

Effects of Information Technology on the Financial Performance of Small and
Medium Sized Enterprises – A case of SMEs in Nairobi

by

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DECLARATION

This is to certify that this thesis is my original work and has not been presented for a degree award in any university or institution of higher learning. Information from other sources has been duly acknowledged.

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ABSTRACT

This study examines the effects of Information Technology (IT) on the financial performance of small and medium sized enterprises (SMEs) situated in Nairobi. The primary objective of the study was to examine whether there is any relationship between the use of IT and firm performance. Data was obtained through the use of purposive sampling from the National Social Security Fund (NSSF) Register of Kenya database as of 2009. The purposive sampling employed on the SMEs registered in the NSSF register led to the database of a leading IT firm which then formed the population of the study. The data obtained was analyzed through the use of descriptive analysis and also through the use of ordinary least squares regression analysis. The key finding of study was that firm performance and IT use are positively correlated. It also found that of the factors that affect the use of IT, only the level of spending on IT systems and the organizational structure of a given firm have a significant effect on IT use and its subsequent effect on firm performance. The study suggests that firms should place more emphasis on the role that individuals play within the organization since the organization will tend to perform well when each individual plays their role well. Further research is recommended to be carried out through the use of other methodologies so as to examine different angles of the role of IT in SME performance improvement.

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ABBREVIATIONS AND TERMS DEFINED

EC – European Commission

IT – Information Technology

NSSF – National Social Security Fund

RBV – Resource Based Value theory

SME – Small and Medium Enterprise

UNIDO – United Nations Industrial Development Organization

Note:

The word Firm, SME and Organization have been used inter-changeably throughout the course of the study and refer to the same thing.

CHAPTER ONE: INTRODUCTION

1.1 Background of study

Small and medium sized enterprises (SMEs) are an important factor in the Kenyan economy especially with respect to employment. An increase in globalization has put them under considerable pressure (Matambalya & Wolf, 2001). Through the rapid spread of information and communication technology and ever decreasing costs of communication, markets in different parts of the world are becoming more integrated.

The prevalence of SMEs in Kenya is fueled mainly by the bad state of the infrastructure that leads to relatively isolated markets with limited demand that can best be served by small-scale localized production (Matambalya & Wolf, 2001). Other factors that have contributed to a large number of SMEs in Kenya are to do with the business environment which, compared to that of developed countries, is characterized by limited access to manufactured inputs, low quality of the infrastructure, poor legal systems and crime prevention and high volatility of macroeconomic conditions and prices. These factors inhibit the existence of bigger enterprises (Tybout, 2000).

Flexibility is considered to be a major source of competitiveness for SMEs compared to larger enterprises. The use of IT is thus viewed as a way in which SME competitiveness can increase. The argument to this view is based on the fact that with the use of IT, transaction costs could be lowered and therefore economies of scale can be reduced (Matambalya & Wolf, 2001).

In spite of their importance to the Kenyan economy, one principal weakness of SMEs in general is their weak productive capacity, which is manifested by low domestic and international market coverage (Chowdury, S and Wolf, S., 2003). Thus, the one basic question is whether the use of IT can help these small and medium enterprises to cope with these new challenges.

Since the 1990s, many SMEs in East Africa have embraced information and communication technology (Matambalya & Wolf, 2001). It is with this fact in mind that Kumar (2004) acknowledges that most businesses today are carefully scrutinizing their IT investments and questioning their value. It is becoming increasingly important for IT managers to articulate the value of IT systems using concepts that finance executives can relate to. Thus, although most organizations recognize that IT systems are valuable, they also recognize that it can be difficult to justify the link between IT and the improvement of firms' financial performance (Bharadwaj, 2000; Kumar, 2004).

A number of studies have been made in the examination of the role of IT in small businesses. Key among these studies are those by Harrison, Mykytyn & Riemenschneider (1997) and Igbaria, Zinatelli & Cavaye, (1997). However, few of those studies have been made in relation to the role that IT plays in SMEs resident in developing countries. With this insight in mind, the focus now shifts to the purpose of this research paper which sought to examine the role that Information Technology (IT) plays in influencing the financial performance of Small and Medium Enterprises (SME) in Kenya, narrowing down to the Nairobi area.

This paper sought to establish the relationship between IT and organizational performance. In doing so the paper assessed whether or not IT influences organizational performance. As Melville et al. (2004) point out, it is not the implementation and existence of IT systems alone that translates to improved performance in a given business, but rather it is through its use. IT should therefore be seen as one of the tools that spur the growth of a business.

1.2 Problem Statement

Firms view investments in information technology as a way to combat competition by improving productivity, profitability, and quality of operations (Devaraj & Kohli, 2003). This thinking is based on the fact that a failure to make changes to their operations may result in harm to the organization through stagnation, negative growth, loss of customers and failure to introduce new products leading to a potential closure of the business.

The increased spending on IT by most businesses has led to questions as to whether there is any value for money in IT investment for a business as everyone seems to be pushed towards IT use (Carr, 2003). The proliferation of IT use has led to a number of businesses today carefully scrutinizing their IT investments and questioning their value. Thus, although most organizations recognize that IT systems are valuable, they also recognize that they can be difficult to justify more so to the investor (Kumar, 2004).

Small businesses are normally constrained by a number of factors that either serve to limit their potential growth or that do serve to negate any gains that they make as a business. It is therefore imperative that wise choices be made with regard to the capital investments made

by such a business since there are high costs involved in setting up IT infrastructure and subsequently high annual maintenance costs that accompany this investment. In this regard, IT implementation forms a major factor of consideration in terms of investing in it and the evaluation of any potential benefits that may accrue from use of IT is thus a key factor for consideration (Carr, 2003; Kumar, 2004).

This study sought to investigate whether there was any value to be derived from use of IT by SMEs. As such the study sought to justify whether the use of IT has any influence on the performance of a firm. More so to the investor the question remains: Does investment in IT lead to improvement in firm performance? (Strassman, 1997).

Studies carried out on IT use and organizational performance have focused on big organizations. In Kenya, the few studies done on IT have not sought to highlight the role that IT use has on organizational performance. This paper sought to fill this gap in the IT realm of studies.

1.3 Research Objectives

The main objective of this study was to examine the effect of IT use on SME financial performance.

The specific objectives were:

1. To examine the relationship between IT use and SME financial performance.
2. To examine how SMEs use IT.
3. To identify the factors that influence adoption of IT use by SMEs.

1.4 Research Questions

The research sought to answer the following questions:

1. Is there a relationship between IT use and SME financial performance?
2. Which are the areas of operation in which SMEs use IT?
3. What are the factors that influence adoption of IT use in SMEs?

