# EFFECT OF QUALITY, USE, AND BENEFITS DIMENSIONS ON SUCCESS OF ENTERPRISE RESOURCE PLANNING SYSTEMS IN PUBLIC AND PRIVATE UNIVERSITIES IN KENYA

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# Effect of Quality, Use, and Benefits Dimensions on Success of Enterprise Resource Planning Systems in Public and Private Universities in Kenya

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## DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

Signature ..... Date .....

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## DEDICATION

First and foremost, I dedicate this work to the almighty God for the strength and all his blessings; to my wife Maureen, for emotional and moral support, and to our children Adrian, Kimberly, and Melissa.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **CUE** | Commission of University Education |
| **COTS** | Commercial-Off - The-Shelf software |
| **CSF** | Critical Success Factors |
| **EBK** | Engineers Board of Kenya |
| **ERP** | Enterprise Resource Planning |
| **ICT** | Information Communication Technology |
| **IS** | Information Systems |
| **JKUAT** | Jomo Kenyatta University of Agriculture and Technology |
| **KRA** | Kenya Revenue Authority |
| **MoE** | Ministry of Education |
| **ODLM** | Open and Distance Learning Mode |
| **ROI** | Return on Investment |

## DEFINITION OF TERMS

**ERP System:** It is a complex information system designed to integrate business processes and functions, and is capable presenting a holistic view of a business by permitting the sharing of common data and practices in a real-time environment. Essentiality, an ERP system builds on one database to ensure information quality. (Ifinedo, 2006)

**System Quality:** System quality refers to the desirable characteristics of an ERP system. For example: ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times (Petter, DeLone, & McLean, 2008).

**Information Quality:** Information quality refers to the desirable characteristics of the ERP outputs; that is, reports. For example: relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability (Petter, DeLone, & McLean, 2008).

**Service Quality:** Service quality refers to the quality of the support that ERP users receive from the support personnel. For example: responsiveness, accuracy, reliability, technical competence, and empathy of the personnel staff (Petter, DeLone, & McLean, 2008).

**Use:** Use is the degree and manner in which staff and customers utilize the capabilities of an ERP. For example: amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose of use (Petter, DeLone, & McLean, 2008)..

**ERP benefits:** ERP benefits refer to the extent to which ERP contributes to the success of individuals, groups, organizations, industries, and nations. For example: improved decision- making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development (Shang & Seddon, 2002).

## ABSTRACT

Enterprise Resource Planning (ERP) systems have been adopted and implemented in the Kenyan higher education sector, with their success being described in many ways that one. Empirical studies have identified quality, use, and benefits dimensions as suitable descriptors of success of ERP systems. An understanding of ERP systems success dimensions will help to appreciate how each dimension fit in the higher education sector and provide a basis from which mitigation mechanisms can be employed to ensure success. There is need for universities to match their expectations on ERP systems with efficiency, assurance, accuracy, coupled with good support service by experienced professionals that will ensure the desired level quality is guaranteed. Engaging end-users during implementation and providing adequate training to employees have a direct impact on productive use of the ERP system. In addition, universities also need to define the strategic goals clearly before embarking on implementation, such that the process can always be steered towards the realization of benefits associated with the ERP system. A cross sectional survey methodology was adopted with a sample of 186 respondents drawn from two public and two private universities in Kenya. Primary data was collected using a structured questionnaire that was automated in order to enhance the response rate. 114 completed questionnaires were received which represented a response rate of 61%. Correlation statistics and multiple regressions were used in the data analysis that covered all aspects of the research objectives. The study found out that quality and use dimensions are good predictors of ERP success. Quality dimension was found to influence the use dimension which in turn had an impact on the net benefits dimension. Even though the use dimension was found to be significant, the study recommended the need to identify a more elaborate way of describing system use. The benefits dimension was not found to be a suitable predictor of ERP systems success. Finally, this study suggests that quality (system quality, information quality, and service quality) is the most important dimension in determining the success of ERP systems in public and private universities in Kenya.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

Universities are currently faced with an increased demand for robust Enterprise Resource Planning systems that will encompass campus wide business goals (Goeun, 2013). On the global arena universities have been challenged by their governments to improve on performance and efficiency (Abugabah & Sanzogni, 2010). Consequently, many universities have implemented ERP systems to improve their operations, and also to enable transparency in their management.

Over the last decade Kenyan universities have been undergoing major changes. For instance, Kenyan universities have witnessed increased student enrolments as a result of deliberate efforts to expand internally, and to establish campuses, colleges, and affiliations across counties and also outside the country (Oanda & Jowi, 2012). Consequently these institutions have experienced changes in the nature of academic work, increased competition from other institutions, pressure by regulatory bodies to improve on quality and efficiency, and increased expectations of stakeholders.

Universities are challenged in complying with their own cultures (statutes) and with the requirements of governing and regulatory bodies, notably the Commission of University Education (CUE) and other professional bodies. With the enforcement of the Universities Act (2012) professional bodies and CUE assumed powers to approve and accredit academic programmes in all universities. In 2014, the Engineers Board of Kenya (EBK), a regulatory body that accredits Engineering programmes, suspended some engineering courses in three public universities for not meeting certain specifications set out by the board (Muindi, 2014). The regular and impromptu audit inspections carried by the Ministry of Education (MoE) and CUE require institutions to provide past and present data of students admissions, enrolment, examination, and graduation. Further, the audit requires institutions to provide data on staff establishment, budgeting, university income, and expenses among other requirements (CUE, 2016). This enhanced regulatory environment has resulted for a quest of an integrated information system that will provide a compliance mechanism.

According to Oanda and Jowi (2012), the demand for university education has soared with institutions developing curricula for non-regular modes of study. At the same time, universities have resulted to adjusting their academic calendars to accommodate more semesters. This has resulted to more demands due to the increased number of students, increased market pressures to reform structures, to lower costs, and to achieve greater administrative efficiency in order to support research activities. Particularly, establishing a functional and coherent support framework for open and distance learning mode of study continues to haunt even the well-established public and private universities. Thus, the need for an integrated ERP system has become a priority and major strategic objective.

### 1.1.1 ERP Systems

Ifinedo (2006) defines an ERP system as a complex information system designed to integrate business processes and functions, and is capable presenting a holistic view of a business by permitting the sharing of common data and practices in a real-time environment. The ERP modules are integrated through a common set of definitions and a common database to ensure information quality (Ifinedo, 2006). Each ERP module is tailored around processes of one business area. Some of the common ERP modules are finance, accounting, inventory, sales and marketing, purchasing, customer relationship management, production, supply chain management, and human resource.

To an organization, adopting an ERP system promises many benefits. First, the solution eliminates repetitive processes and greatly reduces the need to manually enter information. The system also streamlines business processes and makes it easier and more efficient for organization to collect data, across multiple departments or business units. The system provides business managers with essential tools for creating realistic estimates and also to make more effective forecasts. The system facilitates collaboration between departments with data entered into the ERP systems being centralized and consistent. Structured ERP systems allow the addition of new users and functions to grow the initially implemented solution over time. With centralized a database, other platforms like customer relationship management (CRM) can be integrated with the ERP system while keeping data consistent, accurate, and unique. ERP systems provide users customizable reporting interfaces that can respond to complex data requests more

easily. Users can run their own reports without relying on technical staff, thereby saving them time to focus on other projects.

ERP increases efficiency and productivity by helping users navigate complex processes, preventing data re-entry, and improving functions such as production, order completion and delivery, streamlined, efficient processes throughout. With one source of accurate, real-time information, ERP software reduces administrative and operations costs. ERP solutions can also help an organization keep track of regulations within the industry and monitor changes in compliance requirements.

Modern ERP software systems are robust, flexible, and configurable such that they can be tailored to the suit the needs of a specific business. They also can adapt to the changes in the needs of an organization. This ensures that organizations do not have to buy a new solution once the needs change or organization grows. Finally, ERP system have inbuilt security mechanisms that provide for role-based access control whereby user security is determined using the users' roles and responsibilities (Pascu, 2013).

On the other hand, adoption of ERP systems is usually not easy. First and organization has to contend with high costs of implementation and maintenance. Other that the cost of procuring the ERP software, new hard hardware or an adaptation of existing hardware is always required. It is necessary to train all employees in the company so that the system is used efficiently. Quite often than not, there is need to integrate the ERP system with other existing applications. This requires that an organization to seek for expertise that may not only be non-existent within, but also rare outside the organization. Finally, as noted in the PwC (2013)report, an ERP system can be very detrimental to an organization if it is not applied correctly.

### 1.1.2 Cloud Services and ERP Systems

In the brief history of ERP systems, the underlying technology that facilitates their deployment has also been evolving, providing more robust and scalable infrastructure. When ERP systems were first introduced into the manufacturing sector, hosting the system on-premises was the only available choice. However, following the proliferation of digital networks and popularity of web technologies, other choices of hosting ERP systems are now available. Apart from the on-premises hosting, organizations can deploy their systems in hosted solutions or platforms. Even though the hosted platforms are managed off-site, some

software has to be installed on end-users' computers. This approach is still adopted by organizations that are established in different geographical locations, using Wide Area Networks (WAN) connections to distribute the database services. More recently, a significant number of traditional ERP vendors developed software-as-a-service (SaaS) models to offer the option of hosting ERP systems off-site (Panorama Consulting Group, 2011). In this model, ERP system is hosted in the cloud and is distributed to end-users via web browsers. This approach offers substantial benefits, including decreased capital expenditures, lower costs and time of implementation.

PwC (2013) reported that of the biggest challenge to the success of ERP systems is their cost and complexity. The cloud approach promises a new way for organizations to address most of the serious challenges associated with ERP systems implementation. Cloud-based ERP implementations are paid for through a subscription model, which typically includes the ERP software, hosting, and support costs. The initial capital expenditure required and also operating costs for this model are lower when compared with traditional models of hosting an ERP system. The ERP vendors are responsible for hardware and software maintenance provides system monitoring, backup and user support. PwC (2013) found out that a reduction of 50-60 percent on the total cost of ownership can be achieved by adopting cloud-based solutions over a period of 10years.

Cloud-based solutions, offer a basic configuration with a limited range of options that are designed to meet the requirements of most businesses — an approach that can significantly reduce deployment time while still addressing the most critical needs of the organization. Cloud-based ERP systems require organizations to re-engineer their business processes to fit the system as opposed to the traditional ERP implementations. This can significantly reduce complexity and consequently reduce the cost and time of implementation. In addition, cloud-based solutions are designed guarantees of high availability and robust disaster recovery mechanisms. Cloud-based solutions provide an easy way of acquiring additional ERP software modules and functions. For instance, SAP and Salesforce offer add-on applications for advanced analytics, collaboration, and finance management, similar to the apps that are delivered in Google Play stores. This makes cloud-based systems even more appropriate for institutions that are quickly evolving to meet a changing competitive environment.

On the other hand, because cloud-based ERP services are still new to the market, many organizations continue to remain skeptical of their suitability, mainly as a result of not

understanding their current and future data risks, perceived restricted functionality and customization (PwC, 2013). Compared with traditional on-premises and hosted applications, cloud-based solutions typically offer a limited range of configuration options. That makes cloud-based services appropriate for organizations that use standardized ERP modules like sales, purchasing, accounts, and inventory management. Cloud-based ERP solutions may not be able to handle the needs of educational institutions with either highly tailored business processes without indulging into significant customizations.

Organizations opting for cloud-based ERP system must be willing to trust a third-party provider with sensitive information, such as financial data, customers' personal data, and for instance, examinations data in case of higher education institutions. Pwc (2013) notes that for an organization to adopt cloud-based services, it must be ready loosen their control of critical data. Cloud providers, like Oracle, Dynamics 365, and SAP have invested heavily in state-of-the-art security that may exceed of ERP systems that are hosted solutions locally. However, given the security measures that cloud providers have taken, the perception of increased risk tends to be based more on a lack of familiarity with these emerging options than on actual security risks (PwC, 2013).

### 1.1.3 ERP Systems in Higher Education

Universities have already experienced significant troubles trying to implement ERP systems (Abugabah & Sanzogni, 2010). Many of these institutions plan to upgrade, replace, or install modern enterprise-wide system, often as a result of inadequacies of their current systems, which are commonly disjointed. However, unlike other companies in the manufacturing sector, universities have specific and unique administrative needs. Universities require customized systems for student admissions, registration, timetabling, campus financials, curriculum management, examination management, library management, hostel management, and others, that are not part of typical ERP software. Typically, ERP systems address basic business administrative functions such as finance operations, sales and marketing modules, inventory modules, customer relationships modules (Panorama Consulting Group, 2011).

Developing in-house software of this magnitude is not a viable option for many universities. Most universities are non-profit organizations, which renders them

deficient in terms of talent and financial resources needed to create and manage a robust enterprise system. According to experts at PeopleSoft, a leading and dominant provider of ERP solutions for higher learning institutions, a large part of the problem results from the inexperience of university Information and Communication Technology (ICT) departments and their tendency to rush implementations and inadequately test the new systems (Simon, 2011). On the other hand, Fowler and Gilfillan (2003) advises that in order to improve the success of ERP systems in higher education, there is need to create and cordial relationship between two different groups of people. One group is the managers of higher education institutions, who are commonly not familiar with information systems and their implementation and development, and the other is IT experts, who usually lack experience related to the implementation of information solutions that cater to needs of academic services (Fowler & Gilfillan, 2003).

On the other hand, ERP vendors show off their successful implementation stories on their websites and marketing profiles. Unknown to prospective clients, there are also many failures behind their implementation experiences. Research indicates that more than three in five new systems fail (Simon, 2011, p. 2). Many miss their deadlines. Others exceed their initial budgets, often by enormous amounts. To cap it all, those delivered on time and within budget often fail to produce the expected results, and almost immediately, experience major problems after a "successful implementation". From these experiences, critical questions are asked about what is ERP success.

