CLOUD COMPUTING ADOPTION BY SMALL AND MEDIUM ENTERPRISES (SMES) IN NAIROBI COUNTY

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DECLARATION

This research project is my original work and has not been presented for a degree at any other University

Signed ………………………………………   Date ……………………..

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This research project has been submitted for examination with my approval as the University Supervisor

Signed ………………………………………   Date ……………………..

DR NJIHIA MURANGA

DEDICATION

I dedicate this research project to my lovely wife, son and mother.

ACKNOWLEDGMENTS

It has been an exciting and instructive study period in the University of Nairobi and I feel privileged to have had the opportunity to carry out this study as a demonstration of knowledge gained during the period studying for my master's degree. With these acknowledgments, it would be impossible not to remember those who in one way or another, directly or indirectly, have played a role in the realization of this research project. Let me, therefore, thank them all equally.

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Finally, yet importantly, I take this opportunity to express my deep gratitude to the lasting memory of my loving family, and friends who are a constant source of motivation and for their never ending support and encouragement during this project.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Economies are comprised of many companies, majority of which are Small and Medium Sized Enterprises (SMEs). They play a very important role in each market by significantly contributing to each country's Gross Domestic Product (GDP) and its labor market. Therefore, proposing new strategies or developing new systems that can help SMEs become more efficient and productive is not only beneficial for SMEs but also for the economy as a whole. One of the strategies that can help SMEs become more efficient is the use of appropriate Information and Communication Technologies (ICT) (Tehrani, 2013). Cloud computing is one such medium of enhancing SMEs' performance in making profits and growth.

1.1.1 Cloud Computing

There is no universal definition of cloud computing with each scholar coming up with his own definition. Tehrani (2013) defines cloud computing as a computing paradigm in which the computing resources are delivered to customers over a network (e.g. Internet). Companies can access the available services on-demand; access the computing resources at anytime and anywhere they have access to the network (e.g. Internet). According to the National Institute of Standards and Technology (NIST) of the United States, cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal

management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models" (Mell & Grance, 2011).

For cloud computing five criteria must prevail or be prevent: scalability and elasticity (service scale with and on demand); well-defined service interface of basis; services are tracked on usage basis to effect multiple payment models (metered by use); services must share a pool of resource for economies of scale; and, services should be delivered through internet protocols such as IP or HTTP (Gartner, 2008 and Global Access Partners, 2011).

Despite the underlying concept of cloud computing dating back to 1950s (with users accessing mainframes from different terminals), only in late 1990s did cloud computing become a buzz word. Thus, companies gained a better understanding of cloud computing (Schmerken, 2012). Gong, Liu, Zhang, Chen and Gong (2010) state that cloud computing designed through the integration of known and existing computing services such as grid computing, virtualization and utility computing, and High Performance Computing (HPC). Nevertheless, the distinguishing elements of cloud computing from other computing services are: security, business model, data model, programming model, compute model, abstraction and applications (Foster, Zhao, Raico & Lu, 2008).

Despite the foregoing, cloud computing is just a substitute for deploying systems and applications on-premises. That is, customers access computing resources and systems, which are, but not limited to servers, applications, storage, networks and services over a network (e.g. internet). This comes with its own advantages as opposed on-premise

system development as customers are not responsible for designing or operating the actual technology.

Cloud computing is considered as an innovation, because it offers a new method of computing by integrating the already existing technologies (Behrand, Wiebe, London & Johnson, 2010). Similar to other innovations, in addition to costs and benefits of adopting cloud computing there are other factors that influence the decision to adopt cloud computing. SMEs only use the computing resources and pay for the service they used. Cloud computing allows SMEs to reduce the investment cost, the project risk, and the operation and maintenance costs (Khan, Zhang, Khan & Chen, 2011).

The difference between traditional computing (such as developing in- house systems) and cloud computing is the payment model of cloud computing. The payment model of pay-as-you-go allows companies to only pay for the amount of service that they have used. Companies can access and use the most sophisticated computing services, without being required to invest significant amount of money in advance. They do not need to pay upfront for buying, installing or licensing the system. Moreover, companies are not responsible for maintaining and upgrading hardware and software applications. Although cloud computing has many advantages for companies, there are also some drawbacks related to this new phenomenon. Some of the issues that have been discussed by other researchers are issues related to the cloud's security, reliability, availability.

1.1.2 SMEs and Cloud Computing

According to Michael, Makarius and Samuel (2009), Small and Micro Enterprises (SMEs) play an important economic role in many countries. In Kenya, for example the

SME sector contributed over 50 percent of new jobs created in 2005 but despite their significance, SMEs are faced with the threat of failure with past statistics indicating that three out five fail within the first few months.

ICPAK (2013), defines SME as a company that does not have public accountability, publishes general purpose financial statements for external users e.g. owners not involved in day to day management; Kenya Revenue Authority; existing and potential creditors; credit rating agencies, whose debt and equity instruments are not traded in the public market (A domestic or foreign stock exchange or over the counter market) and does not hold funds in a fiduciary capacity for a broad group of outsiders as one of its primary businesses such as banks, credit unions, insurance companies, securities brokers or dealers, mutual funds and investment banks. This definition tries to encompass as much characteristics of SMEs as possible.

In Europe, the European Law website, singles out the main factors determining whether a company is an SME are number of employees and either turnover or balance sheet total. SMEs — micro-entities are companies with up to 10 employees; small companies employ up to 50 workers, whilst medium-sized enterprises contain up to 250 employees.

The size and structure of SMEs gives them some advantages including fast communication between employees and their managers and their ability to rapidly implement and execute decision. But in most cases these companies face many disadvantages. Most of the challenges that SMEs face are due to their lack of access to enough resources (Welsh & Wite, 1981). These resources include but not limited to financial and human resources. This limitation makes SMEs weaker than large companies

in terms of financing, planning, control, training and also information technologies (Bilili & Raymond, 1993). Keeping cost under control is one the biggest challenges that SMEs faces (Communications News, 2008). It is not feasible for SMEs to spend a significant amount of money on their Information Technology (IT).

Cloud computing, as a new computing paradigm, offers many advantages to companies, especially smaller ones. Flexibility, scalability, and reduced cost are just some of many advantages that cloud computing offer to SMEs. Cloud computing enhances companies' competitive advantage (Throng, 2010). It also enables SMEs to access sophisticated technologies without spending significant amount money. These advantages help SMEs grow larger and become more efficient, productive and innovative, by allowing SMEs to focus on their core business. This is applicable to both start-ups and already existing companies. It should also be noted that cloud providers are specialized in providing IT services; therefore the service provided by these companies is better than the service that is delivered by IT department of SMEs. Relying on massive, centralized data centers, results in achieving economies of scale (Ryan, Merchant & Falvey, 2011).

It is expected that the global market for cloud computing will grow at a compounded annual rate of 28 per cent by 2014. Spending on cloud services will generate nearly 14 million jobs worldwide by 2015 and information technology (IT) innovation created by cloud computing could produce US$1.1 trillion a year in new business revenues. Cloud computing has been a new and major trend and is expected to be a major game-changer for businesses (Pornwasin, 2013).

Whilst there is no standard definition of SME in Kenya, typically Financial Sector Deepening (FSD) Kenya define SMEs as businesses with 6 to 50 employees or with annual revenues less than Ksh50 million. In this study, we will define, SMEs as a

business entity that comprises of a limited number of staff and lean turnover or balance sheet. We will look at SME as companies whose headcount or turnover falls below certain limits of employees and annual revenues turnover. According to the Economic Survey in 2006, the SMEs sector contributed over 50 percent of new jobs created in the year 2005 in Nairobi County (Republic of Kenya, 2006). Economic survey of 2009 estimated that there were 7.5 million SMEs in Kenya, providing employment and income generation opportunities to low income sectors of the economy. The sector provided approximately 80% of total employment and contributed over 92% of the new jobs created in 2008.

Despite their significance, past statistics indicate that three out of five businesses fail within the first few months of operation (Kenya National Bureau of Statistics, 2007). In Kenya, strong SMEs tend to be located in urban and peri-urban centres and are usually registered. They face a number of constraints, which include the difficulty in employing competent people with techniques in ICT because of the salaries such people would demand, financial problems arising limited access to capital, inability to obtained technology services from formal sources (Capital Market Authority, 2010).

