effects of Sourcing and Facility (SCM) ERP system implementation on organizational performance?

1.4 Objectives of the Study.

1.4.1 General Objective

The general objective of this research is to assess the effect of ERP system implementation on performance of Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia.

1.4.2 Specific objectives

More specifically, the study will be guided by the following objectives:

1. To assess the effect of Financial ERP system on financial performance.
2. To evaluate the effect Human resource ERP system on organizational performance.
3. To investigate the effect of Sourcing and Facility (SCM) ERP system on organizational performance.

1.5 Significance of the study

The study will be significant to the following stakeholders:

Ethio-Telecom, Ethiopian Airlines and Commercial Bank of Ethiopia are major contributor for the development and growth of the country's economy. Their day to day operations are highly oriented with information and communication technology (ICT) system. Therefore, studying the relationship between one of the modern information and communication technology system known as ERP system and its impact on the performance of companies is very essential because

cost of implementing ERP system is very expensive and time consuming. Thus, it needs serious follow up whether the adopting companies achieved the expected objectives or not. Therefore, the findings from this study serve as an input that ERP system improved the performance of the companies.

The findings of the study will be a guide to the management of finance, human resource and sourcing & facility divisions of Ethiotelecom, Ethiopia airlines and Commercial Bank of Ethiopia as well as to other sectors to make strategic decisions considering the effect of ERP system on organizational performance. For any organization which have a plan to deploy the ERP system, the study will enable them to take correct decisions by looking the findings in Ethiopian context.

The study attempted to fill gap of short of literature within the context of Ethiopia public service company's ERP system. Finally, the findings of this study also serve as reference for future researchers who will be interested to study topics related with ERP implementation and its impact on organizational performance.

1.6 Scope and Limitation of the study

1.6.1 Scope of the study

This study is a multi-case study aiming to assess the effect of ERP implementation on organizational performance that encompasses Ethio-Telecom (telecom sector), Ethiopian Airlines (transportation sector) and Commercial Bank Ethiopia (finance sector). Because these companies' business activities are highly dependent on modern information Technology (IT) and Information System (IS) hence, they invest huge amount of money for implementing ERP systems and providing service to the general publics and also are the prime supporter of rapid growth and development of the country's economy. The participants are management and non-management groups of employees from finance, human resource and sourcing & facility divisions of company's organizational units located at company's Head Quarters only. Because finance, human resource and sourcing & facility divisions had more respondents due to having most of the staffs who participate during feasibility study and ERP system development phase are currently working in these three areas .These divisions were also identified as the divisions that are the major users of the ERP system. The research is conducted at head office level only

mainly due to ERP fully automated centrally at head office level and provide support to branches, zones and regions and can be considered represent the remaining geographical areas.

1.6.2 Limitation of the study

The study is restricted to access only three public service companies. It would be better if more stakeholders were included in the study to reach on national generalization about ERP system. With limited number of independent variables, there could be other ERP modules that may affect the performance of the organizations which are not included in this study. Finally, Because of unavailability of related research work on the current topic in Ethiopia context, the study has focused on materials of other countries.

1.7 Organization of the paper

This paper organized into five chapters.

The first chapter presents introduction of the study which consists of background of the study, background of the organizations, statement of the problem, research questions, and objectives of the study, hypothesis development, scope and limitation of the study. Chapter two deals with literature review in the form of theoretical and empirical studies and states the gap analysis and conceptual framework. The third chapter reflects the research design and methodology of the study. Then chapter four presents data analysis and interpretation of the result. Finally, in the fifth chapter, summary of the findings, conclusion and recommendation are presented.

CHAPTER TWO

LITERATURE REVIEW

INTRODUCTION

In uncertain business environment, a firm develops its resources and capabilities to improve or maintain its competitiveness. A firm needs to provide a product or service in the right place at the right time at the lowest cost. Many firms are employing ERP solutions to respond to customers' demands with speed and accuracy. Using ERP systems effectively is essential to stay competitive and profitable. The following sections provide a brief conceptual understanding Information Technology, what ERP system mean, evolution of ERP system, ERP modules, theoretical framework to justify the need for the current study, review of existing literature on the impact of ERP systems on organizational performance, the empirical review on the relationship between Enterprise Resource Planning (ERP) and organizational performance, Research gap and finally conceptual framework to guide the study discussion.

2.1 Theoretical Review

2.1.1 Concept of Information Technology

"IT investment, broadly defined, includes investments in both computers and telecommunications, and in related hardware, software, and services" (Dedrick, Gurbaxani, & Kraemer, 2003). IT investment is not the only tool for automation of current business processes, but it plays a role of enabler which can bring desired organizational changes that can result in improved productivity (Dedrick et al., 2003). The return on investments in IT can vary significantly among firms, which can be linked to differentiated management practices that allow the firm to bring organizational changes in accordance with the effective use of information technology. As different industries have varying business processes, management, operations, business cycles, decision-making style, the impact of IT can depend on a particular sector.

Devaraj and Kohli (2003) recommend that in order to see the true effect of IT on organizational performance, the impact of particular IT application on specific industry should be assessed. Likewise, different IT investments have a different impact on organizational performance. Gattiker and Goodhue (2005) argue that studies conducted on the performance impact of IT have assessed collective IT investments instead of considering varying impact of the different type of information technology thus they suggest that better results may be achieved through focusing on particular information technology such as enterprise resource planning system (ERPs).

2.1.2 The IT Productivity Paradox

In the early 1990s, researchers did not find significant positive relationship between IT investment and performance because of productivity paradox. Research findings indicated that companies which adopt IT technologies had no additional gains in productivity, and it was claimed later that IT adoption actually slows down the growth in productivity since then, the evidence has been mixed (Kallunki et al., 2011). Poston and Grabski (2001) reported there is no relationship between ERP system implementation and financial performance, on the other hand, Hayes, Hunton, and Reck (2001) found positive effect of ERP system on performance. However, lately research indicates that IT can actually contribute to productivity improvements (Anderson et al., 2003). As Pavlou et al. (2005) stated "previous literature has not conclusively shown that IT investments have a positive effect on either firm or process performance." This phenomenon was named as a productivity paradox because the findings on productivity contradicted the expectations of IT investors who thought that IT investments would improve business performance (Anderson et al., 2003).

2.1.3 Definition of ERP system

There are different definitions of ERP. An Enterprise resource planning system commonly known as an ERP system can be defined as a set of commercial software packages and hardware that promise unified integration of information flow through all functional areas in a firm via providing them access to single database. "Integration" is the key word for ERP implementation. Enterprise resource planning (ERP) is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete business processes such as order fulfillment or billing. The ERP software encompasses the best business practices

which a firm can use to replace existing legacy systems. An ERP system supports most of the business system that maintains in a single database the data needed for a variety of business functions such as manufacturing, supply chain management, financials, projects, human resources customer relationship management, knowledge management and talent management (Nishad Nawaz, K Channakeshavalu, 2013).

According to Spano and Bello (2010) ERP is a kind of advanced Information System (IS), which is capable of providing a comprehensive impression of the firm as well as shared database in which the firm's transactions are both recorded and stored. Parr and Shanks (2000) explain that the ERP system software typically comprises of several enterprise software modules, which are purchased separately, based on the organizations specific technical capabilities and needs, such as sales, service and product development and intra-organizational communication. Some of the most common ERP modules consist of those for material purchasing, product planning, inventory control, accounting, distribution, marketing, human resource and finance. According to Laudon and Laudon (2013) ERP system is a set of integrated software modules and a central database that facilitates an organization to manage the efficient and effective use of resources (materials, human resources, finance etc.) by automating and incorporating business processes, data sharing throughout the enterprise and enabling information access in real-time environment.

Scholars have argued in favor of multiple business value of ERP. Some of the stated values include improved business insight (due to the possibility or availability of real-time information produced by reports) lower organizational operational costs (via well-defined and more streamlined business activities and processes), enhanced collaboration between organizational staff, as well as between the organization and other stakeholders through effective data sharing in requisitions, contracts and purchase orders (Al-Mashari, 2003; Fosser, et al.,2008; Dirisu, et al., 2013). Thus, a firm implementing an ERP system can have benefits such as fast and accurate information gathering, quick decision making, low inventory cost, improved interaction with customers, improved product quality and manage the entire organizations' resources efficiently and effectively.

2.1.4 The history of ERP System

Most research studies view the evolution of ERP systems from a manufacturing perspective. In the late 1950s and the early 1960s, automated reorder point (ROP) systems were used for

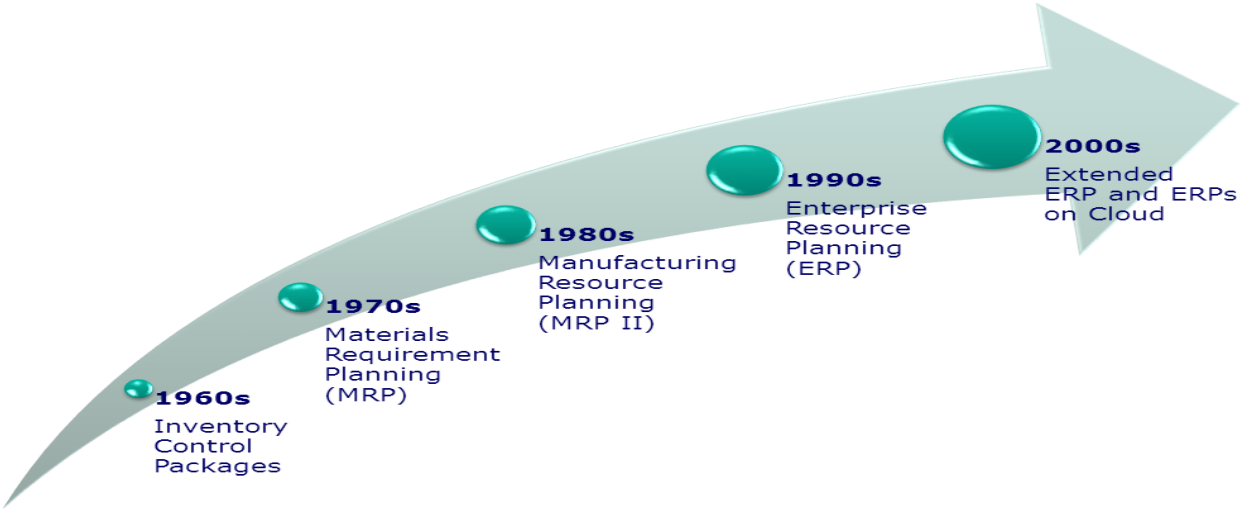
scheduling production, ordering materials, and shipping products within an assigned plant area. During the mid-1960s, computerized materials requirements planning (MRP) systems began to replace ROP systems. These systems represented the first off-the-shelf business application systems available in the market. They supported the creation and maintenance of master data and bill of materials (BOM) across all products and parts in one or more plants. BOM processors and forecasting algorithms along with computerized production reporting tools formed typical parts of the MRP system. In the mid-1970s, manufacturing resources planning (MRP II) systems began to replace MRP systems. MRP II systems integrated materials as well as production capacity requirements in the calculation of overall production capabilities. In addition, advanced reporting capabilities enabled the efficient scheduling and monitoring the execution of production plans. The IT underlying MRP and MRP II systems focused primarily on automating transactions in order to increase the firm's operational efficiency. (Chung & Snyder, 2000; Klaus, Rosemann, & Gable,2000; Rondeau & Litteral, 2001).

The MRP systems typically ran on mainframes, reflected centralized computing, involved limited interactions between users and the system, and had low levels of functional integration. The MRP II systems, in contrast, mainly used multi-user networks and ran on a variety of IT platforms. The late 1980s witnessed rapid advances in technology and MRP II systems were integrated with other systems such as computer integrated manufacturing (CIM), just-in-time (JIT), electronic data interchange (EDI), and manufacturing execution systems (Hsieh & Kleiner,1992; Rondeau & Litteral, 2001).

In the early 1990s, ERP systems replaced MRP II systems. ERP systems extended MRPII system functionalities to include functions such as human resources, sales and distribution, and quality to create seamless, integrated information flows across the entire firm. ERP systems comprise of a suite of integrated products that use a common IT architecture and can be linked or de-linked and integrated with legacy and other application systems. These systems run on multiuser networks and allow the simultaneous aggregation, de-aggregation, and manipulation of real time data across functions. ERP systems now form the IT backbone of firms and their functionalities have extended to include inter-firm integration facilitated by business applications such as electronic-commerce (E-Commerce), SCM, and CRM (Sadagopan, 1999; Chung & Snyder, 2000).

ERP systems produced by companies such as SAP (Systems Applications and Products in Data Processing) gained more interest in the market because they enabled firms to upgrade their capabilities and to improve their business processes and procedures. In the highly competitive and rapidly changing business environment, a firm needs to make right and timely decisions. ERP systems enabled firms to gain competitive advantages through integrating and optimizing business processes (Davenport, 1998). For that reason, ERP has gained importance in the business strategy field.

Figure 2.1 shows the historical evolution of ERP system.



Source: -Rashid, Hossain & Patrick (2002).

2.1.5 ERP Modules

Enterprise Resource planning modules consists of broader variety of functional elements known as Modules. However, different vendors have offered various Module packages. According to major global ERP system vendor Websites there are two module categories, the first one pertains to modules that address intra-firm activities, and the second one to modules that cater to inter-firm activities. Firms initially implement the intra-firm module sub-system comprising of modules such as finance, logistics, and human resources. Then, after stabilizing their internal ERP system deployments, they implement the inter-firm module sub-system consisting of modules such as supply chain, e-commerce, and planning and optimization (ArunKumar Madapusi, 2008).

2.1.5.1 Financials Module

The financials module constitutes the operational aspects of the general accounting and financial information for the firm (Appelrath & Ritter, 2000). This module meets global accounting standards and typically comprises of integrated multi-site and multicurrency financial solutions that allows for reconciliation of balance sheets, profit and loss statements, and cash flow figures over different corporate entities. Flexible components such as the general ledger, accounts receivable, accounts payable, asset management, treasury management, and investment management, automate and streamline key business transactions across a firm's supply chain. They incorporate decision capabilities with drill down facilities that help decision-makers monitor key performance indicators at various organizational levels.

2.1.5.2 Human Resources (HR) Module

This module includes all business processes required to efficiently manage a firm's human resources needs from recruitment to post termination benefits. It provides support for all personnel management and development activities in the firm. The areas typically focused are personnel, payroll, e-recruiting, time management, training, employment laws, meeting statutory reporting requirements, taxes, benefits, workforce deployment and analytics, and self-service delivery. Organizations can maximize the potential of workforce, while supporting innovation, growth, and flexibility. They can automate talent management, core HR processes, and workforce deployment enabling increased efficiency and better compliance with changing global and local regulations (ArunKumar Madapusi, 2008).

2.1.5.3 Supply Chain Management (SCM) Module

The module helps firms manage their back-offices' linear, sequential, as well as adaptive supply chains, by providing firms with planning and execution capabilities to manage internal operations as well as extended inter-firm operations. The key components include order processing, inventory control, inventory planning and forecasting, distribution requirements planning (DRP), Material Requisition Planning (MRP), purchasing audit, customer order management, supply chain manufacturing, and supply chain planning (Ayers, 2001).

To support the above idea, Kudyba and Diwan (2002) reported that investment in various forms of IT has made important contributions to productivity and gross revenue. Hitt et al. (2002) noted

that firms that implemented ERP showed higher performance than firms that did not implement ERP across a wide array of financial metrics. Therefore, based on previous research, ERP implementation should contribute positively to organizational performance.

Previous research also indicates that ERP scope has a clear impact on firm performance. One study indicated that deploying the human resources and financials modules had more impact on performance than deploying either all modules or just the primary modules (Nicolaou, 2004). Other study by Hitt et al. (2002) indicated that implementing financials, human resources, manufacturing, and data warehousing/mining had more impact on firm performance than any other combination. Both studies agree that deploying the financials and human resources modules have the most impact on firm performance when compared to implementing all ERP modules. Based on prior research, ERP implementation status and ERP scope both affect organizational performance. Therefore, this study picks three major ERP Modules namely, Finance, Human Resource and Souring and Facility (SCM) modules and evaluate their impact on organizational performance.