In the global arena, universities have had a fair share of woes arising from failed ERP systems. Few of these experiences are rarely made public, perhaps because that would be "bad publicity". As a result, many of these experiences only become public after a formal lawsuit have been lodged by a client against the vendor. In 2001, the University of Cambridge considered possible legal action against Oracle and KPMG Consulting for a faulty computer system that the university estimated to have spent $13 million. In 2004, Cleveland State University sued software maker PeopleSoft, seeking up to US$510 million in damages and costs for a faulty ERP installation (Songini, 2013). Very recently, Montclair State University sued Oracle for delays that "could ultimately cost the school some $20 million more than originally planned" (Kanaracus, 2011). The claimant also alleged that Oracle "failed to deliver key implementation services, caused critical deadlines to be missed, refused to make available computer resources that it had

promised, failed to deliver properly tested software, and overall, failed to manage properly the entire project.

ERP systems in higher learning institutions constitute the largest portion of their IT investment. JKUAT (2011) announced their successful use of Sage ACCPAC ERP system for registration of new students during the 2011/2012 academic year. The author also pointed out that the ERP system "is so far the largest ICT project the University has implemented" to focus on key areas of the university operation. Large ICT projects such as ERP implementation have more chance to be failures than most people expect. Many studies have shown a persistent dismal performance of ERP implementation experiences. For instance in the 2011 ERP Report, Panorama Consulting Group (2011) showed that 61.1 % of the projects took longer expected, 74.1 % exceeded the budgeted costs, while 48% of the companies rated their business benefits realization below 50% of the projected benefits (Panorama Consulting Group, 2011). In order for organizations to realize business benefits from ERP systems, there is need to customize the ERP software to fit into their business needs. However, these results to increased expenditures, longer timeframes, and changed projects scopes, which negatively impacts on the original project plan assumptions.

Chwen, Bongsug, and Chen-Lung (2004) found out that the impacts of ERP systems differ from one country to another, and also from one industry to another. This research investigated the success of ERP systems in public and private universities in Kenya. This was done by describing the effect of quality, use and net benefits dimensions of ERP systems success and their relative significance with respect to public and private universities in Kenya.

## 1.2 Statement of the Problem

It is worth noting that even the very successful of ERP implementations experience a significant number of challenges. A lot of emphasis is given to success of the "project management" process as opposed to the success of the product. Past studies have shown that it is possible for a project to fail in financial, time frame, and scope metrics and still be considered as success. Baccarini (1999) and Pinkerton (2003) suggested the need to make a distinction between product success and project management success.

Analogously, there is need to distinguish between ERP implementation success and ERP success.

Shenhar, Dvir, and Levy (2001) emphasizes on the relative importance of efficiency, impact on customer, business success, preparation for the future while assessing success dimensions. The authors found out that for projects with lower uncertainty, their efficiency, measured on time and budget goals, may seem relevant and important. However, technological projects like ERP systems have higher uncertainty should be assessed on its business and long-term effects, rather than the short-term concerns of meeting time and budget performance.

Nelson (2005) found out that besides meeting the budget, time, and scope criteria, the ERP system should be assessed alongside the outcome indicators. These are product value, product use, and business value. In this particular study, product use and business value ranked higher than success measured in terms of financial indicators. In relation to ERP systems, these indicators assume dimensions of system quality, use, and net benefits and are associated with adoption of ERP systems.

The implementation of ERP systems in higher education institutions has been described as extremely difficult (Zornada & Velkavrh, 2005) . Umble and Umble (2002) found out that ERP systems challenge organizations because of several factors that can be directly linked to the three dimensions. First the lack of experienced professionals and inadequate training of the employees have a direct impact on the eventual use of the ERP system. Secondly, organizational expectations fail to match with the system efficiency, and lack of assurance on the accuracy of data negatively affects the "quality" of the ERP system. In addition, failure by organizations to clearly define the strategic goals, coupled with the latter factors, impacts on the benefits that the organization would get from an ERP system. This study sought to establish how dimensions of quality, use, and benefits can be used to describe the success of ERP systems in public and private universities in Kenya.

## 1.3 Objectives

### 1.3.1 General Objective

To determine the effect of various dimensions of ERP systems success in public and private universities in Kenya.

### 1.3.2 Specific Objectives

1. To determine the effect of "quality" in success of ERP systems in public and private universities in Kenya.
2. To determine the effect of "use" in success of ERP systems in public and private universities in Kenya.
3. To determine the effect of "net benefits" in success of ERP systems in public and private universities in Kenya.

## 1.4 Research Questions

1. Does "Quality" affect the success of ERP systems in public and private universities?
2. Does "Use" affect the success of ERP systems in public and private universities?
3. Does "Net benefits" affect the success of ERP systems in public and private universities?

## 1.5 Significance of the Study

Research in issues related to ERP systems in higher education represents a forward step in analyzing the actual benefits potentially brought by these systems to organizations. ERP System projects differ from projects in other disciplines because there are no precise industry standards, legislated codes, or published performance benchmarks against which success can be measured. Consequently an environment has been created whereby ERP projects are declared a success or failure based on subjective criteria, individual perceptions, partisan motivations, or other subjective factors.

Petter, DeLone, and McLean (2008) observes that understanding the dimensions of information system success is important because an organization can leverage or control

such factors to improve the success of the system. This study identified the three dimensions as quality, use, and net benefits and described their effect on success of ERP systems in selected public and private universities in Kenya.

The results of this research provide helpful information to the management of public and private universities when evaluating ERP implementations. This study would benefit those actively involved in the deployment of ERP systems in public and private universities, policy makers, governing organs, and decisions makers. Project managers in these institutions would be able to develop an assessment criterion and make informed decisions in planning, and commissioning of ERP implementation projects. This study was also published in order to serve as source of literature and contribute to future research in similar or related studies. Finally, it would be worthwhile to note that either very few studies on success of ERP systems had been conducted, or had been published in Kenya, especially in the higher education sector.

## 1.6 The Scope of the Study

The study covered fully accredited public and private universities; by limiting it to institutions that had recently implemented an ERP system. The selection of these institutions was based on the fact that institutions accredited by the Commission of University Education, had achieved higher levels of establishment and were most likely to have implemented an ERP system.

## 1.7 Limitations of the Study

A number of limitations were encountered during data collection. First, institutions are not always open to researchers, collecting information using questionnaires from their employees. This is because people are always skeptical about giving out information that may be misconstrued to be secretive, private, or information that could pose a risk of damaging the reputation of an organization. This was overcome by obtaining a permit from NACOSTI and an introduction letter from JKUAT. In addition, the questionnaire explicitly indicated that any data that was to be obtained from this research was to be solely used for academic purposes.

Secondly, most employees were not interested on being subjects of a survey. This is because, there were no benefits accrued for participating in the survey. This problem

resulted to longer period of data collection due to lack of enough responses within the planned time frame. To mitigate this, the researcher established internal contacts to act as research assistants within each institution. The contact persons were able to reach their colleagues and urge them to complete the questionnaire. The questionnaire was automated using the Qualtrics platform and thereafter, the researcher contacted the respondents by email and phone, and provided with a link to the questionnaire. This approached ensured achievement of good response rates, since respondents could access the questionnaire using their mobile phones.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter is a review of literature on variables identified in the study. An empirical and theoretical literature on the subjects of the study was reviewed. Research gaps were identified, in order to clearly show the basis of the problem statement. The literature was derived from various sources such as past scholarly work, documented reports and secondary information available in support of the study.

This literature focused on previous studies based on information systems (IS) models that relate to the chosen variables. This study attempted to establish the effect of quality, use, and benefits dimensions in success of ERP systems in public and private universities in Kenya.

## 2.2 Theoretical Framework

There have been many studies on ERP implementation, adoption focusing on success factors, implementation procedures, and implementation outcomes. Chung, Skibniewski, and Kwak (2007) investigated the success or failure factors for ERP systems in construction firms. The factors were grouped into either user related or project related. User related factors included the quality of the system output, users' perception on relevance of the system, tangibility of results, compatibility, and reliability of the ERP system. Project related factors included internal support for the ERP implementation, functionality of the ERP system, and vendor support Supramaniam and Kuppusamy (2010) identified the critical success factors and the key benefits of ERP implementations. Their study identified seven broad categories of factors for successful ERP implementation. These were business plan and vision, change management, communication, ERP team composition, project completion, project champions, system analysis, selection and technical, and implementation.

Moohebat, Aserni, and Jazi (2010) carried out a comparative study of critical success factors in implementation of ERP systems in developed and developing countries. Their study revealed that the success factors behave in an almost similar pattern in both

developed and developing countries almost behave in similar pattern. They also noted that ERP technology has evolved in the cultures of developed countries as opposed to cultures of developing countries. These phenomena informed that organizations from developing countries need more support from vendors when adopting ERP systems.

Wang, Klein and Jiang (2006) found that perceived initial misfits have negative impacts on the quality of an ERP system after implementation. Wahid and Setyono (2010) also found out that due to various misfits, ERP systems are failing to yield matching benefits causing some organizations to enjoy significant gains, while others have had to scale back their projects and accept minimal benefits, or even abandon investments on ERP systems. While noting that ERP systems trace their origins in the manufacturing sector, several studies have observed that their designs have disobeyed the higher education sector leading to issues of misfit (Shehab, Sharp, Supramaniam, & Spedding, 2004). ERP misfits are the gaps between the functionality offered by an ERP package and that required by the adopting organization. Soh, Kien, and Tay-Yap (2000) found out that the issue of misfits issue may be worse in Asia because the business models underlying most ERP systems reflect western industry practices. Similar observations were made by Yen, Idrus, and Yusof (2011) in their framework for classifying ERP misfits.

### 2.2.1 DeLone and McLean Information Systems Success Model

DeLone and McLean (1992) developed a model identifying two indicators of information system (IS) success. These are system quality and information quality which focuses on use and user satisfaction. This in turn results to individual impact, and eventually organizational impact. The authors suggested that even though IS success can assume multiple dimensions, the number of dimensions should be reduced significantly such that research results can be compared and finding validated.

DeLone and McLean (2003) observes that the original IS model, which has been cited or used in over 300 articles published in referred journals, provides a framework that can be extended to integrate IS success research findings. However, some IS researchers have criticized the approach for giving a subjective assessment of IS success. Among the first critics of the original model were Seddon and Kiew (1996), who observed that the model combined both causal and process relationship explanation. They also observed that "use" is ambiguous and is not an appropriate dimension for explaining causal

relationships. Whether the system is good or not and whether the user likes it or not, there is no choice. They go on to observe that conclusions about individual impact and organizational impact are also difficult to determine

After ten years the authors of the original model proposed an updated IS success model based on evaluation and contributions from many researchers, (DeLone & McLean, 2003). Chien and Tsaur (2007) acknowledge the inclusion of service quality in the updated DeLone and McLean IS model. This is advised by the fact that modern IS systems (commonly ERP systems) are complicated and highly integrated. Thus, the quality of service provided by ICT departments, vendors and consultants have become more critical to success of ERP systems than was for isolated IS of before.

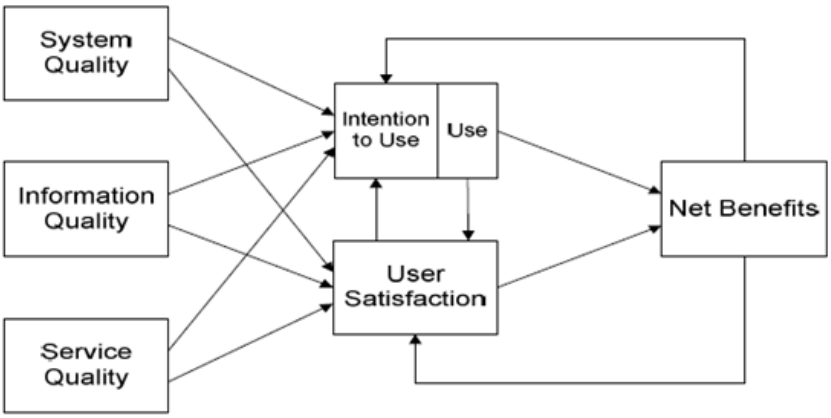


Figure 2.1 The updated DeLone and McLean IS success model

The update model in figure 2.1 above, demonstrates the relationships and associations that were proposed between the various success dimensions. The DeLone and McLean (2003) encouraged further development of the model in order to ensure its continued evolution. In an effort to aid the understanding of the IS success model the authors combined IS process model with a causal model. The process model is composed of three components. The first component is the creation of the system which includes system, information, and service quality. The second component is its use which includes user satisfaction and intention to use the system. The third component is the consequences of using the system, also referred to as “net benefits”. Each component of the model is necessary, but not sufficient for the resultant outcome. For example, there can never be any benefits from an ERP system if it not used. However, there may also be no benefits with system use, even if it is extensive but not meaningful.

### 2.2.2 Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Davis (1989), has also been adopted and its validity proved by many studies. The model theorizes that system use, and thus system acceptance is determined by two beliefs: Perceived ease of use and perceived usefulness. Davis (1989), defines perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort", and perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance". Figure 2.2 shows refined TAM comprising of some external variables that influence the perception of users regarding the ease of using a system and its usefulness. Subsequent researchers have attempted to identify the independent variables under the term "external factors".

Ke, Sun, and Yang (2012) narrowed down on the user characteristics and system characteristics as the external factors to the TAM model. They found out the effect of user characteristics being more significant than system characteristics on perceived usefulness. Conversely they also found out the effect of system characteristics being more significant than user characteristics on perceived ease of use. The research indicates that it is possible for an organization to vary systems characteristics during its design / implementation, which in turn can have an impact on its success. The same however, could not be argued for the user characteristics. Wixon and Todd (2005) integrated system characteristics to TAM, identifying information quality and system quality as the external factors. Their model validates the DeLone and McLean IS success model which identified system characteristics as the independent variables.