1.5 Significance of the study

Most of the work done on this subject of study had been done in developed countries. This study was therefore justified on the grounds that it tried to fill the gap on the need for a similar study in a developing country like Kenya.

With viable results, the study sought to benefit the following parties:

1.5.1 Local companies

This group comprises of the main target for this study. The results of the study would enable companies to make provisions for implementation of IT usage in operations, so as to have improvements in their operations with regard to gaining value in their business processes and improvements in strategy policies. These improvements in operations would subsequently lead to enhanced demands by the businesses in measures to analyze business performance and overall competitive advantage.

1.5.2 Investors

Investors are the providers of capital for any given business venture. They provide capital in the form of equity and loan facilities with an aim to gain benefits. The benefits that they derive are in the form of interests earned or other benefits from the sums of monies that they have invested in the given SME. A key factor that investors look for is the performance of a given firm. Firms do adopt several strategies to improve their performance and one of the strategies is the improvement of the key performance drivers of the company. This study would thus provide an appropriate indicator to both the current investors and the future investors in the case of an improvement on the business performance.

1.5.3 Academicians and other researchers

The study sought to provide reference materials for other researchers to expound on the subject of IT and performance especially in the limited scope with which it has been analyzed in third world countries like Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

As businesses continue to invest in IT, there is a growing awareness of the need to derive value from IT. This is especially the case for SMEs, as poor IT investment decisions can have a critical impact on organizational profitability (Love, Irani, Standing, Lin & Burn, 2004) since the investment required to meet most of the reorganization costs arising from the adoption of IT typically exceeds the budget and the capabilities of the average SME. IT can however contribute to improving their performance yet scant attention is paid to IT evaluation and benefits realization in the context of SMEs.

This chapter reviewed previous studies that had been done on links between IT and performance. It discussed various studies done relating to IT and its links to organizational performance, theories that had been used to link IT to performance were also looked at.

2.2 Definitions of SME, IT and Performance

In order to understand the concepts of SME, IT and firm performance the study herein explored the various definitions offered by different sources on what these terms mean and the scope that they cover.

The United Nations Industrial Development Organization (UNIDO, 2007) defines an SME based on the size and structure of business in the economy. The definition of an SME as per UNIDO is those firms that employ between 10 and 99 employees, with small enterprises

employing between 10 and 49, while for middle sized firms, the employment is between 50 and 99 employees and have an annual turnover threshold of USD \$ 1.4 million (which is about KES 100 million) and assets of a similar amount.

The European Commission (EC, 2004) offers an alternative definition for SMEs, defining SMEs in terms of number of employees. It states that: firms with between 0 to 9 employees are referred to as micro enterprises, those with between 10 and 99 employees are known as small enterprises, and those with between 100 and 499 employees are referred to as medium enterprises.

A further definition of SMEs is offered by Elumba (2008) who defines SMEs in sub-saharan Africa as those firms that have an annual turnover of between US dollars \$0.65 million and \$1.3 million, which loosely translates into KES 52 million and KES104 million respectively.

For purposes of the study, the UNIDO definition on SMEs is applied, though modifications to the turnover baseline have been adopted from the paper done by Elumba since his work is based on SMEs in Sub-Saharan Africa, an area upon which this study covers.

The term Information Technology (IT) refers to any investment made by the company in the form of computer and communication technologies and shareable technical platforms and databases (Ross, J.W., Beath, C.M., and Goodhue, D.L., 1996). To redefine the term in a more discernible way, IT can thus be referred to as any technology that helps to produce, store, communicate and disseminate information.

Firm or organization performance is defined as a measure comprising of overall firm performance aspects that include: productivity, efficiency, profitability, market value and competitive advantage (Hitt & Brynjolfsson, 1996).

An alternative definition on Performance as offered by Melville, Kraemer & Gurbaxani (2004) posits that performance is a measure of the efficiency of a firm. Melville et al. (2004) measured efficiency in terms of cost reduction and productivity enhancement in assessment of a given business process.

For purposes of this study, the definition of performance offered by Melville et al. (2004) is used. That is, performance as a measure of efficiency where efficiency is measured in terms of profitability with the measure employed being that of Net Profit Margin.

2.3 Theoretical frameworks

Further to an analysis of the role that IT use has on firm performance as well as the enumeration of the various factors that influence the adoption of IT use by various firms, it is imperative that the theories that form the basis for the arguments presented herein as well as in the subsequent chapters be presented. The main theory is the Resource based theory (Barney, 1991; Mata et al., 1995; Melville et al., 2004) and a lesser used theory is the Transaction cost theory (Melville et al., 2004).

2.3.1 Resource based value theory

The Resource based value (RBV) theory of the firm is used to influence what a firm's resources have on its performance. Its basis is on the need to link the performance of a firm to resources and skills which are firm specific, rare, and difficult to imitate (Barney, 1991).

The fundamental principle of the RBV is that a firm's competitive advantage over other firms is based on the application of the bundle of valuable resources at the firm's disposal. In this respect RBV focuses on difficult to copy attributes of the firm that are fundamental drivers of performance (Barney, 1991). Researchers do argue that since investments in IT are easily duplicated by competitors, investments per se do not provide any sustained advantages, rather it is how firms leverage their investments to create unique IT resources and skills that determine a firm's overall effectiveness (Mata et al., 1995).

Melville et al. (2004) go further and offer a self criticism to their recommended choice of theory, the Resource Based Theory, by stating that the RBV primarily makes assumptions that resources are always being put into the best of uses although it does not pinpoint or say how this is done.

It is noted that the RBV theory recognizes the importance of intangibles such as customer orientation and organizational knowledge or the technical know-how. The complementariness of these factors to IT is of importance in the eventual examination of how IT impacts on firm performance. It is through a firm's ability to combine these factors with IT use that gives a firm an IT capability.

2.3.2 Transaction Cost Theory

Further to the observations by Melville et al. (2004) on the need to have other supporting theories to support the RBV, another theoretical framework that can form a basis to fortify the study is the Transaction cost theory. The transaction cost theory analyses the relationship between firms providing a service and the customer process thereby highlighting the impact of both costs and benefits accruing to the firm.

The transaction cost theory provides an understanding of the role that IT plays in reducing transaction costs to an organization since the ultimate goal of the firm is to realize benefits that far exceed the costs incurred in the given process.

2.4 Key factors that influence adoption of IT and its use

Hansen G.S and Wernfelt B., (1989), pointed out that the major determinants of firm performance can be split into two. These are the external factors that comprise of market factors which determine firm success on one hand. On the other hand are the organizational factors that determine firm success. This second range of determinants is what formed the basis of this study since this is where the use of IT as a firm performance determinant falls in.

