



**Strathmore**  
UNIVERSITY

Strathmore University  
**SU+ @ Strathmore**  
University Library

---

**Electronic Theses and Dissertations**

2018

Assessment of determinants of enterprise resource planning implementation by small and medium enterprises in Kenya: a case of Nairobi county

Jatin Ghaghda  
*Strathmore Business School (SBS)*  
*Strathmore University*

Follow this and additional works at <https://su-plus.strathmore.edu/handle/11071/6102>

Recommended Citation

Ghaghda, J. (2018). *Assessment of determinants of enterprise resource planning implementation by small and medium enterprises in Kenya: a case of Nairobi county* (Thesis). Strathmore University. Retrieved from <https://su-plus.strathmore.edu/handle/11071/6102>

**ASSESSMENT OF DETERMINANTS OF ENTERPRISE RESOURCE PLANNING  
IMPLEMENTATION BY SMALL AND MEDIUM ENTERPRISES IN KENYA: A  
CASE OF NAIROBI COUNTY**

**JATIN GHAGHDA**

A Dissertation submitted in partial fulfilment of the requirements for the award of  
Degree of Master's in Business Administration

**VT OMNES VNVM SINT**

**STRATHMORE BUSINESS SCHOOL**

**NAIROBI, KENYA**

**JANUARY 2018**

This dissertation is available for Library use on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

## DECLARATION

I declare that this work has not been previously submitted and approved of a degree by this or any other university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

© No part of this thesis may be reproduced without the permission of the author and Strathmore University

Jatin Ghaghda

January 2018

### Approval

Approval

The dissertation of Joyce Ngugi was reviewed and approved by:

Dr. Fred Ogola (Supervisor)

Strathmore Business School

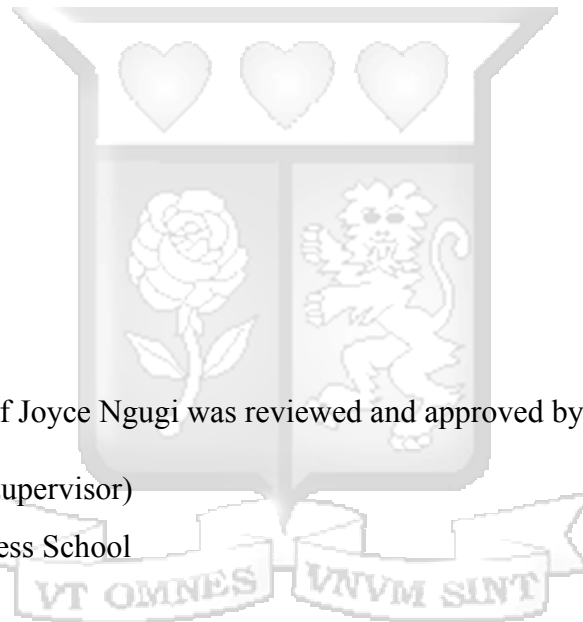
Dr. George Njenga

Dean, Strathmore Business School

Prof. Ruth Kiraka

Dean, School of Graduate Studies

Strathmore University



## DEDICATION

To my daughter and wife.



## **ACKNOWLEDGEMENT**

First and foremost I give my gratitude and humble appreciation to the Almighty God for the gift of life, good health, a sound mind and divine providence that enabled me to come up with this research project.

Secondly, I wish to accord my supervisor Fredrick Ogola, special acknowledgement, for equipping me with the knowledge and skills on dissertation great insight.



## ABSTRACT

The study offers important guidelines to companies implementing an ERP system and develops a coherent conceptual framework that thoroughly investigates the determinants of the effective implementation of an ERP system, thus, broadening the understanding on the issue. The main objective of the study was to assess the determinants of Enterprise Resource Planning (ERP) implementation by Small and Medium Enterprises (SMEs) which are listed as top 100 SMEs in 2017 by KPMG and Nation Media (Appendix III) with specific reference to Nairobi County. Four key specific objectives were addressed in the study: to evaluate the effect of information technology (IT) infrastructure on ERP implementation by SMEs in Kenya; to establish how technical skills contribute to the implementation of ERP by Small and Medium Enterprises; to assess the effect of financial capital on implementation of ERP by Small and Medium Enterprises; and to explore the influence of implementation partner on the ERP by Small and Medium Enterprises. The study was based on three theories:- Technological Acceptance Model, Diffusion of Innovations Theory and Information Systems Success Model. The study used both primary and secondary data. Target population was the Small and Medium Enterprises within the Nairobi County. The author applied judgmental procedure to select 10 SMEs within Nairobi County. Descriptive research design was used to answer the specific questions of the study. Primary findings have shown that IT infrastructure, cost of implementation and cost of personnel have a very strong relationship with ERP Implementation. The examination prescribes different organizations to prepare or prepare enough work force to execute ERP. Small and medium enterprises ought to likewise have a hearty IT foundation important to execute ERP.

## TABLE OF CONTENTS

DECLARATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENT .....	iv
ABSTRACT .....	v
LIST OF FIGURES .....	vi
LIST OF TABLES .....	vii
LIST OF ABBREVIATIONS .....	x
DEFINITION OF TERMS .....	xi
Chapter 1: Introduction to the Study .....	1
1.1 Introduction .....	1
1.2 Background of the study .....	1
1.3 Problem statement .....	4
1.4 Research Objectives .....	5
1.5 Research Questions .....	5
1.6 Scope of the study .....	6
1.7 Significance of the study .....	6
Chapter 2: Literature review .....	8
2.1 Introduction .....	8
2.2 Theoretical Literature Review .....	8
2.2.1 Technological Acceptance Model .....	8
2.2.2 Information Sytems Success Model .....	9
2.2.3 Diffusion of Innovations Theory .....	10
2.3 Empirical review .....	12
2.3.1 IT Infrastructre & ERP Implemenattion .....	12
2.3.2 Technical skills & ERP Implemantation .....	14
2.3.3 Financial capital & ERP Implemantation .....	15
2.3.4 Implementation Partner & ERP Implemenattion .....	17
2.4 Research gap .....	18
2.5 Conceptual framework .....	20
2.6 Operationalization of variables .....	21
Chapter 3: Research Methodology .....	22
3.1 Introduction .....	22
3.2 Research Design .....	22

3.3 Population and sampling .....	22
3.4 Data collection methods .....	23
3.5 Data Analysis .....	24
3.6 Ethical issues .....	26
<b>Chapter 4: Results and Discussions.....</b>	<b>27</b>
4.1 Introduction .....	27
4.2 Sample Characteristics .....	27
4.3 Respondents on ERP Implementation.....	31
4.4 Respondents on Impact of IT infrastructure in ERP Implementation.....	34
4.5 Respondents on Impact of Technical skills in ERP Implementation.....	35
4.6 Respondents on Impact of Financial capital in ERP Implementation.....	37
4.7 Probit Analysis .....	39
4.8 Factor Analysis.....	41
<b>Chapter 5: Conclusions and Recommendations.....</b>	<b>43</b>
5.1 Introduction .....	43
5.2 Discussion .....	43
5.3 Conclusions .....	47
5.4 Recommendations .....	48
5.5 Area/s for further Research .....	49
<b>REFERENCES .....</b>	<b>51</b>
<b>APPENDICES .....</b>	<b>58</b>
Appendix 1: Letter to participants .....	58
Appendix 2: Questionnaire .....	59
Appendix 3: 2017 Top 100 Mid-sized Companies in Kenya Winners List.....	64

## LIST OF FIGURES

Figure 2.3: Conceptual framework

Figure 4.1: Frequency Distribution on Gender

Figure 4.2: Distribution of Respondents by Implementation of ERP



## LIST OF TABLES

Table 4.1: Frequency Distribution of Respondents' Demographics

Table 4.2: Respondents on Implementation of ERP in Business.

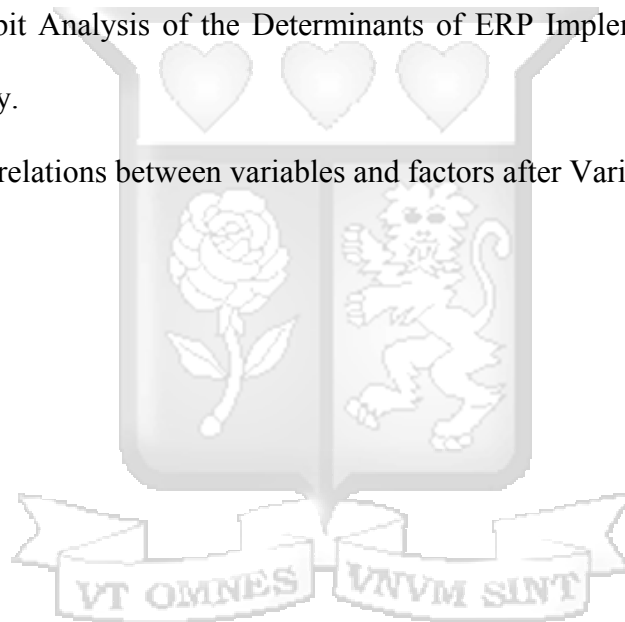
Table 4.3: Respondents on the Impact of IT infrastructure on ERP Implementation

Table 4.4: Respondents on the Impact of Technical Skills on ERP Implementation

Table 4.5: Respondents on the Impact of Financial Capital and Implementation Partner on ERP Implementation

Table 4.6 Probit Analysis of the Determinants of ERP Implementation by SMEs in Nairobi County.

Table 4.7: Correlations between variables and factors after Varimax rotation:



## **LIST OF ABBREVIATIONS**

<b>CDF</b>	Cumulative Distribution Function
<b>DOI</b>	Diffusion of Innovations
<b>ERP</b>	Enterprise Resource Planning
<b>ICT</b>	Information and Communication Technology
<b>SBS</b>	Strathmore Business School
<b>SMES</b>	Small and Medium Enterprises
<b>SPSS</b>	Statistical Package for Social Science



## DEFINITION OF TERMS

**Enterprise Resource Planning (ERP):** is a procedure by which an organization (regularly a producer) oversees and coordinates the vital parts of its business. An ERP administration data framework coordinates zones, for example, arranging, acquiring, stock, deals, showcasing, back and HR (Thompson, 2013).

**Implementation:** The way toward putting a choice or plan into impact; execution (Yeung, 2015).

**Small and Medium Enterprises (SMEs):** are non-subsidary, independent firms which employ fewer than a given number of employees. This number fluctuates crosswise over nations. The most successive upper limit assigning a SME is 250 representatives, as in the European Union (Koch, 2014).

**Information technology (IT) infrastructures:** The term Infrastructure in Information technology (IT) setting alludes to an undertaking's whole gathering of equipment, programming, systems, server farms, offices and related gear used to create, test, work, screen, oversee and additionally bolster data innovation administrations (Stein, 2014).

**Adoption:** the activity or truth of embracing or being received (Needleman, 2013).

**Financial capital:** Monetary capital is any financial asset estimated as far as cash utilized by business people and organizations to purchase what they have to make their items or to give their administrations to the segment of the economy whereupon their activity is based, i.e. retail, corporate, venture managing an account, and so forth (Huang, 2013).

**Technical skills:** are the learning and capacities to perform specific errands. Administration regularly needs specialized abilities keeping in mind the end goal to discuss viably with line laborers and organize endeavours (Coombs, 2015).

**Implementation partner:** Is normally a counselling administrations firm that has been confirmed by the product merchant — meaning the usage accomplice knows the item and can help you effectively execute the product (Stedman, 2014).



# **Chapter 1: Introduction to the Study**

## **1.1 Introduction**

The study sought to assess the determinants of enterprise resource planning (ERP) implementation by small and medium enterprises (SMEs) in Kenya with specific reference to Nairobi County. Section 1.2 defines ERP and presents arguments on the current status of ERP implementation by business enterprises in Kenya as well as implementation experience by the SMEs. Section 1.3 states clearly the study problem. Section 1.4 highlights the specific objectives of the study. Section 1.6 discusses briefly the scope of the study. This chapter also present significance of the study (section 1.7).

## **1.2 Background of the study**

Enterprise Resource Planning is an integrated information system that enables full and efficient utilization of resources for its information needs. The rising demand of information system, the integration of ERP components, brings the perspective of profitability growth and cuts down running costs for SMEs. SMEs represent the spinal code of most economies in the world and they play a major role in economic development. In Kenya, small enterprises are defined as companies with 10 to 50 workers, while medium enterprises have 51 to 100 workers (Nzuki, 2014). In today's fast paced business competition, world class performance cannot be sustained through manual efforts alone.

Technology has proved to be a key enabler of business performance (Raymond, 2013). ERP systems integrate internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship and management among others. The major objective of ERP is

to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders (Millet, 2014). By integrating all departments and functions of the organization into a single computer system, it serves the different departmental needs (Njau, 2016).

The ERP tools help to show the visibility of information across the enterprise and enable seamless access to information. The use of information technology and systems has improved business operations. For example, Gore (2012), South Africa ERP systems are widely used to extract and process data from different functional areas across the enterprise. ICT growth is achieving higher in Malaysia in order to boost economic growth and IT infrastructures in SMEs are upgraded to adopt Information Technology (Shahawai, 2014). Bhavan (2014), efficient benefits of ERP system in India have encouraged SMEs to draw attention towards ERP implementation by offering services to alleviate cost from vendors. Studying the performance ways in SMEs might boost better results while making decision to execute ERP (Bhavan, 2014).