2.1.6 Theoretical Framework

2.1.6.1 Theory of Organizational Information Processing

This theory was developed by Galbraith (2005). The theory identifies three important concepts: information processing needs, information processing capability, and the fit between the two to obtain optimal performance in organizations. According to the theory, organizations need quality information to cope with environmental uncertainty and improve their decision making. Environmental uncertainty stems from the complexity of the environment and dynamism, or the frequency of changes to various environmental variables. The theory further postulates that organizations have two strategies to cope with uncertainty and increased information needs for their management processes: (1) Develop buffers to reduce the effect of uncertainty, and (2) Implement structural mechanisms and information processing capability to enhance the information flow and thereby reduce uncertainty. These sub units require an integrated IT system that improve information flow and reduce uncertainty within organizational sub units. Increasing the capacity to process information required in management processes which require (1) investment in vertical information systems and (2) creation of lateral relations to portray an image of how the levels of management interact in the management processes. Creation of slack

resources and self-contained tasks that reduce the need for information processing after a satisfactory confirmation that indeed output of a process doesn't require further intervention of an information processing system. Increasing the capacity to process information and reducing the need for information processing are products aimed at fulfilling management goals which are key entities of management (Markus et.al, 2000). The model was adopted because accurate and timely information is a key element in management processes. Acquiring this information requires a processing model which cannot be complete without focusing on Information and Communications Technology infrastructure.

2.1.6.2 Theory of Sociotechnical System (STS)

The Sociotechnical System (STS) advocates the joint consideration of social and technical factors when introducing new technologies into an organization. This theory considers organizations as consisting of two interdependent systems; a technical system and a social system. The technical system of an organization consists of tools, techniques, devices, artifacts, methods, configurations, procedures and special knowledge used by organizational members to acquire input and to transform input into output (Perinea and Mc Clean, 1994). The extent of automation of a given technical system is crucial to the productivity of an organization. On the other hand, the social system of an organization comprises the individuals who work in the organization and the total of their individual and social attributes. Specifically, a social system encompasses individuals' characteristics and relationships within and between groups. Individuals' characteristics are related to employee's aptitudes, skills, education, attitudes and beliefs. Relationships include lateral and vertical relationships between supervisors and subordinates.

This theory is applicable especially in service industries putting into consideration to the technical factors such as laying down information technology infrastructure such as networking the industries, buying computers and integrating all functional areas into a single data base as well as the social system which includes hiring of skilled staff and training the existing staff to enable successful adoption and implementation of ERPs. Therefore, the socio-technical perspective describes the devices, tools and techniques needed to transform inputs into outputs to enhance the organizational performance. Tasmin and Woods (2007) showed that the socio-technical model matched with the Knowledge Management proposed elements of leadership and

culture (infoculture), technology (infrastructure) and process and measurement (infostructure). Pan and Scarbrough (1998) stated that "the socio-technical perspective thus adopts a holistic approach which highlights the interweaving of social and technical factors in the way people work".

2.1.7 Organizational Performance

Organizational performance is a method of measuring the success of the organization to ensure that it achieves its goals. Organizational performance measurement plays an important role in organizational growth. Through measuring performance, a firm can identify and track progress against organizational goals, seek opportunities for improvement, and compare performance against both internal and external standards, and formulate strategic activities through reviewing its performance (Woosang Hwang, 2011). Lee, Hong, and Katerattanakul (2004) divided organizational performance into two categories financial performance and non-financial performance. Financial performance, that is the ability to generate profits or profitability assessed by financial measures such as the return on investment ratio (ROI), return on assets ratio (ROA) and non-financial performance, which is organizational effectiveness and efficiency assessed by service delivery lead time, labor efficiency variance and number of customer complaints, in other word, operational/managerial and strategical benefits like market share, product quality, company image and economic value added, which have no immediate effect on the financial position of the firm but are rather of a more long-term character.

Most management practices built around financial measures bear little relation to a company's progress in achieving long term objectives. Financial measures are also criticized for lacking balance because they are more concerned with physical assets and ignore, for instance, perspectives of customers, and internal business processes. All these perspectives are necessary under the circumstances where companies transform themselves for competition based on information (Emmanuel et al., 1990).

2.1.8 ERP system and Organizational Performance

ERP software integrates information used by the accounting, process, distribution, and human resources departments into a seamless computing system (Jaidep Motwani, etal 2005). Most firms place ERP implementation as a key technology priority in today‘s increasingly competitive and turbulent business environment. Many researchers suggest that IT investment leads to improved firm performance including cost, quality, delivery, product variety, and time-to market (McAfee, 2002). Firms must design, build and deliver the highest quality products in the timeliest manner at the lowest costs to win and retain customers.

ERP systems are expected to provide at least in theory, seamless integration of processes across functional areas with improved workflow, standardization of various business practices, improved order management, accurate accounting of inventory, and better supply chain management (Mabert et al.,2000). ERP arrived at a time when process improvement and accuracy of information became critical strategic issues. In the past few years, ERP has become a ‘‘must have’’ system for almost every firm to improve competitiveness.

Evidence from a survey on companies who have adopted ERP systems and their impact on management practice confirms a number of such benefits, increased flexibility in information generation, improved quality of reports, increased integration of accounts applications and improved decisions based on timely and reliable accounting information. After implementing an ERP system, the company can use business processes quickly and correctly to stay on top of product quality and timely delivery, which establishes customer confidence. Using the ability to access and analyze information, a company can readily build a customer database and effectively analyze customer information. This enables a firm to understand customer attributes and behaviors, thereby finding the correct position and market segment for the product. This results in customers becoming corporate assets and firms being able to maintain a good relationship with their customers (Huang et al., 2007). Further with an ERP system, companies can leverage advanced features and functionality to improve all aspects of their operations from product development, sourcing and procurement, through manufacturing, quality testing, and to delivery. As a result, they can enhance efficiency and profitability by reducing cost, developing various products, introducing new products faster than competitors, delivering products on time, and improving quality.

Some researchers have reported that firms typically fail to obtain the full benefits of ERP investment (Pollock et al., 2003; Barker and Frolick, 2003). The main reason that benefits are uneven is that research tends to focus on financial performance. That is, business performance is usually quantified in productivity measures or profitability measures such as ROE (Return on Equity), ROI (Return on Investment), and market share. However, there are many factors which affect the financial performance of organizations such as strategy, organizational culture, organizational competences, and financial standing.

Literature review of ERP systems and organizational performance show that most authors report benefits or measures of business performance which fall into one or more of these three types, namely tactical (operational/managerial), strategic, and financial. Strategic impacts can manifest in the form of innovative business growth; growth business alliance with other organization, create competitive advantage, product differentiation, build cost leadership ,product leading, revenue growth and gains in market share and other strategic things that affect the external affairs (supply chain) of the organization instead of its internal affairs. On the other hand, Tactical impact will affect the managerial and operational level. The impacts only affect the internal affairs of the organization, such as reduction of operational cost and product cost, increase in productivity, operational efficiency, good time and resource management, human resource development. The operational category concerns improvements in functional areas leading to cost reductions, cycle time reductions, and productivity improvements, whereas, the managerial group focuses benefits such as better resource management, improved decision-making and planning, and performance improvements.

2.1.8.1 Impact of ERP System on Financial Performance.

Financial performance is conceptualized as implying the maximization of profits. ERP systems directly improve financial performance by decreasing IT infrastructure costs (Shang & Seddon, 2002). As the system is put to effective use, firms obtain increased productivity levels for their various resources such as labor and capital (Hitt et al., 2002;Hawking & Stein, 2004).The most common financial performance indicators are profitability rations such as, Return on Investment (ROI) and Return on Asset (ROA). Profitability plays a very fundamental role in determining the performance and the survival of the firm. Firms obtain early cost savings as a result of streamlining of operational areas such as inventory, receivables, distribution as well as reduced

information cost across the firm's supply chain (Davenport, 1998; Madhavan, 2000). Profitability also enhances the firm's reputation and as such, profit maximization is a constant preoccupation for most managers. Hence, profit maximization is at the heart of every organization and as such firms are looking for means of ensuring profitability. Thus, ERP promises sales increases and reduction in operational costs hence profitability for adopting firms.

Operating costs are expenses associated with the maintenance and administration of a business on a daily basis. Reducing administrative costs, manual effort, and overhead or diminishing operation costs can lead a firm to be more efficient, effective, responsive, and profitable. Through integrating business processes across departments onto a single enterprise-wide information system, ERP improves cross-functional coordination and increases efficiencies in doing business.

Zeng, Lu and Skibniewski (2012) contend that operation and cycle time reduction are the primary benefits of an ERP system to a company that adopts it. By avoiding duplication of information, an ERP system allows a firm to have opportunities for cost reduction and value-added tasks which result to increased margins. Implementation of an ERP system enhances a firm‘s ability to reduce operational costs by standardizing and optimizing processes, integrating financial information, controlling system introduction effectively, and increasing financial reporting plausibility.

Financial performance and the analysis of financial performance is also of significant importance to the firm's management as they are interested in determining and understanding the various aspects of financial performance including better financial condition, internal processes among others (Abugabah & Sanzogni, 2009). This implies that ERP systems are important to firms with respect to their ability to facilitate financial performance. ERP systems permit for the realization of financial performance in various ways. According to Njihia and Mwirigi (2014) the accurate and timely financial data are necessary for the efficient and smooth direction of the organization. The provision of the right and timely financial data to the right person in the organization helps much in the process of making the right decision in the right moment (Aral & Weil, 2007).

2.1.8.2 Impact of ERP System on Non-Financial Performance

ERP system can be expected to have a direct effect on the non-financial performance of a firm. Empirical studies show that several benefits for operational efficiency can be achieved when implementing ERP system. Shang and Seddon (2002) propose a framework for assessing ERP benefits at five levels: operational (e.g. the automation of business processes),managerial (e.g. better planning and management of organizational resources),strategic (e.g. the ability of the ERP system to support business growth and competitive advantage),IT infrastructural (e.g. savings on IT costs), and organizational (e.g. organizational learning and staff empowerment).The main non-financial benefits of ERP's include productivity and quality improvements in key business areas such as product reliability, customer service, and knowledge management (Hunton et al., 2003).

2.1.9 The role of Financial ERP system on organizational units.

ERP system support the day-to-day operations (transaction processing); for management to be able to ascertain their financial position, to support decision making by internal decision makers (information processing); and for those who need to generate financial statutory reports for external purposes to meet the needs of various stakeholders in real-time, for instance fulfilling taxation requirements. It facilitate communication between company and all the vendors, suppliers, service providers, management of all the revenue received from the clients, all the transactions through the bank system, evaluate, record, track and manage the assets inside the whole organization, manage and evaluation of all the financial frameworks. In general, ERP enable centralization of administrative activities such as account payable and payroll, amount of accounting operations and transactions costs are reduced, preparation of financial statements is performed with a higher accuracy and also performed with a higher speed.

2.1.10 The role of Sourcing & Facility (SCM) ERP system on organizational units.

Supply Chain Management (SCM) is the "systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (Mentzer et al., 2001). SCM is a process to control the information flow, goods and services amongst and within

the firms and also develops strong ties between suppliers and customers. Thus, the flow of management and co-ordinating decisions and inventory are faster and more efficient coming from the top of the chain all the way down. SCM implementation is the improvement of the relationship between upstream suppliers and downstream customers, ultimately resulting in customers' satisfaction and optimal organizational performance of the company. Effectively integrating the information and material flows within the demand and supply process is what supply chain management is all about. SCM draws greatly from the components of asset management, logistics, procurement, and IT. The primary objective of SCM is to improve the overall organizational performance and customer satisfaction by ensuring on time and on-schedule delivery of services and products to customers (Abdallah, Obeidat, & Aqqad, 2014). To achieve this objective, business leaders collaborate with various departments within the organization as well as with external customers and vendors. Both SCM and ERP systems lead to efficiencies and effectiveness within an organization and positively affect performance and competitive advantage.

Enterprise Resource Planning (ERP) systems are changing the ways many businesses and governmental organizations' carry out their business processes by providing a means of connecting all the various departments together thus resulting in more accurate information for the company. ERP systems provide an organization with a single platform system responsible for the coordination and integration of key-business processes.

ERP system can offer high value to any organization whose aim is smooth planning, decision-making and execution of related operations to achieve long term profitability and maintain a solid competitive edge. This is the main reason more and more companies are attracted towards purchasing and implementation of the information technologies like ERPs. ERP has been extensively implemented to enhance inter- and intra-organizational communication, operations, processes within the logistics channel, and distribute data along the supply chain from the merchants to the consumers (Varma & Khan, 2015). In order to obtain a better competitive position, SCM is a strategy that aims to reduce the costs and provide better integration of ERP systems and to enhance the customer satisfaction. Therefore, the following are the four key benefits of ERP on Supply Chain Management of an organization:

Improved Supply Chain Network: ERP provides complete visibility across the supply chain network which is highly impossible in the manual process. With the implementation of ERP an organization can monitor all the status and activities of all suppliers, plants, storage facilities and all the members of the supply chain which makes it easy for communication throughout the network. This in turn helps in effective tracking and management of all processes. The status of all the operations can be monitored at any time and corrected anytime in case of problems.

Minimize delays: Delivery reliability is referred to as the degree to which a firm provides products or services according to the schedule promised at the time of sale. Many supply chains which are not configured with the ERP systems have already placed complaints over poor business relationships and as well as loss in business. Some of the general complaints are late shipments from vendors, slow down on production lines, logistical errors in distribution channels. Shortages and quality problems in supplier parts are additional sources of product delay. These all have negative impacts on organization and therefore results in negative impact with the customers who are the main force of attraction for a supply chain. With the implementation of ERP all the activities can be co-ordinated and executed in such way that enhanced control over components inventory, more precise demand planning, smooth production scheduling, and more effective coordination of distribution channels, enable firms to improve on time delivery of products, a critical performance measure for today‘s firms.

Enhanced Collaboration: ERP helps organization to have a control over all the suppliers and distributors. This creates the ability to know what they are doing all the times. ERP bridges the gap between supply chain partners. With ERP all the members across the network can share vital information like demand, forecasting reports, inventory levels, and status of production, transportation plans and many more in real time.

Reduce costs: Real-time information and automation help the firms to reduce the cost in numerous ways. ERPs enables simultaneous access to a central database that keeps the different departments alert to react at the same time to certain tasks hence it creates efficiency in the organization. IT investment, if handled properly, generates dual effects. It can not only facilitate higher sales, but also it decreases the costs. IT investments have evidenced efficiency through supporting the lean transformational process of operational and supply chain management within and across the firms (Ilebrand, Mesoy, & Vlemmix, 2010). Deployment of ERPs in the firms is

associated with higher productivity and improved inventory turnover thus diminishing the operational cost (R. D. Banker, Bardhan, & Asdemir, 2006; Mukhopadhyay, Barua, & Kriebel, 1995). ERPs deployment injects the efficiency through reducing coordination cost by ensuring the tighter coordination among the departments that allows firms to react simultaneously to certain condition (Banker et al., 2006; R. Kohli, 2007; S. Mithas & Jones, 2007; Whitaker, Mithas, & Krishnan, 2010). Improved reaction time triggered by ERP implementation to fulfill the customers' orders facilitates the firm to reduce the inventory stock which results in enhanced inventory turnover. Inventory management refers to changes in the inventory management processes that lead to sizeable reductions in inventory holdings, increased inventory turnover, and better control over inventories. Various studies indicate that ERP system implementers can gain sizable inventory reduction and increased inventory turnover benefits by standardizing their inventory management processes and improving performance to industry benchmark levels (Madhavan,2000; Drayer & Wight, 2002). Holding less volume of inventory requires fewer workers to deal with thus reducing the labor cost as well as monitoring cost required to supervise the activities of decreased number of workers.

ERP on Business/Internal processes

Business Processes: Business processes are all the activities and key processes required in order for the company to excel at providing the value expected by the customers. Dallas and Wyn (2014) explain that business process management (BPM) is a form of management practice in which is concerned with the improvement of company's performance through the enhancement and control of business processes. The ERP system once implemented is meant to improve organizational functions by simplifying organizational processes leading to seamless operations in the organization. Njihia and Mwirigi (2014) observe further these systems provide, automate support to wide-ranging business processes in modern organizations including sales, billing, marketing, accounting, human resource management, quality control and production thus ensuring general performance of the organization through facilitation of these pertinent processes. Thus ERP systems directly and indirectly facilitate the various business processes in the daily operation of the firm and enhance the firms' performance. In general, ERP systems not only facilitate the integration of organizational processes, it also enhances standardization of

processes across multiple business units with the goal of improving efficiency and generation of profits (Bosilj-Vuksic & Spremic, 2004; Botta-Genoulaz & Millet, 2006).