An analysis of the various studies outlined above points out that IT on its own is not the primary determinant of firm performance. Other firm performance determinants include structure of the firm, systems in place, size of the firm and its history as well as the people factors such as skills, personality, corporate culture, management practices and age (Hansen & Wernfelt, 1989, Barney, 1991, Dewan & Kramer, 2000).

Firms that are successful in creating superior IT capability do enjoy superior financial performance by bolstering firm revenues and/ or decreasing firm costs. Firms that incur costs of IT without deriving benefits from IT resources will be at a competitive disadvantage since the key aim of IT in this sense is to give these firms a competitive edge and in effect to help propel the business forward in terms of improved performances (Bharadwaj, 2000).

Therefore, Bharadwaj (2000) offers the view that use of IT is essentially viewed by the management as a competitive tool used for implementation of strategic plans. IT is also viewed as a tool to influence a firm's ability to gain a competitive advantage through linkage of IT with a firm's strategy and industry (Devaraj & Kohli, 2003).

Though there exists a number of variables that influence the use and adoption of IT in a given firm, this study focused on the following variables: value of IT systems, level of investment, quality of management, and the number of modules implemented. The variables used in the study were felt to be the most appropriate to the Kenyan context with regards to the study on IT use by SMEs and hence were the most relevant to the study.

2.4.1 Quality of management

The managerial skills include: effective management of IS functions, coordination and interaction with user community and also project management and leadership skills (Melville et al. 2004). The managerial ability to coordinate multi-faceted activities associated with successful influence of IT systems on operations has been found to be a key distinguishing factor of successful firms (Bharadwaj, 2000).

2.4.2 Level of spending on IT systems

The level of spending on IT systems determines the value of the IT system and is essential in evaluating the role of IT use in firm performance (Brynjolfsson & Hitt., 1996 and Devaraj & Kohli, 2003). Mata et al. (1995) make use of a resource based analysis approach to evaluate the role that IT plays on firm performance, they argue that IT becomes more valuable if a firm possesses IT systems that other firms do not have or are unable to replicate. In this case then the level of spending on IT denotes the value of an IT system.

Dehning & Richardson (2002) also look at value of IT in terms of the level of spending that a firm undertakes in acquiring its IT systems. Kumar (2004) argues that the value of IT should not only be looked at from the cost of investment but also from the point of view of the intangible benefits derived from the use of IT. As such, he notes that use of traditional quantitative measures such as Net Present Value to evaluate the value of IT is misleading since it does not incorporate the intangible benefits derived from IT.

The value of IT in the long run will be affected by exogenous factors such as, economic factors, industry and competition, proliferation of technology, trends in IT usability, and endogenous factors such as, managerial actions (including pricing, advertising and training).

In this study, borrowing from Dehning & Richardson, 2002, the value of IT was measured in terms of the level of spending in acquiring the IT system.

2.4.3 Industry Sector representation

This refers to the organization of industries in terms of concentration, supply chain configuration, as well as the salient features such as technological change, regulation, IT standards and factors that can change how IT is used within a firm to create IT business value.

The characteristics of a given firm's industry representation may impact on the extent to which a firm benefits from IT use. These factors include: labour intensity of the industry that hampers the ability of a given firm to substitute IT for labour. Alternatively, in time-sensitive industries, there is a need for application of IT to reduce cycle times in production, better manage inventory and also improve on customer satisfaction.

Another factor on industry characteristics is on trading partner resources and business processes. Given that IT increasingly permeates organizational boundaries, linking multiple firms via electronic networks and software applications and melding their business processes (Melville et al. 2004, Mukhopadhyay & Kekre, 2002), this results in trading partners of a firm impacting on the performance of firms in a given industry due to the uptake of IT by competing firms as well as their clientele base.

Inefficient business processes and antiquated technology within trading partners may inhibit the attainment of IT business value of an inter-organizational system initiated by the focal firm. Industry characteristics therefore moderate the ability of firms to apply IT for improved organizational performance and to capture the resulting benefits.

Following on from one of the approaches offered by Melville et al. 2004, the level of industry representation was represented in this study through use of dummy variables.

2.4.4 Organizational structure

Available literature shows that the organizational structure has an effect on performance of an organization. Melville et al. (2004), point out that when analyzing organizational structure the number of employees in an organization helps provide a pointer as to the existence of a structure in place since one cannot have a large work-force without a structure in place.

Organizational structure in this case, denotes the workplace practices within a given organization. This ideally represents composition of a firm's staff across various departments.

The general observation is that the more the number of employees that a firm has, the more highly structured an organization is. This is because of the fact that with more employees, the firm has to define the tasks that each employee undertakes. This is essential in evaluating IT since without proper guidelines as to the tasks that the employees have, the influence that IT should have on performance becomes limited given that there are no defined roles dictating the tasks assigned to the respective employees.

The influence of the number of employees on firm performance therefore, is that organized in appropriate ways, the workplace practices that result from deploying employees to various roles in the organization influence how well a firm will deploy its resources so as to generate

the maximum possible returns from its investments (Brynjolfsson & Hitt, 2000). Firms that adopt decentralized organizational structures and work structures do appear to have a higher contribution of IT to performance (Brynjolfsson & Hitt, 2000).

For purposes of this study therefore, the number of employees was used as a proxy to simulate the organization structure that a given SME has in place. The general conclusion being that the more the number of employees, the better the organizational structure in place.

2.4.5 Modules of IT systems to be adopted

According to Kumar (2004), organizations are increasingly recognizing the importance of an effective IT system, one that can be adapted to suit changing business requirements.

Brynjolfsson & Hitt, (1996), further points out that as computers have become cheaper and more powerful, the business value of computers is limited less by computational capability and more by the ability of managers to invent new processes, procedures and organizational structures that leverage this capability. This thus denotes the ability of an IT system to suit the needs of various organizational needs which include reporting needs and business operational areas.

According to Davern & Kauffman, 2000 it is the ability of a system to offer much more complexity to its use that compels an increase in level of commitment by the top management in implementing support structures for a given system. Thus, systems that offer a greater level of meeting user needs in terms of reporting requirements would result in

greater support in their implementation from the management (Davern & Kauffman, 2000). Thus, the level of reporting needs that a system generates does have an impact on the commitment of the management, which in turn is likely to influence change in attitude by management towards the adoption and implementation of IT systems. This is coupled with a clear vision about the strategic use of IT in the business (Caldeira & Ward, 2001).