1.1.3 SMEs in Nairobi County and Cloud Computing

In Nairobi County, SMEs employs over 4.6 million people which is over 30% of all employment and accounts for approximately 75% of all businesses. The sector also contributes 18.4% of the GDP and accounts for 87% of the new job creation (Kiveu, 2013). As such, the sector is the engine of economic growth since it contributes to employment, supply services and goods in the market, offer competition in the market,

enables industrialization and drives innovation. However, owing to their size and accompanying constraints thereof, SMEs in the country face challenges that impede their competitiveness and growth. ICT adoption is one of the challenges, if not the most serious one. Cloud computing solves logistical implication of SMEs ICT adoption through enabling them give-up the ICT hardware or software managing and maintaining burden and cost (Benioff, 2010). Therefore, at micro level the diffusion of cloud is advantageous for SMEs. At macro level, it is beneficial for the economy and environment.

In 2011, Safaricom Ltd, in partnership with Seven Seas Technologies, EMC and Cisco, made an entry into the cloud computing service with a cumulative Sh3.5 billion capital, the largest in East and Central Africa. The Company targets SMEs and large companies as it offers a range of cloud computing services including hosting, storage and backup services. Kenya Data Network (KDN), Crimson Technologies (Kenya) Ltd, Soften through its product Temenos T24, infoConnect (a division of local firm Dimension Data Ltd) also provides cloud services which include SaaS, PaaS, and data recovery (Shahonya, 2011).

Fibre optic cable company Seacom Ltd became the latest entrant in the cloud services market in 2013 through its subsidiary Pamoja Cloud Services owing to increased demand for cloud computing services by local SMEs (Sunday, 2013). According to Khisa (2013), the increased adoption of cloud services by local SMEs has been fuelled by a regulatory requirement for companies, both large and small, to have a reliable backup which should be available for a long period of time. The traditional form of backup, tape backups

where information is taken every day and stored offsite, is time consuming and fraught with errors as a single incorrect tape backup will need to redone manually.

Before the laying of TEAMS, EASSy, and SEACOM submarine fibre optic cables, cloud computing was offered through satellite telecommunication technology leading to bandwidth limitations. SMEs were then reluctant to adopt the use of cloud computing. However, improved internet infrastructure has shifted computing challenge to pricing (Kagwe, 2012). The cloud computing services have helped SMEs improve, protect and grow business as users carry out their duties with minimum capital. Deloitte East Africa's (2011) survey cited cost and tax advantages as some of the key reasons for increase in cloud computing service uptake among SMEs in Kenya, in addition to other advantages derived from the cloud services. It, however, reports that the inertia to migration is linked to security, legislation issues, and lack of IT knowledge, data privacy, and internal factors within the organizations. Similarly, Kituku (2012) established that major concerns for cloud computing adoption in Kenya are security, privacy and reliability. Mbuvi (2012) state that 51 per cent of SMEs use cloud for data management while 4 per cent planned to adopt the cloud for data management in 6 months, 30 per cent in 24 months and 15 per cent weren't considering the cloud for data management at all.

1.1.4 Factors Influencing Cloud Computing in Adoption in SMEs

There are various factors that influence the adoption. According to Tehrani (2013), they include the available external support, competitive pressure, decision makers level of knowledge on cloud computing and innovativeness, the employees cloud knowledge and the information intensity or availability on cloud computing. He adds that other factors

like complexity, compatibility, trialability, cost and security may also affect. Syed Alam, has examined the impact of five major factors in adopting new IT solutions by SMEs in two states of Malaysia (Alam, 2009). The five investigated factors are perceived benefits, perceived cost, ICT knowledge and skill, external pressures and government supports.

While cloud computing is a new technology develop that can provide several advantages, both strategic and operational, to its adopters, the cloud computing adoption rate is not growing as fast as expected (Banerjee, 2009). Acceptance and usage of any beneficial technology by SMEs have a positive influence on the economy as a whole. Since cloud computing help SMEs save money and become more efficient and productive, its widespread usage has a direct impact on the economy as well. The economy which consists of more innovative, efficient and productive businesses is better off than the economy in which businesses are neither successful nor productive (Tehrani, 2013).

Moreover, the economies of scale always result in better use of resources; therefore an economy in which IT services operate on economies of scale uses resources more efficiently. Limited IT access by SMEs is attributed to limited access to market information, limited marketing capacity, poor quality products, lack of capacity to explore niche markets and & overcrowded markets, ineffective markets due to insufficient information, high transaction costs Poor market research results in discrepancy between the supply and demand, too many enterprises producing undifferentiated products. Some of the cloud computing benefits are more acutely felt by SMEs: they often do not have the financial or human resources to invest in IT. Cloud computing can level the playing field by spreading the economies of scale in respect of software and hardware platforms (Banerjee, 2009).

As to the cloud's potential in the developing world such as Kenya, the first observation is that cloud computing reduces infrastructure costs and levels the playing field for small and medium-sized enterprises (SMEs) (Irani, 2008). The second observation is that, unlike client-based computing, which requires installation and configuration of software and update with each new release as well as revisions of other programs with every update, software on the cloud would be easier to install, maintain and update (Parikh, 2009). This benefit is especially important for the rural users who have less IT training (McFedries, 2008). Third, cloud services provide an adopter with the flexibility of scaling up the use if the demand increases (Grossman, 2009). This approach requires a low upfront investment and is thus ideal for SMEs. Fourth, as software becomes free via web-based applications or available in Software as a Service (SaaS), software piracy is likely to reduce (Bhanoo, 2009). Fifth, cloud can overcome barriers related to the poor broadband deployment in developing economies (Hillesley, 2008). Finally, cloud allows having a business model in which third parties can provide a cost-effective security for SMEs (Grossman, 2009). However, these underscore how economic and institutional problems remain central to the diffusion of cloud computing among SMEs in the developing world.

According to Kim, Kim, Lee and Lee (2009), cloud computing adoption issues are different for SMEs than they are for larger organizations. They argue that outage of the service provider or connection affects the service availability which, in developing countries, depends critically on the reliability of internet infrastructure. Security of data is often perceived as an important weakness even though, from a technical and practical perspective, data in the cloud often is more secure than in-house hosted data, especially

for SMEs who often lack staff with security expertise. Performance can become an issue because communication lag reduces application responsiveness. This can be exacerbated when a larger number of users are simultaneously making data-intensive requests over a limited bandwidth channel; this is a typical circumstance for small businesses in developing world contexts. Integration with existing applications is also an important issue where the SME already has a number of information systems implemented. Finally, although the economies of scale by the cloud computing provider can result in significant savings, internet connectivity is still very expensive in developing nations, often eroding some of the major cost advantages.

1.2 Statement of the Problem

Cloud computing is composed of complex systems using many different technologies, services, and delivery mechanisms and growing dramatically. Potential benefits of cloud computing according to Kourik include reducing IT capital expenditure-capital expenditure, providing rapid dynamic scaling of resources on a metered basis, as well as transparency related to platforms, storage, and transmission and processing of data (Kourik, 2011). However, these benefits come with many potential problems.

While cloud computing is a new technology development that can provide several advantages, both strategic and operational, to its adopters, the cloud computing adoption rate is not growing as fast as expected (Banerjee, 2009, Buyya, Yeo, Venugopa, Broberg & Brandic, 2009 and Goscinski & Brock, 2010). In Kenya Vision 2030 seeks to transform the country into a medium income country using ICT as one of the avenues. It, thus, recognized SMEs as a quintessential vessel in stimulating growth, creating

employment and fighting unemployment by creating enabling factors for the SMEs to adopt ICT. Despite of the government efforts at increasing the competitiveness of SMEs through ICT by enhancing internet infrastructure, lowering cost among others, and adoption of cloud computing has been very low among SMEs. Why SMEs may shy away from Cloud computing could be due to security issues, outages, cost, inflexibility and incompatibility, need to do large data transfers, poor technical support, high latency, understanding, and Integration (Galer, 2013).