ERP and Customer value

Today's business processes are driven by constantly changing business environments, such as customer demand change, uncertainty and rapid technological change. Customer value is referred to as the degree of benefits perceived by customers as a tradeoff between what customers receive and what they sacrifice. It is a source of competitive advantage for business firms. Customer satisfaction is considered in much literature as one of the most perceptible intangible benefits of an ERP system adoption by an organization. It has been argued that an ERP system sends message to customers that the product and service qualities have been improved (Batada & Rahman, 2012). Customer value comes from meeting the current needs of customers more efficiently, from identifying the customer needs proactively, and from meeting new customer needs or new needs of existing customers. Customer value is also related to improved customer service and more accurate customer invoices. An ERP system enables faster response to customers. It also enabled faster and more accurate customer reports regarding project stages, the tasks of project members, and time spent on performing respective tasks.

Less internal mistakes visible to the customer, better follow-up of customer relationships, and more flexibility in adapting to business changes are also possible. Increased customer satisfaction and more increased value for customers are expected once the company enhances its ERP package with a new module. Customers who perceived increased benefits and are satisfied with the quality and features of products are likely to refer new customers to purchase the firm's products. According to Joo (2007) four important factors for customer value through ERP implementations are identified. They are value for money, convenience, timely response, and reputation for quality.

Value for money: is referred to as the degree to which a customer perceives value because a firm has lowered a product's price. It is the value that customers perceive the price of a product purchased is lower than average market price. Customers feel that they purchased products with high value and quality. This may be perceived due to cost reductions or a lower price. ERP systems enable firms to facilitate quicker data/information flow between departments and offices

and helps employees to work faster, save valuable time, and reduce operational costs. As a result, customers can perceive cost saving in their purchases.

Convenience: is referred to as the degree to which a customer perceives value because the firm has provided convenient information and service. Customers experience convenience due to timely and updated information. Valid delivery promises and fulfilling customer orders on time through using an ERP system improves customer service. An ERP system enables a firm to develop customer order quotations faster and even more accurately, improve job estimating, and shorten delivery lead times. As a result, customers can perceive convenience in their purchases.

Timely response: is referred to as the degree to which a customer perceives time saving because a firm quickly acts upon customer needs. Through the experience of quick services, such as order fulfillment and delivery, customers can perceive time savings. ERP systems enable the organizations to respond to any challenges in real time, so that a firm is able to respond in a timely fashion to any customer demands. ERP systems also allow for timely and accurate responses to customer problems and priorities.

Reputation for quality: is referred to as the degree to which a customer perceives product quality and performance (Nasution and Mavondo, 2008; Petrick, 2002). It is based on the customer‘s perception about the superior quality of a product. Customers’ perception of product quality leads to their intentions to purchase products later. According to Zeithaml (1988) perceived quality is different from objective or actual quality and higher in level of abstraction. An ERP system enables a firm to provide quality service to customers through checking and examining customers’ preferences more often. This leads customers to perceive that the firm provides quality products.

Therefore, the transactional cost savings combined with effective usage of the complete ERP system over the long run increases ROI as well as firm profitability. These cost savings as well as high quality service, when passed onto customers’, results in increased customer satisfaction levels. The above performance improvements when sustained and enhanced over the long run through effective leveraging of the ERP system capabilities provide competitive advantages to firms.

ERP on Decision Making

In the current business environment information is the key resource of an organization. If the organization does not have an effective mechanism that gives the decision makers the needed or the right information at the right time, then the chances of that organization succeeding in the future will remain a mystery. The decision-making process is a crucial process in the firm and a primary determinant of organizational success. The process of decision-making takes place at all levels of the organization and it involves problem identification and the consideration of multiple alternatives. So that it is highly information dependent process. The basic fundamental characteristics of information are accuracy, relevancy and timeliness. The available information has to be reliable, and relevant for the decision makers to make decision at the right time. In the changing business environment, the time available for organization to react to the change in market trend is very little (Fisher, Raman and McClelland, 2000). Any technology that will help this gathering of information will enhance the chances of organization to stay alive in the market.

Nooriae (2012) contends that decision-making is one of the principal managerial functions and one with potential positive or negative consequences for organizational performance. It is suggested that this information-dependent attribute of decision-making process is what makes ERP systems important to it. This means any input that facilitates augments or enhances the quality of managerial decision-making directly enhances performance (Zeng et al., 2012). Enterprise resource system also increases the availability of information helping the companies to have information in real time to make wise decisions and accurate prognostics regarding the organization.

Management can, therefore, make decisions faster and with very few errors. Data becomes very visible across the organization. ERP systems enable managers to control the whole business and accelerate decision-making. This implies that ERP improves the quality of the managerial decision regarding how to run the firm, respond to threats and opportunities and successfully position the firm within a competitive business environment.

2.1.11 The role of Human Resources ERP system on organizational units.

In today‘s world of Globalization, it‘s knowledge, commitment, skills, and training that provides the competitive advantage for world class companies. And it‘s Human resource’s job to build that competitive advantage**.** A business is concentrated by four productive resources namely its Land, Labour, Capital and Enterprise to produce or sell products and provide services.

Simultaneously while achieving business tasks, concentration must be also be given to the people who carry out these functional jobs i.e., the organization's Human resource (HR). Human Resources are the company's people included in all hierarchy from employees to middle managers and non-managerial employees to the CEO and others. Human Resource Management (HRM) is the management which involve the activities framed to recruit best candidates suitable for the respective nature of the job and improve their skills and abilities by providing them good and proper support. The five gears of HRM system are: recruitment and selection, training and development, performance feedback, payments and benefits, and labour relations (Jones, 2007).

Human Resource Management practices have strongly influence by ERP system. If there is high level of system use, then it means that system is also linked with human resource management functions including hiring, training, development, compensations, benefits, record management, retirement (Tadinan, H., 2005).The success and failure of ERP implementation highly depends on the education and trainings given by organization to their employees before it commenced. Those organizations, which used ERP without much more effort, they have low commitment to change and they did not actively participate in training of employees for proper handling. They have to bear high costs in trainings for those people who are reluctant. If employees are properly educated about what is expected from their side and also train them accordingly then failure results can convert into success (Goldband, B., 2012). Users took long time to seek and adapt to new systems and productivity effects. If suitable trainings are not given to workers then due to lack of interest their satisfaction level will be low, but innovation and service quality of work will enhance due to new system implementations (Qutaishat, F.T., S.A. Khattab, M.K. Abu Zaid andE.A. Al-Manasra, 2012).

When employees underutilize the new information system it lowers the business's efforts in order to gain benefits from such implementations. Employees are unwilling and show resistance towards change and it is the commonly acceptable reason for system failure (Venkatesh, V.,S.A. Brown, L.M. Maruping and H. Bala, 2008).There is significant effect of Human Resource Management activities on the performance of organizations and productivity increases (Absar, M.M., B. Nimalathasan and M.M. Jilani, 2010). Organizational performance includes the increasing the product quality, satisfaction of the customers using the product, development of the new innovated product, ability to attract and retain the employees of the organizations and to

enhance the relationship between management and these employees (Delaney, J.T. and M.A. Huselid, 1996) .According to Katou, A.A. and P.S. Budhwar, (2006) there is significant effect of HRM activities and policies like recruitment, trainings, promotion, incentives, benefits, safety and health measures on organizational performance which leads towards organizational productivity. Moreover trainings and compensations are very much effective in perceiving the organizational performances (Singh, K., 2004).Recruitment and selection in any organization is helpful in determining the decisions about which candidate is suitable and who will get the employment offer and for this, there is the need to create and maintain better fit between organization, teams, employees and working environment (Tzafrir, S.S., 2006).

Literature suggest that there is no agreed rules and dimensions for measuring ERP system performance in better way but ERP system gives significant change towards organizational success and it is measured with the evaluation of the employees who are actually using this system (Wickramasinghe, V. and M. Karunasekara, 2012).

Key Human Resource Management Processes Affected by ERP:

Time management and leave administration: Information on the work performed by employees and their availability to work are essential elements of a human resources management. ERP helps in making the Time management and leave administration simple and easily manageable. Time Management system in ERP provides with a flexible means of setting up, recording and evaluating working times. Information about working times is transferred to Payroll to calculate employees' gross pay. In ERP Employees can use the Time Sheet to enter their own actual times. Time data can be recorded and transferred to Human Resources management for further processing. Time data can be recorded as attendances, absences, and employee remuneration information for Human Resources.

Recruiting: Since Human resources are the key drivers of any organization it is very important and essential to ensure timely supply of the right talent. Recruitment professional needs to Plan the Organizational resource requirement properly, so that the right talent be provided at the right time and in the right cost. The ERP system enables faster and efficient driving of Recruitment

activity by providing system services such as: - Requisition Management, Management of Job Postings, Application Entry, Applicant Tracking, Processes Flow and Reporting.

Training and Development: ERP provides for the learning solutions which provide the flexibility to put online training calendars consisting of all the internal and external training programs and their key features. Employees can opt for a training program and they can raise an online request for the training program which they want to attend. The request is moved to the respective department through online workflows and after due approval the requester is enrolled for the training program and his attendance is booked. This reduces administrative effort and improves efficiency. This entire online process in ERP saves lot of time and effort in comparison to the manual process. Also, it brings more transparency through online application, cancellation and feedback. Through it's integration with the employee master data the qualification is updated in the master record of an employee once the course is completed this ensures real time reporting and complete synchronization.

Performance management system: Performance management includes processes that effectively communicate company aligned goals, evaluate employee performance and reward them fairly. Clear goal planning, skill development and a true pay-for-performance culture are talent management practices that successful companies use to demonstrate their employees are valued. Effective performance metrics has been proven to increase employee morale and overall productivity. Engaged, productive employees are essential to any company outperforming its competition. Recognizing gaps and developing skills enables managers to properly map out succession plans while employees develop attainable career paths.

ERP helped in simplifying the HR task in Performance management process and making it easy for employee and managers as appraisee and appraisers respectively. ERP enables creation of Appraisal forms in the online format with link to organizational and department goals. HR managers can allocate Forms to all the employees within minutes. Employees can fill the form online and managers can evaluate the performance online in each stage. ERP thus helps in driving the entire process faster and with higher level of efficiency and effectiveness.

ERP on Employee/Staffs Productivity

Employee productivity is a particularly important issue to managers and supervisors as the primary purpose of their job is to get the most out of the people, they are responsible for. Caruso (2009) stated that employees are the secret of the success of any industry. In high-competition business environment of modern times, the issue of employee productivity is a crucial one for supervisors and managers as their primary job is to explore and get the best out of employees to raise their firms' competitive edge (Qutaishat et al., 2012). The emphasis is on getting things done through increasing the productivity of employees. Providing employees with timely information, reducing their workload by eliminating task duplicities, managers are able to achieve their competitive strategies while ensuring optimum performance of individual employees and this can be done by using an integrated technology such as ERP system. Nurmilaakso (2009) stated that one of the reasons behind investing in ICT solutions is to improve labor productivity, where the ERP system has a positive influence on labor productivity. Exact Max (2014) examined that ERP influences staff productivity in at least four important ways; including improved communication, reduced workload per employee, facilitation of fact-based decision-making and elimination of duplication of tasks and data.

2.2 Empirical Review

Parto, Sofian & Saat (2016) investigate the Impact of Enterprise Resource Planning on Financial Performance in a Developing Country. The analyses are based on data drawn among 93 Iranian manufacturing firms. The finding demonstrates that the implementation of each ERP system module separately influences financial performance indicators. Besides, the results indicate that implementing complete package of ERP system might provide synergetic impact on firm's financial performance.

Kim et al. (2009) investigated the relationship between IT investment and company performance using data from the top 100 electronics firms in China to study the impact of IT investment on financial performance, and they compared the results to those of similar organizations in the United States. The empirical results showed that IT investment had a positive impact on

company performance in China; they also showed no significant differences between the two countries.

Almgren and Bach (2014) contend that ERP precipitates more profit for the company by enhancing productivity. They further explain that ERP lead to general reduction in the cost of doing business and in so doing increase the profit margin of the firm. According to Chtiou (2009) about 70% of the most profitable firms and 90% of the leading firms in market capitalization have implemented ERP.

Lorca and Gayo (2014) when they examined 695 leading firms in Spain on the impact of ERP on the profitability. They determined that firms that had successfully implemented ERP systems realized positive ROI, ROA, asset turnover (AT) and profit margin. The conclusion here is that ERP promises sales increases and reduction in operational costs hence profitability for adopting firms.

Velcu (2015) notes that one of the initial studies on the relationship between ERP on organizational performance revealed that ERP had a positive effect on productivity of employees in the firm. He notes that the study determined a gross marginal product of ERP on productivity to be about 95%.

Booth et al. (2000) investigates the impact of ERP system on accounting processes of Australian companies. Their evidence suggests that ERP systems have proved to be effective in transaction processing and less effective in reporting and decision support. Further, they suggest that ERP systems provide both the incentives and means for adopting newer accounting practices such as activity-based budgeting (ABB), product lifecycle costing (PLC), and balanced scorecards.

McAfee A(2002) based on a survey of 101 U.S. firms that implemented SAP R/3 (former name of the enterprise resource planning software), McAfee A found that after ERP implementation, many company performance indicators improved, including the ability to provide customers with information, order turnover time, and the completion rate of orders.

Singh and Singh (2013) show that ERP systems increase customer satisfaction by narrowing the amount of time for service or product delivery. Further, Shannak (2016) conducted a study to examine the impact of ERP on organizational performance basing his assessment on the balanced scorecard. He found that ERP systems increased the effectiveness and efficiency of the

firms that implemented them and that this resulted in a better customer satisfaction. The two explain that use of ERP systems can lead to a reduction of the order cycle times, customer response times as well as delivery speeds hence facilitate positive customer satisfaction.

Bambang Leo Handoko et al (2015) investigate The Impact of Enterprise Resources System and Supply Chain Practices on Competitive Advantage and Firm Performance: The research was carried out for 148 Indonesia Companies' executives. The results indicated that SCM practices and ERP systems has positive impact on competitive advantage and firm performance. Finally, that competitive advantage positively affects the firm performance.

Ucakturk and Villard (2013) find that ERP systems are most reliable source of information for managerial decision-making. They further contend that ERP facilitate real time environmental analysis and provide managers with information that they can use strategically to ensure organizational performance.

Mustapha and Ismail (2013) conducted a study to examine the impact of IT on monitoring and found that firms with an integrated information system experienced significantly lower costs for monitoring. They argued that the ERP system allows the firm to store information in one place and make it easy for managers and other employees concerned with monitoring and evaluation of the firms' progress to obtain such vital information.

In their study, Stefanou and Revanoglou (2006) found that an ERP implementation in a general hospital resulted in improvement in information quality which can lead to better decision making and improvements in health care, reduction of the ambiguity about order information, automated generation of the list of requirements, accurate billing and therefore no loss of income, real-time updating of patient records, existence of available information regarding the type and the quantity of ordered-granted medicines for each patient, and follow-up of suspended orders.

Engidayehu Getachew (2014) conduct an assessment of ERP implementation in Ethio telecom, practice and challenges of ERP system in Ethio telecom focusing mainly on automating the major support activities of the company like finance, human resources and supply chain management. And conclude that ERP implementation has supports the company by reducing the financial cycle time, decision making cycle time, procurement lead time and pay slip generation time.

Elsa Taddele (2015) studied a research on ERP Post-Implementation Management Framework in of case of Ethiopian Airlines. A case study approach and a combination of quantitative and qualitative methods has been used to collect and analyze data. The survey questionnaire and interview method were used for data collection. The quantitative data were analyzed by employing appropriate techniques of descriptive and inferential statistics using SPSS software tool. The result of the study indicated that organizational theme constructs were the most critical determinants of ERP post-implementation success; which make the highest contribution (58.93%) of the total variance. Accordingly, continuous improvement (41.02%), user involvement (6.61%), training (4.94 %), absorptive capacity (3.23%) and top management championship (3.13%) are the major constructs of organizational theme. Technical theme has a significant contribution which explains 10.36% of the total variance of ERP post-implementation success.

Foziya Ahmed (2017) factors affecting the Implementation of Enterprise Resource Planning at Commercial Bank of Ethiopia. The researcher has employed a case study in which qualitative research method was also used to collect and analyze data, Pattern matching technique employed to analyze the data collected through interview, direct observation and participation .The research revealed that factors which affect ERP implementation are technological, organizational and people, the stages of CBE ERP implementation (requirement analysis, solution design, solution built and test, and production transition and support).

Adane Ayalew (2017) studied the effect of Enterprise Resource Planning implementation on Internal Supply Chain Performance: -The case of Ethio Telecom- The research was conducted by selecting eight independent variable and their effect on dependent variable of Internal Supply chain performance. The finding suggested six independent variables such as top management support, project management, user training, IT infrastructure, vendor support and communication have a statistically significant relationship to predict internal supply chain performance, and the remaining two variables project plan & vision and project champion are not statistically significant to predict internal supply chain performance. User training and IT infrastructure accounts the largest share to explain the variation of internal supply chain performance.