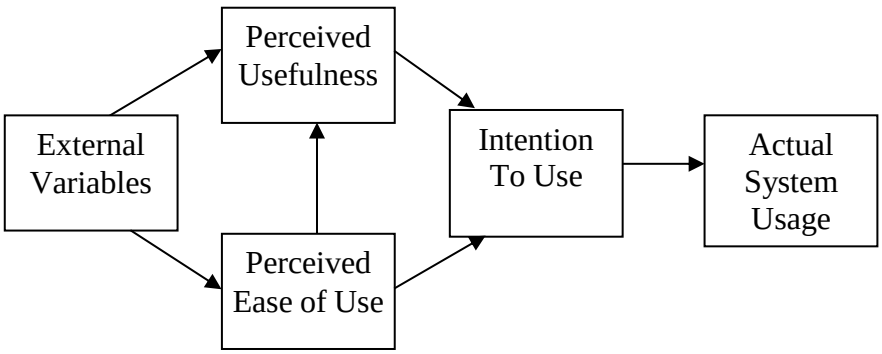


Figure 2.2 Refined Technology Acceptance Model

Sun, Bhattacherjee, and Maa (2009) showed the usefulness of integrating contemporary IS usage models, to investigate impact of use of ERP systems on organizational benefits (via individual performance). Their study also agrees with critics of the IS usage models that system use is not an end in itself. The authors conclude that in order to determine if IT investments are successful, usage should be studied alongside outcomes.

### 2.2.3 Task-Technology Fit (TTF) Model

The Task-Technology Fit (TTF) model is based on IS implementation theory. Goodhue and Thompson (1995) describe TTF as "the correspondence between task requirements, individual abilities, and the functionality of the technology". Their study validates the TTF model and demonstrates how it can be used to predict IS implementation success. Adapting this idea to the study of ERP systems, TTF can be used to describe the degree of match between the facilities provided by the ERP package, the tasks undertaken by its users, and the skills and attitudes of individual users. Figure 2.3 is an extract of the TTF model comprising of three key characteristics of a system that make it appropriate for a given task, thereby resulting to performance impacts or benefits. In this model, a combination of the task and technology characteristics provides the elements of system and information quality, while a combination of technology and individual characteristics provide the elements of the use dimension.

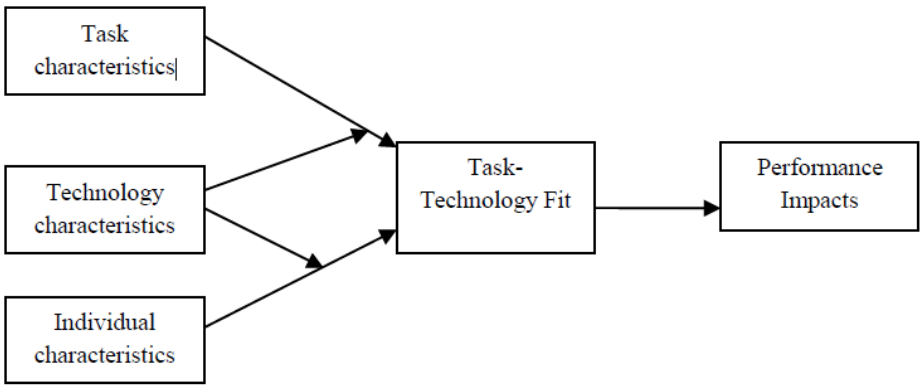


Figure 2.3 The Task-Technology Fit Model

*Source:* Goodhue, (1995)

## 2.3 Conceptual Framework

The success of an ERP system can be hypothesized from three major dimensions derived from a variety of empirical studies (Petter, DeLone, & McLean, 2008), (Chien

& Tsaur, 2007), (Kronbichler, Ostermann, & Staudinger, 2010). These studies suggest that in order to achieve ERP success, organizations need to leverage on these dimensions. These dimensions are Quality, Use and Net benefits of the ERP system.

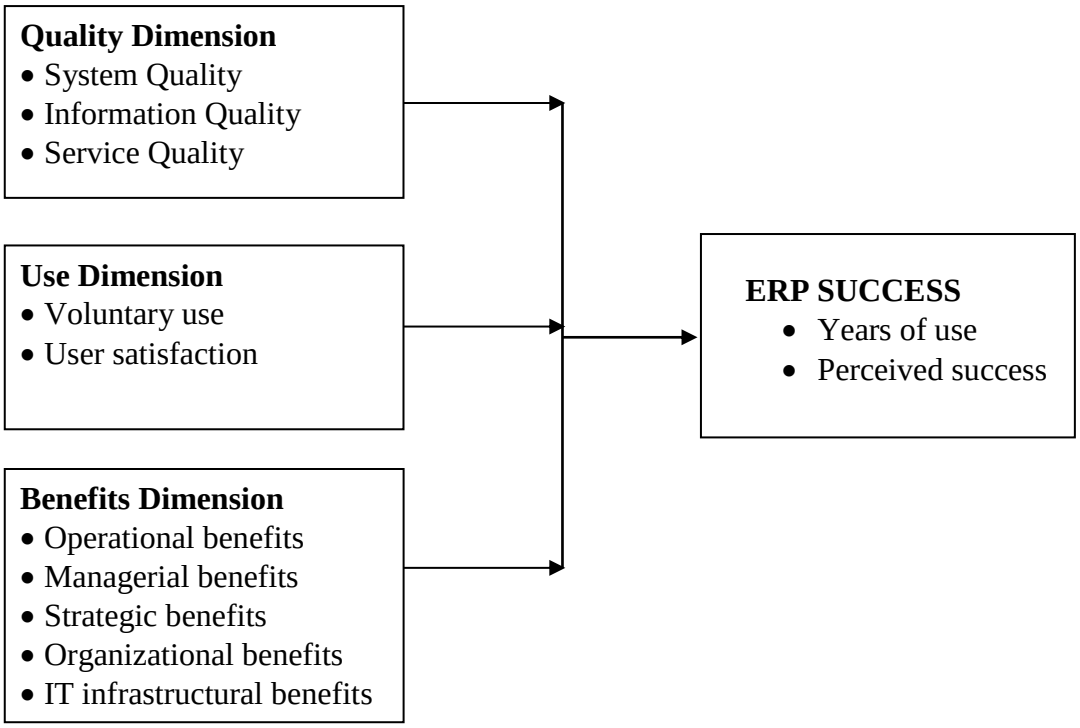


Figure 2.4 Conceptual framework

### 2.3.1 Quality Dimension

The quality of an ERP can be measured using three criteria. These are systems quality, information quality, and service quality. DeLone and McLean (2003) advise that each of these dimensions should be measured separately because singularly or jointly, they will affect subsequent "use" and "user satisfaction.

**System Quality**

System quality refers to the desirable characteristics of an information system. These are ease of use, system flexibility, system reliability, and ease of learning, system intuitiveness, sophistication, and response times (Petter, DeLone, & McLean, 2008). Organizations expect that by adopting ERP systems business processes shall be optimized, and that users and departments shall be able to share accurate and reliable information in a timely manner. Organizations also expect to eliminate effort

duplication or redundancy. To achieve this, the ERP system must meet most of the expectations of different departments in an organization, and also offer additional services for further integration with existing peripheral systems, packages, and business intelligence functions. Chien and Tsaur (2007) define systems quality as a functional feature of the ERP system which makes it difficult to apply "ease of use" as a factor. Thus, their study focused on response time and accuracy to measure system quality. This study measured system quality in terms of flexibility, response time, integration, ease of use, and reliability.

**Information Quality**

Information quality captures the degree to which the information generated by an ERP system possesses three attributes: content, accuracy, and format. Petter, DeLone, and McLean (2008) defines information quality as the desirable characteristics of system outputs or reports. These characteristics include relevance, accuracy, conciseness, completeness, understandability, timeliness, and usability.

Ifinedo and Nahar (2006) studied the success of ERP systems using the attributes of quality and benefits. Contrary to guidance by DeLone and McLean (2003) their study avoided the use dimension, and adopted an argument proposed by Gable, Sedera, and Chan (2003) that measures of success ought to be mutually exclusive. In so doing, each measure not only addresses a specific aspect of success but also avoids overlapping with other measures. Their study found out information quality as the most important dimension of ERP success. This study measured information quality in terms of content accuracy, relevance, availability, and format.

**Service Quality**

Service quality, in the context of this research, refers to the quality of support that system users receive from the support personnel. Service quality is measured in terms of responsiveness, reliability, technical competence, and empathy of the support staff (Petter, DeLone, & McLean, 2008). Technical competence and reliability always go hand in hand, as users prefer getting assistance from a competent technical staff. Empathy of the support staff is the ability to understand the needs, urgency, and importance of users' request for technical assistance.

Chien and Tsaur (2007) define service quality as extent to which the support staff positive attitudes towards and good relationships with its users. Thus, their study focused on responsiveness, reliability, and assurance to measure service quality. This study measured service quality in using three metrics. These are responsiveness, reliability, and empathy of the support staff.

### 2.3.2 Use Dimension

System usage continues to be used as a dependent variable in a number of empirical studies and continues to be developed and tested by IS researchers. DeLone and McLean, (2003) argue that system use is an important measurement where the use is voluntary and essential to desired outcomes. IS researchers often consider use, especially informed and effective use, as an important dimension of IS success. Kronbichler, Ostermann, and Staudinger (2010) found out that most ERP success measurement models consider the user's point of view. They argue that since the users interact with the system when doing their daily business, they are influenced by its performance directly.

Tsai, Lin, Chen, and Hung (2007) assessed the "Use" dimension based on its two related attributes. These are "use of the ERP system" and "satisfaction". The use of an ERP system does not guarantee user satisfaction. However, satisfaction can only be derived if and only if the ERP system is used. It is common to encounter an ERP system that is being used by users who are not satisfied. This occurs where the use of the ERP system is not voluntary. Therefore, in order for the "use" dimension to be significant in the evaluation of ERP success, actual use and user satisfaction must be assessed simultaneously.

Ali and Younes (2013) found out that perceived usefulness of an ERP system and its ease of use affect the overall use of the system. Their research recommended that practitioners and researchers should improve training in order to help user understand the benefits of using ERP system, and to improve the adaptability of the systems to user needs. Tsai, Lin, Chen, and Hung (2007) assessed "use" in terms of duration of use, number of reports generated, number of enquiries made by system users. They assessed "user satisfaction" in terms of information, software interface, and overall system satisfaction.

### 2.3.3 Benefits Dimension

Organizations adopt and invest on ERP systems for various benefits and strategic reasons. The benefits are perceived in terms of being more efficient and eventually profitable to the organization. In many cases the calculation of return on investment (ROI) is weighted against the many intangible and strategic benefits. Rashid, Hossain, and Patrick (2002) observe that even though many of these benefits are commonly intangible, they form a part of weighting in the calculation of return on investment (ROI).

Rashid, Hossain, and Patrick (2002) argue that for an organization to achieve the benefits of ERP systems it must be wary of certain disadvantages, and employ mechanism to mitigate them. They argued that one way through which organizations can use net benefits in describing the success of ERP systems is by being aware of the various pitfalls of ERP systems and employing mechanisms to mitigate them during implementation. First, ERP systems are expensive to implement in terms of time, human, and financial resources. Secondly ERP systems pose a challenge to organizations while they attempt to re-engineer their business process to conform to the ERP modules. Last but not least, ERP systems are also highly vendor- dependent. Shang and Seddon (2002) proposed a framework for classifying ERP benefits by identifying five categories of benefits from past IS research. These categories are operational, managerial, strategic, organizational, and IT infrastructural benefits.

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

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

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

programmes, adapt to rapid competition, comply with existing regulation, and establish new markets.

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

IT infrastructural benefits are reduction of IT related costs, increased IT infrastructure capability, and flexibility (Shang & Seddon, 2002). The cost of maintaining legacy systems, multiple data centers, multiple applications, and consequently, the cost of a bloated IT workforce, can be reduced by implementing an integrated ERP system. Well implemented ERP systems, delivers reliable platforms, transforms information management, and increases the capability of IT resources. Finally, ERP systems adapt well with modern technology, integrate with a wide range of applications, and are highly customizable and configurable. This study adopted the approach used by Zhu, Li, Wang, and Chen (2010) to assess success of and ERP systems with respect to benefits that are realized following the implementation phase.

### 2.3.4 ERP Success

The definition and measurement of success are thorny matters. First, success depends on the point of view from which one measures it. Even within a single organization different people will have different ideas. Nelson (2005) noted that that the different groups are always interested in different things. From a project manager's or a consultant's perspective, ERP success is often defined in terms of completing the project plan on time and within budget. On the other hand, the user and adopter tend to focus on transition from old systems into the new and stable operation. This will involve the realization of system quality, and information quality of the new system.

The three dimensions of time, budget and specifications has featured in many traditional definitions of project management success (Atkinson, 1999), (Munns & Bjeirmi, 1996) , (Shenhar, Dvir, Levy, & Maltz, 2001). However, over time, studies have shown that these are not sufficient to measure project success. Dimensions such as satisfaction of

stakeholders' expectations, value, and even use have emerged and proved to be more significant.

Baccarini (1999) emphasizes that researchers should always distinguish between the Project management success and project product success. Project management success focuses on the project management process and in particular on the successful accomplishment of the project with regards to cost, time and quality. According to Pinkerton (2003) the three dimensions indicate the degree of the "efficiency of project execution" On the other hand; project product success focuses on the effects of the project's end-product. Although project product success is distinguishable from project management success, the successful outcomes of both are inseparably linked (Pinkerton, 2003) .