The study as seen above is meant to cover the gaps in previous studies for example Bitta (2012) whose report gap is evident from the limitation of not studying policies that can be formulated by SMEs to provide a guideline for adoption of cloud computing. Besides, another study carried out in 2012 by Kituku found out there is lack of information on successful case studies and statistics on cloud computing adoption. He suggested further research in cloud computing should focus on investigating how businesses are using the cloud to create advantage and needs to identify the issues faced by organizations when adopting the cloud (the challenges; which this study has included in the objectives). Kituku (2012) observed that since cloud computing is still new to both academia and commerce in Kenya, the outcome of these studies will help scholars and practitioners alike assess the actual uses of the cloud in practice and the business benefits and challenges of adopting it.

Additionally, despite the burgeoning cloud computing adoption in Kenya across sectors, cloud computing is rarely referenced in the academic literature, drawing attention to a continuing gap between industry and academia. The project was geared towards filling-in the knowledge gap by answering the following questions: What is the prevalence of

cloud computing adoption among SMEs? What are factors that influence the decision to use cloud computing by SMEs? What challenges inhibit cloud computing adoption by SMEs in Kenya?

1.3 Objectives of the Study

The objectives of the study were:

  i.   To establish the prevalence of cloud computing adoption among SMEs;

  ii. To ascertain the factors that influence the decision to adopt cloud computing by SMEs; and,

  iii. To establish the challenges facing cloud computing adoption by SMEs in Nairobi County.

1.4 Value of the Study

The study is significant as it is informative on the rate of cloud computing adoption by SMEs in the Kenya and their attitude towards cloud computing. This assists cloud service providers to embark on customer education and sensitization. Information of propensity to adopt by SMEs enables service providers to gauge the market opportunities in Kenya. The service providers can also use the information to forestall and eliminate challenges that SMEs encounter in adopting cloud computing. The findings and recommendations can be used by the government especially Communication Commission of Kenya (CCK) to identify barriers to cloud computing and general ICT acceptance among SMEs. They can, therefore, formulate policies that foster and enhance technology acceptance. The study is a source of reference materials for future researchers and students on related

topic. The study is also an empirical source for future research. Further, academicians find this study useful in learning cloud computing adoption. The knowledge, thus, gained is useful for academic purposes.

1.5 Scope of the Study

The scope of the study lied in determining the factors influencing cloud computing adoption with emphasis on SMEs. The study achieved this by looking at the prevalence of cloud computing adoption, factors influencing the same and challenges, thereof. The study sought to provide direction to the research by narrowing its geographical scope by limiting the same to Nairobi County owing to diversity (scope) of the businesses within the geographical area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter presents the literature, models of cloud computing, theoretical and empirical studies on cloud computing. This   involves a thorough search of all knowledge on the subject being researched on.

2.2. Models of Cloud Computing

There are several kinds of Cloud computing service that SMEs in Kenya can adopt and they are categorized depending on the type of service being offered. The models include Software as a Service, Hardware as a Service and Platform as a Service.

Software as a Service (Saas) In this model Software or an application is hosted in remote servers by a service provider and provided to customers as a service across the Internet. A good example is Google docs. This mode eliminates the need to install and run the application on the customer's local computers. The applications are accessible from various client devices e.g. smart phone, tablets, laptops, desktops that are hooked to the internet through thin client interfaces such as web browsers. According to Bois (2010), sales force was one of the first SaaS providers supplying enterprise resource software such as customer relationship management software (CRM) and also providing the cloud platform for building and running business apps. Other examples of SaaS include the Application Service Provider (ASP) and Oracle. Google's Chrome browser provides another approach to SaaS by adopting an open source model. As an open,

modern software browser, it has the potential to improve their customers' cloud computing experiences.

Hardware as a Service This form of service involves offering Information Technology hardware, an entire data centre, network and processing provision and other fundamental computing resources to users on a pay-as-you-go (PAYG) basis. A customer can deploy and run arbitrary software, which can include operating systems and applications (Miller, 2008). The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems; storage, deployed applications, and possibly limited control of select networking components such as host firewalls. This form of computing has also been described as hardware as a service (HaaS). The offering is made possible by the rapid advances in hardware virtualization, IT automation and usage metering and pricing. Examples of HaaS providers are Amazon EC2 and IBM's Blue Cloud project, Smart Computing, Oracle Cloud Computing, Nimbus and Eucalyptus. Haas is also referred to as Infrastructure as a Service- IaaS.

Platform as a Service (Paas) According to Mckinsey and Company (2008) PaaS as cloud based IDEs that not only incorporate traditional programming languages but include tools for mash up-based development. PaaS enable users to subscribe to their favorite computing platforms with customized requirements of hardware configuration, software installation and data access demands. It facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers (Gartner, 2008). Examples of PaaS include: SalesForce's Force.com

2.3 Theories of Technology Adoption

The theory of reasoned action, theory of planned behavior and technology acceptance model will be reviewed:

2.3.1 Theory of Reasoned Action

Theory of reasoned action (TRA) posits that individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual's attitude toward the behavior and subjective norms surrounding the performance of the behavior. Attitude toward the behavior is defined as the individual's positive or negative feelings about performing a behavior (Fishbein & Ajzen, 1975). It is determined through an assessment of one's beliefs regarding the consequences arising from a behavior and an evaluation of the desirability of these consequences. Formally, overall attitude can be assessed as the sum of the individual consequence and desirability assessments for all expected consequences of the behavior (Bagchi, Kanungo & Dasgupta, 2003). Subjective norm is defined as an individual's perception of whether people important to the individual think the behavior should be performed. The contribution of the opinion of any given referent is weighted by the motivation that an individual has to comply with the wishes of that referent. Hence, overall subjective norm can be expressed as the sum of the individual perception and motivation assessments for all relevant referents (Law, 2010).

The model has some limitations including a significant risk of confounding between attitudes and norms since attitudes can often be reframed as norms and vice versa. A second limitation is the assumption that when someone forms an intention to act, they will be free to act without limitation. In practice, constraints such as limited ability, time,

environmental or organizational limits, and unconscious habits will limit the freedom to act. The theory of planned behavior (TPB) attempts to resolve this limitation (Jae-Nam & Young-Gul, 2005).

2.3.2 Theory of Planned Behavior

Theory of planned behavior (TPB) posits that individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual's attitude toward the behaviour, the subjective norms surrounding the performance of the behavior, and the individual's perception of the ease with which the behavior can be performed (behavioral control) (Eagly & Chaiken, 1993). Attitude toward the behavior is defined as the individual's positive or negative feelings about performing behaviour. It is determined through an assessment of one's beliefs regarding the consequences arising from a behavior and an evaluation of the desirability of these consequences.

Formally, overall attitude can be assessed as the sum of the individual consequence and desirability assessments for all expected consequences of the behavior. Subjective norm is defined as an individual's perception of whether people important to the individual think the behavior should be performed. The contribution of the opinion of any given referent is weighted by the motivation that an individual has to comply with the wishes of that referent. Hence, overall subjective norm can be expressed as the sum of the individual perception and motivation assessments for all relevant referents (Brown & Venkatesh, 2005). Behavioral control is defined as one's perception of the difficulty of performing a behavior. TPB views the control that people have over their behavior as lying on a continuum from behaviors that are easily performed to those requiring

considerable effort, resources, etc. Although Ajzen has suggested that the link between

behavior and behavioral control outlined in the model should be between behavior and

actual behavioural control rather than perceived behavioural control, the difficulty of

assessing actual control has led to the use of perceived control as a proxy (Ajzen, 1991).
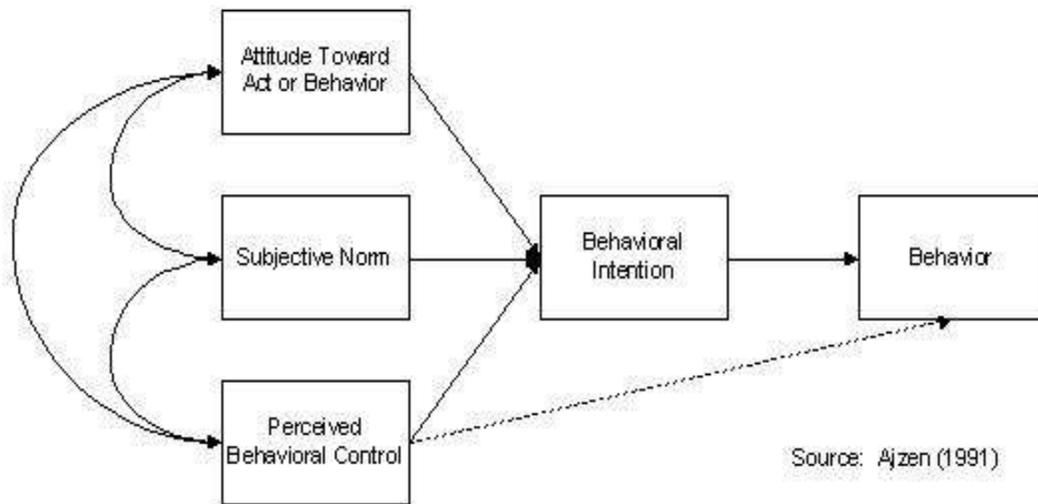
Figure 2.1: Schematic of Theory of Planned Behavior Theory