Although most of companies in the developed world easily adopt new technological innovations, similar organizations in the developing world face numerous challenges due to constraints related to the nature of available information and communication technology (ICT) infrastructure (Zimbrao, 2013). Moreover, the situation in the developing world is worsened by lack of investment in business research and development (Zimbrao, 2013). Gupta (2014), mentioned that ERP projects frequently require more time and capital than what was planned due to the heavy integration needed on the technical and business sides. ERP requires a big portion of time, personnel, and capital (Laukkanen, 2013). For instance, Rabah (2013), noted that most of the implementation failures for ERP is implementation which does not have strong business justifications. This is attributed to the misalignment between the

objectives from the ERP implementation and the strategic organizational and IT goals. Investing into ERP systems without any objective other than following the market or industry trend might also cause an ERP project to fail (Kang, 2014).

Since the adoption of an ERP system requires extensive efforts, both for the technological and business aspects of the implementation, neither information technology (IT) practitioners nor researchers have developed a deterministic method to evaluate the related impacts (Willcocks, 2013). The adoption of ERP systems in Kenya is not on the upper side (Nzuki, 2012). For example, Ndung'u (2012), Uchumi supermarket chain closed down in 2006 admitting it was insolvent. The over ambitious expansion strategy and the poor installation of the ERP system were cited by experts as some of the reasons which contributed to the insolvency of the outlet. According to the study, Uchumi closed several branches in Kenya, Uganda, and Tanzania. The Uchumi supermarket experience was an example that there was an urgent need for understanding ERP implementation in less Developed countries, and in Kenya in particular (Ndung'u, 2012). Most businesses in Kenya have already adopted ERP systems, and are now enjoying the benefits. Small and medium-sized firms have also discovered and started adopting ERP systems although they point out high implementation costs in comparison to their scarce resources as some of the leading factors affecting implementation (Ndung'u, 2012). Other factors include lack of the necessary experience for implementing ERP systems effectively (Rao, 2014).

### **1.3 Problem statement**

Organizations across the world have adopted ERP implementation and has become a key business driver in today's world. Despite widespread usage of ERP in large and mid-sized organisations worldwide as well as rapid increase in implementation of these systems in management, there are different implementation challenges that face businesses that decide to go forward and implement ERP (Zimbrao, 2013). The general problem is that ERP implementation success rates are unsatisfactory and still remain very low in most developing countries and Kenya in particular (Azim, 2010). Small and medium sized enterprises in Kenya have not fully embraced ERP systems to integrate their operations in a bid to cut on operational costs and interact with their stakeholders in 'real-time' (Trott & Hoecht 2014). A study conducted by Rao (2014), indicated that small and medium-sized firms have started adopting ERP systems although they point out high implementation costs in comparison to their scarce resources as some of the leading factors affecting adoption. According to Rao other factors include lack of the necessary experience for adopting ERP systems effectively – hence the motivation behind this study. The specific problem is that much of the literature on ERP systems has centred on large organisations with a glaring lack of clarity on implementation experiences especially in SME sector (Zimbrao, 2013). It is on this basis that the study sought to assess the determinants of Enterprise Resource Planning implementation by SMEs in Kenya: a perspective of Nairobi County.

## **1.4 Research Objectives**

### **Main Objective**

Assessment of determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises in Kenya with specific reference to Nairobi County.

### **Specific objectives**

- i. To evaluate the effect of information technology (IT) infrastructure on ERP implementation by SMEs in Kenya.
- ii. To establish how technical skills contribute to the implementation of ERP by Small and Medium Enterprises.
- iii. To assess the effect of financial capital on implementation of ERP by Small and Medium Enterprises.
- iv. To explore the effect of partner on ERP implementation by Small and Medium Enterprises.

## **1.5 Research Questions**

- i. How does information technology (IT) infrastructure affect ERP implementation by SMEs in Kenya?
- ii. To what extent does technical skills contribute to the implementation of ERP by Small and Medium Enterprises?
- iii. What is the impact of financial capital on the implementation of ERP by Small and Medium Enterprises?
- iv. How does a partner influence ERP implementation by Small and Medium Enterprises?

## **1.6 Scope of the study**

This study focused on assessment of determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises in Kenya which are listed as top 100 SMEs in 2017 by KPMG and Nation Media (Appendix III) with specific reference to Nairobi County. The four key variables addressed in the study were: IT infrastructure, technical skills / personnel, implementation partner and financial capital.

Executive directors, managers, heads of departments and other permanent staff built the sample size of this study. These categories were of interest because of their good understanding of internal information pertinent to the company and knowledgeable background on the research problem. The target population of the study comprised Small and Medium Enterprises within the Nairobi County.

## **1.7 Significance of the study**

**Theoretical significance:** Diffusion of Innovations (DOI) theory is useful to both the developers and users of ERP systems in evaluating how these systems are implemented in various projects. Information Systems Success Model is useful in studying integrated business management information systems and their usage by small and medium enterprises in Kenya. The Technology Acceptance Model assists SMEs to see the usefulness of the ERP system.

**Policy significance:** The study offers important guidelines to the companies implementing ERP system and develops a coherent conceptual framework that thoroughly investigates the determinants of the effective implementation of an ERP system, thus, broadening the understanding on the issue. Given the influence of ERP systems on business success, such a dual contribution seems rather significant for both practitioners and academics.

**Practical significance:** The findings of the study helps managers of SMEs to understand any change in their job and encourage the front-line people to be able to make decisions themselves. SMEs will be in good standing to provide opportunities to enhance the skills of the employees by providing training opportunities on a continuous basis to meet the changing needs of the business and employees.



## **Chapter 2: Literature review**

### **2.1 Introduction**

This chapter primarily focused on the factors that have a strong influence on ERP implementation by small and medium enterprises (SMEs) in Kenya. It critically discussed theoretical review which covered; Technological Acceptance Model, Diffusion of Innovations Theory and Information Systems Success Model. The empirical review covers influence of ICT infrastructure; technical skills/personnel; implementation partner; and financial capital on ERP implementation by SMEs. The chapter will also cover the conceptual framework, critique of the existing literature and research gaps herein.

### **2.2 Theoretical Literature review**

#### **2.2.1 Technological Acceptance Model (TAM)**

The technology acceptance model is based on the theory of reasoned action (TRA) (Azjen & Fishbein, 1980) which proposes that an individual's behavioural intention to use a system is determined by two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU) (Venkatesh & Davis, 2000). Davis (1989) defined perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Perceived usefulness for the individual is most likely the result of improved job performance and user motivation (Robey & Farrow, 2014). Studies have reported that perceived usefulness is positively associated with system usage (Thompson, Higgins, & Howell, 2013). Perceived ease of use is defined as “the degree to which a person believes that using the system will be free of effort” (Davis, 2014). According to TAM, perceived usefulness is also influenced by perceived ease of use because, other things being equal, the easier the system is to use, the more useful it can be. People who perceive ease of use are more likely to believe in

the ease and usefulness of the system (Robey & Farrow, 2014). Based on this model, modern organizations are making significant investments in complex information systems such as the enterprise resource planning (ERP) systems. However, despite their benefits, more than two thirds of ERP system projects result in failure (Chang, Cheung, Cheng, & Yeung, 2015). A closer look at the nature of reported problems clearly suggests that the ERP implementation issues are not just technical, but encompass wider behavioural factors (Skok & Doring, 2014). Organizations need to understand the system adoption from the user's perspective to prepare their employees to face new challenges and learn how to make good use of the technology to reap tangible benefits (Chang et al., 2013). This model is significant to SMEs intending to implement ERP system in the sense that access to information is driven by technology which must be learnt for an individual to accept new technology. The model also emphasises that embracing technology can help in improvement of people's lives.

### **2.2.2 Information Systems Success Model**

The information systems success model as advanced by Delone & McLean (2003) is based on earlier research in communications by Shannon and Weaver as well Mason's theory on Information Influence. As highlighted in the model, three key pillars of information systems success are advanced. These include System Quality, Information Quality and Service Quality.

The theoretical model makes use of a causal relationship to analyse success of implementation of information systems in institutions. The Model comprises of six interrelated dimensions which influence success in implementation of an information system. These include information quality system quality and service quality as independent aspects. These affect the intention to use, user satisfaction and net benefits derived from implementation of an information system. According to the model, an

information system such as an ERP system can be evaluated in terms of information, system and service quality. These subsequently determine system use, intended use, target user satisfaction and net benefits from deployment of the system. Net benefits derived from use of an ERP system can be of either positive or negative influence to satisfaction of users. Net benefits from implementation of an ERP system help to determine feasibility of implemented system (DeLone & McLean, 2003).

The information systems success model will be useful in studying integrated business management information systems and their usage by small and medium enterprises in Kenya. By using the model, the objectives of the research study were best addressed to ascertain not only challenges but also benefits of deployment of these systems in business performance. This theory is important to the study as it will assist SMEs to understand clearly the relationships among six critical dimensions of Information System success which are: information quality, system quality, service quality, system use/usage intentions, user satisfaction, and net system benefits.

### **2.2.3 Diffusion of Innovations Theory**

This study is based on the Diffusion of Innovations (DOI) Theory as described by E.M Rogers in 2003. The theory has its basis in communications and seeks to explain how an idea or product gains momentum and spreads through a specific population or social system. The result of this diffusion is that users take up the new idea or innovation. Adoption as brought out in the theory assumes that users react differently to an innovation compared to previous products or innovations. This facilitates the diffusion process. Diffusion of Innovations Theory posits that theoretically, 49%-87% of the variance of an innovator's rate of adoption is explained by its perceived attributes, type of innovation decision, and nature of social system which the innovation is diffusing and the extent of the agents' promotion efforts in diffusing the innovation (Nzuki,

2012).The theory is useful to both the developers and users of ERP systems in evaluating how these systems are implemented in various projects.

As argued by Rogers (1995), an innovation such as use of ERP in management of business (human resource management, financial resource management, manufacturing resource management, supply chain management, customer relations management) is regarded as a technological innovation. This is realized as a result of paradigm shift from stand-alone information systems to integrated information systems. As cited by Medlin (2001), the theory is useful in investigating implementation of technology in business environments. The theory is useful in the study in evaluating the experiences of SMEs in Kenya in their implementation of enterprise resource planning systems.

The research study borrows heavily from the third (decision) and fourth (implementation) steps in the DOI theory. With deployment of ERP systems in management of small and medium enterprises in Kenya, various organisations are assumed to have undergone the first, second, and third processes in the diffusion of innovations theory as advanced by Rogers (2003). These include gathering knowledge about the ERP systems, persuading stakeholders to support the selected systems in automating their institutional operations and making the decision to implement the systems. While guided by the diffusion of innovations theory, the author will seek to establish the business experiences during the implementation phase of the ERP systems by SMEs.

## **2.3 Empirical review**

### **2.3.1 Information Technology (IT) Infrastructure and Implementation of ERP**

According to Bhatti (2015) adequate IT infrastructure, hardware and networking are crucial for an ERP system's success. It is clear that ERP implementation involves a complex transition from legacy information systems and business processes to an integrated IT infra-structure and common business process throughout the organization. Information systems involve different logic and ways of achieving certain goals.

Luo, (2014) organizations may be overwhelmed by the required organizational changes to fit the system and dealing with ever changing ERP technology and its infrastructure. Further, any successful ERP implementation requires a fit between the ERP system and the organizational processes it supports. Implementing an ERP system involves reengineering the existing business processes to the best business process standard (Stedman, 2013). ERP systems are built on best practices that are followed in the industry. One major benefit of ERP comes from reengineering the company's existing way of doing business (Wallace, 2014).

All the processes in a company must conform to the ERP model. The cost and benefits of aligning with an ERP model could be very high (Wallace, 2014). This is especially true if the company plans to roll out the system worldwide. Stein (2014), it is not very easy to get everyone to agree to the same process. Sometimes business processes are so unique that they need to be preserved, and appropriate steps need to be taken to customize those business processes.

Hydro Agri North America, Inc. implemented ERP (SAP R/3) in 2004, and since then the company is fighting against the integration ERP provides because some of the company's processes are very unique (Stein, 2014). Trying to fit the ERP system

mold resulted in a lot of pain and fewer benefit (Stein, 2014). Koch (2014), companies also face a question as to whether to implement the ERP software "as is" and adopt the ERP system's built-in procedure or customize the product to the specific needs of the company. Johnson (2014), stated that even a best application package can meet only 70 percent of the organizational needs. An organization has to change its processes to conform to the ERP package, customize the software to suit its needs, or not be concerned about meeting the balance 30 percent (Stedman, 2013). If the package cannot adapt to the organization, then organization has to adapt to the package and change its procedures. When an organization customizes the software to suit its needs, the total cost of implementation rises (Needleman, 2013).

The more the customization, the greater the implementation costs. Companies should keep their systems "as is" as much as possible to reduce the costs of customization and future maintenance and upgrade expenses (Stedman, 2013). Needleman (2014), companies implementing electronic supply chains face different kinds of problems with integration of information across the supply chain companies. The major challenge is the impact automation has on the business process (Needleman, 2014). Automation changes the way companies deal with one another, from planning to purchasing to paying.

Needleman (2014), sharing and control of information seem to be major concerns. Companies are concerned about how much information they need to share with their customers and suppliers and how to control the information. Suppliers do not want their competitors to see their prices or order volumes. The general fear is that sharing too much information hurts their business Melymuka (2014). Regarding controlling information, companies are aware that it is difficult to control what they own let alone control what they do not own.

Horwitt (2013), companies need to trust their partners and must coordinate with each other in the chain. The whole chain suffers if one link is slow to provide information or access (Horwitt, 2013). The management also must be concerned about the stress an automated supply chain brings within each organization. For instance, Horwitt (2013), a sales department may be unhappy that electronic ordering has cut it out of the loop, while manufacturing may have to adjust to getting one week's notice to order changes and accommodate those changes into its production orders.