For the purposes of the study, the choice of use for which IT is employed within an organization acted as the proxy to denote the number of modules of the IT system being used.

2.5 Previous studies

In spite of the notion that IT is fundamental to a firm's survival and growth, scholars still struggle to identify the underlying mechanisms linking IT to firm performance. Brynjolfsson & Hitt (1996) state that despite evidence on payoffs from IT, the controversy over the business value of computer systems is still prevalent. This view is shared by Strassman (1997) who argued that there was no discernible relationship between IT and any measure of firm profitability as measured by return on investment, return on equity and economic value added.

Although the above prior studies have identified links between IT and firm performance, there was also considerable skepticism to the benefits of IT and consistent with what is known as "productivity paradox" (Brynjolfsson & Hitt, 1996). The productivity paradox is a concept that explains the lack of good quantitative measures that explained the output and

value created by IT. This in turn makes the task of justifying investments in IT particularly difficult.

Cooper, Watson, Wixon & Goodhue, (2000) and Dewan & Kraemer, (2000) argue that the measure of IT value to firm performance should not be evaluated in isolation and that it depends to a large extent on a variety of factors including: the type of IT, management practices and organizational structure, as well as the competitive and macro environment.

Mata et al. (1995) argue that investment in IT alone does not confer any added value to an organization; rather it is how firms leverage their investment in IT to create unique IT resources and skills that determined a firm's overall effectiveness and efficiency. This point was supported by Brynjolfsson & Hitt (1996) who pointed out that though IT may impact on firm performance through improvement of productivity, these productivity benefits need not translate into firm profitability.

Kumar (2004) on the other hand, stresses on the need to consider IT in terms of usage and not on investment alone since value derived from IT depends on usage and not on investment alone. He stressed that the value of IT is influenced by the extent to which it is used and thus conceptualizes IT infrastructure value as a function of a number of transactions, as well as the value of each transaction.

Melville et al. (2004) pointed out that with regard to performance, IT can be analyzed through evaluating a firm's efficiency. Efficiency being representative of internal perspective

and analyzing metrics such as cost reduction and productivity enhancement. Therefore, efficiency entails improvements in internal operations.

According to Bharadwaj (2000) and Brynjolfsson & Hitt (1996), the problem of these past findings not offering clear insights into links between IT and firm performance can be questioned on the basis of the methodologies used such as; the use of inappropriate measures of IT intensity, a failure to control for other factors that drive firm profits as well as problems related to sample selection and sample size.

Improvements on these limitations have been to some extent incorporated into theoretical models in studies that have tended to look for more direct links between IT and firm performance. Some of these studies have adopted a “process-oriented” view seeking to examine the effects of IT on intermediate business processes (Barua et al., 1995). One of the theoretical frameworks that seek to improve on the aforementioned limitations is the resource based view (RBV) of the firm that links performance of organizations to resources and skills that are firm specific, rare and difficult to imitate (Barney, 1991).

The conceptual framework may be represented in the form of a diagram as shown in figure 1 below. It was derived to a great extent from the research done by Hansen & Wernerfelt, (1989).

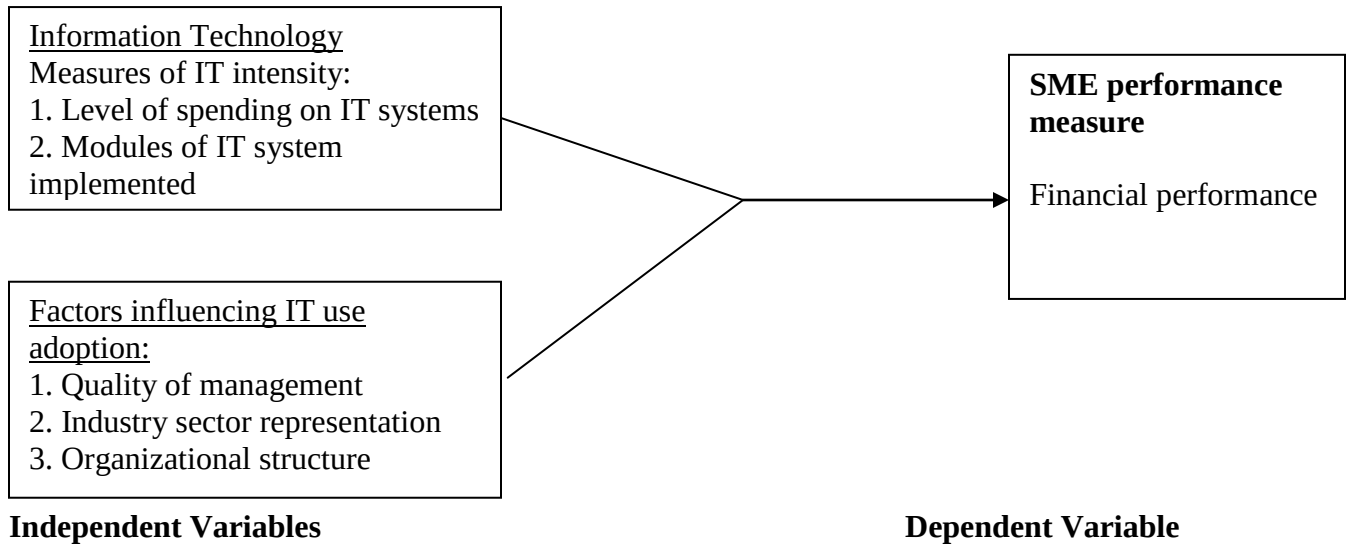


Figure 1 Conceptual framework

2.6 Operationalisation of the variables

A summary of the theoretical grounding is shown in the table below:

Table 2.1: A Summary of the literature review

Variable	Measure/Meaning	Theoretical support
Level of spending on IT investment	The amount of money invested in setting up the IT system in place in a given organization.	Dehning & Richardson (2002)
Industry Characteristics	It is a representation of the SME presence in a given industry.	Mukhopadhyay & Kekre (2002), Melville et al. (2004)
Quality of management	It is represented by the level of training attained by the management. The training level reached acts as a proxy for exposure the management has attained.	Bharadwaj (2000), Melville et al. (2004)
Organizational structure	It is proxied by the number of employees in an organization.	Brnjolfsson & Hitt (2000), Melville et al. (2004)
Modules of IT system to be adopted	It is representative of the extent to which an SME requires to use its IT system for. It is measured by the number of modules implemented by a given firm.	Davern & Kauffman (2000), Caldeira & Ward (2001)

2.6.1 Performance

In this study, performance has been measured by use of net profit. This is because SMEs, which is what the study focuses on, are not good at keeping records of various performance measures, however almost all of them do keep track of their profit margin & hence it is much easier to track their performance in terms of net profit margin.