2.3 Research Gap

Globally different study is conducted on the effect of ERP implementation on organizational performance on different sectors. For instance, Geofrey Kimutaikoech (2014) studied the effect of Enterprise Resource Planning (ERP) performance of Organizations within the Agro-Processing Industry in Kenya, considering information system, quality control, labour allocation facility layout and their impact on organizational performance. And another study conducted by Minh Duc Le and Kyeong Seok Han (2016) conduct a research on the impact ERP System Implementation on firm performance of Small and Medium Size Enterprise (SMEs) in Vietnam resulted that ERP system implementation successfully enhanced the firm performance indirectly through the effects of organizational capability and competitive advantage, in which individual impact showed the strongest effect. Florence W.Wanyoike (2017) studied the influence of Enterprise Resource Planning (ERP) system on organizational performance in Kenya Engineering Consultancy firms focusing impact of ERP system on financial performance, organizational learning and internal processes of the firms.

In Ethiopia too lots of studies mentioned above have been conducted about critical success factors of ERPs, their various implementation steps, related problems, conditions of success and reasons of failure. Within the streams of several previous studies in Ethiopia context user aspects have been mentioned as a crucial factor when studying IS, particularly in terms of ERP systems. The studies however failed to assess the effect of ERP system on organizational performance.

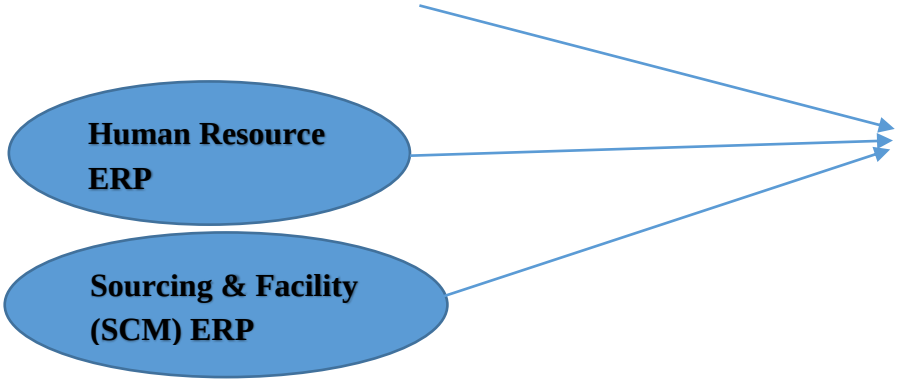
Empirical evidence reveals that little research attention has been devoted to measuring the impact of ERP on organizational performance of public sectors in Ethiopia, and also most of the researchers studied in Ethiopia are focused on identification of the success factors and challenges of ERP implementation on single case industry .The effect of the implementation on organizational performance in multi organizational case is not studied. To the best of the knowledge of the researcher no sufficient empirical study has been conducted regarding the impact of ERP systems implementation on organizational performance focusing three organizations namely: Ethio telecom, Ethiopian Airlines and Commercial Bank of Ethiopia collectively. Because instead of single case, conducting an assessment of the effect ERP system on organizational performance of different business-oriented organizations can give a universal picture of what are its effects on the performance of adopting companies. Therefore, in this research the researcher attempts to show how implementation of ERP system affect the

performance of organization: the case of Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia.

2.4 Conceptual Framework

A conceptual framework is a tool researcher use to guide their inquiry; it is a set of ideas used to structure the research, a sort of a map (Kothari, 2004). It is the researcher's own position on the problem and gives direction to the study. Aside from showing the direction of the study, through the conceptual framework, the researcher can be able to show the relationships of the different constructs that he wants to investigate. One study indicated that deploying the human resources and financials modules had more impact on performance than deploying either all modules or just the primary modules (Nicolaou, 2004). Other study by Hitt et al. (2002) indicated that implementing financials, human resources, manufacturing, and data warehousing/mining had more impact on firm performance than any other combination. Both studies agree that deploying the financials, human resources and sourcing & facility (SCM) modules have the most impact on firm performance when compared to implementing all ERP modules. Therefore, the study will be guided by the following conceptual framework. The dependent variable is Organizational Performance while the independent variables are Financials REP, Human Resource (HR) ERP and Souring and Facility (SCM) ERP.

Fig 2.2 Conceptual framework that show the effect of ERP systems on Organizational performance.



Source: Compiled by the researcher.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

INTRODUCTION

This chapter present briefly the general framework about how this particular study was done, the choice of appropriate research method and methodology applied. The method is adopted with the

aim of expressing & analyzing the effect of ERP system implementation on organizational performance of selected public service in Ethiopia. Specifically, to show the relationship and effect of finance, human resource and sourcing & facility ERP systems on organizational performance. This chapter highlights the study's research design, target population, sampling design and sample size, data collection method, research procedure, the data analysis methods used and model specification. Finally, testing for validity and reliability, and Ethical Considerations.

3.1 Research Design and Approach

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose, keeping in view the objective of the research and the availability of staff, time and money. It constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004).

To do the analysis the study used mainly explanatory research design. Explanatory study is one of research design approach that establish causal relationships between variables. In other words, how one variable (independent variable) produces changes in another (dependent variable). It is preferred and applied as a key tool in this study because it goes beyond simple description and more fit to answer for this type research questions that need answer to the problem and appropriate to address the objectives of the study. The researcher also adopted the descriptive research design for answering research questions and to value mean, standard deviation, the maximum and minimum of the survey.

In this study a combination of quantitative and qualitative research approach are used for data collection techniques and analysis procedures. Quantitative approach is predominantly used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data. In contrast, qualitative is used predominantly as a synonym for any data collection technique (such as an interview) or data analysis procedure (such as categorising data) that generates or use non-numerical data (Saunders et al., 2009).

Since the aim of the study is to examine the effect of ERP system implementation on performance of organization, mainly quantitative research approach was used. Quantitative

approach is convenient to reach more people with optimized time and brought on broad statistical data. To support the quantitative data obtained from closed ended questionnaires and to gain extra data related to the research objectives, qualitative approach also used to interpret data obtained from an open-ended questionnaire.

3.2 Population and Sample

A population is a group of individuals, persons, objects, or items from which samples are taken for measurement. The data for this study was collected by taking a sample from employees located at head quarter of Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia. So that the target group of this study comprised of all staffs in the companies located at head quarter who directly interacted with ERP systems which include managers, supervisors and non-management staffs of finance, human resource and sourcing & facility divisions in the organizations. All parties involved in the implementation process of ERP System are represented by the sample. Samples are subset or portion of a population. As a division finance, human resources and sourcing & facility divisions are major source of information.

3.3 Sampling Design

A sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. To obtain relevant sample for consideration and inclusion in the research, a significant number of individuals are selected from the population. Thornhill and Saunders (2000) explain that it is normally from this population that researcher collects and infers information. It follows therefore that the validity of the study result is contingent on the suitability of the sampling design (Blanche et al., 2006).

3.3.1 Sampling Technique

Sampling techniques provide a range of methods that enable the researcher to reduce the amount of data you need to collect by considering only data from a subgroup rather than all possible cases or elements. The study used probability sampling procedure that is stratified sampling to select the objects that represented the population. The sample would be drawn from the total staffs of Ethio-telecom, Ethiopian Airlines and Commercial Bank of Ethiopia working at head office using stratified sampling techniques. Under stratified sampling the population is divided into several sub-populations (strata) that are individually more homogeneous than the total

population and then we selected items from each stratum to constitute a sample. This sampling technique involves dividing the population into strata or a number of groups, which in this case was manager and non-manager groups.

The researcher also used Non- probability sampling procedure that is purposive sampling method in this study. Purposive or judgemental sampling enables the researcher to use your judgement to select cases that will best enable you to answer your research question(s) and to meet your objectives. The use of purposive sampling enables generating meaningful insights that help to gain a deeper understanding of the research phenomena by selecting the most informative participants (Saunders et al., 2009). Barbour (2013) suggested that purposive sampling allows a researcher to identify participants who are rich with information to provide in-depth knowledge of a phenomenon. Sample from head office level were purposely selected because most of the business activities and transactions are processed centrally at head office level with fully automated ERP system and are well familiar to the application of ERP system and with the assumption that it represent the remaining zones/branches and because companies follow centralized management system most of activities are similar. In addition to that, because each companies comprises of different divisions, the application of ERP system is not similar among these divisions. In considering such issue, availability of data and to meet the desired study target, purposive sampling method used to select the three divisions namely; finance, human resource and sourcing & facility divisions from the other divisions found in head office, due to the fact that the ERP system was applied fully with in these divisions from the beginning of its implementation than other divisions. Furthermore, they have great contribution for the performance of organizations.

3.3.2 Sample Size

The sample size refers to the proportion of individuals that are actually chosen to participate in the study. According to June, 2019, Ehio telecom Employee head count report, 450 ET employees were staffed under those three divisions (strata) at head office level, employees of human resource (136), finance (140) and sourcing & facilities divisions (174). In the same way, for Commercial Bank of Ethiopia (CBE), human resource (112), finance (75) and sourcing & facilities divisions (213), and that of Ethiopian Airlines (EAL) human resource (39), finance (231) and sourcing & facilities divisions (150). The selection of the divisions mainly because

they are fully deployed with ERP system and employees use the system for their day-to-day business activities. In addition, they have great contribution for the performance of organizations. Finance, human resource, and sourcing & facilities division's employees are considered as valid target population for this study since they use ERP system as their major IT solution for their core business functionalities. Therefore, the target population size of these three divisions for ET, CBE and EAL are 450, 400 and 420 respectively. Furthermore, companies follow centralized management system and most of activities are similar, studying different zones and regions would not bring significant difference. To determine the sample size for populations that are large, Cochran(1963) developed the Equation 1 to yield a representative sample for proportions.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Equation 1

This is valid where:

n0 = sample size

Z2 = abscissa of the normal curve that cuts off an area α at the tails (1 – α equals the Desired Confidence level, e.g., 95%) , e = desired level of precision

p = estimated proportion of an attribute that is present in the population, and q is 1-p.

N.B.The value for Z is found in statistical tables which contain the area under the normal curve.

Then, the sample size determined for the large population have been used to determine sample size for a finite population. Therefore, the following formula is derived from equation 1:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Equation 2

Where n is the sample size and N is the population size.

Hence, the sample size for the given population (1160) at e = ±5%, confidence level = 95%, and p = 0.5 (maximum variability).

Equation 1:

(1.96)2 (.5) (.5) = 385 = given
(.05)2

Finally, the sample size is determined using equation 2:

For ET
N= 450, then,
$n = \frac{385}{1+\frac{(385-1)}{450}}$
n= 207 sample size

For CBE
N= 400, then,
$n = \frac{385}{1+\frac{(385-1)}{400}}$
n= 196 sample size

For EAL
N= 420, then,
$n = \frac{385}{1+\frac{(385-1)}{420}}$
n= 201 sample size

Based on the above sample rate, the distribution of the questionnaire and the response rate summarized as follows:

Table 3.1 - Distribution of sample size.

Company Name	Location	Main ERP user Division	Target Population			Proportional sample size of the strata	Distribution will be		Collected
			Managers	Non-Manager	Total		Managers	Non-Managers	
ET	Head Quarter	Finance	20	120	140	64	9	55	50
		Human Resource	17	119	136	63	8	55	35
		Sourcing & Facility	25	149	174	80	12	68	40
		Total	**62**	**388**	**450**	**207**	**29**	**178**	**125**
CBE	Head Quarter	Finance	17	58	75	37	8	29	26
		Human Resource	25	87	112	55	12	43	40
		Sourcing & Facility	48	165	213	104	24	80	49
		Total	**90**	**310**	**400**	**196**	**44**	**152**	**115**
EAL	Head Quarter	Finance	24	207	231	111	11	100	65
		Human Resource	4	35	39	18	2	16	12
		Sourcing & Facility	16	134	150	72	8	64	43
		Total	**44**	**376**	**420**	**201**	**21**	**180**	**120**

Source: ET June, 2019 monthly Report, for CBE & EAL data obtained from ERP implementation sections.

3.4 Data Type and Sources of data

This study used both primary and secondary sources of data for collecting valuable data.

Primary data

Primary data are those which are collected afresh and for the first time (Kothari, 2004). Because primary data are original and relevant to the topic of the research study so the degree of accuracy is very high, current and it can better give a realistic view to the researcher about the topic under consideration. Primary data were collected through questionnaires.

Secondary data

Secondary data are those that are already available and refer to data that have already been collected and analyzed by someone else (Kothari, 2004).

3.5 Methods of Data Collection

Questionnaires

To construct independent variables

A questionnaire is a series of questions asked to individuals to obtain statistically useful information about a given topic. Questionnaire is the main source of collecting primary data. The self-administered questionnaire developed by Johnson Karimi(2017) used for this study. However, the researcher modified and added some questions with regard to their content to make the questions easy to understand to the respondents. The questionnaire is directly related with the research hypotheses and objective of the study. Based on the research questions a five-point Likert-scale type (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree) questionnaires are prepared. The questionnaires are comprised of both closed and open-ended questions type to be answered by the respondents. The questionnaire format consisted of three parts, the first part mainly contained general information (demographic information) which is the gender, age, marital status and level of education, the second part focuses on the effects of ERP system implementation on organizational performance the companies, and finally open-ended questions regarding the topic are presented.

Data obtained from secondary sources such as employees' master lists, company's profile booklet, company's policies and procedures manuals, related publication, books, journals and internet were used to support the primary data to make the finding more accurate and reliable.

3.6 Data Analysis Techniques

After data collection, the filled-in and returned questionnaires were edited for completeness and coded. The analysis process involved the process of transforming a mass of raw data into tables with frequency distribution and percentages to provide key answers to the research questions. First the data that had been collected using closed ended questionnaire were converted to represent the main variables through taking mean values of the item responses for each construct. Mean values are chosen because item responses that ranged from "Strongly Agree" to "Strongly Disagree" generate ordinal data. Then data entries made into a powerful statistical and econometric software package STATA 11 for further analysis. The quantitative analysis involved both descriptive and inferential analyses.

3.6.1 Descriptive statistical Analysis

Descriptive statistics is the term given to the analysis of data that helps describe, show or summarize data in a meaningful way, which allows simpler interpretation of the data. Mean and standard deviations will be used as measures of central tendencies and dispersion respectively. Data will be presented in the form of frequency distribution tables that will facilitate description and explanation of the study findings.

3.6.2 Inferential statistical Analysis

Inferential statistics are techniques that allow us to use the samples to make generalizations about the populations from which the samples were drawn. In inferential statistical analysis, associations between the variable were conducted by use of STATA 11 software through which cross-tabulations, correlations and multiple linear regression methods were conducted between and among relevant variables to permit further interpretation of the data.

3.7 Measurement of Variables

The dependent variable used for this study was organizational performance, whereas, the independent variables were ERP system of Finance, Human Resource, and Sourcing & Facility.

Table: 3.2: Summery of variables and its measurement.

Variables		Measurement of Variables	Source
Dependent	Organizational	-Profit maximization through cost reduction and increase sales revenue. -Operational efficiency.	Questionnaires

	performance	-Productivity. -Operational effectiveness.	
Independent	Financial ERP	-Enhance Finance and Accounting activities. -Reduce Transaction and operational costs. -Fulfill taxation requirements	Questionnaires
	Human Resource ERP	-Training and development. -Employees' performance evaluation. -Recruitment process.	Questionnaires
	Sourcing and Facility ERP	-Enhance sourcing and facility activities. -Resource and Inventory management. -Customer Satisfaction. -Procurement process.	Questionnaires

Source: compiled by the researcher.

3.8 Model Specification

Model specification refers to the determination of which independent variables should be included in or excluded from a regression equation. STATA 11 statistical software was applied to test and analyze the impact of each independent variable finance, human resource and sourcing & facility ERP systems on dependent variable organizational performance and to find out answer for the research question and meet the stated objectives of the study.

The model represented by:

Organizational Performance = f(Finance ERP, Human Resource ERP and Sourcing & Facility ERP).

In addition, the researcher conducted a multiple regression analysis so as to determine the relationship between organization performance and the variables of the study. The regression equation that guided the study was:

Organizational Performance = β0 + β1FAERP + β2HRERP + β3SFERP + ε

Where: - FAERP = Finance ERP

HRERP = Human Resource ERP

SFERP = Sourcing and Facility ERP, And

$\beta 0$ = Constant Coefficient

$\beta 1$ $\beta 2$ and $\beta 3$ are the regression coefficients for measuring independent variables.