Atkinson (1999) studies the deficiency of "The Iron Triangle" consisting of cost, time, and quality to develop a success criterion which he referred to as "The Square root". His model acknowledged the need to focus on product, and product benefits as other success criteria. Pinkerton (2003) states that "using traditional criteria for evaluating project success is like using the time of a single runner to determine whether or not a relay has been successful". He thus alludes that there is a need to incorporate product related dimensions in order to provide a more inclusive model of project success. Nelson (2005) extends the initial triangle of cost, time, and product to include system use, value, and learning criteria. However, his findings based on views from different stakeholder groups observed that learning is of least importance.

Chien and Tsaur (2007) applied the logical framework of updated DeLone and McLean IS success model and proposed a success model for ERP systems. The model validated the use of quality, use, and benefits dimensions in evaluating success of ERP systems. Their study also sought to affirm the importance of service quality as an important dimension by distinguishing between external and internal services. This study adopted the model developed by Chien and Tsaur (2007) to evaluate the dimensions ERP systems success in public and private universities in Kenya.

## 2.4 Critique of Existing Literature

On the empirical front, many studies have examined the success factors ERP implementation. In these studies, the success of ERP implementation depends on some key factors commonly referred to as critical success factors (Somers & Nelson, 2001), (Jafari, Osman, Yusuff, & Tang, 2006), (Chung, Skibniewski, & Kwak, 2007), (Rabaa'i, 2009), (Moohebat, Asemi, & Jazi, 2010) and (Abdelghaffar & Azim, 2010). Findings from these studies ranked some of factors higher than others depending on the industry under which the study was conducted.

Other studies attempted to explain the prevalence of ERP failures from perspectives of individual case studies (Hawari & Heeks, 2010), (Supramaniam & Kappusamy, 2010). Chien and Tsaur (2007) investigated the success of ERP systems with case studies in Taiwan high-tech companies. Their study focused on measuring post-implementation ERP success, based on quality, use, and benefits dimensions. However their study, based on respondents from three high-tech companies only, managed to demonstrate the relationship between the quality and use dimensions, ignoring to explain the hypothesized relationship between use and benefits dimensions.

Al-adaileh (2009) used an integration of system characteristics and TAM to evaluate IS success. Even though the research focused on a user perspective, it fails to distinguish between management control variables and desired results in terms of quality, use, and impacts. As argued by DeLone and McLean (2003) “management support” and “user involvement” are variables that cause success but are not part of success.

Literature reviews on studies related to ERP or IS success have shown that there is extensive research on ERP systems in different sectors. However, as noted by Abugabah and Sanzogni (2010), existing ERP research has neglected the higher education sector worldwide, even though most universities have implemented or are in the process of implementing ERP systems.

## 2.5 Research Gaps

The implementation of an ERP software package can provide significant business benefits (CGN Global, 2006). The ERP project can be considered as the foundational backbone whose success enables such changes and is only the first step in the required

business transformation process. However, according to CGN Global (2006), too much focus is given to software implementation and too little focus is given to business transformation. In fact, it is only the change in business models, the changes to a process-focused business organization, and the changes in relationships and processes with customers and suppliers that have proven to provide significant business value.

Baccarini (1999) argues that in evaluating IS systems (product) success, an organization ought to shift focus from product implementation success towards product success. Measurement should also entail a holistic approach that assesses how well the ERP project has established the foundation for business transformation and has provided the organization with opportunities to achieve substantial business benefits. It is this understanding that drives the need to find new ways for assessing the success of ERP systems.

Currently, there are gaps in both research and documentation in regards to the success of ERP systems in public and private universities in Kenya. Universities desiring to implement an ERP system would find it difficult to identify benchmarking information due to lack of published research on ERP systems performance in the sector. Similarly, universities may abandon ERP systems in absence of an informed assessment of their progress and successes.

## 2.6 Summary

This study reviewed the literature on ERP systems success, the traditional approaches, measurement and views on IS success. The study evaluated the three models of IS success that have been widely studied and also applied in the evaluation of ERP systems success. These models provide a concrete background and understanding of the various dimensions / variables as used in the research objectives. Furthermore, the models have helped to bring out the concept of ERP success from an evaluation of process to the evaluation of the product or the outcome. The framework of quality, use, and benefits dimensions has been tested and validated in many studies on ERP success (DeLone & McLean, 2003). This study adopted the dimensions from the model to determine their effect on ERP success in public and private universities in Kenya.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter describes in detail the research design, the target population, data collection tool and procedures for ensuring validity and reliability, data analysis and presentation as well as ethics in data collection. The chapter will justify the choice of methodology that was used to achieve the objectives of this study.

## 3.2 Research Design

Kothari (2008) emphasizes the need for a research design by noting that it facilitates the smooth sailing of various research operations that makes the research efficient. A research design is the logic that links the data to be collected and the conclusions to be made to the questions of study.

The study adopted a cross sectional survey methodology. This entails collecting data to make inferences about a population at one point in time, by interviewing or administering questionnaire to the sample of respondents (Lavrakas, 2008). The purpose of this study was mainly descriptive, with the objective of finding out the effect of the three dimensions of ERP success in public and private universities. According to Mugenda and Mugenda (2003), a descriptive research is a good method for researchers interested in collecting original data for the purpose of describing a population. Creswell (2009) defines quantitative research as a "means for testing objective theories by examining the relationship among variables, which, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures". He adds that quantitative methods allows accurate measurement of variables, and provides wide coverage of the range of situations. Moreover, statistical analysis and generalizations are possible.

The study was to describe the present status in the proposed area of study. Facts derived from such information provide a good basis of making valid conclusions (Koul, 2009). Quantitative tools were used to describe the significance of each dimension and test the hypothesized relationships in the study. Descriptive research design was thus suitable

for this study since it seeks to investigate the significance of the various dimensions of ERP success in institutions of higher learning in Kenya. Descriptive research deals with quantitative data, which the instrument in this study intends to gather.

### 3.3 Population

The study targeted chartered public and private universities in Kenya. In this study, respondents from established public and private universities were used as a representative of all the other players in the higher education sector. The selection of these institutions was based on the fact that having been accredited by the CUE, they were most likely to have or are in the process of implementing an ERP system. The target population of this study therefore comprised of ERP users in key functional areas of ERP system in public and privates universities in Kenya.

### 3.4 Sampling Frame

The sampling frame "denotes the set of all cases from which the sample is selected" (Singleton & Straits, 2009). The operational definition of the population that provides the basis for this study comprises of 22 public universities and 17 private universities in Kenya (CUE, 2014) . From these institutions, a sample was selected such that aspects of representation and reliability are fulfilled while at the same time ensuring efficiency and flexibility of the study. According to Mugenda and Mugenda (2003) such a sample size is enough for a descriptive study.

### 3.5 Sample and Sampling Technique

Sampling process is the way a researcher selects individuals to be used in a study. The individuals should be representative of the target population from which they have been selected. Through the sampling procedure, the researcher gets the sample that is to be used to gather the information concerning the target population under consideration (Mugenda & Mugenda, 2003). According to Patten (2004) the quality of the sample affects the quality of the research generalizations. The larger the sample size, the greater the probability the sample will reflect the general population.

The main objective of sampling is to produce sample that can be logically assumed to be representative of the population (Lavrakas, 2008). This is achieved by applying expert

knowledge of the population to select a sample of elements that represents a cross-section of the population in a non-random manner. For this study, two public universities and two private universities were selected for the study as presented in Table 3.1. The selection of the two public universities was informed by an E-readiness survey report Kashorda and Waema (2014), among four very large public universities with desirable index of ICT establishment. Similarly, the study identified two private universities that had the highest index in the category of large universities. Only two out of four institutions in each category were selected due to time and cost constraints.

However, sample size alone does not constitute the ability to generalize. The researcher observed that even though universities had a large number of staff to sample from, many had little knowledge of the ERP systems in their respective institutions. Only those who were practically involved or constantly interacted with the system could provide useful information. To achieve this, the researcher identified the key ERP functional areas / departments /sections, such that only those with most practical experience contributed to the study. The main idea was to have people who are competent and can contribute new ideas, to ensure a representation of different types of experience (Kothari 2008). Kothari (2008) argues that this kind of sample is useful in providing insight into the relationships between the variables and also in providing new ideas in relation with the research problem.

The sample size was calculated using the following statistical formulas (Fisher's *et al.*, 1998)

$$X = \frac{z^2 pq}{d^2} = 385$$

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

Where **z** is critical value associated with level of significance usually 1.96 corresponding to 95%, **p** is the proportion of target estimated to have particular characteristics, **q** is (1-p), and **d** is the margin of error which is 5%. For example out of the 75 users in the key ERP functional areas in the University of Nairobi, a sample of 63 was obtained as follows using the second formula; where **n** is the sample size, and **N** is the established finite population of users in key ERP functional areas.

**Table 3.1 Sample Matrix**

| Institution | Category | No. of Staff | No. of users in Key ERP areas (N) | Sample Size (n) |
|---|---|---|---|---|
| Jomo Kenyatta University of Agriculture and Technology | Public | 2,234 | 54 | 48 |
| University of Nairobi | Public | 5,529 | 75 | 63 |
| Kenya Methodist University | Private | 610 | 37 | 34 |
| Mount Kenya University | Private | 1,378 | 45 | 41 |
| Total | | | | 186 |

### 3.6 Data Collection Instruments

The research used both primary and secondary data. Primary data was collected using a structured questionnaire. According to Saunders, Lewis and Thornhill (2009) the use of structured questionnaire ensures consistency of questions and answers from the respondents. The questionnaire was the preferred instrument of this study because of its ability to collect data from a large group within a short period (Mugenda & Mugenda, 2003). Secondary data was obtained by reviewing published journal articles, books, and reports by various organizations for some other purposes. The research also referred to secondary data from the universities records. These sources were instrumental in the formulation of the sampling frame and in calculation of sample size.

The basic assumption of survey research is that by carefully following certain scientific procedures one can be able to make conclusions or generalization of a population by studying a smaller group of the population (Fowler F. J., 2013). The researcher was able to reach the respondents easily, quickly, and at a relatively low cost, given the availability of modern data collection technologies.

## 3.7 Data Collection Procedures

The researcher obtained an introduction letter from the university which will be used to introduce the researcher to the selected institutions. The researcher sought authorization to each of the four institutions allowing respondents. The questionnaire was digitized using the Qualtrics platform and thereafter, respondents were contacted by email and phone, and provided with a link to the questionnaire. This approached ensured achievement of good response rates and within a short time, since respondents could access the questionnaire using their mobile phones.

## 3.8 Pilot Testing

Mugenda and Mugenda (2003) define reliability of a research instrument as a measure of the degree to which the instrument yields consistent result on data after repeated trial. A reliable instrument is the one that produces consistent results when used more than once to collect data from the sample randomly drawn from the same population. According to Mugenda and Mugenda (2003), researchers attempt to maximize the reliability and validity of the data by using properly constructed tools, appropriate data collection procedures, and sampling techniques. The tools, procedures, and techniques must not only target the right population but also yield accurate data. In order to ensure validity of the research instrument, the researcher established its face validity by adopting questions from studies carried out in the past by experts on the same subject. Secondly, an internal pilot survey was conducted whereby some parameters were estimated on the basis of interim data and also helped to adjust the sample size accordingly.

In this research, pre-testing of the questionnaire loaded onto an online platform (Qualtrics) and administered to a few respondents before administering the questionnaires on a large scale. A convenient sample of 10 respondents was selected requested to fill the questionnaire. The purpose of having a convenient sample was to allow the researcher to interact with respondents and identify any question that was not clear and probably needed to be corrected. Thus, the respondents were requested to fill the questionnaire while thinking out aloud. The average time taken by each respondent to complete the questionnaire was 14.7 minutes with a variance of 20.3 due to their different work exigencies. However, respondents were able to complete the

questionnaire while seeking very few clarifications. These results informed the researcher that the instrument was valid but would require contact persons in each of selected institutions. This would to ensure completeness of responses since most respondents could not have voluntarily taken the 15 minutes outside their working routines to fill the online questionnaire.

### 3.9 Data processing, Analysis and Presentation

Data analysis entails organizing, arranging and manipulating of data collected. After collection the data was validated, edited, coded, classified and then analyzed. The tabulation and analysis of data was done using Microsoft Excel and predictive analysis software (PASW) version 23. These tools were used in order to ensure accuracy of data results and also to save time.

After tabulation, the data was analyzed using descriptive and inferential statistics, since they allow generalization of data. Correlations statistics were used to establish the association and relationship between independent variables and the dependent variable. Multiple regression analysis was used to test whether the independent variables individually influence the dependent variable significantly. Multiple regression analysis was used because the dependent variable, ERP success, was continuous. The results were presented using tables, cross tabs, and statistical measures such as mean, median, and standard deviation, variation and percentages. The analysis was continuous to ensure that all aspects of the research objectives were covered in the final report.

# CHAPTER FOUR

# RESEARCH FINDINGS AND DISCUSSION

## 4.1 Introduction

This Chapter deals with the presentation and analysis of data and the discussion of the findings based on the hypotheses and the characteristics of the study sample. Wherever applicable, tables and figures are provided to illustrate and support the findings. Data on the three independent variables and dependent variable represents the perceptions of the respondents regarding the concepts of this study. Some of the variables were measured on a 5 – point likert scale and other structured and unstructured questions. After testing the data for internal consistency of the scale, new variables were created from a summary of responses as grouped in the questionnaire. The valid responses for the likert scale questions were summarized into new continuous variables by calculating their median values.