### **2.3.2 Technical Skills and Implementation of ERP**

In the context of ERP implementation, it has been argued that organizational learning is absolutely essential for the success and the effectiveness of the system because organizations need to overcome knowledge barriers to implement the complex software packages they purchase (Ross, & Boudreau, 2012). Successful teams have critical skills in order to understand and communicate team goals, roles, and norms to other members clearly (Edwards, 2014). The success of any project is critically affected by the choice of the right team members, who have proper knowledge and skills (Edwards, 2014).

Specifically, an ERP project requires a cross-functional and multi-skilled implementation team, both because of the integrative nature of ERP systems, and its complicated implementation (Huang, 2013). ERP system design assumes the existence of “a balanced multi-functional team” drawing skills and knowledge from a variety of areas, including competencies for both implementation and use of the system (Huang, 2013). During recent years, research has identified project team competencies and team composition as critical factors for successful implementation of ERP systems.

Nicolaou (2014) poor project team skills and unavailability of skilled people are one the most critical barriers in ERP implementation, and therefore it becomes

necessary to address these areas. Coombs (2015), all employees should be trained on the new technology, even if the technology is easy to use. Employees should be provided hand-outs to enhance post-training results. The people at the keyboard are now making important decisions about buying and selling -- important commitments of the company. They need to understand how their data affects the rest of company. Some of the decisions front-line people make with an ERP system were the responsibility of a manager earlier.

It is important for managers to understand this change in their job and encourage the front-line people to be able to make those decisions themselves. Training employees on ERP is not as simple as Excel training in which you give them a few weeks of training, put them on the job, and they blunder their way through. ERP systems are extremely complex and demand rigorous training. It is difficult for trainers or consultants to pass on the knowledge to the employees in a short period of time. This "knowledge transfer" gets hard if the employees lack computer literacy or have computer phobia. In addition to being taught ERP technology, the employees now have to be taught their new responsibilities. With ERP systems you are continuously being trained. Companies should provide opportunities to enhance the skills of the employees by providing training opportunities on a continuous basis to meet the changing needs of the business and employees.

### **2.3.3 Financial Capital and Implementation of ERP**

Wallace (2012), even though the price of prewritten software is cheap compared with in-house development, the total cost of ERP system implementation could be three to five times the purchase price of the software. Wallace (2012), implementation costs would increase as the degree of customization increases. The cost of hiring ERP system

consultants and all that goes with it can consume up to 30 percent of the overall budget for the ERP implementation (Stedman, 2014).

According to Gartner Group (2013), total cost of an outside ERP system consultant is around \$1600 per day. Koch (2015), going for in-house ERP-trained technologists creates its own worries. Koch (2015), once the selected employees are trained after investing a huge sum of money, it is a challenge to retain them, especially in a market that is hungry for skilled ERP system consultants. Horwitt (2014) employees could double or triple their salaries by accepting other positions. Retention strategies such as bonus programs, company perks, salary increases, continual training and education, and appeals to company loyalty could work (Horwitt, 2014). Other intangible strategies such as flexible work hours, telecommuting options, and opportunities to work with leading-edge technologies are also being used. Many companies simply strive to complete the projects quickly for fear of poaching by head-hunting agencies and other companies (Horwitt, 2014).

According to Stedman (2014), training and updating employees on ERP is a major challenge. People are one of the hidden costs of ERP implementation (Stedman, 2014). Without proper training, about 30 percent to 40 percent of front-line workers will not be able to handle the demands of the new system. A Sample study of Taiwanese firms also found that it takes about 11 months on average to implement the ERP system (Huang, 2014). A similar period was suggested by Nicolaou (2014) who stated that ERP implementation projects take on average 8 months. In all cases, Gupta, (2013) mentioned that ERP projects frequently require more time and intensive capital than what was planned due to the heavy integration needed on the technical and business sides.

### 2.3.4 Implementation Partner and ERP Implementation

Cohen (2010) points out that implementation and training are the crux of an ERP system and businesses that were not supported in this sense developed a negative perception of the system. Summers (2010) said that 90% of ERP implementation in organisations failed because companies did not choose the right business partner and thus lacked the support, consultancy and training critical to the process.

Individuals, companies and managers often face difficulties in comprehending the full spectrum of capabilities and attributes of ERP systems, due to the system's complicated nature (Finney, 2013). Effective communication is a strong foundation of a trustworthy relationship between external consultants and organizational members (Attewell, 2012). The more consultants and users understand each other, the more effective the communication becomes during the consulting process. Insufficient communication of users' needs, goals and aspirations to the consultants may undermine the implementation of the ERP system (Chen, 2014).

The consulting process is an undertaking that, in order to be effective, constant communication with the client is needed (Lee and Kim, 2012). With effective communication, information can be transferred and exchanged easier between both parties who realize, in that way, that sustaining this relationship is at their best interest. Such relationship, accordingly, generates trust between the client company and the consultant company. As a result, the two companies become allies in a common effort to minimize conflicts that may arise in their cooperation (Morgan and Hunt, 2013). The implementation of an ERP system is a time-consuming process. During that process certain conflicts may occur between users and consultants (King, 2015). Such conflicts will possibly affect in an adverse way the output of the consultant-client relationship (McGivern, 2013). However, the emergence of disagreements during the

implementation period should not be considered as a negative turn in the cooperation, but rather as a common incident during a long-lasting collaboration (Green, 2014).

Effective management of conflicts may lead in an enhanced level of information exchange and group work, thus, improving the implementation of the ERP system (Scott and Kaind, 2012). Knowledge transfer in the ERP consulting process can be described as a gradual procedure in which knowledge is being transferred from external consultants and vendors to the internal environment of the company (Wang et al., 2015). An increased level of knowledge concerning the ERP system will enable the company to exploit the new technology to its full potential and continue to achieve benefits from the use of the system in the future.

Freeman (2014), consultants play a major part in the ERP implementation challenge, since they have the technical knowledge and expertise to assist users in filling the unavoidable knowledge gap that derives from implementing a new ERP system. Under that logic, the consulting process becomes a necessity for any company that is willing to implement an ERP system (Freeman, 2014). The solutions that consultants offer during and after the configuration of the ERP system directly influence the effectiveness of the implemented ERP, independent of their interactions with their client (Wang, 2013).

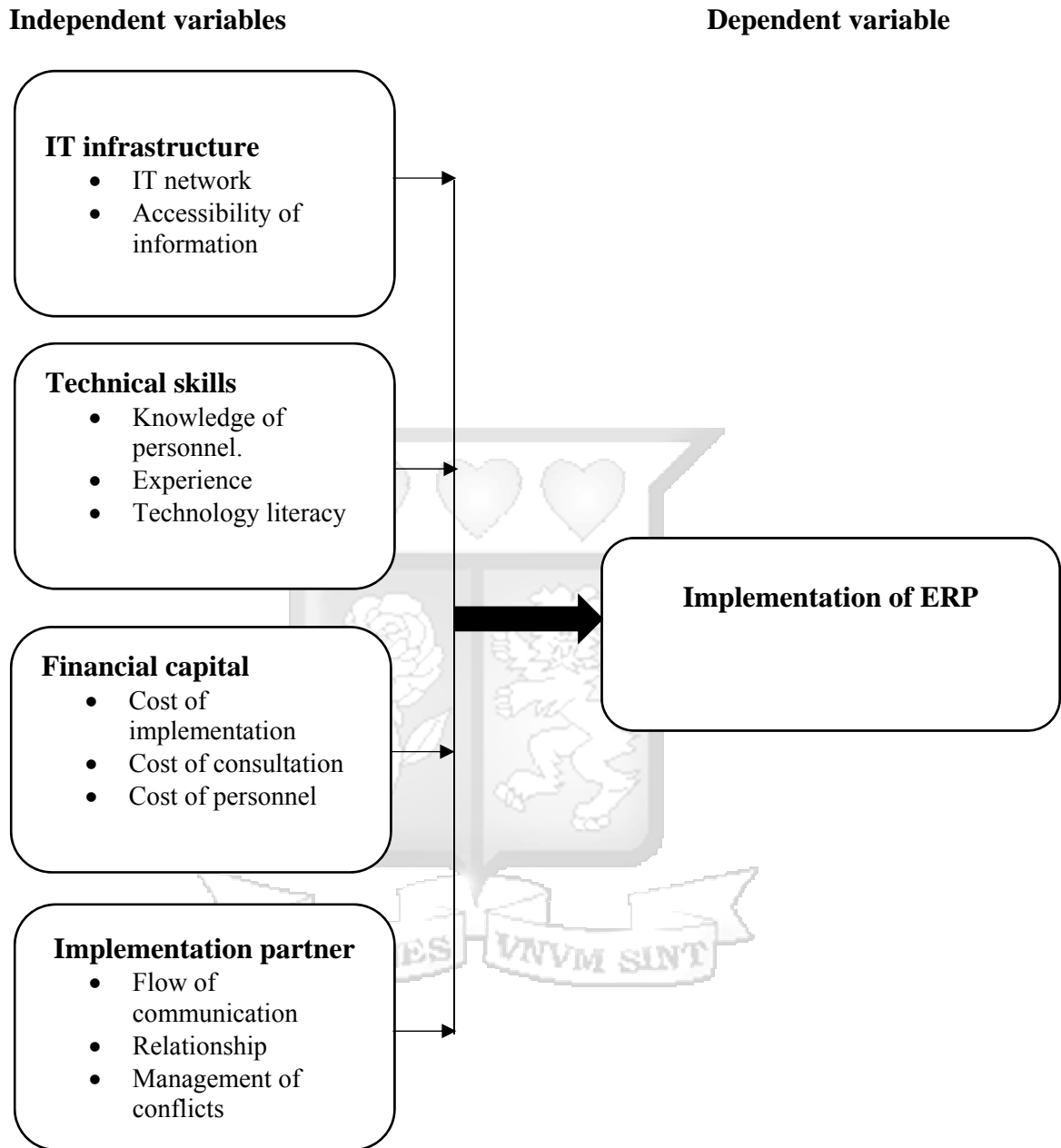
## **2.4 Research gap**

The study pursued this line of investigation to further address the gap in our understanding of determinants of ERP implementation in Kenya. Studies and suggestions meant to achieve desired productivity of enterprise systems, technical improvements and reduction of operational costs are required. The literature has demonstrated that this can be done by aligning organisational functions to functionality

of enterprise system under implementation (Finney, 2013; & Chen, 2014). This would help in choosing an ERP implementation type and customization that not only meets business functional needs but also budgetary constraints of the respective company. To achieve desired levels of service delivery in businesses, use of adequate mix of both internal and external expertise is required in implementation of enterprise systems by SMEs (Kaindi, 2012). However few studies have been done on the topic; determinants of ERP implementation by SMEs in Kenya (Nzuki, 2012; Kaindi, 2012; Melymuka, 2012; & Kim, 2012).

The technology acceptance model is based on the theory of reasoned action (TRA) according to Azjen and Fishbein (1980) which proposes that an individual's behavioural intention to use a system is determined by two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). However, the model does not explain clearly what could be the result for perceived usefulness for the individual. On the other hand, Information Systems Success Model talks of six interrelated dimensions which influence success in implementation of an information system. These include information quality system quality and service quality as independent aspects. These affect the intention to use, user satisfaction and net benefits derived from implementation of an information system. The model however does not give recommendations to SMEs on how to implement enterprise resource planning systems successfully. It only discusses three pillars of information systems success: - System Quality, Information Quality and Service Quality.

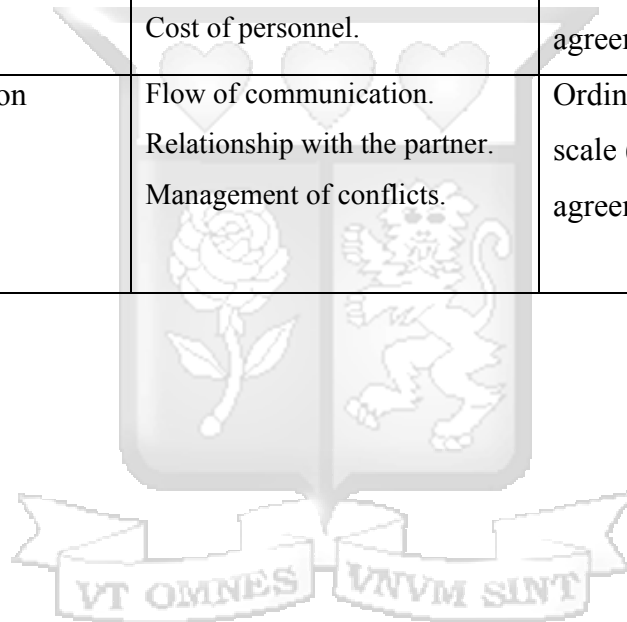
## 2.5 Conceptual framework



**Figure 2.3:** Conceptual framework (Melymuka, 2014; Needleman, 2012; Horwitt, 2015; Stedman, 2013).

## 2.6 Operationalization of the Variables

Variable	Indicators	Measurement
IT infrastructure	IT network. Accessibility of information.	Ordinal scale (5 point Likert scale (to determine level of agreement/disagreement))
Technical skills	Knowledge of personnel. Experience. Technology literacy.	Ordinal scale (5 point Likert scale (to determine level of agreement/disagreement))
Financial capital	Cost of implementation. Cost of consultation. Cost of personnel.	Ordinal scale (5 point Likert scale (to determine level of agreement/disagreement))
Implementation partner	Flow of communication. Relationship with the partner. Management of conflicts.	Ordinal scale (5 point Likert scale (to determine level of agreement/disagreement))



## **Chapter 3: Research Methodology**

### **3.1 Introduction**

The part has different areas demonstrating the system which was applied to undertake this particular investigation with the objective of answering the key specific objectives of the examination. The areas include; research design, sampling techniques to be used, data collection methods, data analysis and ethical considerations.