Source: Ajzen (1991)

2.3.3 Technology Acceptance Model

Introduced by Davis (1989), the Technology Acceptance Model (TAM) is merely an

adaptation of Fishbein and Ajzen's Theory of Reasoned Action (TRA). TAM posits that

perceived usefulness and perceived ease of use determine an individual's intention to use

a system with intention to use serving as a mediator of actual system use. Perceived

usefulness is also seen as being directly impacted by perceived ease of use (Wixom &

Todd, 2005).

Davis (1989) defines perceived usefulness as the degree to which a person believes that

using a particular system would enhance his or her job performance; people are more

likely to use an information system that they believe will help them perform their job better. He further defines perceived ease of use as the degree to which a person believes that using a particular system would be free of effort. Therefore, even if a system is believed to be useful by an individual, if the system is too difficult to use, the potentially enhanced performance benefits to be derived from the system are outweighed by the effort required of having to use it.

TRA and TAM, both of which have strong behavioral elements, assume that when someone forms an intention to act, that they will be free to act without limitation. In practice constraints such as limited ability, time, environmental or organizational limits, and unconscious habits will limit the freedom to act. While TRA states that people are, more often than not, rational beings who make systematic use of available information, considering the repercussions of their actions before deciding whether or not to engage in a given behavior, TAM assigns considerable weight to two key determinants — perceived usefulness and perceived ease of use (Davis, 1989).
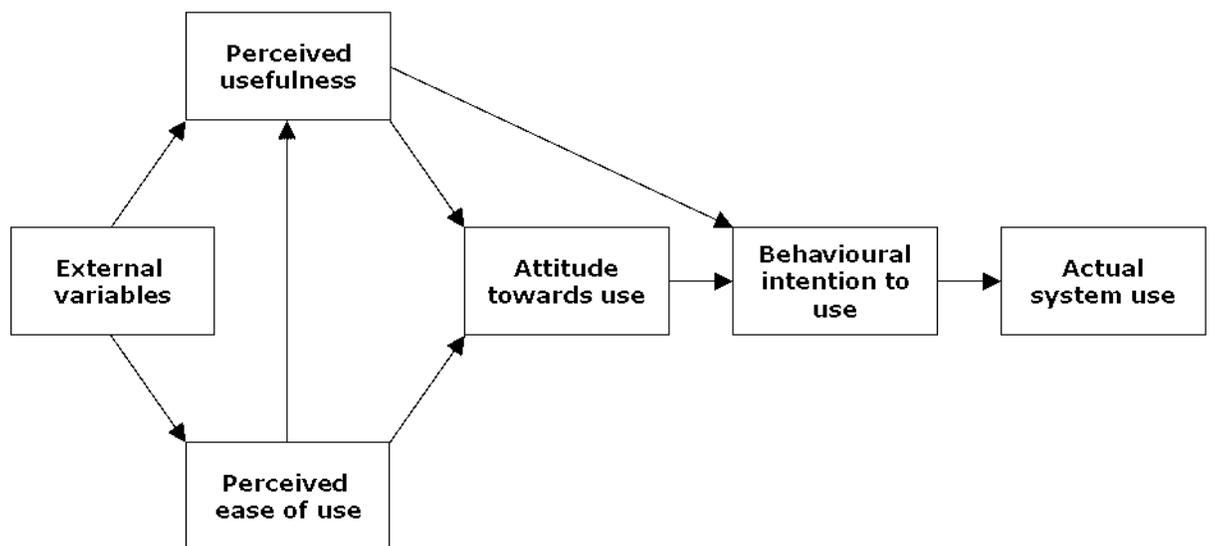
Figure 2.2: Schematic of Technology Acceptance Model

Source: Davis (1989)

2.4 Theory of Technology, Organization and Environment

The three contexts include technological, organizational and environmental (TOE) influence the process by which technological innovations are adopted and implemented, especially in small businesses.

2.4.1 Technology Context

Technological context refers to internal and external technologies applicable to the firm (Kuan & Chau, 2001). According to Rogers (2003), adopting an innovation is affected by its perceived characteristics, including relative advantage, compatibility, and complexity and trial ability. Of these, relative advantage of the technology has been consistently identified as one of the most critical adoption factors (Iacovou, Benbasat & Dexter, 1995 and Kuan & Chau, 2001). When perceived benefit is high, there are higher chances that the organization will allocate more managerial, financial and technological resources to implement the technological system.

Srinivasan, Lilien and Rangaswamy (2002) defined technological opportunism as an organization's ability to sense and respond to new technologies. Being aware and responsive to emerging technologies allows companies to incorporate technological advancements and thus move steps ahead of their rivals to gain competitive advantage. When a firm is characterized as a higher degree of technological opportunism, it is proactive to innovate itself on a consistent basis. Such firm has the ability, skills and

accumulated knowledge to acquire information about technological opportunities and invest resources (Mishra & Agarwal, 2010).

Srinivasan, Lilien and Rangaswamy (2002) further identified two components of technological opportunism – technological-sensing capability (i.e. organizational ability to acquire knowledge about and understand new technology developments) and technological-response capability (i.e. organization's willingness and ability to respond to the new technologies it senses in its environment that may affect the organization). However, Chandy and Tellis (1998) reasoned that an organization with good technology-sensing abilities may not be willing to respond to new technologies as they may cannibalize existing products, markets and organizational relationships. Yet, an organization must know how to reengineer its business strategies to exploit the opportunities or stave off the threats posed by the new technology.

2.4.2 Organizational Capacity

Organizational context includes several indexes regarding firm size and scope, centralization, formalization, and complexity of managerial structure and quality of human resources (Kuan & Chau, 2001). Prior research finds that larger businesses are often more well-equipped with resources and infrastructure to facilitate innovation adoption, while small firms might suffer from resource poverty (Thong, 1999). In Iacovou, Benbasat and Dexter's study (1995) on adopting EDI in small firms, cost of investment and lack of IT expertise are two major concerns among organizational members.

2.4.3 Environmental Context

Environmental context refers to a firm's industry, competitors and government policy (Kuan & Chau, 2001). Organizations operate their businesses within an environmental context which bring them opportunities and constraints. Although the external environment can provide an organization with information, resources and technology, it has regulations and restrictions on the flow of capital and information (Damanpour & Schneider, 2006). Besides, the business environment within which the business operates is of key significance. Competition increases the likelihood of innovation adoption as environmental uncertainty caused by competition helps increase both the need and rate of innovation adoption (Thong, 1999). Typically, environment factors affecting technological adoption is usually understood as competitive pressure which is regarded one critical factor for technological adoption in smaller firms (Iacovou, Benbasat & Dexter, 1995).

2.5 Empirical Review

Another study which investigates the adoption of cloud computing is conducted by Low, Chen and Wu. Low, Chen and Wu (2011) investigated the influence of eight factors in adoption of cloud computing in high tech industry in Taiwan. They try to identify the factors that distinguish cloud adopters from non-adopters. They ran a survey; and collected 111 usable responses. Their regression analysis show that while relative advantage has a significant negative influence on adoption of cloud computing, top management support, firm size, competitive pressure, and trading partner pressure characteristics has a significant positive influence on diffusion of cloud computing.

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Compatibility and complexity were not significantly influencing the adoption of cloud computing (ibid).