The statistical package for social sciences (SPSS 23) was employed in the data analysis. The data was presented in with responses summarized in narrative form and crosstab tables, in order to capture descriptive statistics from each of the four universities. Correlation statistics and multiple regression analysis were used to test casual relationships among all variables in the regression model.

## 4.2 Reliability statistics

Reliability was measured using Cronbach's Alpha generated from SPSS (version 20). Cronbach's alpha is a function of the number of items in a test, the average covariance between item-pairs, and the variance of the total score. It is implicitly assumed that the average correlation of a set of items is an accurate estimate of the average correlation of all items that pertain to a certain construct. This kind of measure was preferred in order determine if the scale used in multiple Likert questions is reliable.

A questionnaire was employed to measure the constructs of the various dimensions of ERP system success. Each construct was made up of three to five questions. The scales indicated a high level of internal consistency, as determined by an overall Cronbach's alpha of 0.916 for the quality dimension, 0.873 for the use dimension, and 0.945 for the

benefits dimension. These results indicated that the questionnaire was reliable as a data collection instrument.

**Table 4.1 Reliability Test**

| Variables | Cronbach's alpha |
|---|---|
| Quality | 0.916 |
| Use | 0.873 |
| Benefits | 0.945 |

In order to polish the three independent variables of the study, a principal component analysis was further conducted based on the responses collected from all respondents. This was done to identify items / questions that did not fit within a particular variable / dimension. The analysis resulted to 6 out of the original 44 items been dropped from further analysis as shown in Table 4.2

**Table 4.2 Dropped Questions**

| Item / Question | Variable |
|---|---|
| 1. SQ1-The ERP system is flexible and allows customization | Quality |
| 2. VQ3-The ERP consultant has good relationship with my organization | Quality |
| 3. U1-The users do not need supervision to use the ERP system | Use |
| 4. U4-The users are involved in the customization of ERP system reports. | Use |
| 5. OB1-The ERP system has enabled our institution to cut on administrative costs. | Benefits |
| 6. OB5-The ERP system has enabled our institution to improve its customer service by providing enhanced data access and enquiry mechanisms. | Benefits |

## 4.3 Response Rate

The researcher used an automated tool to distribute the questionnaire, with a target of 186 respondents from the selected institutions. Those who participated and completed the questionnaires were 114 in number (84%) while 22 participants (16%) did not

complete their questionnaires. The incomplete questionnaires were deemed invalid and were excluded from analysis. The 114 completed questionnaires represented 61% of the targeted 186 responses from the four institutions, and were found to be significant for analysis. In order to alleviate the possibility of these findings being interpreted by any audience for other purposes, names of the four institutions were masked in subsequent results. Table 4.3 is a summary of responses that were received from each of the sampled institution.

**Table 4.3 Sample Distribution Table**

| Institution | ERP System | No. of Responses |
|---|---|---|
| A | Sage ACCPAC | 24 |
| B | Sage ACCPAC | 29 |
| C | Microsoft Dynamics | 30 |
| D | SysPro | 31 |
| Total | | 114 |

## 4.4 Demographic Characteristics

This section provides the general demographic characteristics of the study sample. It provides information about, their levels of education, there age brackets, length of service, job group and gender. Statistical tools such as tables, frequencies and percentages were used to analyze these characteristics. Table 4.4 summarizes demographic characteristics of all the respondents.

**Table 4.4 Demographic Characteristics**

| Characteristics | | A | B | C | D | Total | % |
|---|---|---|---|---|---|---|---|
| Academic Qualifications | Undergraduate | 12 | 15 | 13 | 13 | 53 | 46 |
| | Postgraduate | 12 | 14 | 17 | 18 | 61 | 54 |
| Gender | Male | 13 | 15 | 10 | 16 | 54 | 47 |
| | Female | 11 | 14 | 20 | 15 | 60 | 53 |
| Age | Below 25 Years | 0 | 4 | 0 | 1 | 5 | 4 |
| | 26-35 Years | 17 | 14 | 17 | 25 | 73 | 64 |
| | 36-45 Years | 7 | 11 | 13 | 5 | 36 | 32 |
| Total | | 24 | 29 | 30 | 31 | 114 | 100 |

The gender of respondents was considered an important consideration in the research to eliminate any possible bias in regard to gender. Out of the 114 respondents who filled and returned their questionnaires 60 (53%) were women, and 54 (47%) were men. The difference in the percentage was minimal indicating a fair distribution of respondents across both genders. This shows that the views from both genders were equally considered and therefore, any possible bias that could have occurred because of gender was neutralized.

The age of the respondents was taken into consideration to ensure that the results the study were not adversely affected by skewedness of their perceptions and use of ICTs. From the results, 5(4%) respondents aged below 25 years, 73 (64%) aged 25 to35 years, 36 (32%) aged 36 to 44 years. None of the respondents was above 45 years. The results show that the respondents were all in a good age bracket to make good assessment of the ERP systems in their institutions.

The academic qualification of the respondents was important to reveal whether the respondents had the requisite qualifications to use and assess the various dimensions of ERP system success. From the findings, it was established that 53 (46%) had completed undergraduate studies, while 61 (54%) had post graduate qualifications. It can therefore be assumed that the academic qualifications of the respondents were sufficient for them to have a good understanding of ERP systems in their institutions.

**Table 4.5 Respondents Length of Service**

| Length of service in years | A | B | C | D | Total |
|---|---|---|---|---|---|
| 2 | 0 | 3 | 0 | 2 | 5 |
| 3 | 4 | 1 | 2 | 0 | 7 |
| 4 | 5 | 5 | 5 | 5 | 20 |
| 5 | 6 | 2 | 19 | 6 | 33 |
| 6 | 4 | 1 | 3 | 7 | 15 |
| 7 | 1 | 6 | 1 | 1 | 9 |
| 8 | 1 | 1 | 0 | 3 | 5 |
| 9 | 2 | 2 | 0 | 2 | 6 |
| 10 | 1 | 3 | 0 | 4 | 8 |
| 11 | 0 | 5 | 0 | 0 | 5 |
| 15 | 0 | 0 | 0 | 1 | 1 |
| Average | 5.38 | 6.83 | 4.87 | 6.45 | 5.90 |

The respondents' length of service was important to determine whether the respondents had worked with their institutions for a time long enough to assess the use, quality, benefits, and success of ERP system in their institution. The results in Table 4.5 show that majority of the respondents had worked for more than five years in their respective institutions.

**Table 4.6 Respondents Role**

| Role | A | B | C | D | Total |
|---|---|---|---|---|---|
| Academic Services | 5 | 2 | 7 | 10 | 24 |
| Accounting /Finance | 8 | 10 | 7 | 14 | 39 |
| Procurement | 6 | 6 | 7 | 3 | 22 |
| ICT | 5 | 11 | 9 | 2 | 27 |
| Other Roles | 0 | 0 | 0 | 2 | 2 |
| | **24** | **29** | **30** | **31** | **114** |

The study was intended to capture responses from across several functional areas of the ERP system. This decision was guided by the fact that ERP systems are basically designed and desired to integrate the functions of the entire organization as opposed to

isolated departments or sections (Yen, Idrus, & Yusof, 2011).That being the case, it was important to ensure that there was no response biasness with respect to ERP functional areas. The results in Table 4.6 show that respondents were fairly distributed among the four main areas identified for this study.

## 4.5 Independent Variables

Data for each of the three independent variables namely, quality, use, and benefits was collected from the respondents. The responses to questions targeting the independent variables represent perceptions of the respondents regarding the three dimensions of success of ERP systems in the selected institutions. The variables were measured using questions in a 5 point likert scale as follows.

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

Medians of each item measuring a certain variables were extracted, and their means obtained respectively in order to determine the measure of each of the independent variables. Table 4.7 shows the means and standard deviations for independent variables.

**Table 4.7 Means and standard deviation**

| | A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|---|
| Dimension | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| **Quality** | | | | | | | | |
| System Quality | 3.625 | 0.647 | 4.207 | 0.774 | 4.167 | 0.379 | 2.548 | 1.207 |
| Information Quality | 3.896 | 0.707 | 4.190 | 0.604 | 3.517 | 0.382 | 2.597 | 1.121 |
| Service Quality | 3.708 | 0.464 | 3.897 | 0.772 | 3.800 | 0.407 | 2.258 | 1.365 |
| **Use** | | | | | | | | |
| Voluntary Use | 4.146 | 0.312 | 3.569 | 0.776 | 3.417 | 0.349 | 2.000 | 1.041 |
| User Satisfaction | 3.875 | 0.448 | 3.793 | 0.726 | 3.400 | 0.498 | 1.871 | 0.991 |
| **Net Benefits** | | | | | | | | |
| Operational | 3.333 | 0.482 | 3.138 | 0.915 | 3.567 | 0.504 | 2.097 | 1.044 |
| Managerial | 4.652 | 0.272 | 3.172 | 1.136 | 3.500 | 0.509 | 2.323 | 0.832 |
| Strategic | 4.792 | 0.252 | 2.914 | 1.173 | 3.017 | 0.382 | 1.887 | 0.750 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Organizational | 4.823 | 0.204 | 3.517 | 0.796 | 3.500 | 0.415 | 2.532 | 1.372 |
| IT infrastructure | 4.250 | 0.255 | 3.448 | 0.772 | 4.450 | 0.304 | 2.726 | 1.316 |

From the above results it is evident that each of the institution had different ERP success experiences. This was noted from the different mean scores received in each of the three dimensions of success that were used in this study. Table 4.8 contains results from ANOVA test, which shows that there was no sufficient evidence to indicate that the mean scores were equal across the four institutions.

**Table 4.8 One-way ANOVA**

| Variable | Source of Variation | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Quality | Between Groups | 45.727 | 3 | 15.242 | 31.660 | .000 |
| | Within Groups | 52.957 | 110 | .481 | | |
| | Total | 98.684 | 113 | | | |
| Use | Between Groups | 88.466 | 3 | 29.489 | 58.586 | .000 |
| | Within Groups | 55.368 | 110 | .503 | | |
| | Total | 143.833 | 113 | | | |
| Net Benefits | Between Groups | 82.598 | 3 | 27.533 | 58.746 | .000 |
| | Within Groups | 51.554 | 110 | .469 | | |
| | Total | 134.151 | 113 | | | |

A one-way ANOVA was conducted to compare the mean scores of Quality, Use, and Benefits across the four institutions. The results, in table 4.8, shows that there were statistically significant differences between groups as determined by one-way ANOVA ($F$ (3,110) = 31.660, $p < 0.0005$) for the quality dimension, ($F$ (3,110) = 58.586, $p < 0.0005$) for the use dimension, and ($F$ (3,110) = 58.746, $p < 0.0005$) for the net benefits dimension. Specifically, the results suggest that institutions had achieved varying levels of ERP success different based on assessment of the three different dimensions.

### 4.5.1 Quality

The study sought to investigate how the quality of an ERP system can be used to describe its success in both public and private universities. The quality of an ERP was

measured using three dimensions. These are systems quality, information quality, and service quality. Each of these quality dimensions was further measured using a five-point likert scale comprising of between three and five questions. A total of thirteen questions were formulated whereby respondents indicated their agreement with the provided preposition. In order to find out whether all the thirteen questions were consistent with the underlying variable (quality), a reliability test was carried out. Table 4.9 shows the results of reliability test based on all thirteen items measuring the quality variable.

**Table 4.9 Reliability of items measuring the Quality of ERP system**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.917 | 0.916 | 13 |

The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.916. The items statistics table results show that if questions SQ1 (The ERP system is flexible and allows customization), and VQ3 (The ERP consultant has good relationship with my organization) were excluded from analysis, it would result to an improvement in Cronbach's alpha. The “Corrected Item-Total Correlation" value was also significantly lower for the two questions (0.49, and 0.49) as compared to the other ten questions. These results informed the decision to drop the two questions from further analysis.

**Table 4.10 Item-Total Statistics for the Quality Variable**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| **SQ1** | 40.97 | 96.734 | **0.494** | 0.386 | **0.916** |
| SQ2 | 40.77 | 93.151 | 0.667 | 0.568 | 0.910 |
| SQ3 | 40.67 | 93.074 | 0.633 | 0.517 | 0.911 |
| SQ4 | 40.37 | 88.288 | 0.775 | 0.664 | 0.905 |
| SQ5 | 41.01 | 95.177 | 0.544 | 0.405 | 0.915 |
| IQ1 | 40.79 | 94.575 | 0.624 | 0.523 | 0.911 |
| IQ2 | 40.68 | 91.956 | 0.693 | 0.568 | 0.909 |
| IQ3 | 40.47 | 92.163 | 0.728 | 0.647 | 0.907 |
| IQ4 | 40.75 | 92.452 | 0.657 | 0.531 | 0.910 |
| VQ1 | 40.82 | 90.187 | 0.729 | 0.689 | 0.907 |
| VQ2 | 40.88 | 91.649 | 0.704 | 0.662 | 0.908 |
| **VQ3** | 40.76 | 97.280 | **0.497** | **0.456** | **0.916** |
| VQ4 | 40.75 | 92.244 | 0.646 | 0.582 | 0.910 |

#### 4.5.1.1 System Quality

System quality refers to the desirable characteristics of an information system. These are ease of use, system flexibility, system reliability, and ease of learning, system intuitiveness, sophistication, and response times (Petter, DeLone, & McLean, 2008). Chien and Tsaur (2007) define systems quality as a functional feature of the ERP system which makes it difficult to apply "ease of use" as a factor. This study measured system quality in terms of flexibility, response time, integration, ease of use, and reliability.