### **3.2 Research Design**

In his study Robson (2014), described research design as a detailed outline of how an investigation takes place. The study used descriptive research design. The study sought to answer the questions; what are the Key factors that are necessary to implement an ERP?; and what is the impact of ERP have on the business performance and therefore the choice of this research design was in line with Ader (2013), who indicated that descriptive research design is used when the researcher wants to find out “what is” and to describe specific behavior as it occurs in the environment - This was the motivation in choosing descriptive design in this study with the main aim of describing comprehensively the the determinants of ERP implementation by SMEs in Kenya.

### **3.3 Population and sampling**

The target population of the study was the Small and Medium Enterprises within the Nairobi County which are listed as top 100 SMEs in 2017 by KPMG and Nation Media (Appendix III). The interest in SMEs was because the sector plays a major role in economic growth especially in Kenyan economy (Nzuki, 2012). The author applied judgmental procedure to select 10 SMEs from the target population within Nairobi County and interview 1 respondent from each of the following categories of individuals in each business; Chief executive officer, managing directors, managers, heads of departments and other subordinate staff making a sample size of 50 respondents which

was considered adequate for this particular study. According to Hum (2015), using too many participants in a study is expensive and exposes more number of subjects to procedure. This is also amplified by Russel (2001) who observed that a study should be of an adequate size relative to the objectives of the study. It must be big enough that an effect of such magnitude as to be of scientific significance will also be statistically significant. The selection of 10 SMEs was based on the following factors: type of business; number of employees; employee turnover; and ERP implementation.

**Table 3.1: Population and Sampling**

	Manix Ltd		Napro Ltd		Bagda Ltd		Skypex Ltd		Elite tools		Fayaz Ltd		Lota Ltd		Roy Ltd		Komal Ltd		Allwin Ltd		
	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	
<i>Quotas</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	<i>P</i>	<i>S</i>	
C.E.O	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
M.D	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Managers	5	1	4	1	3	1	3	1	4	1	2	1	4	1	5	1	2	1	3	1	
H.O.D	6	1	6	1	3	1	4	1	3	1	2	1	7	1	4	1	6	1	2	1	
Subordinates	12	1	8	1	13	1	21	1	13	1	10	1	11	1	12	1	17	1	19	1	
<b>Total</b>	<b>26</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>21</b>	<b>5</b>	<b>30</b>	<b>5</b>	<b>21</b>	<b>5</b>	<b>16</b>	<b>5</b>	<b>24</b>	<b>5</b>	<b>23</b>	<b>5</b>	<b>27</b>	<b>5</b>	<b>26</b>	<b>5</b>	

### 3.4 Data collection methods

Both primary and secondary data were used for the study. This study used questionnaire as the key instrument for primary data collection. Secondary data was gathered using publications based on data from the World Values Surveys, government records, non-profit organisations (NGOs) records, media articles, and studies related to the current topic. The use of questionnaire was preferred as it ensured confidentiality was upheld, saved on time, and was easy to administer (Bell 2013). The questionnaire was ideal because the author was able to collect information from a larger sample. It also gave a

greater feeling of anonymity hence encouraged open responses to sensitive questions and was free from bias and so accurate and valid data was achieved.

The questionnaire used structured (closed ended) and unstructured (open ended) to elicit specific responses for quantitative and qualitative analysis respectively. Some of the closed ended questions required a response on a five point Likert scale, showing to what extent each factor (IT infrastructure, technical skills, financial capital, implementation partner,) determine ERP implementation.

The questionnaire was organized into themes. The first theme of the questionnaire dealt with demographic statistics such as education level. The other sections comprised questions from the two objectives. As a strategy aimed at getting credible data from the field, the author trained enumerators who assisted in questionnaire administration.

#### **3.4.1 Reliability of Research Instruments**

McColl (2012) described reliability as the degree to which a test consistently measures whatever it measures. Bozlu (2013) errors of measurement that affect reliability are random errors and errors of measurement that affect validity are systematic or constant errors. To ensure consistency of the instrument, a pilot study was conducted using a random sample of 10 participants in the following companies listed among the top 100 SMEs in 2017 by KPMG: - Polytanks ltd; Pathcare Kenya ltd, Elite tools ltd; Roy Transmotors ltd; Bimas Kenya ltd; and Waterman Drilling Africa ltd. SMEs have almost similar characteristics, and the number 10 is chosen for the pretest based on Kathuri and Pals, (2013) suggestion that it is the smallest number that yields meaningful results in data analysis in a survey research. The pilot results were subjected to the spilt-half analysis technique according to Cronbach's formula;

$$\alpha = (N*r/1+ (N-1)*r)$$

Where  $N$  = number of items and  $r$  is the average inter-item correlation among the items. The pilot results achieved a reliability coefficient of 0.7 which meant that the questions used in the questionnaire were relevant and easy to tackle by the participants. According to Sekeran (2013) a pilot test is necessary for testing the reliability of data collection instruments. Pilot study was thus conducted to test weaknesses in design and instrumentation to provide proxy data for selection of a sample.

### **3.4.2 Validity of Findings**

Bozlu (2013) defined validity of data as the extent to which a test measures what it is supposed to measure. The author argued that the question of validity is raised in the context of the three points; the form of the test, the purpose of the test and the population for whom it is intended. Face validity was applied in this study by asking participants whether they felt the test was well constructed and useful...?.

Content and construct validity was used to evaluate the inferences based on the results from the instruments. To establish content and construct validity the researcher sought expert opinion concerning the research instruments from the supervisors at Strathmore Business School (SBS).

### **3.5 Data Analysis**

The questionnaires were first edited then coded to facilitate statistical analysis. Data collected was both qualitative and quantitative. Primary data was analyzed using factor analysis and presented by use of frequency distribution tables, mean scores and standard deviations. Statistical Package for Social Science (SPSS) will be the key tool for data analysis. Probit model of analysis was also applied to analyze binomial response from the data findings.

These analyses were used to address the specific objectives (to establish the determinants of ERP implementation by SMEs in Kenya; and to find out the effect of

ERP implementation on business performance). With the help of (SPSS) the findings were presented in frequency distribution tables, bar charts and pie charts. The data was then be summarized according to the study's specific objectives.

$$F(Y) = Y = X\beta + \varepsilon$$

Where-:  $F(Y) = \Phi^{-1}(Y)$  - this is known as probit link

$\Phi$  -Cumulative Distribution Function (CDF)

$\varepsilon$  -  $N(0, 1)$  known as latent variable-i.e variables that are not directly observed.

Y -an indicator for whether this latent variable ( $\varepsilon$ ) is positive

X-vector of regressors

$\beta$ - Measure of the volatility-typically estimated by maximum likelihood.

Y- Denotes the dependent variable which is ERP Implementation while X- denotes the observable variables (IT infrastructure, technical skills, financial capital, and implementation partner).

N- is our sample size.

### **3.6 Ethical issues**

Data was collected from the sampled respondents after obtaining their consent. The anonymity of the respondents was upheld at all times. In addition, all the information from the respondents was held in confidence and never shared for any other purpose other than for academic goal by the researcher. An official letter was obtained from Strathmore Business School (SBS) and an introductory letter from the researcher provided in the course of the data collection.

## **Chapter Four: Presentation of Research Findings**

### **4.1 Introduction**

This chapter discusses research findings of the study, which was aimed to assess the determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises in Kenya with specific reference to Nairobi County. The chapter presents the analysis of the findings guided by questionnaire responses as well as secondary data obtained from business annual reports. The analyses were divided into two sections. First section analysed respondents' demographics while the second section did a detailed analysis on Enterprise Resource Planning implementation by Small and Medium Enterprises in Nairobi County.

### **4.2 Sample Characteristics**

In this section, the author was interested on the age of the respondents, level of education and gender.



**Table 4.1: Frequency Distribution of Respondents' Demographics**

Variable	Frequency	Percentage
<b>Age</b>		
18-24	2	4%
25-34	29	58%
35-44	11	22%
45-54	5	10%
55-64	2	4%
65-75	1	2%
Above 75	0	0.00%
<b>Total</b>	<b>50</b>	<b>100.00%</b>
<b>Level of Education</b>		
Masters holder	16	32%
Degree holder	17	34%
Diploma holder	10	20%
PhD	4	8%
Certificate	3	6%
<b>Total</b>	<b>50</b>	<b>100.00%</b>
<b>Duration (in years) in the Business</b>		
Less than 2 years	6	12%
3 -5 years	8	16%
6- 10 years	24	48%
Over 10 years	12	24%
<b>Total</b>	<b>50</b>	<b>100.00%</b>

Table 4.1 above revealed that most of the respondents were within the age category of 25-34 years 29, 58%), followed by age category 35-34 (11, 22 %). This was followed by age category 45-54 (5, 10%), followed by age group 18-24 (2, 4%). The least percentages of respondents interviewed were in the age categories 65-74 (1, 2%).

The findings are in line with studies conducted by Munyua (2012) who noted that most young people (20-35 years) in Kenya dominate the labor markets across all sectors. Age was significant to the study because individuals who grow up at the same time are a generation and often share many of the same experiences as others of the same age group. This depicts that age can influence determinants of Enterprise

Resource Planning implementation by Small and Medium Enterprises in Kenya. The findings could then mean that the sampled SMEs are employing fresh graduates who can innovate and bring in new business ideas in the business to assist in implementing ERP.

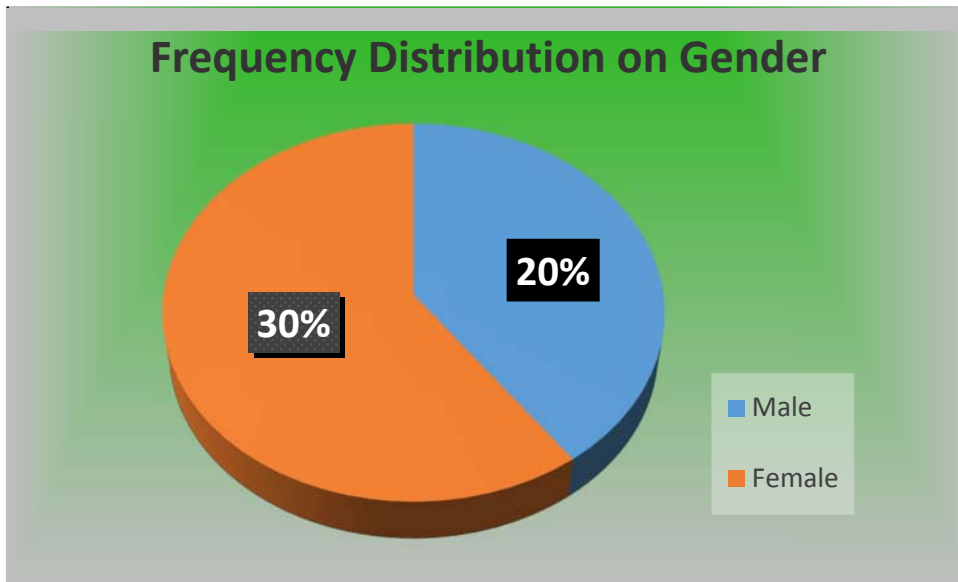
Further results in table 4.1 above shows that majority of respondents interviewed had attained a bachelor's degree (17, 34%), followed closely by masters level (15, 32%). 20% (10) of the respondents interviewed were found to have attained a diploma. A small percentage of respondents (4, 8%) had attained a PhD closely followed by certificate level (3, 6%). This goes to show that most participants in the study population are either a degree holder (34%) or a master's holder (32%). Level of education was significant to this study because educated respondents have higher capability in processing information and are able to make substantive decisions and therefore education can influence determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises. The results above therefore means that the sampled SMEs are keen on employing skilled personnel to successfully implement ERP system.

The findings further revealed that 48% of the respondents interviewed had been in business for a period of between 6 and 10 years during the time of interview. 24% of the participants interviewed had been in business for over 10 years as indicated in table 4.1. Followed by 16% who reported to have been in business for duration of between 3 and 5 years when this study was being undertaken. 12% of the respondents reported to have been in business for less than 2 years. The results could mean that majority of the participants have been in business for at least 5 years which could suggest that they have good experience of Enterprise Resource Planning.

#### 4.2.1 Gender.

In this sub section, the interest of the author was to determine gender distribution of the participants.