ε - Error terms showing unobserved factor.

Finally, a diagnostic test conducted to make sure that the data and methodology meets the basic assumptions of the Classical Linear Regression Model (CLRM) such as: -

- **Multicollinearity test**: multicollinearity will occur if some or all of the independent variables are highly correlated with one another (Brooks (2008). To check existence of strong correlation between the independent variables was tested using correlation matrix.
- **Normality test**: It is assumed that the distribution of residuals is normal. To check for normality, Kurtosis and Skewness of the distribution of the data, Jarque bera test as well as histogram of residuals for the model were examined.
- **Autocorrelation test**: Autocorrelation refers to the degree of correlation between the values of the same variables across different observations in the data. Durbin Watson test (DW) rule for autocorrelation was applied in this study.
- **Heteroscedasticity test**: The variance of the error term, given the explanatory variables, is not constant (Wooldridge, 2009). Breusch–Pagan–Godfrey (BPG) test was used for this study.

3.9 Test of Validity and Reliability

Reliability and validity are means of evaluation of research instruments.

3.9.1 Validity

According to Kothari (2004) Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. As stated above, questionnaire was used to collect the primary data (see Appendix I).

Meanwhile, the questionnaire was adopted from Johnson Karimi (2017) with some modification by the researcher. After the questionnaire was constructed, pre-testing was done with individuals who have knowledge of the area (professionals) by allowing them to read and comment on it. Constructive comments were collected from the professionals and the questionnaire was adjusted

accordingly. Then, validation of the instrument was given by academic advisor prior to the data collection process.

3.9.2 Reliability

Reliability is the extent to which a measure, procedure or instrument yields the same result on repeated trials. The study used internal consistency method to measure reliability of the survey instrument (i.e. questionnaire). Internal consistency method was tested using Cronbach's Alpha, which measure how closely related a set of items are as a group. The ultimate goal is to minimize errors and biases that may occur during the research.

3.10 Ethical Considerations

- ✓ The study was in line with the organizations policy in relation to any intellectual property rights of the organization.
- ✓ Regarding privacy of the respondents, their responses are strictly confidential and only used for academic purposes.
- ✓ It could not be ethical to access some confidential documents of the organization. So, the organizations' code of ethics taken in to account without significantly compromising the findings of the study.
- ✓ Concerning references, all the materials and sources are properly acknowledged**.**

CHAPTER FOUR
DATA ANALYSIS AND INTERPRETATION

INTRODUCTION

Chapter three presented, the research design and methodology adapted for this study. Accordingly based on the framework in the previous chapters, in this chapter the result and analysis of the data taken from the selected public service companies are presented. The data collected using both closed and open-ended questionnaires were analyzed and presented based on the objectives of the study. Therefore this chapter presents demographic information of the respondent, descriptive statistics, correlation analysis, tests for the classical linear regression model assumptions (diagnostic test), model specification test and finally analysis of regression results.

Response Rate

A total of 604 questionnaires were distributed for finance, human resource and sourcing & facility division's employee of ET, EAL and CBE. Out of 604 questionnaires, 360 have been collected and used for data analysis and interpretation for this study. The response rate was 60%.

4.1 Demographic Profile of Respondents

The respondent in the survey has composed from wide ranges of age groups, gender, educational background, job position, years of experience and their division including their familiarity with ERP system to enhance organizational performance.

Table 4.1: Full description of respondents' Demographic profile.

Demographic information	Category	Company name			Frequency (n)	Percent (%)	Cumulative Percent
		ET	EAL	CBE			

Gender of respondent	Female	53	44	41	138	38.33	38.33
	Male	72	76	74	222	61.67	100.00
	Total	**125**	**120**	**115**	**360**	**100.00**	
Age of respondent (in years)	25 and below years	2	16	6	24	6.67	6.67
	26-35 years	68	69	61	198	55.00	61.67
	36-40 years	27	19	30	76	21.11	82.78
	Above 40 years	28	16	18	62	17.22	100.00
	Total				**360**	**100.00**	
Educational Qualification	College diploma	3	3	1	7	1.94	1.94
	Bachelor's degree	74	114	87	275	76.39	78.33
	Master's degree	38	17	23	78	21.67	100.00
	Total				**360**	**100.00**	
Company Experience	5 and below years	22	41	9	72	20.00	59.44
	6-10 years	26	33	54	113	31.39	90.83
	11-15 years	34	21	24	79	21.94	21.94
	16-20 years	31	15	17	63	17.50	39.44
	Above 20 years	12	10	11	33	9.17	100.00
	Total				**360**	**100.00**	
Company working in		125	120	115	**360**		
Division of employees	Finance	50	65	26	141	39.17	39.17
	Human Resource	35	12	40	87	24.17	63.33
	Sourcing&Facility	40	43	49	132	36.67	100.00
	Total				**360**	**100.00**	
Job Position of Respondent	Expert	1	1	0	2	0.56	0.56
	Manager	12	1	3	16	4.44	5.00
	Officer	0	36	86	122	33.89	38.89
	Staff	83	76	22	181	50.28	89.17
	Supervisor	29	6	4	39	10.83	100.00
	Total				**360**	**100.00**	
Interaction with ERP system on daily basis	< 25 %	24	20	30	74	20.56	63.89
	25-50 %	21	18	25	64	17.78	17.78
	51-75 %	34	31	27	92	25.56	43.33
	More than 75%	46	51	33	130	36.11	100.00
	Total				**360**	**100.00**	

Source: Survey Result, 2019

As depicted in table 4.1 above, out of 360 respondents, 61.67 % of them were male and the remaining 38.33% were female respondents. A significant number of respondents are found in the age group of 26-35 years, which constitutes 55 % of the total respondent. However, age

groups 25 years and below are less likely to use ERP system daily, which accounts for 6.67%. This show that all the three companies were staffed with young and energetic employees. In other words, the companies were staffed employees belonging in the productive age group. With regards to educational status of respondents, it is observed that majority of the respondents (76.39%) were Bachelor's degree holder, Master's degree (21.67 %) and the remaining (1.94%) had college diploma. This prove that human resource profile of the companies in terms of educational background was in a good position, that means staffed with well educated professionals with the ability of easily understand the concept and functions of ERP system.

Regarding company experience, the majority of the employees, 31.39% have been working with the company for at least 6 to 10 years, 21.94% of the respondents have an experience which ranges from 11 up to 15 years, 17.50% of the respondents have been working with the company from 16 up to 20 years, 9.17% had longer experience which is 21 years and above and the remaining 20% of the respondents had an experience of 5 years or less in the company. It shows that respondents had remarkable work experience in telecom, airlines and banking sectors. Because vast majority of the respondents 48.61% participants had above ten years working experience in their respective companies.

Out of the 360 respondents who returned the questionnaire, 39.17% of respondents belonged finance division and 36.67% sourcing & facility division and the remaining 24.17% of respondents are from human resources division. Regarding the job position of the respondent 50.28% of the respondents were staff, 33.89% officer, 10.83% supervisor, 4.44% managers and the remaining 0.56% were expert level. The survey also reveals in terms of the daily interaction and usage to ERP system, the majority of the employees performs their daily activity using ERP system which constitute (61.67). This implies that employees are familiar with ERP system and used this system for their daily business operations. Thus, reduce workload, reduce errors and cycle time, reduce paper work, reduce cost of paper, and minimize time & energy spent on manual working which leads to increased employees' productivity and improved organizational performance.

Reliability Test

Prior to conducting the analysis, the suitability of the data to be analyzed has been checked. Internal consistency of the data was checked so that reliability statistics was conducted through Cronbach's Alpha method. Cronbach's alpha reliability coefficient (α) normally ranges between 0 and 1. There is a greater internal consistency of the items if the Cronbach's alpha coefficient closes to 1.0. According to George and Mallery, (2003) rule of thumb if (α > 0.9 – 'Excellent'), (α >0.8 – 'Good'), (α >0.7 – 'Acceptable'), (α >0.6 – 'Questionable'), (α >0.5 – 'Poor'), and (α <0.5 – 'Unacceptable'). As depicted in table 4.2 below there is "Excellent" and "good" internal consistency of each independent variable's parameters used. The alpha coefficient for the sixty items was 0.85, suggesting that the items have relatively high internal consistency. Therefore, the reliability test of the study is located on "excellent" range.

Table 4.2: Reliability Test of Variable's Using Cronbach's Alpha

S.№	Variable Name	№ of Items	Average interitem Covariance	Cronbach's Alpha	(α)reliability ranges
1	Finance ERP system	14	0.136	0.804	Good
2	Human Resource ERP system	15	0.144	0.823	Good
3	Sourcing & Facility ERP system	15	0.156	0.858	Good
4	Organizational Performance	16	0.177	0.902	Excellent
Overall		**60**		**0.85**	

Source: STATA 11 Output of survey Result, 2019.

4.2 Result of Survey data

4.2.1 Financial, Human Resource and Sourcing & Facility ERP systems.

In order to evaluate the effect of ERP system on organizational performance, a close ended questioner was designed. Then, the respondents were asked to rate their accuracy with ERP system on their daily activity based on five-point likert scales ranging from highly disagree to highly agree. To characterize the effect of ERP system on organizational performance for the study, the researcher used three main variables and eight sub-variables along with 60 factors.

Table 4.3: Summary of survey result for the independent variables.

Financial ERP system	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev.
(i) Enhance Financial and Accounting activities.	36.71	47.92	13.80	1.30	0.27	4.20	0.73
(ii) Reduce Transactional costs.	39.78	45.83	12.11	1.61	0.67	4.22	0.76
(iii) Fulfilment of Taxation Requirements	19.72	45.46	29.63	2.87	2.32	3.78	0.86
Average (mean) response value	**34.16**	**46.40**	**18.61**	**1.93**	**1.08**	**4.12**	**0.41**
Human Resource ERP system							
(i)Employee performance evaluation	22.87	53.01	20.00	3.52	0.60	3.94	0.78
(ii) Training and Development	19.80	54.21	20.36	4.76	0.87	3.87	0.79
(iii) Recruitment processes	19.17	57.78	20.00	2.64	0.41	3.93	0.73
Average (mean) response value	**20.95**	**54.20**	**20.17**	**3.98**	**0.70**	**3.91**	**0.42**
Sourcing and facility ERP system							
(i) Improve Sourcing and facility activities	21.44	59.58	16.02	2.78	0.18	3.99	0.70
(ii) Facilitate procurement processes and customer satisfaction	18.57	56.44	20.23	4.26	0.50	3.88	0.76
(iii) Improve inventory control activities	21.11	55.37	20.65	2.50	0.37	3.94	0.74
Average (mean) response value	**20.22**	**57.48**	**18.63**	**3.31**	**0.35**	**3.94**	**0.43**

Source: STATA 11 output of survey, 2019.

Table 4.3 above designed based on the average responses (mean value) of respondents. The arithmetic average or mean takes into account all of the available information in computing the central tendency of a frequency distribution and standard deviation has also been included to see how responses deviate among individual respondents from the central value calculated for each response. To evaluate the effect of financial ERP system on organizational performance, the

researcher categorizes financial ERP performance measurement indicator into three sub-variables; enhances accounting & finance activities, reduce transactional cost and fulfil taxation requirements. Again, each of this sub-variable has different questions under it.

According to respondents' feedback, about on average 84.63% of them forwarded their view as agree and strongly agree that ERP system enhance finance and accounting activities through on timely and with a higher accuracy preparation of financial statements, accurate & quick data acquisition from all sections, reduces burden of operation, enables management to ascertain their financial position & control the financial flows and helped simultaneous data recording in different sections.

Similarly, on average 85.61 % of respondents were extended their view on ERP system in reduce transactional cost especially shortening accounting process cycle times, reduce the paperwork, smooth integration with IT system, centralization of administrative activities and facilities quick information retrieval and easily identify problems. And on average 65.18 % of the respondents agreed that ERP system enable to fulfil of taxation requirements by initiates early payment of taxes and minimizing tax penalty and ultimately removing interest which arises from late payments of taxes. Therefore, we can say that ERP system enables organizations' to meet taxation payment requirements before due date, retaining tax penalty and interest on late payments of taxes. In conclusion, the majority of the respondents confirm that ERP system has greater impact on smoothly and efficiently utilization of financial resources in the organization which leads to improvement in financial performance.

As depicted in table 4.3 above, on average 75.88% of the respondents agreed that ERP system facilitate employee performance evaluation processes through producing accurate appraisal documentation, maintaining employees' loyalty and commitment, providing disciplinary performance procedures and feedback guidelines, making time management and leave administration simple and easily manageable and finally leads to improves employees and organizational performance. On average 74.01% of the respondent agree and strongly agree as ERP system enhances training and development activities, increased employees' skills, productivity and qualification growth. From organizational perspectives, the contribution of ERP system towards improving overall company's productivity, research and development has a positive outcome. 76.95% of the respondents' agreed that ERP system shorten recruitment

processes. Generally, when there is system based human resource management within a given organization, no doubt there is what we call self-help management of employees and such culture actually creates employee and employer loyalty, and finally enhances the overall organizational performances.

With regards to sourcing & facility ERP system, 81.02% of respondents on average agreed that ERP system improves sourcing & facility activities through better coordination and cooperation between various departments, improved interaction with customers & suppliers and enhance inter- and intra-organizational communication. 75.01% of the respondents' on average agreed that ERP system facilitate procurement processes through integrating departmental and functional activities and enhance inter and intra communication and improved customer satisfaction through on time and on-schedule delivery of products and services to the customers. 76.48% participants revealed their view that ERP system enhances the inventory control activities helping to avoid unnecessary purchase of material by doing this the companies use their resources properly, minimize their expenses highly, hence increase the overall performance of the companies.

As shown in the table 4.3 above, the respondents' Aggregate mean and Std. Dev. rating regarding financial ERP was 4.12 and 0.41 respectively. It implies that the effect of financial ERP in enhancing financial and accounting activities, reducing transactional costs and meeting taxation requirement were high. The standard deviation is less than one suggesting the individual response did not deviate at all from the mean. So, majority of respondent give positive response for application of ERP in finance also the same view in human resource and sourcing. & facility.

In general, based on the aggregate mean comparison of the independent variables as shown in table 4.3, it can be seen that finance ERP was ranked first followed by sourcing & facility ERP and then human resource ERP.

4.2.2 Organizational performance

The study tries to find out the respondents' opinion on organizational performance. The findings were presented in table 4.4 below. The results indicated that on average 86.22% of the respondents strongly agree and agreed that the ERP system has improved the financial performance through reduction of operational, administrative and organizational costs and lead

to profit maximization, enhance competitive advantage and improved the performance of the companies.

The survey results also revealed that on average 84.47% of the respondent agreed and strongly agreed that the ERP system improved organizational efficiency and effectiveness of the companies through provide accurate and reliable information that is essential for strategic planning & operational control (information quality), facilitate easier access and faster retrieval of information (information availability), fulfill user satisfaction, and customer satisfaction, improved order management/order cycle, reduced delivery lead times(On-time Delivery) and increased productivity of their job. ERP system had improved overall company's productivity, helped in building common vision and improved in decision making and planning processes of the companies.

Table 4.4 Summary of survey result for the dependent variable.

Organizational performance							
(i) Financial performance	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Mean**	**Std. Dev.**
ERP has an impact on Profit maximization and eventually leads to improved business performance.	33.33	51.67	11.94	2.50	0.56	4.15	0.76
Implementation ERP system in our company leads to good financial performance.	26.67	60.83	11.39	1.11	0.00	4.13	0.64
ERP implementation has helped in reduction of operational and administrative costs.	30.28	60.28	7.78	1.67	0.00	4.19	0.64
ERP improves competitive advantage and lowers transaction costs.	25.56	57.22	15.28	1.94	0.00	4.06	0.69
Our ERP reduces organizational costs.	24.17	61.11	11.94	2.50	0.28	4.06	0.69
Average (mean) response value--(i)	**28.00**	**58.22**	**11.67**	**1.94**	**0.17**	**4.12**	**0.68**
(ii) Non-Financial performance							
Information Quality (accurate and reliable information for strategic planning & operational control).	22.50	61.39	13.89	2.22	0.00	4.04	0.67
Information Availability (easier access and faster retrieval of information).	36.39	53.06	8.33	2.22	0.00	4.23	0.69
User Satisfaction (precise information availability, user friendly system, output available in useful format).	27.22	56.94	13.61	2.22	0.00	4.09	0.70
Customer Satisfaction (improved customer relations & timely responsiveness, increased interaction with customers).	22.78	60.00	15.00	2.22	0.00	4.03	0.68

On-time Delivery (improved order management/order cycle, reduced delivery lead times).	22.50	57.22	17.78	2.50	0.00	4.00	0.71
The ERP system has positive impact on the productivity of my job.	35.83	50.56	11.67	1.94	0.00	4.20	0.72
Better resource and inventory management.	28.33	52.78	16.39	2.22	0.28	4.06	0.74
Improving overall company's productivity.	33.33	51.67	13.06	1.94	0.00	4.16	0.71
Build common vision.	27.50	50.28	19.17	3.06	0.00	4.02	0.76
Improved decision making and Planning.	32.22	55.56	11.11	1.11	0.00	4.18	0.66
In general ERP system improved operational efficiency and effectiveness of an organization.	36.67	54.44	8.06	0.83	0.00	4.27	0.64
Average (mean) response value--(ii)	**29.57**	**54.90**	**13.46**	**2.04**	**0.03**	**4.12**	**0.70**

Source: STATA 11 output of survey, 2019.