Five questions sought to establish how the quality of an ERP system contributes to its success. Correlations statistics on the five items showed that two of the five questions were not suitable with respect to the population being studied. The items SQ1 and SQ5 measured the flexibility of the ERP system and extent to which it allowed for customization. All the ERP systems studied in this survey were all proprietary software with local vendors. These packages commonly provides for minimal flexibility and customization, especially where vendor support is inadequate. This inadequacy impacts

negatively on individual scores under system quality. However, this undesired result was attributed to another variable – service quality.

#### 4.5.1.2 Information Quality

Information quality captures the degree to which the information generated by an ERP system possesses three attributes: content, accuracy, and format. Petter, DeLone, and McLean (2008) defines information quality as the desirable characteristics of system outputs or reports. These characteristics include relevance, accuracy, conciseness, completeness, understandability, timeliness, and usability. This study measured information quality in terms of content accuracy, relevance, availability, and format.

#### 4.5.1.3 Service Quality

Service quality refers to the quality of support that system users receive from the support personnel. Chien and Tsaur (2007) define service quality as extent to which the support staff positive attitudes towards and good relationships with its users. Service quality was measured in terms of responsiveness, reliability, and empathy of the support staff (Petter, DeLone, & McLean, 2008). The competence of staff and reliability always go hand in hand, since users prefer getting assistance from a competent technical staff. Empathy of the support staff is the ability to understand the needs, urgency, and importance of users' request for technical assistance.

### 4.5.2 Use

The study sought to investigate how the use of an ERP system can be used to describe its success in both public and private universities. Tsai, Lin, Chen, and Hung (2007) assessed the "Use" dimension based on its two related attributes. These are "use of the ERP system" and "satisfaction". The use of an ERP system does not guarantee user satisfaction. However, satisfaction can only be derived if and only if the ERP system is used. This argument guided this study in the measurement of overall use of an ERP system.

The use of ERP systems was measured using a five-point likert scale comprising of nine questions. The questions were formulated such that respondents indicated their agreement with the provided preposition. In order to find out whether all questions were

consistent with the underlying variable (use of ERP system), a reliability test was carried out. Table 4.11 shows the results of reliability test based on all nine items measuring the use variable.

**Table 4.11 Reliability of items measuring the Use of ERP system**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.872 | 0.873 | 9 |

The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.873.The items statistics table results show that if questions U1 and U2 were removed from the analysis, it would result to an improvement in Cronbach's alpha. The "Corrected Item-Total Correlation" value was also significantly lower for the two questions (0.345 and 0.335) as compared to the other seven questions. These results informed the decision to drop the two questions from further analysis.

**Table 4.12 Item-Total Statistics for the Use Variable**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| **U1** | 24.59 | 50.829 | **0.345** | 0.248 | **0.879** |
| U2 | 24.25 | 44.475 | 0.763 | 0.650 | 0.844 |
| U3. | 24.23 | 45.434 | 0.555 | 0.589 | 0.864 |
| **U4** | 25.24 | 50.306 | **0.335** | 0.322 | **0.882** |
| US1 | 24.56 | 45.664 | 0.651 | 0.600 | 0.854 |
| US2 | 24.37 | 44.235 | 0.759 | 0.652 | 0.844 |
| US3 | 24.09 | 42.647 | 0.806 | 0.723 | 0.839 |
| US4 | 24.20 | 45.685 | 0.559 | 0.493 | 0.863 |
| US5 | 24.19 | 45.325 | 0.760 | 0.632 | 0.846 |

### 4.5.3 Net Benefits

The study sought to investigate how various benefits can be used to describe the success of ERP systems in both public and private universities. The various benefits that can be realized from the use of an ERP system were reviewed and classified into five categories as proposed by Shang and Seddon (2002). These categories were operational, managerial, strategic, organizational, and IT infrastructural benefits. Each of these benefits was further measured using a five-point likert scale of between three and five questions. A total of 20 questions in all the five categories were formulated whereby respondents indicated their agreement with the provided preposition. In order to find out whether all the twenty questions were consistent with the underlying variable (benefits), a reliability test was carried out. Table 4.13 shows the results of reliability test based on all twenty items measuring the net benefits variable.

**Table 4.13 Reliability of items measuring the net benefits of ERP system**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.945 | 0.945 | 20 |

The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.945. The items statistics table results show that if questions OB1 (The ERP system has enabled our institution to cut on administrative costs) and OB5 (The ERP system has enabled our institution to improve its customer service by providing enhanced data access and enquiry mechanisms) were removed from the analysis, it would result to an improvement in Cronbach's alpha. The “Corrected Item-Total Correlation" value was also significantly lower for the four questions (below 0.50) as compared to the other 18 questions. These results informed the decision to drop the two questions from further analysis.

**Table 4.14 Item-Total Statistics for the Benefits Variable**

| Question | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| **OB1** | 62.27 | 261.120 | **0.485** | 0.557 | **0.945** |
| OB2 | 62.13 | 258.735 | 0.662 | 0.677 | 0.942 |
| OB3 | 62.18 | 258.452 | 0.689 | 0.625 | 0.942 |
| OB4 | 62.11 | 260.279 | 0.589 | 0.690 | 0.943 |
| **OB5** | 62.25 | 267.023 | **0.349** | 0.480 | **0.947** |
| MB1 | 61.61 | 249.336 | 0.756 | 0.762 | 0.941 |
| MB2 | 62.02 | 253.150 | 0.664 | 0.666 | 0.942 |
| MB3 | 61.82 | 249.491 | 0.725 | 0.671 | 0.941 |
| SB1 | 62.84 | 257.320 | 0.626 | 0.730 | 0.943 |
| SB2 | 61.89 | 246.544 | 0.720 | 0.645 | 0.941 |
| SB3 | 62.03 | 250.521 | 0.693 | 0.676 | 0.942 |
| SB4 | 62.13 | 250.027 | 0.631 | 0.685 | 0.943 |
| SB5 | 62.43 | 257.415 | 0.561 | 0.598 | 0.945 |
| GB1 | 61.59 | 248.315 | 0.780 | 0.710 | 0.940 |
| GB2 | 61.61 | 246.717 | 0.788 | 0.787 | 0.940 |
| GB3 | 61.85 | 252.057 | 0.760 | 0.755 | 0.941 |
| GB4 | 61.70 | 246.636 | 0.806 | 0.777 | 0.940 |
| IB1 | 61.61 | 259.885 | 0.554 | 0.537 | 0.945 |
| IB2 | 61.50 | 250.960 | 0.736 | 0.691 | 0.941 |
| IB3 | 61.57 | 255.787 | 0.643 | 0.649 | 0.943 |

The benefits of any venture or investment are realized after such investment has been put in place. Past studies (Shang & Seddon, 2002; Panorama Consulting Group, 2011) have shown that most ERP benefits will not appear immediately after implementation. ERP benefits start being realized one year after implementation or beyond.

Cost reduction is a major objective for any growing organization. There are several strategies that an organization can cut costs. Among them is quality improvement, and supply chain management, both of which are envisaged to be delivered by the adoption

of ERP systems. However, due low or incomplete utilization of ERP systems and also because of growth in these institutions, responses received from these two questions were inconsistent with the rest of the questions under the benefits dimension.

## 4.6 ERP System Success

The study sought to determine the effect of quality, use, and benefits, and benefits in the description of success of ERP systems in public and private universities. The study operationalized the dependent variable success by focusing on how long an ERP system had been used in each of the universities, and also on the perceptions of ERP users on its success. The study also sought to find out the various approaches used by different institutions to acquire the ERP system. The approaches used were analyzed to find out if success of an ERP varied from one institution to the other, and whether such success could be attributed to the approach used.

### 4.6.1 Duration of Use of the ERP System

Respondents were requested to indicate the number of years the ERP system had been in use. Table 4.15 shows the results as tabulated across the two categories of public and private universities.

**Table 4.15 Duration of Use of ERP system**

| | | | Public | Private | Total |
|---|---|---|---|---|---|
| For how long has the ERP system been used in your institution? (Years) | 1 | Count | 0 | 11 | 11 |
| | | % | 0.0% | 18.0% | 9.6% |
| | 2 | Count | 0 | 50 | 50 |
| | | % | 0.0% | 82.0% | 43.9% |
| | 5 | Count | 30 | 0 | 30 |
| | | % | 56.6% | 0.0% | 26.3% |
| | 6 | Count | 23 | 0 | 23 |
| | | % | 43.4% | 0.0% | 20.2% |
| Total | | Count | 53 | 61 | 114 |

There were significant differences in the number of years the ERP system had been in use between public and private universities. This difference could be attributed to other

underlying factors, rather than mere categorization of an institution being public or private. For instant it is important to note that public universities have been in existent for a longer period that the private universities (CUE, 2014). This implies that their establishments, which include ICT establishments, have matured or are in a higher stage of maturity than similar establishments in private universities.

On the other hand, the number of years an ERP has been in use in a certain institution may roughly describe if the ERP is successful or not. This is because for an institution to continue using an ERP for a prolonged period, the system must exhibit the desired characters, and should also be seen as a strategic tool that aids in achievement of various strategic benefits. To confirm this, the results of Table 4.15 above were compared with a cross tabulation of the respondents perceived success of the ERP system and category of institution. In this cross- tabulation, the duration of ERP use was excluded as an input to ERP success variable. The results in Table 4.16 show that even though there were varying levels of perceived success amongst the universities studied, there is a significant relationship between the duration an ERP system has been in use and the success of an ERP system. The two-sided asymptotic significance of the chi-square statistic is below 0.005. Since this value is less than 0.005, the study concluded that the relationship observed in the cross tabulation is real and not due to chance. This confirms that the duration of use can be an indicator of success of an ERP system in public and private universities.

**Table 4.16 Chi-square test for Duration of Use by Perceived Success**

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 51.168 | 8 | 0.000 |
| Likelihood Ratio | 64.881 | 8 | 0.000 |
| Linear-by-Linear Association | 0.513 | 1 | 0.474 |
| N of Valid Cases | 114 | | |

### 4.6.2 Choice ERP system

The success of an ERP system, like any other information, can be argued to be influenced by how the system was acquired. In their studies, Hawari & Heeks (2010) and Soh, Kien, & Tay-Yap (2000) found that misfits that were not properly assessed during ERP acquisition were responsible to for many ERP failures in developing countries. In this study, respondents indicated some of the considerations or factors that were taken to account in selecting the ERP system in their institution. A multiple response set was derived from among the six distinct responses that emerged from the raw data. A cross tabulation of this multiple response set and type of institution was done in order to identify the predominant factors in each category. Table 4.17 contains a summary of the factors considered in order of importance.

**Table 4.17 Most important factor for acquiring an ERP system**

| Factor | | Public | Private | Total |
|---|---|---|---|---|
| ERP features and functionality best fit our requirements | Count | 50 | 50 | 100 |
| | % of Total | 44.2% | 44.2% | 88.5% |
| Bench marked with peer institutions | Count | 29 | 30 | 59 |
| | % of Total | 25.7% | 26.5% | 52.2% |
| ERP Vendor's reputation was good | Count | 27 | 30 | 57 |
| | % of Total | 23.9% | 26.5% | 50.4% |
| Advice from a consultant | Count | 0 | 18 | 18 |
| | % of Total | 0.0% | 15.9% | 15.9% |
| ERP price was competitive | Count | 1 | 2 | 3 |
| | % of Total | 0.9% | 1.8% | 2.7% |
| Previous experience with the ERP vendor | Count | 0 | 2 | 2 |
| | % of Total | 0.0% | 1.8% | 1.8% |
| Total | Count | 53 | 60 | 113 |
| | % of Total | 46.9% | 53.1% | 100.0% |

The cross tabulation table suggests that both public and private universities were guided by similar approaches in their choice of ERP systems. In the top three major factors,

there were no significant differences in percentages across the two categories. These results affirm that even though the success of ERP systems in these institutions varied, the variance could not be attributed to the approaches used to acquire them.

### 4.6.3 Perceptions of ERP Users

Al-adaileh (2009) defines users' perception of success is the degree to which the users perceive the systems that they use as successful. The users' perception of the ERP system success is guided their use of the system which eventually translates to realization of some benefits. Respondents were requested to rate the success of the ERP system success and also to indicate if they would recommend the same ERP system to be implemented in another institution. The two questions were summarized in Table 4.18 to describe the users' perception of ERP system success.

**Table 4.18 Users' perception of ERP system success**

| | Not Successful | Neutral | Successful | Total |
|---|---|---|---|---|
| Public | 15 | 18 | 20 | 53 |
| | 28% | 34% | 38% | |
| Private | 24 | 0 | 37 | 61 |
| | 39% | 0% | 61% | |
| Total | 39 | 18 | 57 | 114 |

The results of Table 4.18 indicate that users from the various institutions had varying perceptions of ERP success. These variations could not be attributed to categorization of an institution (whether public or private). However, perceptions were found to be consistent amongst users within the same institution. This is collaborated by the fact that the dimensions of success yielded scores that were only consistent amongst ERP users from the same institution, as discussed in Table 4.7 earlier.

## 4.7 Research Questions

The study sought to establish whether quality, use, and benefits dimensions affect the ERP systems success in public and private universities in Kenya. To achieve these objectives, three research questions were formulated. Logistic regression was used to test and answer these questions was deemed to be the most appropriate for this study because of the categorical nature of the dependent variable. The researcher chose to establish the success of ERP systems by evaluating the perceptions of the users regarding its quality, how they use it and its perceived benefits. These perceptions were also juxtaposed with responses that directly sought their overall perception of the ERP system success. The following three questions were formulated.

4. Does "Quality" affect the success of ERP systems in public and private universities?
5. Does "Use" affect the success of ERP systems in public and private universities?
6. Does "Net benefits" affect the success of ERP systems in public and private universities?