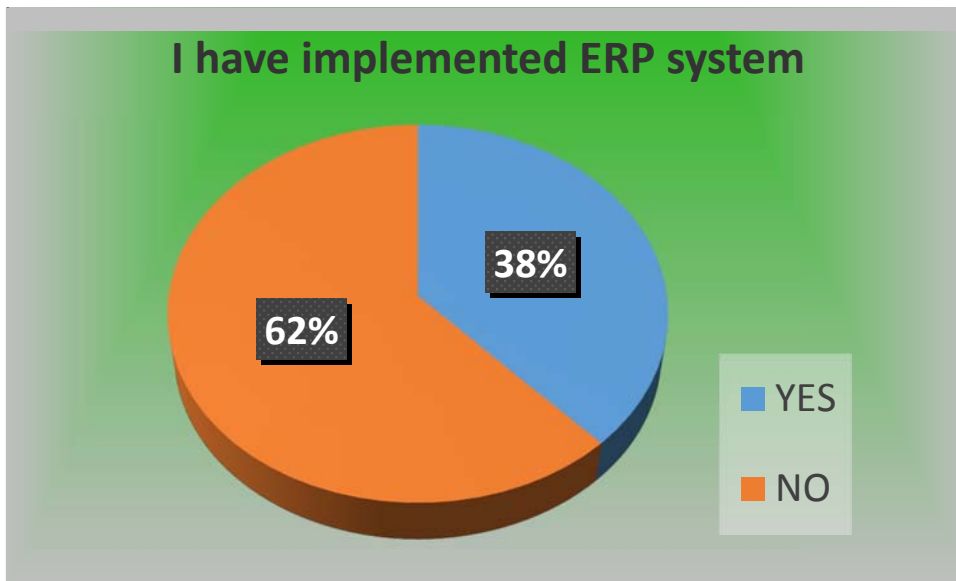
**Figure 4.1: Frequency Distribution on Gender**



The results in figure 4.1 above reveals that the highest percentage of respondents interviewed (30, 60%) were female while (20, 40%) were male. This could mean that the SME sector in Nairobi County is widely dominated by female. Gender mix was important in this research because different genders have different ways of thinking. Women tend to be more aware of emotions (Wahome, 2014) and this could help to get there inner views with respect to determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises.

#### 4.2.2 Distribution of Respondents by Implementation of ERP

Figure 4.2 Distribution of Respondents by Implementation of ERP



As shown in figure 4.2 above, the highest percentage (62%) of respondents interviewed indicated that they have not implemented ERP systems in their businesses and only 38% indicated they have ERP systems. The results align to a study conducted by Azim (2010) which found that ERP implementation success rates are unsatisfactory and still remain very low in most developing countries and Kenya in particular. Small and medium sized enterprises in Kenya have not fully embraced ERP systems to integrate their operations in a bid to cut on operational costs, and interact with their stakeholders in ‘real-time’. This could be attributed to lack of skill and financial capital by the businesses in the study area.

#### 4.3 Respondents on Implementation of ERP in Business.

In this section, the researcher sought to determine the extent to which the SMEs in Nairobi County have implemented ERP. Respondents were asked to indicate their level of agreement/disagreement on implementation of ERP in their businesses.

**Table 4.2: Respondents on Implementation of ERP in Business.**

Indicator	SD	D	U	A	SA	Total
Our ERP systems are fully implemented.	4.00%, 2	28.00%, 14	18.00%, 9	36.00%, 18	14.00%, 7	50
Our ERP System is now fully operational.	8.00%, 4	18.00%, 9	14.00%, 7	40.00%, 20	20.00%, 10	50
All our ERP modules are fully operational and used as intended by our organization.	4.00%, 2	16.00%, 8	12.00%, 6	36.00%, 18	32.00%, 16	50
Order Management / Sales Module has been implemented to your satisfaction.	10.00%, 5	14.00%, 7	6.00%, 3	24.00%, 12	46.00%, 23	50
Finance / Accounting has been implemented to my satisfaction.	8.00%, 4	14.00%, 7	10.00%, 5	32.00%, 16	36.00%, 18	50
Manufacturing / Production Planning has been implemented to my satisfaction.	6.00%, 3	8.00%, 4	18.00%, 9	38.00%, 19	30.00%, 15	50
Supply Chain Management has been implemented to my satisfaction.	16.00%, 8	16.00%, 8	10.00%, 5	24.00%, 12	34.00%, 17	50
Human Resource Management has been implemented to your satisfaction.	6.00%, 3	18.00%, 9	16.00%, 8	22.00%, 11	38.00%, 19	50
It is now easier to track employee responsibility throughout the organization since the ERP system implementation.	14.00%, 7	18.00%, 9	6.00%, 3	38.00%, 19	24.00%, 12	50

Table 4.2 above indicates that 50% of the participants agreed (14% strongly agreed, 36% agreed) that ERP systems are fully implemented in their business. 32% disagreed (4% strongly disagreed, 28% disagreed). While 18% remained undecided. This finding goes to mean that most of the SMEs in Nairobi County have implemented ERP system and women entrepreneurs who have attained at least a bachelor's degree dominate the sector. The findings are consistent with another study conducted by Edwards (2014), which averred that the success of any project is critically affected by the choice of the right team members, who have proper knowledge and skills.

Further results in table 4.2 above also show that 60% of the respondents interviewed agreed (20% strongly agreed, 40% agreed) that the ERP System from the sampled SMEs are fully operational. 26% disagreed (8% strongly disagreed, 18% disagreed) while 14% remained undecided. This could mean that the sampled businesses have committed resources to ensure the ERP system is working. The results are supported by a study conducted by Huang (2013) which indicated that an ERP project requires a cross-functional and multi-skilled implementation team, both because of the integrative nature of ERP systems, and its complicated implementation. This is also amplified by Nicolaou (2014) who noted that ERP system design assumes the existence of a balanced multi-functional team drawing skills and knowledge from a variety of areas, including competencies for both implementation and use of the system.

Further findings revealed that, of the total 50 participants interviewed, 70% agreed that Order Management / Sales Module has been implemented to their satisfaction within the business. Only 24% disagreed while 6% remained undecided. 68% of the respondents agreed that finance /accounting has been implemented to their satisfaction within the business, 22% disagreed while 10% of those interviewed remained undecided.

Additionally, majority (68%) of the participants agreed that manufacturing/production planning has been implemented to their satisfaction within the business, 14% disagreed while 18% remained undecided. 58% of the respondents agreed that Supply Chain Management has been implemented to their satisfaction within the business, 32% disagreed while 10% of those interviewed remained neutral. Further, 60% of the respondents agreed that human resource management has been implemented to their satisfaction with the business, 24% disagreed while 16% remained undecided.

Finally, table 4.2 revealed that majority (62%) of the participants agreed that it is was easier to track employee responsibility throughout the organization since the ERP system implementation, 32% disagreed while only 6% remained undecided. These findings could mean that majority of the SMEs in the study population have actually succeeded in full implementation of ERP system. This goes to mean that the owners have invested in finance capital, technology, and technical skills as Coombs (2015) points out that companies should provide opportunities to enhance the skills of the employees by providing training opportunities on a continuous basis to meet the changing needs of the business and employees.

#### **4.4 Respondents on the Impact of Information Technology (IT) Infrastructure on ERP Implementation**

In this section, the researcher sought to determine the impact of IT infrastructure on the ERP implementation by the SMEs in Nairobi County.

**Table 4.3: Respondents on the Impact of IT infrastructure on ERP Implementation**

Indicator	NAA	VLE	LE	GE	VGE	Total
Impact of cost of implementing an ERP on implementation plan decisions?	14.00% 7	20.00% 10	14.00% 7	32.00% 16	20.00% 10	50
Effect of sharing and control of information on decision to implement ERP?	4.00% 2	10.00% 5	16.00% 8	38.00% 19	32.00% 16	50
Sharing of too much information and ERP implementation decisions.	12.00% 6	22.00% 11	20.00% 10	34.00% 17	12.00% 6	50
Chain of information and slow flow of information?	14.00% 7	18.00% 9	14.00% 7	34.00% 17	20.00% 10	50

When asked how much did cost of implementing an ERP impact on ERP implementation plan decisions. Highest percentage (52%) of the respondents indicated great extent, 34% great little while 14% no impact at all as shown in table 4.3 above.

More findings in table 4.3 above reveal that when asked how much did sharing and control of information pose a concern in their decision to implement ERP. 60% indicated to great extent, 14% indicated little extent while 16% indicated no impact at all.

When asked how much did the fact that there was going to be sharing of too much information in order to implement the ERP system affected their decisions to implement ERP system, highest percentage (46%) indicated to great extent, 34% little extent while 20% indicated no impact at all.

Finally, table 4.3 reveals that majority of the participants interviewed when asked how much does the whole chain of information suffer if one link to the information flow is slow to provide information 54% indicated to great extent, 32% indicated little extent while 14% indicated no impact at all.

#### **4.5 Respondents on the Impact of Technical Skills on ERP Implementation**

In this section, the researcher sought to determine the extent to which technical skills impact implementation of ERP by the SMEs in Nairobi County.

**Table 4.4: Respondents on the Impact of Technical Skills on ERP Implementation**

Indicator	NAA	VLE	LE	GE	VGE	Total
Training versus the front line workers for the ERP Systems implementation?	8.00% 4	36.00% 18	18.00% 9	28.00% 14	10.00% 5	50
Technical skills of employees versus adoption of ERP Implementation?	4.00% 2	26.00% 13	30.00% 15	30.00% 15	10.00% 5	50
Training versus ERP Implementation?	6.00% 3	20.00% 10	10.00% 5	36.00% 18	28.00% 14	50
Success of ERP implementation versus right personnel in an organization?	0.00% 0	14.00% 7	14.00% 7	26.00% 13	46.00% 23	50
ERP project requires a cross-functional and multi-skilled implementation team?	8.00% 4	18.00% 9	10.00% 5	28.00% 14	36.00% 18	50
Poor project team skills, unavailability of skilled people versus ERP implementation?	10.00% 5	18.00% 9	24.00% 12	24.00% 12	24.00% 12	50
Importance of training employees on ERP systems implementation?	4.00% 2	12.00% 6	16.00% 8	44.00% 22	24.00% 12	50
Training opportunities versus skills of the employees in ERP Implementation?	4.08% 2	18.37% 9	12.24% 6	32.65% 16	32.65% 16	50
Training opportunities for Companies versus willingness for ERP systems implementation?	6.12% 3	10.20% 5	18.37% 9	42.86% 21	22.45% 11	50

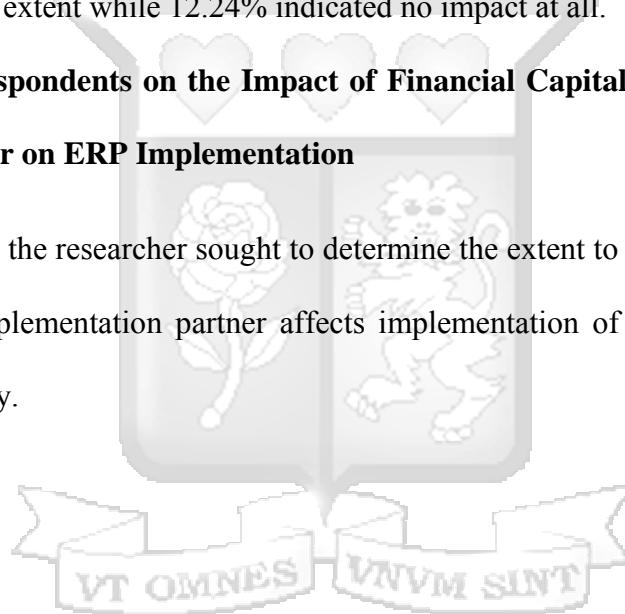
When asked how much has the training prepared the front line workers for the ERP systems implementation? Highest percentage (44%) of the respondents indicated little extent, 38% great extent while 18% no impact at all as shown in table 4.4 above. More findings in table 4.4 above reveal that when respondents asked how much technical skills of the employees have enhanced their adoption of the ERP system Implementation. 40% indicated to great extent, 30% indicated little extent while 30% indicated no impact at all.

Additionally, when asked how much does the success of ERP implementation depend on the right personnel in an organization, the highest percentage (72%) indicated great extent, 14% little extent while another 14% indicated no impact at all as per table 4.4.. Further results reveals that the highest percentage (64%) indicated that ERP project requires a cross-functional and multi-skilled implementation team to a great extent. 26% indicated little extent and 10% indicated no impact at all.

When asked how much is training employees on ERP important in the ERP systems implementation, 65.3% Of the participants indicated great extent, 22.45% indicated little extent while 12.24% indicated no impact at all.

#### **4.6 Respondents on the Impact of Financial Capital and Implementation Partner on ERP Implementation**

In this section, the researcher sought to determine the extent to which financial capital as well as Implementation partner affects implementation of ERP by the SMEs in Nairobi County.



**Table 4.5: Respondents on the Impact of Financial Capital and Implementation**

**Partner on ERP Implementation**

Indicator	NAA	VLE	LE	GE	VGE	Total
Cost of hiring ERP system consultants versus ERP implementation	14.00% 7	34.00% 17	12.00% 6	36.00% 18	4.00% 2	50
How much are the Training people regarded as one of the hidden costs of ERP implementation?	10.20% 5	20.41% 10	14.29% 7	32.65% 16	22.45% 11	50
ERP software affordability to organizations?	8.00% 4	12.00% 6	24.00% 12	28.00% 14	28.00% 14	50
Affordability of ERP software versus Adoption of an ERP?	8.00% 4	12.00% 6	16.00% 8	36.00% 18	28.00% 14	50
Expected Return on Investment versus adoption of ERP System?	12.00% 6	12.00% 6	20.00% 10	34.00% 17	22.00% 11	50
Effective communication versus relationship between external consultants and ERP systems implementation?	10.00% 5	10.00% 5	24.00% 12	38.00% 19	18.00% 9	50
How much is Training employees on ERP important in the ERP systems implementation?	14.00% 7	20.00% 10	6.00% 3	34.00% 17	26.00% 13	50
Effective management of conflicts versus ERP systems implementation?	10.00% 5	8.00% 4	10.00% 5	34.00% 17	38.00% 19	50
Consultants versus ERP implementation?	6.00% 3	10.00% 5	16.00% 8	32.00% 16	36.00% 18	50
Solutions that consultants offer versus the effectiveness of the implemented ERP	10.00% 5	18.00% 9	24.00% 12	30.00% 15	18.00% 9	50

When asked how much is the cost of hiring ERP system consultants, which can consume up to 30 percent of the overall budget for the ERP implementation important to the implementation. Highest percentage (48%) of the respondents indicated little extent, 38% great extent while 12% no impact at all as shown in table 4.5 above.