Another study investigated the adoption of cloud computing by college students. On one hand they studied the acceptance of cloud computing by students' and on the other hand they studied students' future intention. They used Technology Acceptance Model3 (TAM3), as their theoretical model. They found that the students' characteristics such as their ability to travel to campus influence the usefulness perceptions. First-hand experiences with the platform and instructor support are other factors that influence students' perception about ease of use (Behrand, Wiebe, London & Johnson, 2010).

Tan and Lin (2012) did a study on factors affecting adoption of cloud computing. The study established that the factors affecting cloud computing adoption include: perceived relative advantage and industry pressure, technology-sensing capability. They act as predictor of cloud computing adoption. Tehrani (2013) conducted a study on factors influencing the cloud computing adoption by Small and Medium sized Enterprises. He established that decision maker's knowledge about cloud computing was the main influential factor in adoption. Saleem (2011) did a study on the cloud computing's effect on enterprises with reference to cost and security. The study established that more than security of cloud computing, the accompanying cost reduction is the main factor influencing the adoption. From these theories, we infer that the following affects technology adoption: Context, individual (TAM), and measured against the benefits and or challenges the technology will provide. This partly relates to Diffusion of Innovations model (Rogers, 1995 and 2003).
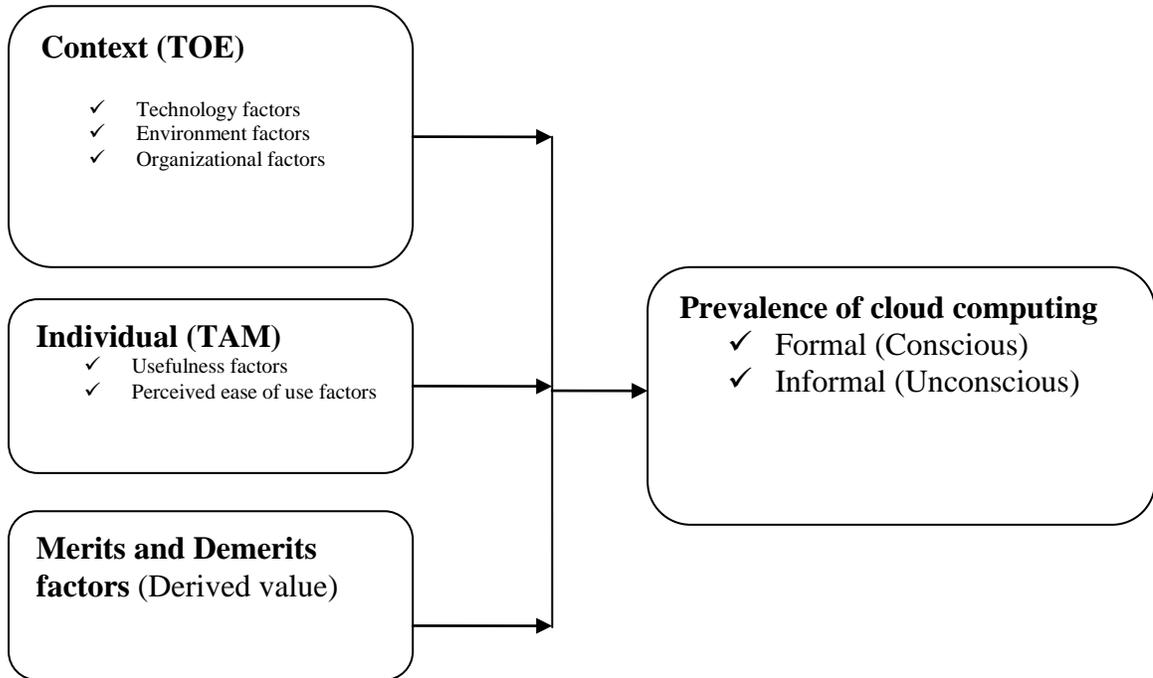
Figure 2.3: Adapted Framework

2.6 Summary

The literature has reviewed various models on technology cloud computing. The models include Software as a Service, Hardware as a Service and Platform as a Service. We have also discussed the theories of technology adoption: - theory of reasoned action, theory of planned behavior and technology acceptance model. We have reviewed one more model that contextualized a combination of the TOE and TAM. This is an adapted framework that will guide our study. On the Empirical review, we have noted that the SME sector has not been researched on in-depth in terms of cloud computing adoption. Other areas like commercial banks, and companies listed on Nairobi Stock Exchange. We noted the gap from the definition of the SME itself. We also noted that SMEs play a major role in

fast growing economies thus the need to address their difficulties in adoption of cloud computing in line with Kenya's vision 2030. The research gap therefore the study seeks to fulfill is the prevalence of cloud computing adoption among SMEs. The study will also investigate the factors that influence the decision to use cloud computing by SMEs and the challenges that inhibit cloud computing adoption by SMEs in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

The chapter presents the approach that was taken to actualize the study. The chapter is outlines the: research design, study's population, sample and sampling techniques, and data collection procedure and data analysis.

3.1 Research Design

The study employed a descriptive cross sectional survey research design. Kothari (2012) state that descriptive research includes surveys and fact finding enquiries of different kinds. It describes the data in order to draw conclusions about the population characteristics or phenomenon being studied. A researcher in this context seeks to measure such items as for example, frequency of shopping, preferences of people, or similar data. Additionally, the description is accurate, factual and systematic making it appropriate for the study. Descriptive approach was integrated with survey design so as to collect comprehensive qualitative and quantitative data that enriches the outcome of the study. Therefore, the approach enabled the study establish the factors influencing adoption of cloud computing by SMEs.

3.2 Target Population

The study population will be all SMEs with Nairobi County. Nairobi County is composed of 17 constituencies: Westlands, Dagoretti South, Langata, Kibra, Roysambu, Kasarani, Ruaraka, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Makadara, Kamukunji, Starehe and Mathare. Nairobi City Council estimates that there are 101,450 SMEs within the County (Nairobi City Council, 2012).

3.3 Sampling

The study will employ cluster sampling technique in selecting a sample from the target population. The sampling technique is considered as it considers diversity within a target population and selects those clusters that are representative of the entire populations considering the constraints faced. Cluster sampling technique also has an added advantage over other sampling techniques as it deselects redundant clusters from sample which makes it economical (Yates, Moore & Starnes, 2008). The target population of 17 constituencies will be clustered into 4 constituencies drawn from South, East, North and West regions of the County.

Stratified random sampling technique will be applied within the clusters to ensure that all sectors (industry) that SMEs operate in are included in the sample. Stratification will achieve at this by grouping the heterogeneous population into homogenous subsets (per industry) to ensure representativeness. The industries will be telecommunication (ICT), manufacturing, hospitality, retail or merchandize and consultancy or service. Random sampling technique will be used to sample individual SMEs within the stratum as it eliminates bias since each member of the target population has an equal chance or probability of being selected. From each stratum, 30 SMEs will be chosen making a sample size of 120 SMEs which is adequate for the study. That is, it will be adequate enough to ensure representation without being subject to data redundancy that would be the case with larger sample sizes. The statistical justification for this is a constraint on time to cover all the possible SMEs. In addition it will give us a wide range of views from a cross section of the SMEs.

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3.4 Data Collection

Primary data sources will include SME business owners, ICT managers and the business consultants or outsourced ICT Company for the SME will be targeted by the study. The study will target one person per SME. Semi-structured questionnaires will be used; that is, with open and close-ended questions for qualitative and quantitative data respectively. Questionnaire as research instrument for data collection will be considered as they are less costly, use less time, require less administration effort inherent in instruments like interviews and useful in obtaining objective data (Marshall & Rossman, 2006). Furthermore, questionnaires have standardized answers that make it simple to compile data.

According to the objectives of this study which stated earlier; Section A will deal with objective one, Section B will tackle objective two and Section C will handle objective three.

Before administration of the instrument, the researcher will seek the permission/authorization letter from the University. This will help minimize respondents' suspicion of the intent, object and purposes of the study. The questionnaire was administered through drop and pick later method. This will give the respondents adequate time to respondent to the questions owing to their busy schedules.

3.5 Data Analysis

The filled-in questionnaires will be edited for consistency and the inadequately fill ones will be expunged from the record. The data generated will be qualitative and quantitative.