To answer these research questions, correlation analysis was used to determine the significance of association between the independent variables and the dependent variable. Correlation analysis was applied first to determine the interrelationships among the questionnaire items of each research variables. The questionnaire items that exhibited a desired level of internal consistency within each dimension were selected for further correlation analysis with the dependent variable. Correlation analysis was conducted to describe how each of the three dimensions influenced success of ERP systems in the selected institutions.

### 4.7.1 Results from Correlation Analysis

Pearson's Product - moment correlation coefficient was used to determine the strength and the direction of relationships between the variables. Table 4.19 represents correlation analysis of the three variables against success of ERP systems in public and private universities in Kenya.

**Table 4.19 Correlation Coefficients**

| Variable | | Quality | Use | Benefits | Success |
|---|---|---|---|---|---|
| Quality | Correlation | 1.000 | .730 | .588 | **.624** |
| | Sig. (2-tailed) | | .000 | .000 | .000 |
| Use | Correlation | .730 | 1.000 | .589 | **.348** |
| | Sig. (2-tailed) | .000 | | .000 | .000 |
| Benefits | Correlation | .588 | .589 | 1.000 | **.413** |
| | Sig. (2-tailed) | .000 | .000 | | .000 |
| | N | 114 | 114 | 114 | 114 |

All correlation is significant at the 0.01 level

A Pearson product-moment correlation coefficient was computed to assess the relationship between the quality, use, benefits, and success of ERP systems. There was a strong positive correlation between quality and success, r = 0.624, n = 114, p = 0.005; a weak positive correlation between use and success, r = 0.348, n = 114, p = 0.005; and moderate positive correlation between benefits and success, r = 0.413, n = 114, p = 0.005. Overall, increases in quality, use, and benefits were correlated with higher rates of ERP system success.

Quality it is evident that the quality of an ERP system is highly correlated (0.730) with use, followed by success (0.624), and then benefits (0.588). This implies that the use of an ERP system is largely influenced by the quality of the system. Similarly, use is more significantly correlated with benefits (0.589) than with success (0.348). This indicates that the benefits of an ERP system are largely influenced by its use. In brief, the results of correlation analysis shows that the three dimensions of ERP success are significantly related with the dependent variable, and also are inter-related. However, one problem that emerged with our initial model was that correlations between independent variables and the dependent variable were much lower than correlation among the independent variables. In order to understand these relationships, more analysis was required that would remove the effect of control, that was introduced by randomness each of the independent variables.

### 4.7.2 Results from Regression Analysis

In order to establish the independent contribution of each of the three variables, multiple regression analysis was used to test the proposed model. Variance Inflation Factor (VIF) and Tolerance statistics were extracted to ensure that the independent variables were not highly correlated. If correlations among the predictor variables were high, it would have led to unreliable and unstable estimates of regression coefficients.

**Table 4.20 VIF and Tolerance Statistics**

| Independent Variables | Tolerance | VIF |
|---|---|---|
| Quality | .428 | 2.335 |
| Use | .428 | 2.335 |
| Benefits | .600 | 1.668 |

Table 4.20 shows that VIF for all the three variables was less than 5 ranging from 1.668 to 2.335. The allowed variation (Tolerance) for each independent variable ranged from 0.428 to 0.600, indicating that the model did not exhibit multicollinearity problem. Therefore, the data was found to meet the requirements of the multiple regression analysis that was used to test the proposed model. Table 4.21 below is a summary of the regression analysis.

**Table 4.21 Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .652[a] | .426 | .410 | .87450 |

a. Predictors: (Constant), Benefits, Quality, Use

The value R value (0.652) indicates a good level of prediction of the dependent variable. The three predictors proposed in our model including quality, use, and net benefits can account for 42.6% of the variance in success of ERP systems. To ensure the validity of the model in testing the main hypothesis of this study, the results of regression analysis in Table 0.22 were used.

**Table 4.22 Results of Regression Analysis**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 62.325 | 3 | 20.775 | 27.166 | .000 |
| | Residual | 84.122 | 110 | .765 | | |
| | Total | 146.447 | 113 | | | |

a. Dependent Variable: Success

b. Predictors: (Constant), Benefits, Quality, Use

The results shows that the independent variables statistically predict the dependent variable, and that the overall model is good fit of the data, $F(3,110)= 27.166$ , $p < 0.005$.

**Table 4.23 Correlation Coefficients**

| | **Unstandardized Coefficients** | | **Standardized Coefficients** | | | **Correlations** | | |
|---|---|---|---|---|---|---|---|---|
| Model | B | Std. Error | Beta | t | Sig. | Zero-order | Partial | Part |
| (Constant) | .463 | .336 | | 1.378 | .171 | | | |
| Quality | .908 | .135 | *.746* | 6.752 | *.000* | .624 | .541 | .488 |
| Use | -.280 | .111 | *-.278* | -2.514 | *.013* | .348 | -.233 | -.182 |
| Benefits | .144 | .098 | *.138* | 1.476 | *.143* | .413 | .139 | .107 |

a. Dependent Variable: Success

The following regression model was used for the study:

$(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon))$ , where:

Y represents the success of ERP system in public and private universities in Kenya

$X_1$ = Quality

$X_2$ = Use

$X_3$ = Net Benefits

$\varepsilon$ = Error term

$\beta_0$ = is the constant value

$\beta_1$ ... $\beta_4$ represents the coefficients of regression, which measures how each independent variable / dimension influenced the dependent variable (ERP system success among public and private universities in Kenya)

The regression results in Table 4.23 were used to yield the following model.

$Y = 0.463 + 0.908X_1 - 0.280\ X_2 + 0.144X_3$

Even though the overall significance of the model was below the 5% it was necessary to minimize the possibility of having a Family-Wise Error Rate (FWER). This is the probability of a Type I error for at least one of the hypothesis tests performed. The Bonferroni method was used to apportion the overall Type I error between different inferences. Therefore, to achieve an overall Type I error rate of 0.05, the overall significance level of 0.05 was apportioned to the pre-planned inferences. Thus, dividing the overall significance level ($\alpha$=0.05) by 3 (number of inferences); Bonferroni correction would test each individual variables at 0.016.

From the above results, it was concluded that even though a combinations of all independent variables significantly predicted ERP success ($p<0.005$), the benefits dimension was not significant at the chosen alpha level of 0.05. Secondly, the use dimension switched its sign because its positive correlation with ERP success was attributed to its high positive correlation (0.730) with the quality dimension. This implies that the use dimension when individually tested does not affect the overall success of ERP systems in public and private universities in Kenya. The quality dimension was observed to be a significant contributor of ERP systems success ($p< 0.016$). This implies that the quality dimension is a significant predictor of success of ERP systems in public and private universities in Kenya.

## 4.8 Summary

The study sought to find out the effect of quality, use, and net benefits of ERP systems towards the success of the systems in public and private universities in Kenya. The independent variables studied were quality, use, and net benefits, with success as the dependent variable. From the analysis, quality and use dimensions qualify as significant predictors of ERP success at significance levels of 0.01. The study found out that the most important dimension in predicting the success of ERP system is quality

(0.624).The study found out that quality was highly correlated with the use dimension (0.713). This indicated that use of an ERP system is significantly influenced by its quality. Similarly, net benefits dimension was highly correlated with the use dimension (0.589), implying that most benefits are realized after the ERP system is properly utilized. The results of multiple regression analysis showed that even though the use and benefits dimensions positively correlated with ERP success, the relationship was mainly due to existing correlations with the quality dimension.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This chapter presents the summary of the study, the conclusions and recommendations drawn from the study. It also provides suggestions for further research.

## 5.2 Summary

This study sought to determine the effect of quality, use, and net benefits in description success of ERP systems in public and private universities. The study focused on the dimensions of quality, use, and net benefits of ERP systems as the three major dimensions, and how each of the dimension influence the dependent variable - ERP success. Primary data was collected using structured questionnaires from 114 respondents from two public and two private universities in Kenya.

The study evaluated the three models of IS success that have been widely studied and also applied in the evaluation of ERP systems success. These models provided a concrete background and understanding of the various dimensions / variables as used in the research objectives. Furthermore, the models helped to bring out the concept of ERP success from an evaluation of process to the evaluation of the ERP system. This study adopted the dimensions from the DeLone & McLean IS success model to describe the effect of quality, use, and net benefits on success of ERP systems in public and private universities in Kenya. Initial analysis using correlation analysis revealed that quality, use, and net benefits had a significant relationship with ERP systems success in public and private universities in Kenya. Further analysis using multiple regression analysis were carried out to find out how each of the three dimensions individually contributed to success of ERP systems.

Quality was found to be highly correlated with ERP success at 0.624 indicating that it was important dimension in influencing the success of ERP systems. This means that there is a positive relationship between quality, and ERP success in public and private universities in Kenya. The use of ERP systems was found to correlate with its success

(0.348). However, due to higher correlation with the quality dimension (0.73), and with the net benefits dimension (0.589), its significance could not be clearly explained in the ERP success model. The net benefits dimension was found to correlate with success (0.413) but further analysis showed that as a predictor, it was not significant. Hence, the first research question on effect of quality in the success of ERP systems in public and private universities was answered. This corresponds well with the findings of Chien and Tsaur (2007), who reported that the success of implementing ERP systems was largely accounted by the quality dimensions.

## 5.3 Conclusion

The purpose of this research was to determine the effect of quality, use, and net benefits in the assessment of ERP systems success in public and private universities in Kenya. Universities in Kenya have ventured in ERP systems with the aim of improving organizational operations and supporting various organizational goals to achieve more efficiency and effectiveness. However across different institutions, the implementation of ERP systems, their use, and net benefits are realized in different measures resulting fallacious comparisons between different ERP software packages.

The study findings were intended to help comprehend success of ERP systems from three dimensions – Quality, use, and net benefits. These dimension were empirically identified in past studies on IS and ERP success. The study found out that quality has the greatest influence on the success of ERP systems in public and private universities in Kenya. This agrees with findings of Chien & Tsaur (2007) who also found out that service quality as the most significat contributor to ERP systesm success in high tech companies. The quality dimension also positively impacts on the use of an ERP system, which in turn influences the realization of net benefits.

The results from this study reveal that quality dimension is the most significant predictor of ERP systems success in public and private universities in Kenya. In addition quality has significant influence on system use, which in turn positively contributes to the achievement of the net benefits. These findings do not mean that use and net benefits are totally dependent on the quality, since there are other factors that contribute to meaningful use, and to realization of net benefits of the ERP system.

The use dimension was found to have a significant relationship with the perceived success of ERP systems. However, the contribution of this dimension was little when tested individually. This is because the use of ERP systems in large organizations is never voluntary. Users do not choose either to use or not to use the ERP system. By virtue of the huge investments made on an ERP system, its use becomes the standard mode of service delivery and users continue using the system until it is decommissioned. Institutions should therefore focus on interventions that guarantee the quality of ERP systems since the use dimension can be controlled by institutions administrative practices and procedures. Similar observations were observed by Petter, DeLone, and McLean (2008) who concluded that use is a suitable predictor of ERP success as it acts as mediator between the quality and net benefits dimensions.

Net benefits dimension was found to have an insignificant relationship with success of an ERP system. Rashid, Hossain, and Patrick (2002) found out that most of the benefits realized from a successful ERP system are commonly intangible. Benefits categorized as managerial, strategic, and organizational benefits are predominantly intangible and whether they have been realized or whether they were realized as a direct result of having an ERP system in place is an area that would require further research. On the other hand IT infrastructural benefits and operational benefits are realized after the use of the ERP system has matured in all areas of its operation. In addition most users who may have utilized the ERP system for lesser years may not be aware of how the situation was before its implementation. This phenomenon distorts their assessment of whether the benefits have been realized or not.

This study provides information for managers in public and private universities when evaluating the success of their ERP investments. The study identified the three major dimensions which can act as a base for developing assessment criteria in evaluation of ERP systems. However statistical data that was collected and analyzed based on the research objectives indicated that quality dimension was the most appropriate predictor of ERP systems success in public and private universities in Kenya.

## 5.4 Recommendations

On the basis of the findings of this study, it is recommended that factors like ease of integration with other systems, flexibility, and openness should be given more emphasis

when choosing ERP software. Since the findings of this study proved that quality dimension as the most significant predictor of ERP success, the design of ERP system reports should consider inputs collected directly from the users. This approach ensures that the ERP system provides information that matches the user requirements in terms of accuracy, completeness, relevancy, and simplicity. In addition, institutions should consider a more detailed training for the ERP support staff before introducing the system to the other users. This will ensure that users receive good support as they begin interacting with the ERP system

For net benefits dimension to be more meaningful in the assessment of ERP success, it would me more prudent to identify and communicate the expected benefits of proposed ERP systems to all the stakeholders. This will be instrumental in improving the perception of users in terms of ERP system usefulness and its individual and organizations impacts.

Further studies on ERP success should zero in on relationships between one dimension to the other rather than combinations of multiple dimensions. This is because, as it was demonstrated by results of this study, the causal effects across dimensions are not always translative, nor are they always commutative. For instance, whereas quality dimension may positively affect use, such influence may not eventually be evident in the net benefits dimension. The relationship between quality, use, and benefits dimensions may also change from one organization to the other.

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# APPENDICES

## APPENDIX A

## QUESTIONNAIRE

Dear Respondent,

My name is Anthony Irungu, a Msc. ICT Policy and Regulation student at JKUAT. I am carrying out a research on Dimensions of Enterprise Resource Planning Systems Success in Public and Private Universities in Kenya.

As an experienced user of an ERP system in your institution, you have been selected as a respondent for this study. Your participation in the exercise will be highly appreciated. All responses will be held in confidence and information given shall be purely for academic purposes.

Thank you.