4.3 Descriptive Statistics of Variables

Descriptive analysis deals with the descriptive statistics results of dependent and independent variables used in the study. The descriptive statistical value of mean, standard deviation, the maximum and minimum value of the dependent and independent variables presented respectively.

Table 4.5: Descriptive statistics for dependent and independent variables aggregate value:

	Organizational Performance	Finance ERP system	Human Resource ERP system	Sourcing and Facility ERP system
Mean	4.12	4.12	3.91	3.94
Maximum	5	5	4.93	5
Minimum	2.63	2.64	2.42	2.60
Std. Dev(SD)	0.44	0.41	0.42	0.43
Observations	**360**	**360**	**360**	**360**

Source: STATA 11 output from survey, 2019.

Table 4.6: Descriptive statistics for dependent and independent variable individual value:

MEAN VALUE

Company Name	Organizational performance	Finance ERP	Human Resource ERP	Sourcing & Facility ERP
ET	4.14	4.13	3.84	3.90
EAL	4.14	4.19	3.95	4.03
CBE	4.08	4.03	3.93	3.89

Source: STATA 11 output of survey, 2019.

Discussion on the descriptive statistical value of dependent variable.

Organizational performance (OP): the aggregate mean value of OP of the selected public service companies was 4.12 with a minimum of 2.63 and a maximum of 5. The mean value of organizational performance rated highly indicated that participants were agreed that the performance of an organizations positively affected by implementation ERP system. The standard deviation of this variable was 0.44, indicating that the respondents' perceptions were close to one another because the std.dev. was less than 1.00. In case of individual company level statistical mean values, the ET and EAL for Organizational performance variable was similar at 4.14 whereas the mean value for CBE was 4.08, which reveals most respondents agreed that implementation of ERP system positively affected the performance of ET and EAL and CBE.

The result from qualitative data (open-ended questions) also support the above idea in that most of the respondents revealed their view about ERP system suggesting a positive response on the organizational performance, enhance organizational productivity and improves operational efficiency and effectiveness of an organization

Discussion on the descriptive statistical value of independent variables.

Financial ERP system: Its aggregate mean value was 4.12, with minimum and maximum value 2.64 and 5 respectively. The mean value show that the majority of respondent give positive response regarding the implementation financial ERP system in selected public service companies. The standard deviation of this variable was 0.41. It indicates that the respondents' perceptions were close to one another because the std.dev. was less than 1.00. When we observe individually the mean value was rated highly 4.19, 4.13 and 4.03 for EAL, ET and CBE respectively show that the respondents' agreement level on financial ERP system EAL ranked

first, ET ranked second, then CBE third and generally agreed that the variable had positive impact on performance of all three companies.

The result from qualitative data (open-ended questions) also confirmed that ERP system facilitate accurately and timely report of for financial statement, easily access of information, minimize paper work and increased the efficiency and effectiveness of business processes.

Human Resource ERP system: The aggregate mean value of selected public service companies was 3.91 with minimum 2.42 and maximum value of 4.93. The mean value implies that participants were agreed on the implementation of ERP in human resource division as a whole had a greater impact in the improvement of performance of public service companies. Its standard deviation was 0.42. It shows that the respondents' perceptions about the effect of human resource ERP on organizational performance were close to one another because the SD was less than 1.00. Individually the mean value 3.95, 3.84 and 3.93 indicated that EAL ranked first followed by ET and finally CBE. The result from qualitative data (open-ended questions) also justify that ERP system creates a positive effect on human resource module, facilitate evaluation processes, salary and benefit payment and enhance employees productivity.

However, some of the respondents revealed their perception about problem they faced about ERP system. Firstly, more of system-oriented activities in our society not acceptable, they suggested that system implementation is difficult because the employees fear the system and resist to accept quickly due to lack of awareness by employees about ERP. Therefore, the management before plan to announce new system or go live the system, they must prepare to brain wash their staffs about the system. Other problem raised by respondents is lack of training in basic ERP system skills or there is training gap among employees and create dissatisfaction among them. Hence, they proposed that all users should have trained in basic ERP system skills regularly. Lack of educated person on ERP system programming because IT system (ERP) needs highly skilled professional to give support. The ERP system is internet/network oriented, the interruption of network has an impact for effect in ERP system on organizational performance.

Sourcing & Facility ERP system: The mean value of the explanatory variable sourcing & facility ERP system was 3.94 with minimum and maximum value of 2.60 and 5 respectively. The

mean value implied that the majority of participants give positive response regarding the implementation sourcing & facility ERP system in selected public service companies. This variable has standard deviation of 0.43 which implies that the respondents' perceptions about the effect of sourcing & facility ERP on organizational performance were close to one another because the std.dev. was less than 1.00. In case of individual company level statistical mean values for EAL, ET and CBE were 4.03, 3.90 and 3.89 respectively show that the respondents' agreement level about sourcing & facility ERP EAL ranked first , ET ranked second ,then CBE third and generally agreed that the variable had improvement on performance of all three companies.

4.4 Correlation Analysis

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

The result of the correlation analysis is shown in table 4.7 below. It indicates that the correlation between explained variable organizational performance and explanatory variables financial ERP, human resource ERP and sourcing & facility ERP have positive and statistically significant correlation with value 0.54, 0.53 and 0.52 respectively at 5% significant level. This implies that efficiency and effectiveness of organizational performance had improved as a result of the adoption of ERP system in these major areas.

Table 4.7: Correlation Matrix between the dependent and the Independent Variables.

```
. pwcorr OP FAERP HRERP SFERP , sig obs
```

	OP	FAERP	HRERP	SFERP
OP	1.0000			
	360			
FAERP	0.5368	1.0000		
	0.0000			
	360	360		
HRERP	0.5279	0.4753	1.0000	
	0.0000	0.0000		
	360	360	360	
SFERP	0.5207	0.4857	0.5576	1.0000
	0.0000	0.0000	0.0000	
	360	360	360	360

Note: Correlation coefficient significant at 5% significant level.
Source: Computed from STATA 11 output.

4.5 Model Diagnostic test

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

4.5.1 Multicollinearity Test

Multicollinearity is a statistical problem which occurs when the explanatory variables are much correlated with each other (Hair et al., 1998). When there is a perfect or exact relationship between the predictor variables, it is difficult to come up with reliable estimates of their individual coefficients. It will result in incorrect conclusions about the relationship between outcome variable and predictor variables. In any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively benign in the sense that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other. High degrees of multi-collinearity can result in both regression coefficients being inaccurately estimated and difficulties in separating the

influence of the individual variables on the dependent variables (Brooks, 2008). In this study, the existence of multicollinarity examined by looking at the matrix of correlations between the explanatory variables. Brooks (2008) noted that correlation above 0.8 among explanatory variables may be sign of multicollinearity and have to be adjusted.

When we look at table 4.8 below, no variable correlation matrix exceeds 0.8 between the independent variables, the maximum correlation observed was 0.5576 between human resource ERP (HR-ERP) and sourcing & facility ERP (SF-ERP). Thus, there is no problem of multicollinearity in this study which confirm the reliability of the regression analysis.

Table 4.8: Correlation matrixes of independent variables.

```
. pwcorr FAERP HRERP SFERP

             |   FAERP    HRERP    SFERP
-------------+---------------------------
      FAERP  |   1.0000
      HRERP  |   0.4753   1.0000
      SFERP  |   0.4857   0.5576   1.0000
```

Source: correlation matrix from STATA 11 output

Another widely used method to examine the existence of multicolinerity among the predictor variables is by examining "Tolerance" and "VIF" values for each predictor variables. The variance inflation factor (VIF) is a measure of how much the variance of the estimated regression coefficient is "inflated" by the existence of correlation among the predictor variables in the model. Tolerance defined as a statistical tool which used to indicate the variability of the specified independent variables from other independent variables in the model (Pallant, 2007). Tolerance values less than 0.10 and VIF (variance inflation factor) greater than 10 indicates existence of multicollinearity (Wooldridge, 2009). From table 4.9 below, the VIF was 1.53 and tolerance value were greater than 0.10, then multicollinearity is not an issue for this study.

Table 4.9: Multicollinearity test using VIF method

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
       SFERP |      1.60    0.626188
       HRERP |      1.58    0.634353
       FAERP |      1.42    0.703419
-------------+----------------------
    Mean VIF |      1.53
```

Source: Computed from STATA 11 output.

4.5.2 Autocorrelation Test

The assumption of autocorrelation is that the errors associated with one observation are not correlated with error of any other observation cover several different situations. If the errors are correlated with one another, it would be stated that they are "autocorrelated" or that they are 'serially correlated' (Brooks, 2008). To confirm either there is autocorrelation or not the Durbin Watson test (DW) rule for autocorrelation was applied in this study and the null hypothesis being there is no autocorrelation. The Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non autocorrelation, a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation (Hair et al., 1998). Having 360 observations with three independent variables the regression result of DW as shown in table 4.10 below was 1.7689 which is closer to 2 indicated that the null hypothesis can't be rejected. Therefore, there is no evidence of autocorrelation among error terms in this study. The hypothesis for the autocorrelation test was formulated as follow:

HO: There is no autocorrelation problem in the model.

H1: There is autocorrelation problem in the model.

```
. gen t=obs

. tsset t
        time variable:  t, 1 to 360
                delta:  1 unit

. estat dwatson

Durbin-Watson d-statistic(  4,   360) =  1.768859
```

Source: Computed from STATA 11 output. **(Table 4.10: Durbin-Watson test**).

4.5.3 Normality test

The classical linear model assumption which states that the error (dependent variable) has a normal distribution, conditional on the explanatory variables (Wooldridge, 2009). In other words, normality test assume that the mean of the residuals is zero. One of the most commonly

applied tests for normality is the Bera-Jarque (BJ) test. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments-the mean and the variance and its corresponding kurtosis (Brooks, 2008). Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution are. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3.

The null hypotheses is that with 5% significant level (i.e. P > 0.05) we do not reject the null hypotheses (HO) and we said the data is normally distributed and the kurtoses of 3 or closer to 3 we said the data have normal distribution .Table 4.11 below the p-value for the Jarque-Bera test was of 0.0744 for the model which is greater than 0.05. Therefore, we fail to reject the null hypothesis hence the residuals are normally distributed and conclude that the error terms of the modes are found to be normally distributed. In addition, the kurtosis was 3.44 the value close to 3 which is also acceptable and confirm the data was normally distributed. The hypothesis for the normality test was formulated as follow:

H0: Error term is normally distributed

H1: Error term is not normally distributed

Table 4.11: Normality test

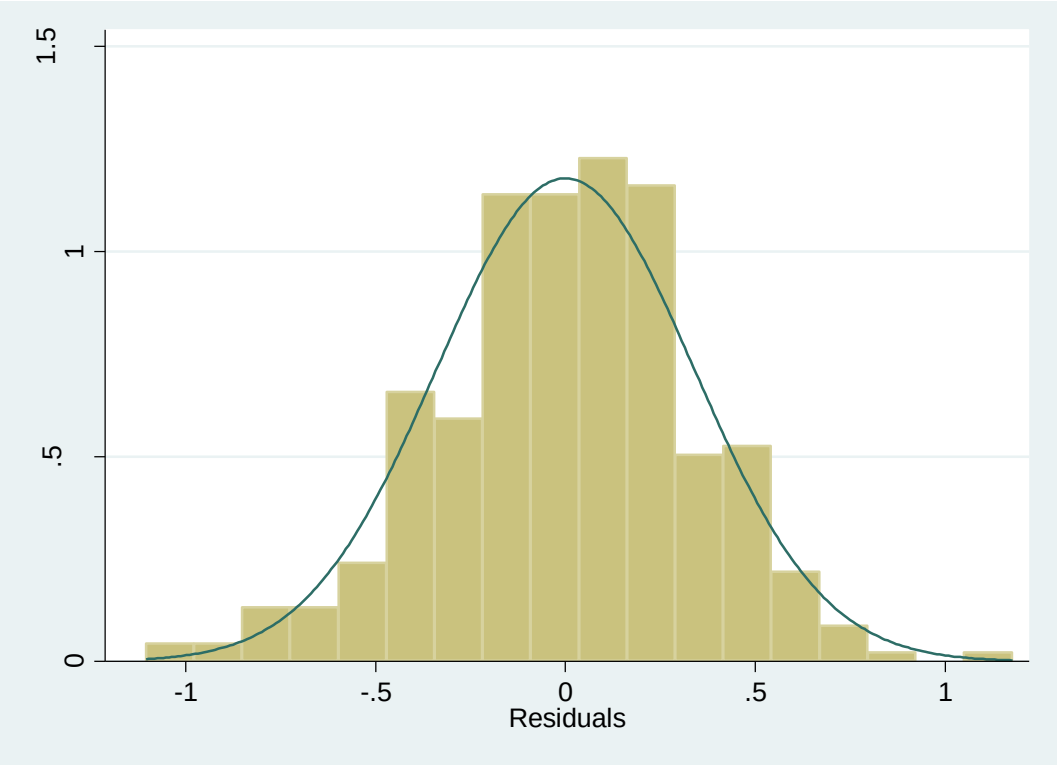
```
. predict uhat , residual

. jb uhat
Jarque-Bera normality test:  5.197 Chi(2)  .0744
Jarque-Bera test for Ho: normality:
```

```
. sum uhat , detail

                        Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.8773718      -1.104577
 5%    -.5462547       -1.02673
10%    -.4375897      -.9153826       Obs                 360
25%    -.1957883      -.8773718       Sum of Wgt.         360

50%      .021744                      Mean           -1.82e-10
                        Largest       Std. Dev.      .3384973
75%     .2068956        .774899
90%     .4261207       .7885512       Variance       .1145804
95%     .5263181       .8320877       Skewness      -.1921282
99%      .774899        1.17649       Kurtosis        3.44587
```

Source: Computed from STATA 11 output.

Histogram of Residuals: Normality can further be checked through histograms of the standardized residuals (Stevens, 2009). A histogram of residuals is can be used to check whether the variance is normally distributed, or the variance is a constant. A symmetric bell-shaped histogram of residual which is distributed around zero indicates that the normality assumption is

likely to be true. **Figure 4.1** below show that the histogram is bell-shaped normal distribution curve on the histogram.



Source: Computed from STATA 11 output.

4.5.4 Heteroscedasticity Test

Heteroskedasticity is a systematic pattern in the errors where the variances of the errors are not constant. The presence of heteroscedasticity makes the standard errors too big or too low and hence any inferences made could be misleading. One of the most popular method to test heteroscedasticity is the Breusch–Pagan–Godfrey (BPG)'s test. BPG is a test for heteroskedasticity where the squared OLS residuals are regressed on the explanatory variables in the model. The null hypothesis of homoskedasticity is rejected if BPG statistics is greater than the chi-square values. According to (Brook, 2008) if the probability of the heteroscedastic BPG test result is in excess of 5% then there is no heteroscedastic problem. Accordingly, as shown in table 4.12 below, the test statistic gave the conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values 0.1953 was in excess of 0.05. Thus, the null hypothesis

that the variance of the error term is constant (homoscedastic) not violated and should not be rejected. The hypothesis for the Heteroscedasticity test was formulated as follow:

HO: There is no Heteroscedasticity problem in the model

H1: There is Heteroscedasticity problem in the model

Table 4.12- Heteroscedasticity Test: The Breusch–Pagan–Godfrey (BPG).

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of OP

         chi2(1)      =     1.68
         Prob > chi2  =   0.1953
```

Source: Computed from STATA 11 output

4.6 Model Specification Test

A model specification error can occur when one or more relevant variables are omitted from the model, or more irrelevant variables are included in the model or choosing the wrong functional form. If relevant variables are omitted from the model, the common variance they share with included variables may be wrongly attributed to those variables, and the error term is inflated. On the other hand, if irrelevant variables are included in the model, the common variance they share with included variables may be wrongly attributed to them. Model specification errors can substantially affect the estimate of regression coefficients. To detect specification errors, this study used the ovtest (Omitted Variables Test) method. It performs a regression specification error test (RESET) for omitted variables. The hypothesis for the model specification test was formulated as follow;

HO: the model is correctly specified

H1: the model is not correctly specified

As depicted in table 4.13 below, the p-value for ovtest was 0.2049 which is greater than (p=0.05) at 5% significance level, so we fail to reject the null and conclude that the model is correctly specified.