Therefore, descriptive analysis techniques will be used; consistent will the research design. Using Package for Social Sciences (SPSS 17.0), the quantitative data will be coded to enable the responses to be grouped into categories. Descriptive statistics such as frequencies, percentages, mean and standard deviation will be used mainly to summarize the data. Likert scale will be used in analyzing adoption factors by ranking them in accordance to their weighted means. Tables, charts and graphs will be used in presenting the analyzed data. Qualitative data will be analyzed using content analysis. That is, the data will be categorized into themes and analysis, thereof, based on the prevalence of the themes and subthemes in addition to their relevance to the topic. This will enhance the descriptive analysis.

CHAPTER FOUR:

DATA FINDINGS AND ANALYSIS

4.1 Introduction

This chapter presents analysis of the findings on cloud computing adoption by small and medium enterprises (SMEs). Semi-structured questionnaires were used in data gathering. The study targeted SMEs within Nairobi County and 120 SMEs were sampled. However, 108 questionnaires were returned making a response rate of 90%. The response rate was made possible as the researcher administered the questionnaires in-person and waited for them to be filled-in. In few cases, the questionnaires were dropped and respondents reminded continuously to fill them in.

4.2 Demographic Characterization

This section presents the data findings on the respondents' demographics. It specifically looks at their gender, age, position, number of employees employed by the SME, and the industry of the SME.

Table 4.1 presents the findings on the gender of the respondents. From the findings, 70.4% of the respondents were male while 29.6% were female. Given that the sample was randomly chosen, this shows that majority of the SMEs owners and managers in Nairobi County are male. This owes to the fact that Kenyan society and the economy, thereof, is patriarchal.

Table 4.1: Gender of the Respondents

Gender	Frequency	Percentage
Male	76	70.4
Female	32	29.6
Total	**108**	**100.0**

Figure 4.4 presents the findings on the age distribution of the respondents. From the findings, 52.0% of the respondents were 26 – 35 years old, 44% were 36 - 45 years old, 7% were 45 years and above while 5% were at least 25 years old. The findings depict that majority of the senior management and owners of SMEs within Nairobi County were aged 26 to 45 years old with majority within this range being youths.
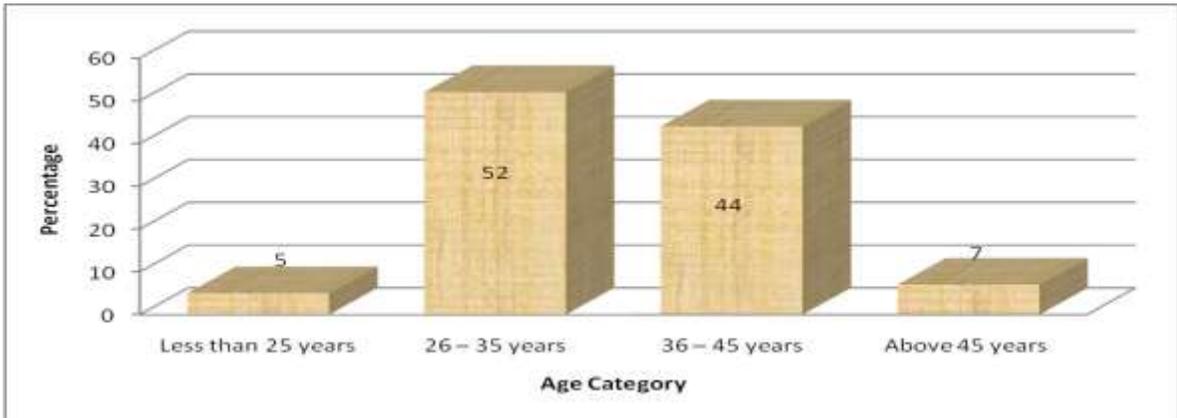
Figure 4.4: Age of the Respondent

Figure 4.5 presents the findings on the position of the respondent in the SME. The findings indicate that 56% of the respondents were management employees, 32% were owners of the SMEs, and 11% were SMEs' supervisors. The findings depict that majority of the respondents were either management staff or owners of the SMEs. As such, they were well-versed with cloud computing dynamics within their respective firms.
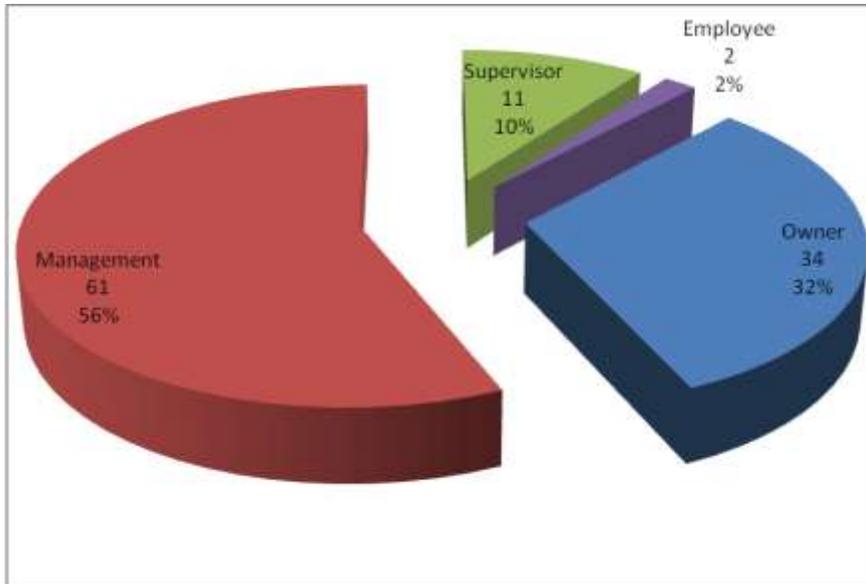
Figure 4.5: Position of the Respondent in the SME

Table 4.2 presents the findings on the number of employees within the SMEs. The Table reveals that 39.8% of the SMEs had more than 20 employees, 28.7% employed between 16 – 20 employees, and 11.1% employed between 11 – 15 employees. The findings depict that majority of the SMEs sampled had in excess of 15 employees.

Table 4.2: Number of Employees in the SME

Number of Employees	Frequency	Percentage
Up to 5 employees	5	4.6
6 – 10 employees	17	15.7
11 – 15 employees	12	11.1
16 – 20 employees	31	28.7
More than 20 employees	43	39.8
Total	**108**	**100.0**

Table 4.3 presents the findings on the industry or sector of the economy where the SMEs belonged to. It is shown that 38.0% of the SMEs belonged to the manufacturing sector, 28.7% were in travel and accommodation industry, 17.6% belonged to the hospitality (hotel) sector, and 13.9% belonged to the service (consultancy). Thus, most of the SMEs sampled belonged to manufacturing, travel and accommodation, hospitality industries. This could owe to the amount of data handled by firms in these industries and the need to streamline their services or processes.

Table 4.3: Industry/Sector of the SME

Industry	Frequency	Percentage
Hospitality (Hotel)	19	17.6
Travel and Accommodation	31	28.7
Retail Trade (e.g. computer shop)	2	1.9
Manufacturing	41	38.0
Service (consultancy)	15	13.9
Total	**108**	**100.0**

4.3 Prevalence of Cloud Computing Adoption

This section presents the findings on the prevalence of cloud computing among SMEs in Nairobi County. It presents findings on whether the SMEs had adopted cloud computing, reasons for not adopting cloud computing, cloud computing services subscribed for, level of satisfaction with cloud computing.

The study sought to determine whether the SMEs had adopted cloud computing. The findings presented in Figure 4.6 shows that 57% of the SMEs sampled had adopted cloud

computing and 43% had not adopted cloud computing. This depicts that majority of the
SMEs sampled had adopted cloud computing.
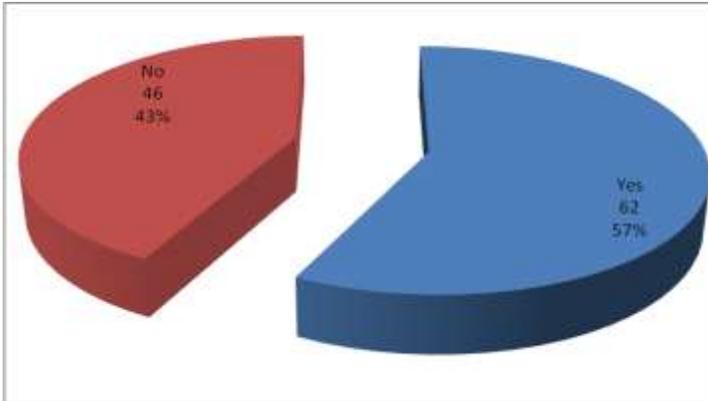
Figure 4.6: Adoption of Cloud Computing

The study sought to rate the intention or prospect of the SMEs that had not adopted cloud
computing to adopt the same. Table 4.4 shows that 50.0% of the SMEs that had adopted
cloud computing intended to use cloud computing, 34.8% stated that they might consider
using cloud computing, and 15.2% did not intend to use cloud computing. This depicts
that majority of the SMEs that currently don't use cloud computing intended to adopt the
same in future.