## SECTION A

1. Kindly indicate your gender (tick as appropriate)

   [ ] Male [ ] Female

2. What is your age bracket?

   [ ] Below 25 Years [ ] 26-35 Years

   [ ] 36-45 Years [ ] above 45 years

3. What is your highest educational level?
   [ ] Postgraduate [ ] Undergraduate [ ] Diploma [ ] O-Level
4. For how long you have worked in the institution? _____ years

5. Which of the following ERP functional areas closely matches your current role in the institution?

   [ ] Academic Services (Admissions, Advisory, Registration, Examinations)

   [ ] Finance (Management Accounts, Student Accounts (AR), Payments (AP))

   [ ] Procurement (Purchase order processing, Stores)

   [ ] ERP System Administration (ICT)

   [ ] Human Resources & Planning

**SECTION B**

For each of the following statements, circle one number in the 5-point scale i.e. (1= Strongly disagree, 2= Disagree, 3= Neutral, 4=Agree, 5=Strongly agree) that describes how that statement applies to the ERP system used in your institution.

6. The following statements seek to describe system quality of the ERP system used in your institution.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system is flexible and allows customization | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system is reliable | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system is consistent in terms of response times | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP system is easy to learn and use | 1 | 2 | 3 | 4 | 5 |
| v. The ERP system integrates with other IT systems | 1 | 2 | 3 | 4 | 5 |

7. The following statements seek to describe information quality of the ERP system used in your institution.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system provides accurate information. | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system produces reports that are relevant | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system provides timely and complete reports | 1 | 2 | 3 | 4 | 5 |
| iv. The format of the ERP reports is good and easy to understand. | 1 | 2 | 3 | 4 | 5 |

8. The following statements seek to describe service quality of the ERP system used in your institution.

| | | | | | |
|---|---|---|---|---|---|
| i. The support personnel give prompt service to ERP system users | 1 | 2 | 3 | 4 | 5 |
| ii. The support personnel or consultant provides adequate technical support for the ERP system. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP consultant has good relationship with my organization | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP consultant is experienced and provides sufficient training and services | 1 | 2 | 3 | 4 | 5 |

9. The following statements seek to determine the level of voluntary use of the ERP system in your institution.

| | | | | | |
|---|---|---|---|---|---|
| i. The users do not need supervision to use the ERP system | 1 | 2 | 3 | 4 | 5 |
| ii. The users rely on ERP system reports to make decisions | 1 | 2 | 3 | 4 | 5 |
| iii. The users respond to student enquires by querying the ERP system. | 1 | 2 | 3 | 4 | 5 |
| iv. The users are involved in the customization of ERP system reports. | 1 | 2 | 3 | 4 | 5 |

10. The following statements seek to determine whether users within your institution are satisfied with the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has met most of the users' requirements. | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system enables users to solve problems efficiently | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system provides users with decision making tools. | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP system helps users to communicate across the institution | 1 | 2 | 3 | 4 | 5 |
| v. The ERP system enables users to save time and energy in executing their individual tasks and duties | 1 | 2 | 3 | 4 | 5 |

11. The following statements seek to describe the operational benefits that your institution has realized as a result of implementing the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has enabled our institution to cut on administrative costs. | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system has enabled our institution to achieve cycle time reduction in students', employee, and suppliers' support activities. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system has enabled our institution to achieve a higher productivity per employee. e.g. Reduced overtime. | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP system has enabled our institution in quality improvement and monitoring activities. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| v. The ERP system has enabled our institution to improve its customer service by providing enhanced data access and enquiry mechanisms. | 1 | 2 | 3 | 4 | 5 |

12. The following statements seek to describe the managerial benefits that your institution has realized as a result of implementing the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has enabled better resource (assets, inventory, and workforce) management in our institution. | 1 | 2 | 3 | 4 | 5 |
| ii. The decision making and planning processes in our institution has improved after implementing the ERP system. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system has enabled our institution to improve in terms of efficiency and to cope with rising number of students | 1 | 2 | 3 | 4 | 5 |

13. The following statements seek to describe the strategic benefits that your institution has realized as a result of implementing the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has enabled our institution to open new campuses and launch more academic programmes. | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system has enabled our institution to streamline internal processes, achieve business economies of scale, and establish shared services. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system has enabled our institution to comply with regulatory bodies. e.g. KRA, CUE, and other statutory bodies. | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP system has enabled our institution to build a competitive advantage and stay ahead of competitors | 1 | 2 | 3 | 4 | 5 |
| v. The ERP system has enabled our institution to launch new modes of delivering its services. e.g. E-learning, ODLM etc. | 1 | 2 | 3 | 4 | 5 |

14. The following statements seek to describe the organizational benefits that your institution has realized as a result of implementing the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has enabled our institution to achieve harmonization of processes across schools, faculties, departments, and campuses. e.g. Examinations, admissions, graduation etc. | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system facilitates the learning process of the workforce through shortened learning time and broadened employee skills. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system has empowered employees to be more accountable, proactive, work autonomously, and to be more involved in the management. | 1 | 2 | 3 | 4 | 5 |
| iv. The ERP system has enabled the institution to concentrate on core business. i.e. Focus on student, market, and overall performance. | 1 | 2 | 3 | 4 | 5 |

15. The following statements seek to describe the IT infrastructural benefits that your institution has realized as a result of implementing the ERP system.

| | | | | | |
|---|---|---|---|---|---|
| i. The ERP system has enabled the institution to reduce in IT related costs e.g. Printing, telephony, IT staff, and hardware maintenance costs | 1 | 2 | 3 | 4 | 5 |
| ii. The ERP system provides a reliable platform to support current and future changes in structure and processes. | 1 | 2 | 3 | 4 | 5 |
| iii. The ERP system provides a modern and flexible platform that integrates with a wide range of applications, and external parties. e.g. Corporate email, banking services etc. | 1 | 2 | 3 | 4 | 5 |

**SECTION C**

16. What is the name of the ERP system that has been implemented in your institution?

[ ] SAP

[ ] Oracle

[ ] People soft

[ ] Microsoft Dynamics

[ ] JD Edwards

[ ] SysPro

[ ] Sage ACCPAC

[ ] Other (Please specify) _____

17. For how long has the ERP system been used in your institution? _____ Years

18. Why did your institution choose the ERP product? (Select all that apply)

    [ ] ERP features and functionality best fit our requirements

    [ ] ERP price

    [ ] ERP Vendor's reputation

    [ ] Bench marked with peer institutions

    [ ] Advice from a consultant

    [ ] Previous experience with the ERP vendor

    [ ] Other _____

19. At the time of choosing the ERP product, which was the most important factor for your institution? (Select one only)

    [ ] Transform the way the institution operates

    [ ] Modernize the IT environment / replace aging legacy systems

    [ ] Enhance accountability / regulatory compliance

    [ ] Provide better management tools

    [ ] Improve services for students, faculty & staff

    [ ] Keep institution competitive

    [ ] Other _____

20. The following statements seek your personal opinion on success of the ERP system used by your institution.

| | | | | | |
|---|---|---|---|---|---|
| i. I consider the overall performance of the ERP system as successful | 1 | 2 | 3 | 4 | 5 |
| ii. I would recommend the system to another higher learning institution that is planning to acquire an ERP. | 1 | 2 | 3 | 4 | 5 |

**APPENDIX B**

**UNIVERSITIES IN KENYA**

| | **Public Universities** | **Established / Accredited** |
|---|---|---|
| 1 | University of Nairobi (UoN) | Established - 1970 |
| 2 | Moi University (MU) | Established - 1984 |
| 3 | Kenyatta University (KU) | Established - 1985 |
| 4 | Egerton University (EU) | Established - 1987 |
| 5 | Jomo Kenyatta University of Agriculture and Technology | Established - 1994 |
| 6 | Maseno University | Established– 2001 |
| 7 | Masinde Muliro University of Science and Technology | Established - 2007 |
| 8 | Dedan Kimathi University of Technology | Accredited 2012 |
| 9 | Chuka University | Accredited 2013 |
| 10 | Technical University of Kenya | Accredited 2013 |
| 11 | Technical University of Mombasa | Accredited 2013 |
| 12 | Pwani University | Accredited 2013 |
| 13 | Kisii University | Accredited 2013 |
| 14 | University of Eldoret | Accredited 2013 |
| 15 | Maasai Mara University | Accredited 2013 |
| 16 | Jaramogi Oginga Odinga University of Science and Technology | Accredited 2013 |
| 17 | Laikipia University | Accredited 2013 |
| 18 | South Eastern Kenya University | Accredited 2013 |
| 19 | Meru University of Science and Technology | Accredited 2013 |
| 20 | Multimedia University of Kenya | Accredited 2013 |
| 21 | University of Kabianga | Accredited 2013 |
| 22 | Karatina University | Accredited 2013 |

Source: (CUE, 2014)

| | Private Universities | Accredited |
|---|---|---|
| 1 | University of Eastern Africa, Baraton | 1991 |
| 2 | Catholic University of Eastern Africa (CUEA) | 1992 |
| 3 | Daystar University | 1994 |
| 4 | Scott Christian University | 1997 |
| 5 | United States International University | 1999 |
| 6 | Africa Nazarene University | 2002 |
| 7 | Kenya Methodist University | 2006 |
| 8 | St. Paul's University | 2007 |
| 9 | Pan Africa Christian University | 2008 |
| 10 | Strathmore University | 2008 |
| 11 | Kabarak University | 2008 |
| 12 | Mount Kenya University | 2011 |
| 13 | Africa International University | 2011 |
| 14 | Kenya Highlands Evangelical University | 2011 |
| 15 | Great Lakes University of Kisumu | 2012 |
| 16 | KCA University | 2013 |
| 17 | Adventist University of Africa | 2013 |

Source: (CUE, 2014)

**APPENDIX C**

**LETTERS OF INTRODUCTION**

**JOMO KENYATTA UNIVERSITY**
**OF**
**AGRICULTURE AND TECHNOLOGY**
**DEPARTMENT OF ENTREPRENEURSHIP, TECHNOLOGY,**
**LEADERSHIP & MANAGEMENT**

Telegrams "Thika"
Tel: (0151) 52181-4
Fax: (0151) 52164
Email: director@ibtd.jkuat.ac.ke

OFFICE OF THE CHAIRPERSON
P. O. BOX 62000-00200
NAIROBI

**DATE:** 5th February, 2016

JKU/40/ HD314-2093/2010

**To whom it may concern:**

Dear Sir/Madam,

**RE: MSC. RESEARCH PROJECT FOR: ANTONY IRUNGU NJIA**

This is to introduce to you **Mr. Njia** who is a student pursuing Master of science degree in ICT Management in the Department of Entrepreneurship, Technology, Leadership, and Management in the School of Entrepreneurship, Procurement and Management, College of Human Resource Development at Jomo Kenyatta University of Agriculture and Technology.

The student is currently undertaking a research proposal on: **"Dimensions of Enterprise Resource Planning Systems in Public and Private Universities in Kenya"** in partial fulfilment of the requirement for the programme.

The purpose of this letter is to request you to give the student the necessary support and assistance to enable her obtain the necessary data for the research. Please note that the information given is purely for academic purposes and will be treated with strict confidence.

Thank you.

Yours faithfully,

05 FEB 2016

**Dr. Alice Simiyu**
**Postgraduate Research Coordinator**
**Department of Entrepreneurship, Technology, Leadership and Management**

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

DIRECTOR, BOARD OF POSTGRADUATE STUDIES

P.O. BOX 62000
NAIROBI - 00200
KENYA
Email: director@bps.jkuat.ac.ke

TEL: 254-067-52711/52181-4
FAX: 254-067-52164/52030



**REF: BPS/HD314-2093/2010** **04th January, 2016**

Mr. Anthony Irungu Njina
C. /o SEPM
JKUAT

Dear Mr. Irungu,

**RE: APPROVAL OF RESEARCH PROPOSAL AND SUPERVISORS**

Kindly note that your research proposal entitled: "*Dimensions of Enterprise Resource Planning Systems success in Public and Private Universities in Kenya.*" has been approved. The following are your approved supervisors:-

1. Dr. Mike Iravo
2. Dr. Michael W. Kimwele

Yours sincerely

**PROF. MATHEW KINYANJUI**
**DIRECTOR, BOARD OF POSTGRADUATE STUDIES**
Copy to: Dean, SEPM


# NATIONAL COMMISSION FORSCIENCE, TECHNOLOGY ANDINNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/35668/17266**

Date: **6th June, 2017**

Anthony Irungu Njina
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
**NAIROBI.**

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on ***"Dimensions of Enterprise Resource Planning Systems Success in public and private universities in Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu, Meru and Nairobi Counties** for the period ending **2nd June, 2018.**

You are advised to report to **the Vice Chancellors of selected Universities, the County Commissioners and the County Directors of Education, Kiambu, Meru and Nairobi Counties** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

**GODFREY P. KALERWA MSc., MBA, MKIM**
**FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The Vice Chancellors
Selected Universities.

The County Commissioner
Kiambu County.

## APPENDIX D

## NACOSTI RESEARCH PERMIT

THIS IS TO CERTIFY THAT:
*MR. ANTHONY IRUNGU NJINA*
of JOMO KENYATTA UNIVERSITY OF AGRICULTURE & TECHNOLOGY,
2193-60200 MERU,has been permitted to conduct research in *Kiambu , Meru , Nairobi Counties*

on the topic: *DIMENSIONS OF ENTERPRISE RESOURCE PLANNING SYSTEMS SUCCESS IN PUBLIC AND PRIVATE UNIVERSITIES IN KENYA*

for the period ending:
*2nd June,2018*

Permit No : NACOSTI/P/17/35668/17266
Date Of Issue : 6th June,2017
Fee Recieved :Ksh 1000

.....
*Applicant's Signature*

.....
*Director General*
*National Commission for Science, Technology & Innovation*