2.6.2 Level of spending on IT systems

Adapting from the study by Dehning & Richardson (2002), the value of IT systems has been looked at in terms of the level of spending undertaken to acquire the IT systems.

2.6.3 Industry sector representation

This variable has been represented in this study through the use of dummy variables to denote the variation in industrial sector representation (Melville et al. 2004).

2.6.4 Organizational structure

Organizational structure in this study was denoted through use of the number of employees in an organization as a proxy to simulate the existence of staff composition across various departments in the organization (Brynjolfsson & Hitt, 2000 and Melville et al. 2004).

2.6.5 Quality of management

The quality of management has been represented in the study through use of a proxy denoting the level of education attained by management. This representation thus leads to its examination in a nominal form during data analysis in the study (Melville et al. 2004).

2.6.6 Modules of IT system implemented

This variable has been measured in the study through the choice of use to which IT is employed within the organization. It is therefore analyzed in a binary form (Davern & Kauffman, 2000).

2.6.7 Model specification

The general regression equation will be as shown below:

$$Y = f(INVL, MEDUC, SECTOR, NE, MOD)$$

The regression equation will take the following reduced form:

$$Y = \alpha + \beta_1 ITVAL + \beta_2 QMAN + \beta_3 SECTOR + \beta_4 OS + \beta_5 MOD + \epsilon$$

Where:

Y: Performance as measured by Net profit which is a function of:

ITVAL: Value of IT investment

QMAN: The quality of management denoted by the education levels of management

OS: Organizational structure denoted by the number of employees

MOD: Number of IT system modules implemented

SECTOR: Represents the Industrial representation

ϵ : Error term

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research design, a description of the data that was collected and the tools that were used in collecting this data. It also discusses the methods used in analyzing data collected.

3.2 Research Design

The study was correlational in nature and attempted to analyze the relationship between IT use and SME performance. The data used for the study was quantitative in nature and was analyzed through the use of the Ordinary least squares regression model. The data also had qualitative aspects which were analyzed through use of a survey.

In addition, the data was also cross sectional in nature. The main reason for opting for the cross sectional approach was due to the difficulty in obtaining financial data from SMEs. Another justification for the use of cross sectional data was due to the consideration of the time frame within which the study was to be completed.

3.3 Population and Sampling

The data obtained from this database was corroborated further with the National Social Security Fund (NSSF) register, 2009, of businesses. The reason for the choice of the NSSF register was because it had conveniently classified the registered businesses into micro, small, medium and large enterprises. The Nairobi area was divided into five regions which

include: the Central Business District (CBD), Eastern, Northern, Western and Southern regions.

Purposive sampling from the NSSF database led to the database of a leading IT solutions provider from which the population of the study was obtained. The database which was then corroborated with the National Social Security Fund (NSSF) register ascertained the registration of these firms with the NSSF and hence the existence of these firms.

The database for the study which was obtained from a leading IT solution provider consisted of a list of 574 firms all classified as SMEs and it is from this population that a sample of fifty firms was drawn through use of the random sampling technique. The choice of a sample of fifty firms was necessitated by time and data collection costs. Out of fifty questionnaires distributed, only 40 were returned representing a response rate of eighty percent.

3.4 Data Collection

Data was collected from a list of SMEs obtained from the database of a leading IT solutions provider and the same list was corroborated with the NSSF register. The database contained SMEs spread across the country but the research narrowed down to those SMEs within the Nairobi area. The main reason for choosing the Nairobi area was due the fact that with Nairobi being the capital city, most businesses were located herein.

The researcher collected data through the interview method. Questions were posed to the small and medium enterprises' managers. Out of 50 questionnaires administered to the

interviewees, 40 of them were returned for data analysis. This translated to 80.0 percent return rate of the respondents, against an expected response rate of 60.0 percent necessary to approximate a normal distribution. Overall, the response rate can be considered to be very high. The questionnaire is attached in the appendix and the data analyzed is in chapter four.

3.5 Data Analysis

Ordinary least squares (OLS) regression was the main tool used to measure the relationship between firm performance and IT use, through the use of Minitab software. The choice of Ordinary least squares regression was because it shows significance and strength of the variables and the model through the p-values.

To verify that there was no multi-collinearity between the variables, the Pearson test was carried out as per an earlier study by Bharadwaj, 2000. The findings of this test are presented in the next chapter.

Other than the use of OLS regression model, further analysis was obtained through the use of descriptive statistics. The results obtained were reviewed against literature to ascertain consistency with the theory on the relationship between operational performance and IT use.

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study according to the data analysis. The responses were analyzed using descriptive statistics and ordinary least squares regression. The chapter also presents interpretation of the results obtained using the above mentioned techniques.

4.2 The relationship between Performance and various Determinants

The study used ordinary least squares regression to test for the relevance of the variables in estimating the dependent variable, in this case, performance as measured through the net profit.

The results of the regression output are hereby presented in table 4.1 below.

Table 4.1: OLS Regression results (Response is Net profit on 6 predictors, with N = 40)

	Coefficient	P-Value	T-Value
Spending on IT system	0.394	0.001*	3.57
Organizational structure	0.513	0.000*	3.97
Industrial sector representation	-0.052	0.832	-0.21
Number of Modules	-0.0173	0.844	-0.20
Quality of management	-0.0146	0.849	-0.19
Constant	13.80	0.000*	20.12
S	0.631928		
R-Sq	54.5 %		
R-Sq (Adj)	47.2 %		
P-Value Model	0.000		

Note:* Indicates significance at 10% level of significance

**Indicates significance at 5% level of significance

***Indicates significance at 1% level of significance

Source: *Researcher's computation*

Based on the results presented in table 4.1, the result of the ordinary least squares regression analysis showed a positive coefficient of 0.394 with a p-value of 0.001 between the value of investment and net profit. This indicates a positive relationship between the two variables. This means that if the value of investments increases by one unit, the net profit will subsequently increase by 0.394 units with all other factors held constant. The relationship suggested that the higher the level of investment, the higher the net profit of the SME.

The findings as per table 4.1 also show a positive coefficient of 0.513 with a p-value of 0.000 between the number of employees and the net profit. This indicates a positive relationship between the two variables. This means that if the employees increase by one unit, the net profit increases by 0.513 units with all other factors held constant.

Further findings from the regression analysis, as shown in table 4.1, show that the three variables: Industrial sector representation, number of modules and quality of management are not significant. The results show a negative coefficient of -0.052 with a p-value of 0.832 between the industry representation and net profit. Holding all factors constant, the results suggest that a change in industry representation by one unit will have a negative effect on net profit, which decreases.