Table 4.13: Model specification test

```
. ovtest

Ramsey RESET test using powers of the fitted values of OP
       Ho:  model has no omitted variables
                 F(3, 353) =      1.54
                  Prob > F =      0.2049
```

Source: Computed from STATA 11 output.

4.7 Result of regression analysis

The Classical Linear Regression Model (CLRM) is concerned with the study of the dependence of one variable, the dependent variable, on one or more other variables, the explanatory variables, with a view to estimating and/or predicting the (population) mean or average value of the dependent variable in terms of the known or fixed (in repeated sampling) values of the latter. (Wooldridge, 2009). The regression results between the dependent variable and independent variables was shown below.

Table 4.14: Regression result between dependent variable organizational performance and independent variables finance ERP, human resource ERP and sourcing & facility ERP.

```
. reg OP FAERP HRERP SFERP

      Source |       SS       df       MS              Number of obs =     360
-------------+------------------------------           F(  3,   356) =   85.16
       Model |  29.5185876     3  9.83952921            Prob > F      =  0.0000
    Residual |  41.1343638   356  .115545966            R-squared     =  0.4178
-------------+------------------------------           Adj R-squared =  0.4129
       Total |  70.6529514   359  .196804879            Root MSE      =  .33992

------------------------------------------------------------------------------
          OP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       FAERP |   .3270377   .0519855     6.29   0.000     .2248005    .4292749
       HRERP |   .2704245   .0538977     5.02   0.000     .1644265    .3764225
       SFERP |   .2403436   .0530897     4.53   0.000     .1359348    .3447524
       _cons |    .770304   .2105271     3.66   0.000      .356271    1.184337
------------------------------------------------------------------------------
```

Source: Regression results from STATA 11.

4.7.1 Evaluation on the regression out put

R-Squared (R^2) value: In the course of model estimation, it is common practice to evaluate the appropriateness of a single descriptive model for the problem under study with the help of the coefficient determination, R^2. It tells what proportion of the variation in the dependent variable is

explained by the explanatory variable. This R^2 lies between 0 and 1. In empirical studies, the most important benefit of R^2 is that it serves as a fast and easily interpretable measure for the goodness of fit of the estimated model (Reisinger, 1997). However, R^2 is not an absolute indicator of goodness of fit. Some authors particularly in social science largely reject the usage of the coefficient of determination (Reisinger, 1997; Thompson, 2002). Further, cross-sectional studies achieved lesser R^2 value than time-series studies (Reisinger, 1997). Thus, the best value for R^2 depends on what the researcher measured. This study depends on participant's perception which collected through questionnaire. Therefore, r-squared (R^2) value more than 25% can be respectable and good to fit (Reisinger, 1997; Thompson, 2002). As depicted in table 4.14 above the R-squared value was 41.78%, indicating that financial ERP, human resource ERP and sourcing & facility ERP collectively counted for 41.78% of the variance in the organizational performance and the remaining 58.22% was explained by other factors which are not included in the model.

Adjusted R-Squared (R^2) value: The adjusted R^2 show that the percentage of variation explained by only the independent variables that actually affect the dependent variable. The adjusted R^2 will penalize you for adding independent variables that do not fit the model. As indicated in table 4.14 it was 41.29%, indicating that the change in independent variables finance ERP, human resource ERP and sourcing & facility ERP explain 41.29 % of the dependent variable organizational performance.

T-Statistic value: T-value measure of the statistical significance of an independent variable in explaining the dependent variable. It is determined by dividing the estimated regression coefficient by its standard error. Thus, the *t*-statistic measures how many standard errors the coefficient is away from zero. Generally, t-value of more than 2 are indicating a strong relationship between the independent and dependent variable (Hair et al., 1998).

F-Statistic value: The F-test is useful for testing a number of hypotheses and is often used to test for the joint significance of a group of variables. When testing for the significance of the goodness of fit, our null hypothesis is that the explanatory variables jointly equal zero. If our F-statistic is below the critical value we fail to reject the null and therefore we say the goodness of fit is not significant (Wooldridge, 2009).The joint F statistical probability of this study was

0.0000 and F=85.16 confirm that jointly the model was reliable, valid and statistically significant to predict the effect of ERP system on organizational performance.

P-Value: p-value is the probability, for a given statistical model that, when the null hypothesis is true, the statistical summary would be equal to or more extreme than the actual observed results. It is the lowest significance level at which a null hypothesis can be rejected. The decision rule is if the p-value is less than or equal to 0.05 we reject the null and accept the alternative hypothesis at 5% level of significance (Wooldridge, 2009). Based on this criterion, as depicted in table 4.14 above, the P value of independent variables, finance ERP with P value of 0.000, human resource ERP with P value of 0.000 and sourcing & facility ERP with P value of 0.000 were statistically significant at 5% significance level. Therefore, we reject the null hypothesis, and accept the alternative hypothesis.

Regression model: The general model equation for predicting the effect of ERP system implementation on organizational performance from finance, human resource and sourcing & facility perspectives are

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon$$

$$OP = 0.770 + 0.327(FA\text{-}ERP) + 0.270(HR\text{-}ERP) + 0.240(SF\text{-}ERP) + \varepsilon$$

Where:

OP- Organizational Performance

$\beta 0$ - Constant coefficient

β1-3- Regression coefficient for measuring independent variables

FA-ERP: Finance ERP system

HR-ERP: Human Resource ERP

SF-ERP: Sourcing & Facility ERP

ε - represent the error term

The constant coefficient (β0) is the point on the vertical axis where the regression line crosses the Y axis. The value of β0 is 0.770 represent the expected value of organizational performance when all the three explanatory variables assume zero value.

The beta (β) sign includes a sign of positive (+) and negative (-). It shows the effect of independent variables over the dependent variable (Field, 2009). Based on Table 4.14 beta sign of all the independent variables were positive suggesting that they had a positive effect on the predicting the dependent variable which is organizational performance. That means an increase in the implementation ERP systems will result in the increase in the performance an organization.

Effect of Financial ERP on organizational performance.

Financial (FA) ERP: The regression result as depicted in table 4.14 confirm there was a positive relationship between financial ERP and organizational performance. The coefficient for financial ERP was 0.327. This means the model predicts that with a unit increase in adoption financial ERP in the firm, one should expect an increase in firm's organizational performance by 0.327 units, all other factors remain constant. The t-value of 6.29 and P value of 0.000 indicated that there is a strong relationship between financial ERP and organizational performance and also statistically significant at 5% significance level. Therefore, we can conclude that company's performance has improved as a result of adoption of ERP system in finance division.

Theoretically the result of the regression confirms the theory of organizational information processing. It assumes organizations need quality information to cope with environmental uncertainty and improve their decision making. The theory further hypothesizes that organizations have to design a strategy of implementing structural mechanisms and information processing capability to enhance the information flow and thereby reduce uncertainty. Accurate and timely information is a key element in management processes. Acquiring this information requires a processing model which cannot be complete without focusing on Information and Communications Technology infrastructure. Hence ERP system is one of ICT that help in smoothly flow of information throughout the organization that help top management to make right decision at the right time which leading to company's operation efficiently and effectively.

This finding was consistent with the finding of Spathis and Constantinides (2014) have found that ERP facilitates the accounting process in firms that have adopted enhancing efficiency and speed of these processes. It has been found that ERP systems provide general benefits in terms of increased transaction processing efficiency, more accessible information of a higher quality and greater support for real- time data reporting, involve increased flexibility in information generation ,increased integration of accounts applications and improved decisions based on timely and reliable accounting information.

Effect of Human Resource ERP on organizational performance.

Human Resource (HR) ERP: The regression result show that there was a positive relationship between human resource ERP and organizational performance in selected public service companies. The coefficient for HR-ERP was 0.270. It implies that the model predicts that with a unit increase in HR-ERP adoption in the firm, one should expect an increase in firm's organizational performance (productivity) by 0.270 units, all other factors remain constant. The p-value of 0.000 and t-value of 5.02 indicated that the variable was statistically significant at 5% significance level and had strong relationship with organizational performance.

Theoretically the theory of Sociotechnical System (STS) is in line with the output of variables human resource ERP system and organizational performance. According to this theory both social and technical factors must be considered jointly when introducing new technologies into an organization. The extent of automation of a given technical system is crucial to the productivity of an organization. This theory suggested that the technical factors such as laying down information technology infrastructure such as networking the companies, buying computers and integrating all functional areas into a single data base as well as the social system which includes hiring of skilled staff and training the existing staff to enable successful adoption and implementation of ERPs. Therefore, the socio-technical perspective describes the devices, tools and techniques needed to transform inputs into outputs to enhance the organizational performance.

Previous empirical findings by Exact Max (2014) and Velcu (2015) support the findings of this research study. They found that ERP influences staff productivity in at least four important ways; including improved communication, reduced workload per employee, facilitation of fact-based decision-making and elimination of duplication of tasks and data.

Effect of Sourcing and Facility ERP on organizational performance.

Sourcing and Facility (SF) ERP: From the regression result as depicted in table 4.14 above the coefficient of sourcing and facility ERP was 0.240 and it is positively correlated with organizational performance and statically significant at 5% significance level because the P value of the coefficient was 0.000. The value of the coefficient 0.240 implies that a unit increase in sourcing and facility ERP adoption in the firm, one should expect an increase in firm's organizational performance by 0.240 units, and all other factors remain constant.

Theoretically the result of the regression confirms again the organizational information processing theory, it assumes organizations need quality information to cope with environmental uncertainty and improve their decision making. The theory further hypothesizes that organizations have to design a strategy of implementing structural mechanisms and information processing capability to enhance the information flow and thereby reduce uncertainty. Accurate and timely information is a key element in management processes. Acquiring this information requires a processing model which cannot be complete without focusing on Information and Communications Technology infrastructure. Hence ERP system is one of ICT that help in smoothly flow of information throughout the organization that help top management to make right decision at the right time which leading to company's operation efficiently and effectively.

This finding in line with the findings of with the finding of Gartner (2010) and Nooriae (2012). According to Gartner (2010), ERP systems provide firms with the ability to enhance businesses process through the integration of all the activities and function areas of a company. Nooriae (2012) has argue that ERP systems facilitate product or service improvement as well as enhanced management of the life cycle of customers, both of which increases customers level of satisfaction. ERP systems contribution to improvement in on-time delivery of product and services. He also revealed that decision-making is one of the principal managerial functions and one with potential positive or negative consequences for organizational performance. It is suggested that this information-dependent attribute of decision-making process is what makes ERP systems important to it. This means that any input that facilitates augments or enhances the quality of managerial decision-making directly enhances performance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

INTRODUCTION

This chapter present the summary of the study, summarizing the purpose and the research questions of the study as well as the study key findings, the conclusion and suggests some recommendations for further research.

5.1. Summary

An organization's business environment is changing and becoming turbulent at an accelerated speed throughout the world, creating significant challenges for firms in maintaining a competitive advantage. To sustain competitiveness, firms should be able to embrace global challenges as well as manage their environment effectively. Information systems are often used as tools to improve customer service, increase effectiveness, and efficiency of an organizations. An ERP system is a large information system practices project with a huge impact on a number of different areas regarding the organization that implements it. This study was intended to provide both theoretical and practical insights into the effect of ERP system implementation on the performances of selected public service companies namely: ET, EAL and CBE. This research presented a model to explain the effect of ERP implementation on organizational performance, picking up fully ERP automated modules, particularly focused on finance, human resource, and sourcing & facility divisions that can contribute to assess the overall organizational performances of the companies. The study sought to answer the following research questions, namely; what are the effects of financials ERP implementation on organizational performance? What are the effects of human resource ERP implementation on organizational performance? What are the effects of sourcing & facility ERP implementation on organizational performance? To what extent do the selected factors influence improvement in organizational performance?

The main objective of this study was to evaluate the effect of ERP system on organizational performances in case of selected public service companies. To achieve this objective the research design and methodology of the study (i.e. explanatory research approach) was selected and the data for the selected three companies were obtained using five point likert type questionnaire (both closed and open ended) distributed to 604 respondents out of which 360 were returned for analysis purpose for this study. The data was analyzed and tested using classical linear regression model assumption. To analyze and answer to the proposed research question descriptive statistics, diagnostic tests, model selection, regression result analysis and test of the hypothesis have been done using SATAT 11 econometric software.

The mean value for organizational performance of the selected public service companies were high which implies the performance of these companies highly improved as a result of ERP implementation in finance, human resource and sourcing & facility divisions, according to the respondent's perception. With regard to independent variables finance ERP, human resource ERP and sourcing & facility ERP, they were positively and significantly affected organizational performance of selected public service companies. Therefore, the management of these organizations should give emphasis to use these determinant variables to make its service delivery efficient, effective and maintaining a competitive advantage which leads to improve overall organizational performance.

This study finds that the composite measure of financials ERP, human resource ERP and sourcing & facility ERP accounted for 41.78% (R^2 = 0.4178) variance for organizational performance. This means that about 41.78 percent of the variation in the organizational performance is explained by independent variables finance ERP, human resource ERP and sourcing & facility ERP collectively. The remaining 58.22 % were accounted for other variables that are not included in the model.

5.2 Conclusion

With the objectives of examining the effect of ERP implementation on the organizational performance of selected public service companies, the researcher made detail analysis and attempted to provide answers for the research questions and test the hypothesis the following conclusions are drawn.

For the research question that was “what are the effect of financials ERP on organizational performance?” Based on the finding of the research, financials ERP and organizational performance had positive relationship indicating that as the value in the adoption of financials ERP increased at certain value and all other variables remain constant, the organizational performance has also increased. When examine the significance of the variable, it has statistically significant effect on the organizational performance at 5% significance level. The conclusion is therefore financials ERP significantly affect financial and accounting activities (accounting process) with greater efficiency and speed of these processes , real time generation of reports, accurate financial reports, reducing the financial cycle time, there has been increased transparency and accountability due to the use of ERP systems in the companies , reducing transactional costs and fulfilment taxation requirement on time before due date, mainly saving the companies from penalty and unnecessary expenses like interest on late payment of taxes, which in fact enhances the financial position and leads to profitability of selected public companies that gives the companies greater competitive advantage and ultimately increases the overall organizational performances.

For the research question that was “what are the effects of human resource ERP on organizational performance?” Based on the finding of the study, human resources ERP plays greater role in improving the performance of public service companies. Human resource ERP had a positive relationship with organizational performance. This means that a unit increase in human resource ERP adoption in the companies, one should expect an increase in companies’ organization performance, all factors staying stantis paribus. The explanatory variable was statistically significant at 5% significance level. Accordingly, the findings show that the human resource ERP had a very significant importance in facilitating employee performance evaluation, enhancing training & development activities and shorten recruitment process. ERP systems enable to reduce the workload for their employees and to ensure their optimum productivity. It allows for the collection and storage of information regarding employees’ background and improves the efficiency of tracing employee’s detail. It also contributions a lot towards improving overall company’s research & development activities and ultimately enhances organizational productivity.

For the research question that was "what are the effect of sourcing and facility ERP on organizational performance?" From the finding of the research, the coefficient of sourcing and facility ERP was positive indicating as the value of sourcing and facility ERP system adoption increase, the performance of the organization also increased. Sourcing and facility ERP variable was statistically significant at 5% significance level. It has significant impact on organizational performance by improving sourcing & facility activities, facilitate procurement process, fulfil customer satisfaction and enhances the inventory control activities. ERP enable better resource management, better coordination and cooperation between functional departments of the company, support managers access to accurate, timely and complete information that support their decision-making competencies (on time decision making). It provides firms with the ability to enhance businesses process, internal process and monitoring through the integration of all the activities and function areas of a company. ERP systems facilitate communication activities through quick and accurate information sharing between and across departments as well as with external stakeholders.

To conclude, finance, human resource and sourcing & facility ERP systems discussed above had a positive and statistically significant effect on organizational performance of selected public service companies.