Table 4.4: Prospect of Cloud Computing Adoption

Prospect	Frequency	Percentage
Do not intent to use cloud computing	7	15.2
Might consider using cloud computing	16	34.8
Intend to use cloud computing	23	50.0
Total	**46**	**100.0**

The study further required the respondents to rate their firms' level of satisfaction with the cloud computing service. Table 4.5 shows that 66.1% of the SMEs were satisfied with the cloud computing services they subscribed to, 17.7% were very satisfied and 16.1% were indifferent (neither satisfied nor dissatisfied). This depicts that majority of the SMEs are satisfied with the cloud computing services.

Table 4.5: Level of Satisfaction with Cloud Computing

	Frequency	**Percentage**
Very dissatisfied	0	0.0
Dissatisfied	0	0.0
Neutral	10	16.1
Satisfied	41	66.1
Very Satisfied	11	17.7
Total	**62**	**100.0**

The respondents were further asked to indicate what cloud computing service they currently use. The findings presented in Table 4.6 shows that 75.8% of the SMEs use storage as a service (disaster recovery, security services and hosted applications), 80.6% use back-up as a service (data archiving and backup and recovery), and 33.9% use infrastructure as a service (data centre and storage services). This illustrates that majority of the SMEs within Nairobi County that adopts the use of cloud computing have subscribed for storage and back-up as a service. In addition, some of the SMEs indicated that they used cloud computing services provided by email hosting service providers such as Gmail and Yahoo.

Table 4.6: Cloud Computing Service Used

Service	Yes	No
Infrastructure as a Service (data center and storage services)	33.9	66.1
Storage as a Service (disaster recovery, security services & hosted applications)	75.8	21.0
Back-up as a Service (data archiving and backup and recovery)	80.6	19.4

The study sought to determine the source of information on cloud computing or where the firms learnt of the cloud computing services. Figure 4.7 shows that 36.1% of the respondent's learnt of cloud computing from social media or internet, 22.2% learnt of cloud computing from cloud service providers, 11.1% learnt of the same from conventional media (TV, radio and newspaper) and friends and family. This depicts that internet is an effective way of disseminating information on cloud computing as it was the source of information for most employees.
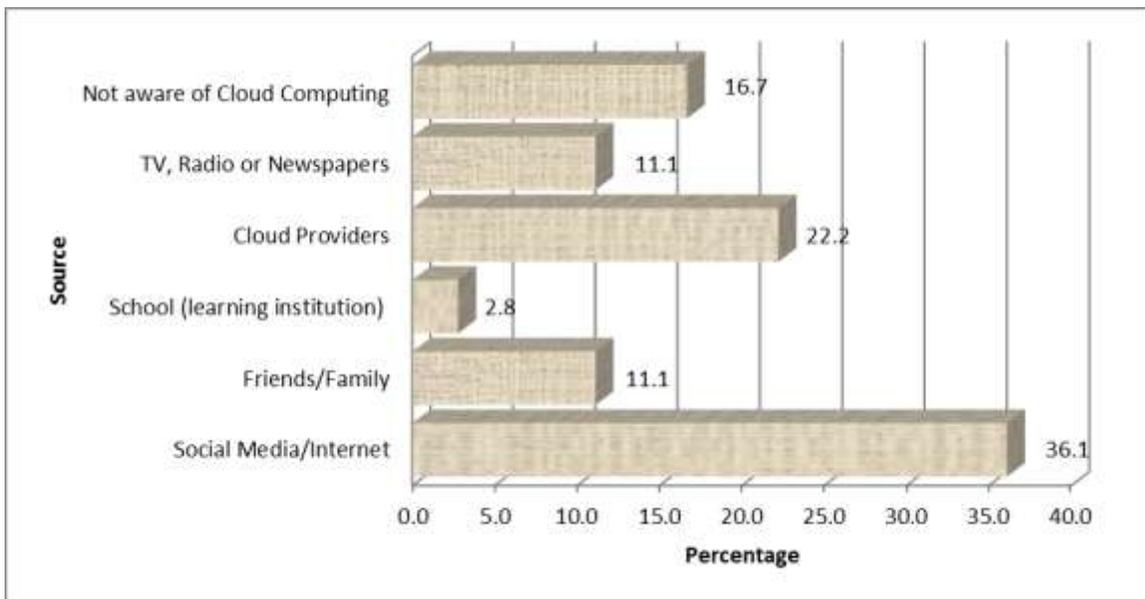
Figure 4.7: Source of Information on Cloud Computing

4.4 Factors Influencing Decision to Adopt Cloud Computing

This section presents the findings on factors influencing decision to adopt cloud computing. It presents the views of both cloud computing adopters and non-adopters. It also achieves at this by looking at the cost and benefits of cloud computing.

The respondents were asked to disclose the factors that influenced their firms to adopt cloud computing services. A 5-point Likert scale was used in data collection and analysis where 1 point was accorded to strongly disagree, 2 points to disagree, 3 points to neutral (neither agree nor disagree), 4 points to agree while 5 points to strongly agree. The findings were presented in Table 4.7. The descriptive results from findings show that: 'availability of cloud computing services has enabled us adopt the same' and 'it is easy to use cloud computing' has a mean 4.56; 'cloud computing services offered are relevant to the company's business or task' to mean 4.55; 'top management support cloud computing adoption' had a mean of 4.45; 'competition in the market has made adoption of cloud computing mandatory' had a mean of 4.39; 'the need to have data backup necessitated the move to cloud computing' a mean of 4.37; 'our customers expect us to use technology such as cloud computing' had a mean of 4.35; 'the benefit of adopting cloud computing outweighs its cost' and 'the human resource is well-trained to handle cloud computing (IT) services' had a mean of 4.34; while, 'unreliability of in-sourced IT services drove us into cloud computing' had a mean of 4.0. This depicts that the firms the adopted cloud computing were influenced by availability of the service, its ease of use, its relevance to business' tasks and processes, top management or owners support for its adoption, competition in the market and risks inherent in loosing data that is in-house.

Table 4.7: Factors Influencing Adoption of Cloud Computing

Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	STDEV
The benefit of adopting cloud computing outweighs its cost	0	0	9	23	30	4.34	0.717
Cloud computing services offered are relevant to the company's business or task coupled by risks to data	0	0	0	28	34	4.55	0.498
Unreliability of in-sourced IT services drove us into cloud computing	0	3	11	31	17	4.00	0.803
The need to have data backup necessitated the move to cloud computing	0	0	7	25	30	4.37	0.678
It is easy to use cloud computing	0	0	0	27	35	4.56	0.496
Top management support cloud computing adoption	0	0	3	28	31	4.45	0.587
The human resource is well-trained to handle cloud computing (IT) services	0	0	2	37	23	4.34	0.537
Our customers expect us to use technology such as cloud computing	0	0	9	22	31	4.35	0.721
Competition in the market has made adoption of cloud computing mandatory	0	0	7	24	31	4.39	0.680
Availability of cloud computing services has enabled us adopt the same	0	0	0	27	35	4.56	0.496

To the question on the extent of the cost and benefits of cloud computing, the findings were presented in Table 4.8. The study used a 5-point Likert Scale in collecting the data so the factors could be ranked based on their weighted mean as previously indicated. From the results: 'cloud computing eliminates or decreases the cost of upgrading the system and maintenance' had a mean of 4.63; 'cloud computing decreases our IT costs (such as IT personnel)' had a mean of 4.61; both 'the overall cost of using cloud computing is less than the cost of installing or developing a technology in-house' and 'cloud computing eliminates the cost of licensing new software' had a mean of 4.40; 'cloud computing enhances our company's data storage capacity' had mean of 4.37;

'cloud computing allows us to use the latest version of the technology cheaply' had a mean of 4.34; 'cloud computing has decreased our capital expenditure or investment in new infrastructure' had a mean 4.29; 'overall I think using cloud computing is advantageous for the business' had a mean of 4.27; 'compared to traditional computing, cloud computing makes data-intensive computing faster' had a mean of 4.24; and, 'using cloud computing increases our company's productivity' had a mean of 4.0.