Another finding from the regression analysis results is that of the number of modules of the IT system implemented against net profit. The results to this finding show a negative coefficient of -0.0173 with a p-value of 0.844 against the net profit. From the results of this

finding, the indication is that with all factors held constant, an increase by a unit of one module leads to a reduction of the net profit by -0.0173 units.

The next result of the regression analysis shows a negative relationship between the quality of management and use of IT systems with a coefficient of -0.0146 and a p-value of 0.849. This suggests that an improvement in quality of management by a factor of one led to a reduction in net profit by 0.0146.

The results also show an R-sq (adjusted) of 47.2% which is an indication that the independent variables are related to the dependent variable. This means that about 47.2 % of the variations in SME performance are explained by the independent variables in the regression output.

4.3 Survey results and Interpretation

This research also attempted to corroborate the regression results by conducting a survey on a number of factors and their relationship with net profit. The various results obtained are presented in the subsequent tables that follow herein.

4.3.1 Areas of operation whereby IT is in use

Through this analysis, the study sought to find out the areas of operation where IT is used by the respondent SMEs. Consistent with objective 2 the study tried to identify how SMEs use IT system that they have implemented in place.

The results are tabulated below.

Table 4.2: Modules of IT implemented

Details	Areas of operation	Frequency
It is basically an analysis of the common modules that SMEs have adopted for use	Base module	40.0%
	Multi warehousing module	22.5%
	Inventory module	25.0%
	Manufacturing module	2.5%
	Serial number tracking	2.5%
	Time and Billing module	2.5%
	BIC module	2.5%
	No Response	2.5%
	Total	100.0%

Source: Researcher (2011)

From results shown in Table 4.2 above, it was evident that the majority of the respondents represented by 40% have adopted the core module which is the base modules. The base module allows for basic sales and expenses monitoring. The results also reveal that 25% have adopted the Inventory module, 22.5% have the multi warehousing module implemented while the remaining 10.0% have Manufacturing (2.5%), Time and Billing (2.5%), Serial number tracking (2.5%) and the BIC module (2.5%).

4.3.2 Areas where improvement has been noted

The study sought to find out which specific areas of operation improvements had been noted as per the SMEs that highlighted improvements since start of use of IT. The results are tabulated below and their aim was to determine objective 3 of the study.

Table 4.3: Areas of noted improvement since start of IT use

Details	Improvement areas	Frequency
Improved areas as a result of IT use in an SME	Sales tracking and Expenditure monitoring	45.0%
	Efficient Inventory management	27.5%
	Financial analysis and reporting improvement	15.0%
	Efficiency in management reporting	2.5%
	Improvement in Manufacturing process	2.5%
	No response	7.5%
	Total	100.0%

Source: Researcher (2011)

From results in Table 4.3 above majority of the respondents represented by 45.0% noted an improvement in the sales tracking and expenditure monitoring sector followed by 27.5% who noted improvement in inventory management, 15.0% of the respondents felt that financial analysis and reporting had greatly improved with the adoption of the IT systems, 2.5% noted improvements in management reporting while remaining 2.5% noted improvements in the manufacturing process. The remaining 7.5% did not respond to the question.

4.3.3 Factors that influence the choice of IT system in place

In answering Objective 3 of the study, this query found out the factors that influenced the respondent SMEs choice in the IT systems that they chose. The results are tabulated below.

Table 4.4: Factors driving the choice of IT system

Details	Factors that influence the choice of IT system	Frequency
Analysis of the various factors that led to adoption of IT use	Nature of business operations	65.0%
	Current trend of most businesses to adopt IT	17.5%
	Change in management	5.0%
	Need to improve on products and services offered	10.0%
	No response	2.5%
	Total	100.0%

Source: Researcher (2011)

From results in table 4.4 above more than half of the respondents (65%) agreed that the nature of business operations necessitated acquiring IT systems. It also reveals that 17.5% agreed that current trend of most businesses acquiring IT systems was their driving factor, 5% change in management necessitated need for change and 10.0% need to improve products manufactured and services offered.

4.3.4 Suggestions/Recommendations towards the effect of IT on SMEs financial performance

The study sought to find out recommendations that respondent firms had on the effects of IT on SMEs performance. The results are tabulated below.

Table 4.5: Suggestions/Recommendations towards IT use

Details	Recommendations/Suggestions	Frequency
Suggestions and recommendations given by various IT system users from the survey conducted	Enables easy tracking of products and financial trends	2.5%
	Enables easy storage and access of vital information	7.5%
	Improves efficiency	12.5%
	Enables costs reduction	5.0%
	Every activity in an SME should involve IT use to increase productivity	50.0%
	Employees need training to be familiar with the system	5.0%
	Enables increased transparency in management	7.5%
	Some accounting software are designed for accounting purposes only	2.5%
	No response	7.5%
	Total	100.0%

Source: Researcher (2011)

The results in table 4.5 above show that half of the respondents represented by 50.0% felt that every activity in an SME should involve IT to increase production followed by 12.5% with the suggestion of improving efficiency, 7.5% increasing transparency in management, 7.5% enabling easy access and storage of vital information, 5.0% cost reduction for example acquiring the system, e-procurement, 5.0% employees need to be trained to be familiar with the system, 2.5% enabling easy tracking of products and financial trends and 2.5% some financial software's are designed for accounting purposes only. However, a minority of 7.5% did not respond to the question.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter focused on the interpretation and implication of the findings from the study based on the research objectives. The main objective of the study was to find out whether there is a relationship between IT and SME performance. Other objectives included finding out the nature of the relationship between IT and SME performance and, to identify the factors that influence adoption of IT use in SMEs.

5.2 Discussions

5.2.1 Objective 1: The relationship between IT use and SME Performance

As indicated in table 4.1 of the OLS regression results, the value of IT systems estimated through a measure of level of IT investment was noted to have a strong positive relationship with performance of an organization. This relationship was significant ($p < 0.001$). This meant that an increase in the value of IT investments by one unit led to a corresponding increase in the performance measured by net profit by 0.394 units, all other factors held constant. The finding was in tandem with that of Dehning & Richardson (2002) and Kumar (2004), who found positive correlations between the value attached to IT systems and the resulting effect that this has on net profit of a given firm.

5.2.2 Objective 2: The areas where SMEs use IT

According to results provided in table 4.3, the most prevalent use of IT within an SME is on sales tracking and expenditure monitoring. The next most implemented module is the Inventory module. The other modules as adopted in order are multi warehousing module, manufacturing module, serial number tracking module, Time and billing module and the BIC module that aids in the generation of management reports. In accordance with Davern & Kauffman (2000) and Caldeira & Ward (2001), the areas where IT systems are used within an SME are representative of the extent to which an SME requires to use its IT system to enhance its operations.