Further results in table 4.5 above reveal that when asked to what extent is the ERP software not affordable to organizations. 56% indicated to great extent, 30% indicated little extent while 24% indicated no impact at all.

Additionally, when asked to what extent was the expected Return on Investment in ERP systems Implementation a major factor in adopting ERP System, the highest percentage (56%) indicated great extent, 24% little extent while another 20% indicated no impact at all as per table 4.5.

Further results reveals that the highest percentage (56%) indicated that effective communication is important to building a strong and trustworthy relationship between external consultants and organizational members in the ERP systems implementation to a great extent. 20% indicated little extent and 24% indicated no impact at all.

When asked how much do consultants play a major part in the ERP implementation, 68% of the participants indicated great extent, 16% indicated little extent while 16% indicated no impact at all.

#### **4.7 Summary of Probit Analysis on Determinants of ERP Implementation by SMEs in Kenya.**

In this particular area, the researcher wanted to find out whether ERP Implementation has actually happened among the sampled SMEs in Nairobi. The test focused on the following study variables: - IT network infrastructure; accessibility of information; knowledge of personnel; experience; technology literacy cost of implementation; cost of consultation; cost of personnel; flow of communication; relationship with implementation partners; and management of conflicts. The researcher used probit model for binary unit (1 / 0). 1 if the response is “Yes” and 0 if otherwise.

The outcome of the probability of ERP implementation was computed by the use of marginal effects. The marginal effect is associated with continuous explanatory variables  $X_k$  on the probability function  $F(Y) = \mathbf{X}\beta + \varepsilon$  when other factors are held constant.

$$\text{Probit (Y)} = \mathbf{X}\beta + \varepsilon$$

Whereby in this study;  $X_i$ = IT network infrastructure,  $X_{ii}$ = accessibility of information,  $X_{iii}$ = knowledge of personnel,  $X_{iv}$ = staff experience,  $X_v$ = technology literacy,  $X_{vi}$ = cost of implementation,  $X_{vii}$ = cost of consultation,  $X_{viii}$ = cost of personnel,  $X_{ix}$ = flow of communication,  $X_x$ = relationship with implementation partners,  $X_{xi}$ = management of conflicts. Therefore, the researcher was keen on the specific variables that are statistically key in the probit model.

**Table 4.6 Summary of Probit Analysis on Determinants of ERP Implementation by SMEs in Nairobi County.**

Parameters	Probit Estimates	Standard error	Marginal effects	P - values
IT network infrastructure	0.2784	-0.2222	0.0538	0.120
accessibility of information	0.1498	0.1112	0.0289	0.008
knowledge of personnel	0.0706	0.3167	0.0136	0.084
staff experience	0.0920	0.2612	0.0177	0.046
technology literacy	0.1711	-0.0055	0.0376	0.064
cost of implementation	0.0835	0.2834	0.0161	0.065
cost of consultation	0.1306	0.1612	0.0252	0.101
cost of personnel	0.006	0.1018	0.0200	0.083
flow of communication	0.062	0.0888	-0.0171	0.028
relationship with implementation partners	0.1297	-0.035	0.0218	0.009
Management of conflicts.	0.111	0.0256	0.04234	0.083

$P > 0.10$  No evidence against the null hypothesis

$0.05 < P < 0.10$  Weak evidence against the null hypothesis in favor of alternative.

$0.01 < P < 0.05$  Moderate evidence against the null hypothesis in favor of alternative.

$0.001 < P < 0.01$  Strong evidence against the null hypothesis in favor of alternative

$P < 0.001$  Very strong evidence against the null hypothesis in favor of alternative

The results in table 4.6 above show no evidence on IT network infrastructure against the null hypothesis as indicated by (0.12 p-value). This could mean that most businesses in the study can access internet and communication network coverage.

Results also reveal a very strong evidence against null hypothesis on accessibility of information (0.008 p-value). This means that majority of the businesses in the study area are not in a position to access the right ERP implementation information.

Further results in table 4.6 show moderate evidence against the null hypothesis on knowledge of personnel; technology literacy; cost of implementation; cost of personnel, flow of communication, and management of conflicts as indicated by 0.084, 0.046, 0.064, 0.065, 0.083, 0.028 & 0.083 p-values respectively.

Cost of consultation shows no evidence against null hypothesis (0.101 p-value). This could mean that the consultation is actually affordable in the study area. Finally, the probit estimates in table 4.6 above show a very strong evidence against null hypothesis on relationship with implementation partners (0.009 p-value).

#### **4.8 Factor Analysis**

In this section, the researcher was interested in finding out which of the following variables are the most important for ERP implementation: IT network infrastructure; accessibility of information; knowledge of personnel; staff experience; technology literacy; cost of implementation; cost of consultation; cost of personnel; flow of

communication; relationship with implementation partners; and Management of conflicts.

**Table 4.7: Correlations between variables and factors after Varimax rotation:**

Variables	D1	D2
IT network infrastructure	0.217	0.687
Accessibility of information	0.521	0.169
Knowledge of personnel	0.001	0.314
Staff experience	0.644	0.041
Technology literacy	0.877	-0.059
Cost of implementation	0.867	0.143
Cost of consultation	0.589	-0.385
Cost of personnel	0.851	0.302
Flow of communication	0.081	0.864
Relationship with implementation partners	0.777	0.391
Management of conflicts.	0.854	0.236

Table 4.7 shows that technology literacy has got the highest factor loading (0.877) on factor 1 (D1) which means that the variable has the strongest association with ERP implementation. This goes to mean that the company has enough informed personnel to implement ERP. This is followed by cost of implementation, which has a correlation of 0.867 with ERP implementation. Cost of personnel, management of conflicts and relationship with implementation partners have also large positive loadings on factor 1 (D1):- 0.854, 0.851 and 0.777 which means that they have a strong relationship with ERP implementation. On the other hand, IT infrastructure has a large positive loading (0.687) on factor 2 (D2) which means that the company has the necessary IT capacity to implement ERP.

## **Chapter 5: Discussion, Conclusions and Recommendations**

### **5.1 Introduction**

This was the final chapter of the study. It summarized the findings of the primary study and implications of the study and provided recommendations.

### **5.2 Discussion**

#### **5.2.1 How does information technology (IT) infrastructure affect ERP implementation by SMEs in Kenya?**

The study showed that the highest percentage of the respondents indicated that cost of implementing an ERP effect on ERP implementation plan decisions to a great extent. The findings are reported to be consistent with a study conducted by Gupta (2014) which mentioned that ERP projects frequently require more time and capital than what was planned due to the heavy integration needed on the technical and business sides.

It was also reported that sharing and control of information pose a concern in their decision to implement ERP to a great extent as indicated by 60% of the participants. The findings are in line with a study conducted by Finney (2013) which found that individuals, companies and managers often face difficulties in comprehending the full spectrum of capabilities and attributes of ERP systems, due to the system's complicated nature.

The results also reported that majority of the participants interviewed indicated that the whole chain of information can suffer if one link to the information flow is slow to provide information. This goes to mean that with effective communication, information can be transferred and exchanged easier between both parties who realize, in that way that sustaining this relationship is at their best interest. Factor analysis

showed that IT infrastructure has a large positive loading (0.687) on factor 2 (D2) which means that IT infrastructure has a very strong relationship with ERP Implementation.

### **5.2.2 To what extent does technical skills contribute to the implementation of ERP by Small and Medium Enterprises?**

The findings showed that training prepared the front line workers for the ERP Systems implementation to little extent as reported by the highest percentage (44%) of the respondents. This could mean that the sampled businesses are not applying the necessary training structures to enhance skill on ERP. The findings are not in line with another study conducted by Ross and Boudreau (2012) which asserted that in the context of ERP implementation, it has been argued that organizational learning is absolutely essential for the success and the effectiveness of the system because organizations need to overcome knowledge barriers to implement the complex software packages they purchase.

It was also reported that technical skills of the employees has enhanced adoption of the ERP system Implementation to a great extent. The findings are supported by a study conducted by Nicolaou (2014) which found that poor project team skills and unavailability of skilled people are one the most critical barriers in ERP implementation, and therefore it becomes necessary to address these areas.

Further results also indicated that success of ERP implementation depend on the right personnel in an organization to a great extent as reported by the highest percentage (72%) of the participants. The findings are consistent with a study conducted by Coombs (2015) which asserted that ERP systems are extremely complex and demand rigorous training.

More results reported that more than half of the respondents indicated that ERP project required a cross-functional and multi-skilled implementation team to a great

extent. The findings are consistent with Huang (2013) who posited that ERP system design assumes the existence of a balanced multi-functional team drawing skills and knowledge from a variety of areas, including competencies for both implementation and use of the system.

Additionally, more than half of the participants indicated that training employees on ERP was to a very great extent important in the ERP implementation systems. This goes to mean that the owners of the sampled businesses are keen on investing in ERP skill through training. This is consistent with Ross (2012) who argued that companies should provide opportunities to enhance the skills of the employees by providing training opportunities on a continuous basis to meet the changing needs of the business and employees.

### **5.2.3 What is the impact of financial capital on the implementation of ERP by Small and Medium Enterprises?**

Findings reported that cost of hiring ERP system consultants, which can consume up to 30 percent of the overall budget for the ERP implementation, was to a great extent significant on the implementation. This goes to mean that the sampled businesses are keen on selecting the implementation partner. The findings are in line with another study conducted by Chen (2014) which indicated that the more consultants and users understand each other, the more effective the communication becomes during the consulting process. The study averred that insufficient communication of users' needs, goals and aspirations to the consultants may undermine the implementation of the ERP system.

It was also reported that ERP software was not affordable to organizations in the study area to a great extent. The reason could be because of the intensive costs accompanied by the implementation as supported by Wallace (2012) who argued that

even though the price of ERP software is cheap compared with in-house development, the total cost of ERP system implementation could be three to five times the purchase price of the software.

It was also found that ERP project requires a cross-functional and multi-skilled implementation team to a great extent. This means intensive costs for successful ERP implementation. It was also clear that training employees on ERP was important in the ERP systems implementation to a great extent. This goes to mean that the owners of the sampled businesses are keen on investing in ERP skill through training, which comes with a lot of cost. Factor analysis shows that cost of implementation and cost of personnel have very large positive loadings on factor 1 (D1) which means that they have a strong relationship with ERP implementation.

#### **5.2.4 How does the implementation partner influence ERP by Small and Medium Enterprises?**

Results indicated that effective communication was important to building a strong and trustworthy relationship between external consultants and organizational members in the ERP systems implementation to a great extent. The findings are consistent with Attewell (2012) who asserted that effective communication is a strong foundation of a trustworthy relationship between external consultants and organizational members.

It was also reported that implementation partner play a major part in the ERP implementation to a greater extent. This goes to mean that the businesses in the study area are keen on investing in the right implementation partners. This is consistent with Freeman (2014) who noted that implementation partner play a major part in the ERP implementation challenge, since they have the technical knowledge and expertise to assist users in filling the unavoidable knowledge gap that derives from implementing a new ERP system. Factor analysis indicates that relationship with implementation

partners also has large positive loading on factor 1 (D1) as shown by the factor loading which means a strong relationship with ERP implementation.

### 5.3 Conclusions

Probit estimates showed no evidence on IT network infrastructure against the null hypothesis as indicated by (0.12 p-value) which could mean that most businesses in the study can access internet and communication network coverage. Results also reported a very strong evidence against null hypothesis on accessibility of information (0.008 p-value). Which could mean that majority of the businesses in the study area are not in a position to access the right ERP implementation information.

Further results indicated a moderate evidence against the null hypothesis on knowledge of personnel; technology literacy; cost of implementation; cost of personnel, flow of communication, and management of conflicts as indicated by 0.084, 0.046, 0.064, 0.065, 0.083, 0.028 & 0.083 p-values respectively. Which goes to mean that the businesses in the study area are encountering multiple ERP implementation challenges. Which also explains why majority of the respondents have not implemented the ERP system.

Cost of consultation showed no evidence against null hypothesis (0.101 p-value). Which goes to mean that the consultation is actually affordable in the study area. Finally, the probit estimates reported a very strong evidence against null hypothesis on relationship with implementation partners (0.009 p-value) which means that majority of the businesses in the study area are not in a position to access the right ERP implementation information. Results showed that IT infrastructure, cost of implementation and cost of personnel have a very strong relationship with ERP Implementation.

## 5.4 Recommendations

Following the conclusions from the empirical findings, we can therefore highlight that the most important determinant factor to the success or failure of an ERP implementations is the technical skills of the staff involved in the project. Other factor however necessary may not give the same magnitude of impact as having a competent in-house team. Every SMEs' staff should sufficiently learn how to interact with ERP and business processes, as ERP will affect the entire organization's operations. Inadequate user training and lack of understanding of how ERP changes the existing business processes are impediments to a successful ERP implementation.

The way an organization can ensure they have the necessary technical skills within the staff is to regularly hold training sessions which will highlight importance of IT literacy, and the impact this can have on the work. The organizations may at one point in time be faced with the challenge of whether the existing staff are competent to work in the ERP project, this can be due to adaptability of the ERP processes by the staff. In this case the organization may have to replace the staff for the benefit of the completing the project.