5.3 Recommendations

Based on the findings and conclusion of the study, the following recommendations were forwarded:

- The organizational performance of selected public service companies was significantly and positively affected by financial, human resource and sourcing & facility ERP systems. Hence, the management of these companies have to emphasize on those variables and develop strategy accordingly in facilitating organizational survival, profitability, market share and competitive advantage and ultimately improved overall performance of the companies.
- In order to enhance the user's satisfaction as one of the constructs of ERP implementations, it is recommendable that employees who use the ERP applications should be involved during the life cycle of ERP implementation. Since employees would

need time to adapt the change imposed by the new technology, it would be very practical to develop adequate training programs and course in order to equip end-users with sufficient knowledge about system and that identifies and explains all the necessary changes that would occur to the business processes inside the organization. Moreover, although ERP systems standardize processes inside organizations, fast learners and technology-adaptive employees should have the chance to be distinguished and rewarded based on their effort. Therefore, managers should support and encourage such employees with suitable ways and procedures for incentives and rewards.

- The research study recommended that the management must adopt ERP systems as a strategy of enhancing firm's overall performance. ERP systems potential for the enhancement of business processes such as decision-making, productivity, task performance and managerial control. Additionally, ERP systems adopted should also be customer oriented and be aimed at enhancing firm-customer relations with the goal of achieving greater customer satisfaction. In general, the management should appreciate the ability of ERP systems to enhance information management within the firm. They should adopt ERP systems since the systems have the ability to facilitate the internal processes such as internal access to vital information, internal communication (both horizontal and vertical) and the accounting processes. They should appreciate the potential of ERP systems to generate efficiency and effectiveness in these processes, which has a direct impact on organization performance.

5.4. Recommendations for Further Research

Finally, this study focused on the effect of ERP system on organizational performance of selected public service companies picking up three independent variables, but those explanatory variables included in this study are not exhaustive. Therefore, the study recommends further research should studied in the future by other researchers interested in the area of the topic including other variables in order to improve understanding on the ERP factors in broader range that affect organizational performance.

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Appendices

Appendix I: Questionnaire

Addis Ababa University
Faculty of Business and Economics
Department of Accounting and Finance

Researcher: Sisay Gezahegn

Dear respondents,

This questionnaire is designed to prepare a research title of "**The Effect of Enterprise Resource Planning Implementation (ERP) system on Organizational Performance: the case of Ethio telecom, Ethiopian Airlines and Commercial Bank of Ethiopia"** for the purpose of partial fulfillment of the requirement for the Degree of Master of Science in Accounting and Finance. I kindly request you to take your time to complete the questionnaire to the best of your knowledge and thereafter send the same back to me. Hereby, I would like to express my gratitude for your dedicated cooperation in participating in this study. Had it not been your genuine cooperation in filling this questionnaire, it would have not been possible to conduct this thesis. All your responses are confidential and will only be used for the purposes of this research. You may feel free to verify these statements from me personally via the under mentioned addresses. Thank you in advance for taking the time to complete this survey.

Thank you.

Sisay Gezahaegn
E-mail:- sisaygeza@gmail.com
Mobile phone:-+251911 50-23-20
General Instruction: This questionnaire contains **three parts.** Please provide your responses to the questions based on the instructions under each part.

PART I: General Information (Demographic Information) - Please put **(√)** in the box.

1.1. What is your gender? Male ☐ Female ☐

1.2. Age Group:

≤ 25 ☐ 26 – 35 ☐ 36 – 40 ☐ 41 and above ☐

1.3. Educational Qualification: A) Collage Diploma ☐ B) Degree ☐

C) Masters & Above ☐ D) other please specify _____

1.4. Your service year:

≤ 5 ☐ 6 – 10 ☐

11 – 15 ☐ 16 – 20 ☐ 21 and above ☐

1.5. In which company are you working in?

Ethio telecom ☐ Commercial Bank of Ethiopia ☐

Ethiopian Airlines ☐

1.6. In Which division are you working in?

Finance ☐ Sourcing & Facilities ☐

Human Resources ☐

1.7. The position you hold in the organization

Staff ☐ Supervisor ☐ Manager ☐ Officer ☐

Other _____

1.8 On average, how much do you interact with the ERP system in your daily work routine?

Less than 25% of daily work routine ☐ 25%to 50% of daily work routine ☐

51% to 75% of daily work routine ☐ More than 75% of daily work routine ☐

PART-II: <u>Questions Related to the topic</u>.

To what extent do you agree or disagree with the statements provided below from question No. 2A.1-2D.17 since ERP system is implemented? Show the extent of your agreement on the statements provided below by putting [x] mark on space provided in the table within the five-point Likert- rating scale:

Where: **1 = Strongly Disagree** **4= Agree**
2 = Disagree **5= Strongly Agree**
3 = Neutral

SECTION 2: Survey questions for- Effect of ERP system on organizational performance.

SN	Description of performance measurements	Scale				
2A	**Financial ERP system**					
	Enhance Finance and Accounting activities	**5**	**4**	**3**	**2**	**1**
2A.1	ERP system helps on timely and with a higher accuracy preparation of financial statements.					
2A.2	ERP system leads Accurate & quick data acquisition from all sections.					
2A.3	ERP System reduces burden of operation.					
2A.4	ERP enables the management to ascertain their financial position.					
2A.5	ERP enable us to control the financial flows.					
2A.6	ERP system uses for Simultaneous data recording in different sections.					
	Reduce transactional Costs.	**5**	**4**	**3**	**2**	**1**
2A.7	In my view ERP system shorter accounting process cycle for example financial closing cycle.					
2A.8	ERP system reduce the paperwork.					
2A.9	Our ERP allows for integration with other IT systems.					
2A.10	ERP enable centralization of administrative activities.					
2A.11	The ERP system facilities quick information retrieval and easily identify problems.					
	Fulfill Taxation Requirements	**5**	**4**	**3**	**2**	**1**
2A.12	In my opinion ERP system initiates early payment of taxes.					

2A.13	I think ERP system minimize tax penalty.					
2A.14	ERP system remove interest on taxes payment.					
2B	**Human Resource ERP system**					
2B.1	**Employee Performance Evaluation**	**5**	**4**	**3**	**2**	**1**
2B.1.1	ERP system produces accurate appraisal documentation to protect both the employee and employer.					
2B.1.2	ERP system standardizes evaluation forms in line with clear performance measures.					
2B.1.3	ERP system maintains employees' loyalty.					
2B.1.4	ERP system maintain employees' commitment.					
2B.1.5	ERP system provides clear disciplinary performance procedures and feedback guidelines.					
2B.1.6	ERP helps in making the Time management and leave administration simple and easily manageable.					
2B.2	**Training and Development**	**5**	**4**	**3**	**2**	**1**
2B.2.1	All users have been trained in basic ERP system skills.					
2B.2.2	The training programs where properly and well designed for end-users.					
2B.2.3	ERP facilitate online training programs.					
2B.2.4	In my opinion ERP system increase employee skill level.					
2B.2.5	In my view ERP enhances qualification growth.					
2B.2.6	I think ERP system enhances Research & Development (employee innovation) in the company.					
2B.2.7	ERP helps quickly updated on master record of employee (employee profile) after training courses completed.					
2B.3	**Recruitment process**	**5**	**4**	**3**	**2**	**1**
2B.3.1	ERP system enable to supply the right talent at right time and in the right cost.					
2B.3.2	ERP system reduced the recruitment cycle.					
2C	**Sourcing and Facility ERP system**					
2C1	**Enhance Sourcing and Facility activities**	**5**	**4**	**3**	**2**	**1**
2C1.1	Better coordination and cooperation between various departments within the organization and with external customers and vendors.					
2C1.2	Easily monitor all the status and activities of business process at any time and corrected anytime in case of problems.					
2C1.3	Improved interaction with customers.					

2C1.4	Improved interaction with suppliers.					
2C1.5	Enhance inter- and intra-organizational communication.					
2C1.6	ERP improve organizational functions by simplifying business and internal Processes of the company.					
2C.2	**Procurement process and Customer Satisfaction**	**5**	**4**	**3**	**2**	**1**
2C.2.1	Enables buying the items actually needed on time.					
2C.2.2	ERP system create delivery reliability.					
2C.2.3	Fulfill customers' order accurately					
2C.2.4	ERP system facilitate on time delivery of customer order.					
2C.2.5	ERP system enables a firm to provide quality services to customers					
2C.2.6	ERP minimize customer complaints for late delivery					
2C.3	**Inventory control activities**	**5**	**4**	**3**	**2**	**1**
2C.3.1	Real-time access to inventory turnover					
2C.3.2	More dominance on warehouse control					
2C.3.3	Decreased excess time spent for taking of inventory					

SECTION D- <u>Survey questions for Organizational Performance</u>

	Key performance indicators	**Scale**				
2D	**Effect of ERP system on Financial performance**	**5**	**4**	**3**	**2**	**1**
2D.1	ERP has an impact on profit maximisation and eventually leads to improved business performance.					
2D.2	Implementation ERP system in our company leads to good financial performance.					
2D.3	ERP implementation has helped in reduction of operational and administrative costs.					
2D.4	ERP improves competitive advantage and lowers transaction costs.					
2D.5	Our ERP reduces organizational costs.					
	Effect of ERP system on Non-Financial performance	**5**	**4**	**3**	**2**	**1**
2D.6	Information Quality (accurate and reliable information for strategic planning & operational control)					

2D.7	Information Availability (easier access and faster retrieval of information)					
2D.8	User Satisfaction (precise information availability, user friendly system, output available in useful format)					
2D.9	Customer Satisfaction (improved customer relations & timely responsiveness, increased interaction with customers).					
2D.10	On-time Delivery (improved order management/order cycle, reduced delivery lead times).					
2D.11	The ERP system has positive impact on the productivity of my job.					
2D.12	Better resource and inventory management.					
2D.13	Improving overall company's productivity.					
2D.14	Build common visions.					
2D.15	Improved decision making and planning.					
2D.16	In general ERP system improved operational efficiency and effectiveness of an organization.					

Part III

1. If there is any other issue/ problem that you observed in relation to the effect of ERP system implementation on organizational performance. Please write down here:----------
   ---

Thank You Again!

Appendix II: Descriptive Statistics of Variables

Descriptive statistics for dependent and independent variables aggregate value

	Organizational Performance	**Finance ERP system**	**Human Resource ERP system**	**Sourcing and Facility ERP system**
Mean	4.12	4.12	3.91	3.95
Maximum	5	5	4.93	5
Minimum	2.63	2.64	2.42	2.6
Std. Dev(SD)	0.44	0.41	0.42	0.44
Observations	**360**	**360**	**360**	**360**

Source: STATA 11 output from survey, 2019.

Descriptive statistics for dependent and independent variable individual company value

MEAN VALUE				
Company Name	Organizational performance	Finance ERP	Human Resource ERP	Sourcing & Facility ERP
ET	4.14	4.13	3.84	3.90
EAL	4.14	4.19	3.95	4.03
CBE	4.08	4.03	3.93	3.89

Source: STATA 11 output of survey, 2019.

Appendix III: Multicollinearity Test

Correlation matrixes of independent variable.

```
. pwcorr FAERP HRERP SFERP

             |    FAERP    HRERP    SFERP
-------------+---------------------------
       FAERP |   1.0000
       HRERP |   0.4753   1.0000
       SFERP |   0.4857   0.5576   1.0000
```

Source: correlation matrix from STATA 11 output

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
       SFERP |      1.60    0.626188
       HRERP |      1.58    0.634353
       FAERP |      1.42    0.703419
-------------+----------------------
    Mean VIF |      1.53
```

Source: Computed from STATA 11 output.

Appendix IV: Autocorrelation test

Autocorrelation test-: Durbin-Watson test

```
. gen t=obs

. tsset t
        time variable:  t, 1 to 360
                delta:  1 unit

. estat dwatson

Durbin-Watson d-statistic(  4,   360) =  1.768859
```

Source: Computed from STATA 11 output.

Appendix V: Normality test

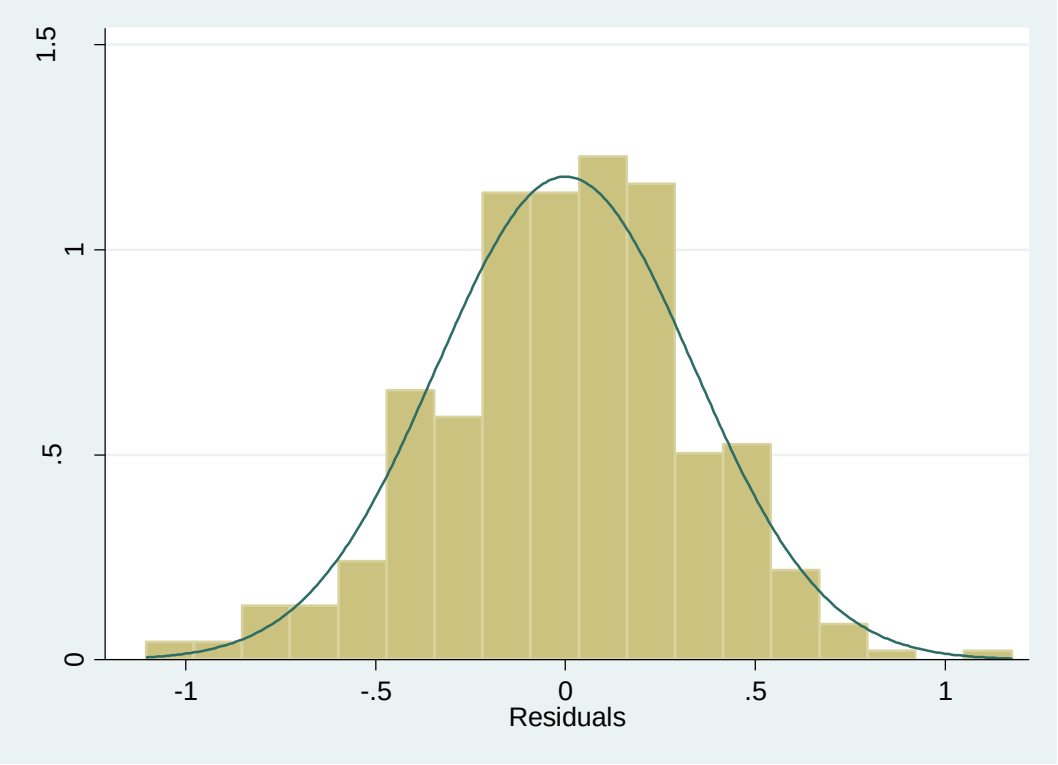
Normality test: Bera-Jarque (BJ) test

```
. predict uhat , residual

. jb uhat
Jarque-Bera normality test:  5.197 Chi(2)  .0744
Jarque-Bera test for Ho: normality:
```

```
. sum uhat , detail
                        Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.8773718      -1.104577
 5%    -.5462547       -1.02673
10%    -.4375897      -.9153826       Obs                 360
25%    -.1957883      -.8773718       Sum of Wgt.         360

50%      .021744                      Mean           -1.82e-10
                        Largest       Std. Dev.      .3384973
75%     .2068956        .774899
90%     .4261207       .7885512       Variance       .1145804
95%     .5263181       .8320877       Skewness      -.1921282
99%      .774899        1.17649       Kurtosis       3.44587
```

Source: Computed from STATA 11 output.

Normality test: Histogram of residuals



Appendix VI: Heteroscedasticity Test

Heteroscedasticity Test: The Breusch–Pagan–Godfrey (BPG).

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of OP

         chi2(1)      =     1.68
         Prob > chi2  =   0.1953
```

Source: Computed from STATA 11 output.

Appendix VII: Model Specification Test.

Model Specification Test: OVTEST (Omitted Variables Test)

```
. ovtest

Ramsey RESET test using powers of the fitted values of OP
       Ho:  model has no omitted variables
                 F(3, 353) =      1.54
                  Prob > F =      0.2049
```

Source: Computed from STATA 11 output.

Appendix VIII: Regression Results for effect of ERP system Implementation on Organizational Performance of selected public service companies.

```
. reg OP FAERP HRERP SFERP
```

Source	SS	df	MS		
Model	29.5185876	3	9.83952921	Number of obs =	360
Residual	41.1343638	356	.115545966	F(3, 356) =	85.16
				Prob > F =	0.0000
Total	70.6529514	359	.196804879	R-squared =	0.4178
				Adj R-squared =	0.4129
				Root MSE =	.33992

OP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
FAERP	.3270377	.0519855	6.29	0.000	.2248005	.4292749
HRERP	.2704245	.0538977	5.02	0.000	.1644265	.3764225
SFERP	.2403436	.0530897	4.53	0.000	.1359348	.3447524
_cons	.770304	.2105271	3.66	0.000	.356271	1.184337

Source: Regression results from STATA 11.