5.2.3 Objective 3: Factors that influence adoption of IT use in SMEs

According to earlier studies (Mata et al., 1995; Dewan & Kraemer, 2000; Cooper et al., 2000; Kumar, 2004), the fallacy of isolating IT and treating it as the sole determinant of performance is highlighted. These studies point out to the need to incorporate other support factors that influence and support the role that IT has in terms of improving firm performance.

5.2.3.1 Level of spending on IT systems

The finding as per regression output (table 4.1) showed a fairly strong relationship between performance and the level of spending on IT systems by SMEs. This relationship is critical ($p < 0.001$). The resulting observation suggests a variation in the level of spending on IT systems of a firm by a single factor leads to an increase in performance levels, measured by net profit by 0.394 units.

The results confirm those of Dehning & Richardson, (2002) who found that the level of spending on IT systems by a firm acts as a measure of the extent to which the firm placed a value on the IT systems that they have acquired in place.

5.2.3.2 The organizational structure

As observed in the regression output (table 4.1), a strong positive relationship was noted between organizational structure adopted and the performance levels of a firm. Number of employees in the study was taken as an indicator of the organizational structure prevalent in the SME. This relationship was significant ($p < 0.000$). The resulting observation suggests that an improvement in the level of organizational structures by a single factor resulted in the net profit subsequently increasing by a factor of 0.513.

The results confirm those of Melville et al., (2004) who found that how well a firm is able to deploy its manpower across various roles in the organization determines to a great extent the level of returns such an organization is expected to derive.

5.2.3.3 Industrial sector representation

The finding as per regression output (table 4.1) showed a weak relationship between performance and industry sector representation of the firm. This relationship is non-critical ($p < 0.832$). The resulting observation suggests that a variation in the industry representation by a single factor leads to a decrease in performance levels, measured by net profit by -0.052 units.

This result contradicts to a great extent that of Melville et al., (2004); Mukhopadhyay & Kekre (2002) who found out that industrial sector representation of a firm does have an impact on how well the firm measures up in terms of performance, given that such a firm will more likely benefit through the linkages offered through its association with other firms in its given industrial sector.

5.2.3.4 The number of modules of IT system to be adopted

The finding as per regression output (table 4.1) showed a weak relationship between performance and number of modules of the IT system implemented. This relationship is non-critical ($p < 0.844$). The resulting observation suggests a variation in the reporting needs of a firm by a single factor leads to a decrease in performance levels, measured by net profit by - 0.0173 units.

This result contradicts the findings of Davern & Kauffman, (2000) who found out that the level to which a system is able to satisfy management needs (indicated by the extent of its usage through the various modules implemented) tends to be positively correlated to the level of commitment that management commits to such a system given the reliance that they will subsequently have on its ability to meet their needs and to this extent therefore it denoted the ability of the system to have improvements on performance.

5.2.3.5 The quality of management

The finding as per regression output (table 4.1) showed a weak relationship between performance and the quality of management in the SMEs surveyed. This relationship is non

critical ($p < 0.849$). The resulting observation suggests a variation in the quality of management of a firm by a single factor leads to a decrease in performance levels, measured by net profit by -0.0146 units.

The management education levels in the case of the study acted as a proxy to the quality of the management in charge of running of the SME. The results obtained for the relationship between the management education levels and performance contradicts to a great extent those of Bharadwaj (2000) and Melville et al., (2004) who found that efficient management skills influence performance through the ability of the management to effectively manage IT functions and co-ordinate the various activities hence leading to success of the firm as measures by various methods, one of which is performance improvement.

5.2.3.6 The survey and results put together

In the survey findings presented in tables 4.3 through to table 4.6, majority of the respondents indicated that they rated performance improvements in their firms as being prevalent in the following areas: sales tracking and expense monitoring, improvement in inventory management, ease of management reports generation and financial analysis and improvements. A finding of the study pointed to evidence from the survey results contradicting that of the regression which showed negative relationships between performance levels and industrial sector representation, quality of management and the modules of the IT system adopted.

An observation from the various responses obtained pointed to interesting insights into the determinants for a given SMEs choice of the IT system. It was observed that a majority of the respondents base their choice or need of an IT system on the nature of their business. A substantial number of respondents based their decisions to adopt IT systems on current trends prevalent of most businesses acquiring IT systems, thus implying a need to comply not on the basis of a foreseen need but rather on the basis of following a proscribed trend set by other businesses.

Another interesting observation is that despite the more logical need of using output from IT systems to support management needs in terms of reports, few of the firms surveyed obtained reports from their IT systems that could be used to support management needs in terms of their reporting needs. This contradicts the findings proposed by Davern & Kauffman (2000) and Caldeira & Ward (2001) who attribute the success of a firm to how well the management embraces the functionalities offered by a given system as portraying a positive impact of the system to influence performance improvements.

5.3 Conclusion

The study found that there was a positive relationship between use of IT and performance of an organization. The study also found that there were certain factors that greatly influenced the adoption of IT by SMEs.

The main factors that had a big impact on the success of IT use which led to improvements in firm performance were the value of IT systems indicated as the level of investment in this

study, and the organizational structure of the given organization, denoted by the number of staff in the case of this study.

The results however showed a negative correlation when this influence was measured between industrial sector representation of a given firm, the modules in use as per the given IT system and the quality of management.

The conclusions to be drawn from these observations on why the value of IT system was viewed to have a positive relationship with performance can be concluded to either one of the following reasons. One, given a high level of expenditure, the management and the employee teams in the organization devote themselves to ensuring that the system fits into place and subsequently enhances the firms' performance. Alternatively, it could also be that given the firms level of expenditure in the IT systems, the resulting benefits point to improvements in performance of the firm in question.

On the choice of modules to be adopted for use, the conclusion to be derived is that if the system enables the SME to improve on only one area of operation then that single area of improvement is enough to have an effect on subsequent performance improvement.

The quality of management was also portrayed as having a negative influence on the extent to which IT use affects performance levels. This may be tied to the fact that despite the fact that it is management that determines the choice of the IT system to be implemented, it is upon the end users to determine the success or failure rate of such a system.

5.4 Recommendations and areas for further research

Firms need to place more emphasis on the role that individual employees play within the organization. This is because, despite the need to have well educated staff who are able to adapt to various work settings and adjustments, it is ultimately not the level of education that an individual may have attained but rather in how well they are able to operate as a team with other employees that determines the success that IT will have on the returns of the organization. If each employee is able to perform well in their given area of work, the whole organization performs well in general and hence firm performance improves overall.