Effective communication also plays a vital role in ERP implementation. Expectations from management at every level of organization need to be communicated to ERP implementation partners. One of the reasons for unsuccessful ERP implementation is poor communication.

This study recommends that a multi-dimensional approach be used in implementation of change. An organizational structure must be put in that has proper infrastructure (hardware and software), good data management system, and a reasonable level of communication with strong organizational culture. The

organizations implementing ERP system should systematically offer proper training development and other requisite support to ensure success in their endeavors.

It is also recommended that the top management should be at the forefront in championing the implementation process by providing leadership motivating employees and ensuring that all legal and other regulations are adhered to.

### **5.5 Area/s for further Research**

The result of this study adds to the existing body of research literature on determinants of Enterprise Resource Planning implementation by Small and Medium Enterprises in Kenya. The results however are based only on four different ERP determinants (information technology (IT) infrastructure, technical skills, financial capital and implementation partner) and future research should utilize a larger number of determinants of ERP implementation parameters in order to establish the determinants of ERP implementation by SMEs in Kenya; and to find out the relationship between the level of ERP implementation and business performance. The use of more ERP variables could also offer a wider scope of insight into how ERP implementation affects business performance parameters.

Further, future research could perform similar testing's in recent years to assess the effect of financial capital on implementation of ERP by Small and Medium Enterprises on another county as opposed to Nairobi County investigated in this study. It can be observed from the results in this research that there was moderate evidence against the null hypothesis on knowledge of personnel; technology literacy; cost of implementation; cost of personnel, flow of communication, and management of conflicts and future research could investigate what could be the factors leading to this situation.

Another suggestion for future research is to utilize a larger sample than the one observed in this research. Due to the panel data study design, the sample was only able to include 10 SMEs in Nairobi County.



## REFERENCES

- Ader, M., (2013), Change Management Strategies for Successful ERP Implementation. Emerald Library
- Attewell, M. M., (2012). Organization Adoption of Enterprise Resource Planning Systems: A Conceptual Framework, *Journal of High Technology Management Research* 18(1) 73-97
- Azjen, W. & Fishbein, H. (1980) „ERP implementation: chief information officers“ perceptions of critical success factors“, *International Journal of Human-Computer Interaction*, 6(1): 5–22.
- Bell, K., (2013) TAM-based success modeling in ERP. *Interacting with Computers*, 20(6), 515-523
- Bessant W. and Rush,W., (2012). *Business Research Methods* (8th Ed), McGraw-Hill: New York
- Bhatti, P.,(2015) Putting the enterprise into the enterprise system. *Harvard Business Review*, July-August, pp.121-131
- Bhavan, Q., (2014). "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update," *Journal of Management Information Systems* (19:4), Spring, pp 9-30.
- Bhavan, T., (2014), *Critical Success Factors for Enterprise Resource Planning Implementation and Upgrade*; *Journal of Computer Information Systems – Special Issue*; Lincoln: Nebraska University
- Bozlu, J. T. (2013). “A goal/question/metric research proposal to monitor user involvement and participation in ERP implementation projects”, paper presented at Information Resources Management Association Conference (IRMA), pp. 325-7.
- Chang, P. O. (2013). “On the leading edge: critical success factors in ERP implementation projects”, *Business World (Philippines)*, May 17, p. 27.
- Chang, Q., Cheung, E., Cheng, K. O. & Yeung, M. (2015). A classification for better use of ERP systems, *Computers in Industry* 56 (2005) 573-587.

- Chen, G., (2014). *Management Information Systems (4th Ed)*, USA; Boston: Thomson Course Technology
- Coombs, W. L., (2015), *Strategic Enterprise Management Systems: Tools for the 21st Century*. CIMA publishing. New Delhi, India
- Davis, J. L. (2014). *Enterprise-wide Software Solutions: Integration Strategies and Practices*, Addison-Wesley Professional, Reading, MA.
- Davis, V. (1989) „Critical elements for a successful enterprise resource planning implementation in small- and medium-sized enterprises“, *International Journal of Production Research*, 42(17) 3433–3455.
- Delone M. & McLean S., (2003) *Enterprise Systems in Universities: Panacea or Can of Worms?* JISC: infoNet Publication. North Umbria University
- Edwards, G. G., (2014). *A Framework for Stakeholder Integration in Higher Education Information Systems Projects*, TASM
- Finney, H., (2013). *SAP Project Management*, Tata McGraw-Hill Publishing Company, New Delhi, India
- Freeman, H., (2014), *Communication as a Dimension of User Participation*, IEEE,
- Gore, L., (2012), *The Critical success factors for ERP implementation: an organizational fit perspective*. *Information & Management*, Vol. 40: 25 – 40.
- Green, W., (2014). *ERP Implementation Issues In Advanced and Developing Countries*. *Journal of Enterprise Information Management*
- Gupta (2014), *Information Systems Evaluation: Navigating Through the Problem Domain*. *Information Management*, Vol. 40 1(11-24)
- Gupta, W., (2013) ‘The promise and Performance of Enterprise Systems in Higher Education; Respondents’ Summary, Correspondent
- Hamilton M .M., and Asundi, K.,(2012) *ERP and the Public Sector: ‘Useful Implementation Insights from Peers That Have Been There, Done That’*. KPMG LLP
- Horwitt, M. M.. (2013), *Enterprise Resource Planning (2nd Ed)*, McGraw-Hill, New Delhi, India

- Horwitt, N. M., (2014) *Management Information Systems (9th Ed)* Thomson Publishers. London,
- Huang, M. & Palvia Y., (2014) *Research methods*. Kenya. Nairobi.: ACTS Press.
- Huang, Q., (2013). Critical Factors for Successful ERP Implementation: Exploratory Findings from Four Case Studies. *Communications of the ACM*, 56(6)
- Hum, K .L, (2015), Critical Factors for Successful Implementation of Enterprise Systems. *Business Process Management*, 7(3)
- Hunton. M. M., (2013) *Understanding the research process and methods. An introduction to research methods*. Acts Press, Nairobi
- KanG, (2012). *Psychometric theory (3rd ed.)*. New York:
- Kang, B., (2014). Increasing Role of Computer-Based Information Systems in the Management of Higher Education Institutions. In *Proceedings of the Annual Strathmore University ICT Conference*
- Kathuri, M., and Pals M., (2013) *Implementing Enterprise Systems for Management: A Case of Kenyan Universities*. *Technology*, 2,
- Kennerley, S. and Neely M., (2014) *Factors Affecting Adoption of Enterprise Resource Planning Software in the Manufacturing Sector in Nairobi Metropolitan, Kenya (Phd Thesis)*. KU
- King, R., (2015). *Managerial Issues of Enterprise Resource Planning Systems*, McGraw-Hill, Taiwan.
- Koch, T. M. (2014), *The New Social Audits– Accountability, Managerial Capture or the Agenda of Social Champions*. *European Accounting Review*, 9(1), 81-99.
- Laukkanen, C., (2013). "ERP systems and the university as a “unique” organisation", *Information Technology & People*, Vol. 17 Iss: 1, pp.31 – 52
- Lee M. and Kim, J., (2012). *ERP Implementation in the Egyptian Organization*. White Paper,
- Luo, W., (2014) *Determinants of individual engagement in knowledge sharing*. *The International Journal of Human Resource Management*, 17(2), 245-264.

- Matolcsy., O., (2015) Exploring the Impediments of Successful ERP Implementation: A Case Study in a Public Organization. *International Journal of Business and Social Science*, Vol. 2(22)
- McColl, M. M., (2012) “Componentizing the enterprise application packages”, *Communications of the ACM*, Vol. 43 No. 4, pp. 63-9.
- Medlin., (2001), ‘Critical Issues Affecting an ERP Implementation’. *Information Systems Management*; Vol.16: 7 – 8.
- Melymuka, K., (2014) The Contingent Effects of Management Support and Task Interdependence On Successful Information Systems Implementation, *MIS Quarterly*
- Morgan, W. and Hunt, A., (2013). Post-Implementation Success Factors for ERP Student Administration Systems in Higher Education Institutions, *Journal of the American Association of Collegiate Registrars and Admissions Officers* 86(2) pp.22-31
- Ndung’u, D., (2012). Enterprise Application suites are becoming a focal point of business & Technology Planning. *Information Week*, 12th Oct. 1998
- Ndung’u.U., (2012), Critical Success Factors in Enterprise Wide Information Management Systems Projects, *Proceedings of the Americas Conference on Information Systems*, pp.297-303
- Needleman, Q., (2013). Essential Characteristics of an ERP System: Conceptualization and Operationalization. *Journal of Information and Organizational Sciences*, Vol. 29 (2)
- Nicolaou, L. L., (2014) Enterprise Resource Planning: Implementation procedures and Critical success factors; *European Journal of Operational research*; 146 (2): 241 – 257
- Njau, W., (2016). Critical Success Factors of Enterprise Resource Planning Systems Implementation Success in China. *Proceedings of the 36th Hawaii International Conference on Systems Sciences*, pp.61-75
- Nzuki, T. M., (2014) “Enterprise resource planning: a taxonomy of critical factors”, *European Journal of Operational Research*, Vol. 146 No. 2, pp. 352-64

- Pilat, W., (2014), "Unleashing the integration potential of ERP systems: The role of process- based performance measurement systems", *Business Process Management Journal*, Vol. 8 No. 3, pp. 254-77
- Poston., K., (2013), Putting the enterprise into the enterprise system. *Harvard Business Review*, 76( 4), 121-131.
- Rabah, U., (2013), "A goal/question/metric research proposal to monitor user involvement and participation in ERP implementation projects", paper presented at Information Resources Management Association Conference (IRMA), pp. 325-7.
- Rao, A., (2014). "ERP adoption by European midsize companies", *Communications of the ACM*, Vol. 43 No. 4, pp. 27-31.
- Raymond, Q., (2013). "Key Recurrent Issues in the MIS Implementation Process," *MIS Quarterly*, 5 (1981): 47-59.
- Rei, A. K., (2014). .Modeling Micro blogging Adoption in the Enterprise. *Americas Conference on Information Systems* (pp. 1-10). San Francisco, California
- Robey, E. O. & Farrow, (2014). "Enterprise resource planning: common myths versus evolving reality", *Business Horizons*, Vol. 44 No. 3, p. 69.
- Robey, J. & Farrow, R. (2014). .,Critical Success Factors of Enterprise Resource Planning Systems Implementation Success in China". *Proceedings of the 36th Hawaii International Conference on System Sciences*.
- Rogers, L., (1995), *Enterprise Resource Planning: A case of a Blood Bank*, *Industrial Management and Data System*, 104 (7), pp.589-603.
- Ross, E. & Boudreau, A.,(2012). .,Reengineering the Corporation: A Manifesto for Business Revolution", Harper Business, New York, NY, USA
- Ross, G., (2012). *Implementation of ERP in Libyan Public Sector Organizations*, PhD Thesis, University of Salford.
- Russel, L. L. (2001) "Enterprise resource planning (ERP) – A brief history", *Journal of Operations Management*, Vol. 25 No. 2, pp. 357-63.

- Scott T. and Kaind, A., (2012). "Towards developing a framework for measuring organizational impact of it-enabled BPR: case studies of three firms", *The Data Base for Advances in Information Systems*, Vol. 37 No. 1, pp. 40-58.
- Sekeran W., (2013) *Enterprise Resources Planning and beyond: Integrating Your Entire Organisation*, St. Lucie Press, Florida.
- Shahawai, W., (2014). „Critical elements for a successful enterprise resource planning implementation in small- and medium-sized enterprises“, *International Journal of Production Research*, 42(17) 3433–3455.
- Skok, R. & Doringe, R. O. (2014). "Componentizing the enterprise application packages", *Communications of the ACM*, Vol. 43 No. 4, pp. 63-9.
- Stedman, A., (2013). *Enterprise-wide Software Solutions: Integration Strategies and Practices*, Addison-Wesley Professional, Reading, MA.
- Stedman, S.S., (2013). "Enterprise resource planning: common myths versus evolving reality", *Business Horizons*, Vol. 44 No. 3, p. 69.
- Stedman, W., (2013). *Issues in Implementing ERP: A Case Study*, *European Journal of Operational Research*, 146(2), pp. 274-283.
- Stein O., (2012), "A Theoretical Assessment of the User-Satisfaction Construct in Information Systems Research," *Management Science*, 36 (1990): 76-91.
- Stein, A. L., (2014). "A case study analysis of factors for success in ERP system implementations", *Proceedings of the Seventh Americas Conference on Information Systems*, Boston, MA, pp. 1012-8.
- Success W., (2014). „ERP implementation: chief information officers“ perceptions of critical success factors“, *International Journal of Human-Computer Interaction*, 6(1): 5–22
- Summers, L., (2010) "Enterprise Resource Planning Systems Implementation and Upgrade: A Kenyan Study," *School of Engineering and Information Sciences Middlesex University*
- Thompson, M. N., Higgins, E. & Howell, S. S. (2013). *Implementation of ERP in Libyan Public Sector Organizations*, PhD Thesis, University of Salford.