Further research could be carried on other factors both at a micro level as well as at a macro level that may have an effect on the extent to which IT use influences SME performance. Other methodologies need to be adopted in similar studies so as to examine different angles of the role that IT plays in SME performance improvement.

5.5 Limitations of the study

The researcher recognizes the fact that purposive sampling method used to pick the data could have lead to another data sample if an alternative sampling technique is used. An alternative sample would subsequently result in different results other than what was obtained.

Another factor is choice of the modules of the IT system analyzed. The analysis of an alternative IT system with varying modules would have resulted in different modules being analyzed hence resulting in different results being obtained.

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APPENDIX I: LETTER OF INTRODUCTION

Gikonyo Geoffrey,
P.O BOX 59857- 00200
Nairobi, KENYA.

Dear Respondents,

RE: **DATA COLLECTION**

I am a student at the Strathmore University. I am currently undertaking a research study to fulfill the requirements of the Award of Master of Commerce on the **EFFECTS OF INFORMATION TECHNOLOGY ON SMEs FINANCIAL PERFORMANCE: A CASE OF SMEs IN NAIROBI.**

You have been selected to participate in this study and I would highly appreciate if you assisted me by responding to all questions in the attached questionnaire as completely, correctly and honestly as possible. Your response will be treated with utmost confidentiality and will be used only for research purposes of this study only.

Thank you in advance for your co-operation.

Yours faithfully,

Gikonyo Geoffrey
Researcher

APPENDIX II: STRUCTURED QUESTIONNAIRE

Instructions: *Kindly complete the following questionnaire using the instructions provided for each set of question. Tick appropriately.*

Confidentiality: *The responses you provide will be strictly confidential. No reference will be made to any individual(s) or organization in the report of the study.*

1. Type of business ownership (Tick where appropriate)

- a) Partnership ☐ b) Private Limited company ☐
c) Sole proprietor ☐ d) Others (specify) _____

2. Which sector does your company operate in? (Tick where appropriate)

- a.) Manufacturing ☐
b.) Trade ☐
c.) Service ☐
d.) Other (Please specify) _____

3. How many years has your organization been in operation? (Tick as appropriate)

- a) 1-3 years ☐ b) 4-7 years ☐
c) 8-10 years ☐ d) Over 10 years ☐

4. What is the total number of employees in your company?

- a.) 0-20 employees ☐
b.) 21-40 employees ☐
c.) 41-60 employees ☐
d.) 61-80 employees ☐
e.) 81-100 employees ☐
f.) 101 and above ☐

5. What is the size of your annual turnover? (Tick as appropriate)

- a.) Approximately KES 1 Million to 20 Million ☐
b.) Approximately KES 20 Million to 40 Million ☐
c.) Approximately KES 40 Million to 60 Million ☐
d.) Approximately 60 Million to 80 Million ☐

- e.) Approximately 80 Million to 100 Million ☐
- f.) In excess of 100 Million ☐

6. What is your percentage expenditure in relation to your annual turnover?

- a.) 0-20 % ☐
- b.) 21-40% ☐
- c.) 41-60% ☐
- d.) 61-80% ☐
- e.) 81-100% ☐
- f.) Other (Please specify) _____

7. Approximately how much did you invest during the initial stage of the IT infrastructure implementation?

- | | | | |
|-----------------------------|--------------------------|-----------------------------|--------------------------|
| a.) Less than 100,000 | ☐ | d.) Between 600,001-900,000 | ☐ |
| b.) Between 100,001-300,000 | ☐ | e.) Above 900,001 | ☐ |
| c.) Between 300,001-600,000 | ☐ | | |

8. Which modules of Sage Pastel Partner have you implemented?

- a.) Base module (consists of General ledger, Customers and Suppliers). ☐
- b.) Inventory module. ☐
- c.) Multi warehousing module. ☐
- d.) Job costing module. ☐
- e.) Time and Billing module. ☐
- f.) BIC Module. ☐
- g.) Other (Please Specify) _____

9. Has there been an improvement in the nature of your finance operations since you implemented your IT systems?

- a.) Yes ☐
- b.) No ☐

10. If YES to Q (10) above, which specific areas of operations have you noted an improvement on since you implemented IT systems in place?

- a.) Sales tracking and Expenditure monitoring ☐
- b.) Efficient stocks management ☐
- c.) Ease of management reports generation ☐
- d.) Other (Please Specify) _____

11. What factors drove your choice of the IT systems that you selected?

- a.) Nature of business operations necessitated acquiring IT systems ☐
- b.) Current trend of most businesses acquiring IT systems ☐
- c.) Change in management necessitated need for change ☐
- d.) Other (Please specify) _____

12. What is level of education of the management?

- a) Secondary school level ☐
- b) Tertiary College level ☐
- c) First Degree level ☐
- d) Post graduate diplomas level ☐
- e) Multiple degrees level ☐
- f) Post graduate degree level ☐

15. Please give suggestions/recommendations towards effects of information technology on SMEs financial performance

Thank you for your time and cooperation

APPENDIX III: LIST OF SMEs INCLUDED IN THE SAMPLE

1	Computer Technics Limited	21	Spicers (Eastern Africa) Limited
2	Centrepont Limited	22	Access Leo Advertising Limited
3	Kobo Safaris	23	Everest Enterprises Limited
4	Power Technics Limited	24	Medina Chemicals Limited
5	AC Nielsen (K) Limited	25	Next Technologies Limited
6	Geerlofs Kenya Limited	26	Rusinga Management Limited
7	Kennat Inks and Chemicals Limited	27	Seiya Limited
8	Lindberg Holidays and Safaris Limited	28	Uwezo Limited
9	Fedha Management Limited	29	General Plastics Limited
10	Indent Limited	30	Hemmingways Limited
11	Akaba Investments Limited	31	Alliance Garment Industries Limited
12	Camerapix Limited	32	Chui Traders
13	Fox Communication Limited	33	Rentworks Kenya Limited
14	Fast Choice Limited	34	Pradip Enterprises Limited
15	Badar International Limited	35	Network Source Limited
16	Schindler Limited	36	Newline Limited
17	Oil Seals and Bearings Centre Ltd	37	Meditec Limited
18	Professional Technologies Limited	38	Longman Kenya Limited
19	Cimbria East Africa Limited	39	Brulto Limited
20	Kandia Fresh Produce Limited	40	Microsave Consulting Limited

Source: The database of a leading IT Solutions provider