- Trott G., & Hoecht, T., (2014) Why do companies go public? An empirical analysis, *Journal of Finance*, LIII (1) 27-64
- Venkatesh, L. O. & Davis, K. (2000). "Enterprise resource planning: business needs and technologies", *Industrial Management & Data Systems*, Vol. 100 No. 2, pp. 81-8.
- Wallace, T. E., (2014). "The Nairobi Stock Exchange in the context of development of Kenya". *Savings and Development*, VIII (4), p363-372.
- Wallace, I. O., (2012), "Enterprise resource planning: business needs and technologies", *Industrial Management & Data Systems*, Vol. 100 No. 2, pp. 81-8.
- Wang, A., (2013). "A profile of ERP adoption in manufacturing SMEs", *Journal of Enterprise Information Management*, Vol. 20 No. 4, pp. 487-502.
- Wei, L., (2014) „Critical Success Factors of Implementing Enterprise Portals“. *Proceedings of the 39th Hawaii International Conference on System Sciences*
- Willcocks, A., (2013). „Critical Success Factors of Implementing Enterprise Portals. *Proceedings of the 39th Hawaii International Conference on System Sciences*
- Zimbrao, D., (2013). "On the leading edge: critical success factors in ERP implementation projects", *Business World (Philippines)*, May 17, p. 27.



## APPENDICES

### Appendix I: Letter to Participants

JATIN GHAGHDA

P. O. Box - 00100

NAIROBI

Dear Sir/Madam

#### **RE: REQUEST FOR PARTICIPATION IN A RESEARCH STUDY**

I am a final year Master of Business Administration student at Strathmore Business School (SBS). I am currently undertaking a research on “ASSESSMENT OF DETERMINANTS OF ENTERPRISE RESOURCE PLANNING IMPLEMENTATION BY SMALL AND MEDIUM ENTERPRISES IN KENYA: A CASE OF NAIROBI COUNTY”

I will be grateful if you could spare sometime from your busy schedule and fill in the questionnaire provided. All the information provided will be purely used for academic purposes and your identity will be treated with utmost confidentiality.

Yours faithfully,

Jatin Ghaghda

Tel. +254722919996

Nairobi, Kenya

## Appendix II: Questionnaire

### SECTION A: RESPONDENTS DEMOGRAPHICS

(Fill in the blank spaces and tick once in the below given choices of all questions)

1. Name (optional):
  
2. Please indicate your age bracket.....?
  - 26 - 30 [ ]
  - 31 - 35 [ ]
  - 36 - 40 [ ]
  - 41 - 45 [ ]
  - 46 and above [ ]
  
3. Please indicate your gender:
  - Male [ ] Female [ ]
  
4. Please indicate your education level
  - Masters [ ]
  - Certificate [ ]
  - Bachelor's degree [ ]
  - Diploma [ ]
  - Others (specify).....
  
5. For how long have you been in the business? .....
6. Have you implemented an ERP in your busines?.....?

### SECTION B: IMPLEMENTATION OF ERP

(In this section please tick (✓) the most appropriate response for each of the statements in the table below with the scores in the bracket.)

**Strongly agree (SA) = 5, Agree (A) = 4, somewhat agree (U) = 3, Disagree (D) =2, strongly disagree (SD) = 1**

Statement	1	2	3	4	5
Our ERP systems are fully implemented					
Our ERP System is now fully operational					
All our ERP modules are fully operational and used as intended by our organization					
Order Management / Sales Module has been implemented to your satisfaction.					
<b>Choose from - 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent</b>					

To what extent has the Efficient fulfilling of orders in your organization been impacted by the ERP Implementation					
<b><i>Strongly agree (SA) = 5, Agree (A) = 4, somewhat agree (U) = 3, Disagree (D) =2, strongly disagree (SD) = 1</i></b>					
Finance / Accounting has been implemented to my satisfaction.					
<b><i>Choose from - 1. Not at all 2. Very small extent. 3. Small extent4. Great Extent 5. Very great extent</i></b>					
To what extent has the new system given you a better understanding of the Finance operations of your business?					
How much has the finance module helped in getting access to information you never had before?					
<b><i>Strongly agree (SA) = 5, Agree (A) = 4, somewhat agree (U) = 3, Disagree (D) =2, strongly disagree (SD) = 1</i></b>					
Manufacturing / Production Planning has been implemented to my satisfaction.					
<b><i>Choose from - 1. Not at all 2. Very small extent. 3. Small extent4. Great Extent 5. Very great extent</i></b>					
How much control does the ERP system provides in the production planning process?					
To what extent is the manufacturing process integrated in the ERP system.					
<b><i>Strongly agree (SA) = 5, Agree (A) = 4, somewhat agree (U) = 3, Disagree (D) =2, strongly disagree (SD) = 1</i></b>					
Supply Chain Management Has been implemented to my satisfaction.					
<b><i>Choose from - 1. Not at all 2. Very small extent. 3. Small extent4. Great Extent 5. Very great extent</i></b>					
To what extent are all purchases of supplies in the organization being initiated from the ERP system?					
<b><i>Strongly agree (SA) = 5, Agree (A) = 4, somewhat agree (U) = 3, Disagree (D) =2, strongly disagree (SD) = 1</i></b>					
Human Resource Management has been implemented to your satisfaction.					
<b><i>Choose from - 1. Not at all 2. Very small extent. 3. Small extent4. Great Extent 5. Very great extent</i></b>					
How much has the ERP system affected the tracking of Human resource transactions?					
It is now easier to track employee responsibility throughout the organization since the ERP system implementation					

## INFORMATION TECHNOLOGY (IT) INFRASTRUCTURE

Indicate your level of impact on how much IT infrastructure has affected the ERP implementation: (Score of 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent)

Statement	1	2	3	4	5
How much did the cost of implementing an ERP Impact on your EPR implementation plan decisions?					
How much did Sharing and control of information posed as a major concern in your decision to implement ERP?					
How much did the fact that there was going to be sharing of too much information in order to implement the ERP system affected your decisions to implement ERP system?					
How much whole chain of information suffers if one link to the information flow is slow to provide information?					

In your own view, other challenges do you encounter when integrating business processes using ERP? (briefly explore)

.....

.....

.....

## TECHNICAL SKILLS

Indicate your level of agreement/disagreement regarding how much technical skills are required to implement an ERP? (Please tick (√) the most appropriate response for each of the statements in the table below) (Score of 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent)

Statement	1	2	3	4	5
How much has the training prepared the front line workers for the ERP Systems implementation?					
How much has the technical skills of the employees enhanced their adoption of the ERP system Implementation?					
How much has the fact that ERP Implementation requires lots of Training and updating employees on ERP affected the ERP Systems Implementation?					
How much does the success of ERP implementation depend on the right personnel in an organization?					

How much does the ERP project requires a cross-functional and multi-skilled implementation team.					
How much are poor project team skills and unavailability of skilled people posed as one of most critical barriers in ERP implementation					
How much is Training employees on ERP important in the ERP systems implementation					
How important has training opportunities for Companies enhanced the skills of the employees in dealing with ERP Implementation					
How important has training opportunities for Companies enhanced your willingness for ERP systems implementation?					

Does management support influence ERP implementation? (Briefly expound)

.....

.....

### FINANCIAL CAPITAL

*To what extent do you agree/disagree with the following possible barriers to ERP implementation? (Score of 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent)*

Statement	1	2	3	4	5
How much is the cost of hiring ERP system consultants, which can consume up to 30 percent of the overall budget for the ERP implementation important to the implementation.					
How much is the Training people regarded as one of the hidden costs of ERP implementation					
To what extent is the ERP software not affordable to organizations					
To what extent does the affordability of ERP software a major consideration in the Adoption of an ERP					
To what extent was the expected Return on Investment in ERP systems Implementation a major factor in adopting ERP System					

## IMPLEMENTATION PARTNER

*To what extent do you agree/disagree with the following possible barriers to ERP implementation? (Score of 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent)*

Statement	1	2	3	4	5
How much does having the correct implementation partner impact the success or failure of the ERP.					
How much is Effective communication important to building a strong and trustworthy relationship between external consultants and organizational members in the ERP systems implementation?					
To what extent is Effective management of conflicts leads in an enhanced level of information exchange important during ERP systems implementation?					
How much do consultants play a major part in the ERP implementation					
How much do solutions that consultants offer during and after the configuration of the ERP system directly influence the effectiveness of the implemented ERP					

## SECTION C: RELATIONSHIP BETWEEN IMPLEMENTATION OF ERP AND BUSINESS PERFORMANCE

*To what extent do you agree/disagree with the following? (Score of 1. Not at all 2. Very small extent. 3. Small extent 4. Great Extent 5. Very great extent)*

Statement	1	2	3	4	5
How much is the profitability impacted due to the adoption of ERP					
How much is the perceived receivables management impacted the adoption of the ERP					
How much did the ERP Implementation lead to having the right number of employees in your organization hence efficiency due to better employee productivity?					
To what extent did the business fail to achieve its expected Return on Investment with the ERP implementation?					
How much was the return on sales impacted due to ERP Implementation.					

**Appendix III: 2017 Top 100 Mid-sized Companies in Kenya Winners List  
(KPMG, 2017)**

1. NAPRO INDUSTRIES LTD
2. POLYGON LOGISTICS LTD
3. NORTH STAR COOLING SYSTEMS LTD
4. RAVENZO TRADING LTD
5. CARE CHEMISTS
6. ISOLUTIONS ASSOCIATES LTD
7. VALLEY HOSPITAL LIMITED
8. SOLOH WORLDWIDE INTER-ENTERPRISES LIMITED
9. SUPER BROOM SERVICES LTD
10. WELL TOLD STORY LIMITED
11. NOVEL TECHNOLOGIES EA LTD
12. MELVIN MARSH INTERNATIONAL LTD
13. POLUCON SERVICES (k) LTD
14. SPECICOM TECHNOLOGIES LTD
15. MANIX LTD
16. SOFTWARE TECHNOLOGIES
17. VINEP FORWARDERS LIMITED
18. PRAFULCHANDRA & BROTHERS LTD
19. AMEX AUTO & INDUSTRIES LTD
20. SHEFFIELD STEEL SYSTEMS LIMITED
21. VIVEK INVESTMENTS LTD
22. BLUEKEY SEIDOR (K) LTD
23. SKYPEX SUPPLIES LTD
24. PATHCARE KENYA LIMITED
25. ORANGE PHARMA LIMITED
26. PINNACLE KENYA TRAVEL LTD
27. SUPERIOR HOMES (K) LIMITED
28. FURNITURERAMA LIMITED
29. BAGDA s& S AUTO SPARES LTD
30. NAIROBI ENTERPRISES LTD
31. EXPRESS COMPANY LIMITED
32. GINA DIN CORPORATE COMMUNICATION
33. ZAVERCHAND PUNJA LTD
34. PATMAT BOOKSHOP LTD
35. EXECUTIVE HEALTHCARE SOLUTIONS LTD
36. ELITE TOOLS LTD
37. BIMAS KENYA LTD
38. MANDHIR CONSTRUCTION LIMITED
39. HOTEL WATERBUCK LIMITED
40. GENERAL AUTOMOBILE CORP
41. ECONOMIC INDUSTRIES LTD
42. WATERMAN DRILLING AFRICA LTD
43. NDUGU TRANSPORT CO LTD
44. FAYAZ BAKERS LIMITED
45. MPPS LTD
46. TRIDENT PLUMBERS
47. RILEY PALUON SECURITY LTD
48. THIKA CLOTH MILLS LTD
49. MAROO POLYMERS LTD

50. MUKURWEINI WAKULIMA D LTD
51. TOTAL SOLUTIONS LTD
52. OIL SEALSANDBEARINGS CENTRE LTD
53. PALMHOUSE DAIRIES LTD
54. SENSATIONS LIMITED
55. THE MAKINI SCHOOL LTD
56. COMPUTER PRIDE LTD
57. GENERAL CARGO SERVICES LTD
58. VARSANI BRAKELININGS LTD
59. TYPOTECH IMAGING SYSTEMS LTD
60. KENYA BUS SERVICES MGT
61. PHILAFE ENGINEERING LTD
62. MIC GLOBAL RISKS INSURANCE BROKERS LTD
63. SYNERGY GASES (K) LTD
64. MACHINES TECHNOLOGIES LTD
65. ORBIT ENGINEERING LTD
66. ZEN GARDEN LIMITED
67. NORDA INDUSTRIES LIMITED
68. ASTRAL INDUSTRIES
69. LOTA AUTOMOBILES LTD
70. WARREN ENTERPRISES LTD
71. XTREME ADVENURES LTD
72. IDEAL MANUFACTURING CO. LTD
73. CANON ALUMINIUM FABRICATORS LTD
74. MASTER FABRICATORS LTD
75. SPECIALIZED ALUMINIUM RENOVATORS LTD
76. HYDRO WATER WELL K LTD
77. ROY TRANSMOTORS LTD
78. RONGAI WORKSHOP & TTRANSPORT LTD
79. HIPORA BUSINESS SOLUTIONS
80. NATIONWIDE ELECTRICAL INDUSTRIES LTD
81. ALLWIN PACKAGING INTL LIMITED
82. KOMAL CONSTRUCTION CO LTD
83. IMPAX BUSINESS SOLUTIONS
84. SYNERMEDICA (KENYA) LIMITED
85. SYNERMED PHARMACEUTICALS (k) LTD
86. UNEEK FREIGHT SERVICES LTD
87. SOLLATEK ELECTRONICS (K) LTD
88. AVTECH SYSTEM LTD
89. KISIMA DRILLING E.A LTD
90. SPECIALISED HARDWARES
91. SMART BRANDS LIMITED
92. CLASSIC MOULDINGS LTD
93. FARMPARTS LIMITED
94. EDUCATE YOURSELF LIMITED
95. EMMERDALE LIMITED
96. RIFT VALLEY MACHINERY SERVICES
97. HAJAR SERVICES LIMITED
98. ADVANTA AFRICA LIMITED
99. E MOMENTUM INTERACTIVE
100. UNITED ENGINEERING SUPPLIES LTD