Other cost/benefit factors had low means and they included: 'using cloud computing makes it easier for us to do our job' (3.82); 'deployment process of cloud computing involves a negligible amount of time and effort' (3.79); 'using cloud computing enhance our effectiveness and operation efficiency on the job' (3.60); 'using cloud computing improve the quality of the work we do' (3.42); 'using cloud computing enables us accomplish tasks more quickly' and 'the pay-as-you-go model of payment makes cloud computing an attractive solution' (3.35); 'all our employees need to be trained in order to use the cloud' (2.76); and, 'training process on using cloud takes a lot of time and effort' (2.66).

The findings thus depict that cloud computing: eliminates or decreases the cost of upgrading the system and maintenance; decreases SMEs' IT costs (such as IT personnel); reduces the cost that would have otherwise been incurred in installing or developing a technology in-house, licensing new software thereby allowing the SME to use latest version of the technology cheaply; enhances SMEs' data storage capacity; makes data-intensive computing faster; increases SMEs' productivity.

However, the findings depict that using cloud computing very much enhances the effectiveness and operation efficiency on-the-job nor the quality of the work SMEs do and accomplishing tasks more quickly. The findings further indicate that SMEs do not like pay-as-you-go model of payment used by some cloud computing providers. They also indicate that do not need training in order to use the cloud services.

Table 4.8: Cost and Benefits of Cloud Computing

Cost and Benefit	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	STDEV
Using cloud computing enables us accomplish tasks more quickly	0	11	25	19	7	3.35	0.900
Using cloud computing improve the quality of the work we do	0	5	31	21	5	3.42	0.752
Using cloud computing makes it easier for us to do our job	0	0	23	27	12	3.82	0.730
Using cloud computing enhance our effectiveness and operation efficiency on the job	0	8	21	21	12	3.60	0.941
Using cloud computing increases our company's productivity	0	0	15	32	15	4.00	0.696
Cloud computing enhances our company's data storage capacity	0	0	8	23	31	4.37	0.701
Compared to traditional computing, cloud computing makes data-intensive computing faster	0	0	11	25	26	4.24	0.734
Cloud computing allows us to use the latest version of the technology cheaply	0	0	8	25	29	4.34	0.694
The pay-as-you-go model of payment makes cloud computing an attractive solution	0	9	22	31	0	3.35	0.721
Overall I think using cloud computing is advantageous for the business	0	0	8	29	25	4.27	0.676
Cloud computing has decreased our capital expenditure or investment in new infrastructure	0	0	9	26	27	4.29	0.705
Cloud computing eliminates the cost of licensing new software	0	0	8	21	33	4.40	0.706
Deployment process of cloud computing involves a negligible amount of time and effort	0	0	26	23	13	3.79	0.765
Cloud computing eliminates or decreases the cost of upgrading the system and maintenance	0	0	0	23	39	4.63	0.483
Cloud computing decreases our IT costs (such	0	0	0	24	38	4.61	0.487

as IT personnel)							
Training process on using cloud takes a lot of time and effort	4	21	29	8	0	2.66	0.782
All our employees need to be trained in order to use the cloud	4	17	31	10	0	2.76	0.797
The overall cost of using cloud computing is less than the cost of installing or developing a technology in-house	0	0	6	25	31	4.40	0.659

4.5 Challenges Facing Cloud Computing Adoption

The study sought to establish the factor hindering or limiting the use and/or adoption of cloud computing by SMEs. A five point Likert scale was used as previously indicated. Table 4.9 shows that: 'I do not trust the effectiveness of cloud service usage and control' had a mean of 3.92; 'difficulty in assessing the costs involved due to the on-demand nature of the services' had a mean of 3.90; 'with cloud computing, my firm can get bogged down by IT infrastructure inefficiencies' had a mean of 3.83; 'difficulty in migrating in and out of the cloud and switching providers' had a mean of 3.74; 'cloud providers still lack round-the-clock service resulting in frequent outages' had a mean of 3.54; 'firms that have adopted cloud services report problems with the system' had a mean of 3.39; 'cloud computing can expose the firm to data security risks and minimize information privacy' had a mean of 3.30; 'the firm would spend more for the bandwidth than it would on hardware and in-house software' had a mean of 3.12; 'discouraged by the IT provider' had a mean of 2.93; 'limited resources of cash to operate cloud' and 'no reason to throw away existing system' had a mean of 2.87; and 'unaware of computing services or available options' had a mean of 2.27. This depicts that SMEs' use of cloud computing is either hindered and negated by lack of trust of the effectiveness of cloud service usage and control, difficulty in assessing the costs involved due to the on-demand

nature of the services, fear of the firm getting bogged down by IT infrastructure inefficiencies, difficulty in migrating in and out of the cloud and switching providers, cloud providers lacking round-the-clock service resulting in frequent outages, and firms that have adopted cloud services reporting problems with the system.

Table 4.9: Challenges Facing Cloud Computing Adoption

Challenge	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	STDEV
No reason to throw away existing system	6	32	49	12	9	2.87	0.973
Unaware of computing services or available options	56	12	13	9	18	2.27	1.549
Limited resources of cash to operate cloud	25	15	31	23	14	2.87	1.334
Firms that have adopted cloud services report problems with the system	3	21	27	45	12	3.39	1.008
Discouraged by the IT provider	0	45	33	23	7	2.93	0.940
Cloud computing can expose the firm to data security risks and minimize information privacy	12	19	23	33	21	3.30	1.271
I don't trust the effectiveness of cloud service usage and control	0	12	26	29	41	3.92	1.029
With cloud computing, my firm can get bogged down by IT infrastructure inefficiencies	0	17	23	29	39	3.83	1.084
Difficulty in assessing the costs involved due to the on-demand nature of the services	0	12	25	33	38	3.90	1.009
Difficulty in migrating in and out of the cloud and switching providers	0	11	31	41	25	3.74	0.927
The firm would spend more for the bandwidth than it would on hardware and in-house software	13	27	25	20	23	3.12	1.324
Cloud providers still lack round-the-clock service resulting in frequent outages	0	23	31	27	27	3.54	1.084

4.6 Discussion of the Findings

On prevalence of cloud computing, we found out that 57 per cent of SMEs had not adopted Cloud computing. This shows some congruence with studies done by Low Chen and Wu, et al, (2011). They were able to single out factors that affect cloud adopters and non-adopters. The early cloud computing adopters have been made aware of the service via various ways such as social media, direct personal sales and advertisements of the service providers. In as much as the adoption was not prevalent amongst the majority, the findings show that SMEs that had adopted cloud computing were satisfied with the services. It is interesting to note that some of the SMEs were using the services without knowing it is cloud computing e.g. Google Docs and drive. This agrees with the adoption theory called TAM as proposed by Rogers (1995 and 2003). Rogers argues that the benefits of the technology will drive an individual towards adoption.

When asked if they intend to use cloud computing in future, 50 per cent of the respondents agreed. Looking at previous studies done by Fishbein and Ajzen, (1975), we draw some parallels. They point out that attitude towards a technology forms the pattern for one adoption once they believe it will benefit them.

On the factors that influenced cloud computing adoption by the SMEs, the study managed to attach itself to the adapted framework we came up with. It has three main areas, context (TOE), Individual (TAM) and merits and demerits of the technology.

On context, technology factors such as models of cloud computing affected how SMEs adopt the cloud computing. The study found out that most SMEs i.e. 80 per cent use Back

up as a service on cloud computing. Whereas other models are such Infrastructure as a service are at 34 per cent on usage. The reason behind this is that they have not found a reason to invest in infrastructure yet, however, the little information they have, they need to safe guard it to allow for business continuity. Other factors such as relevance of the service offered by providers, ease of use, technical knowhow, reliable service providers, availability of local service providers also came into picture. SMEs were able to identify with potential benefits outlined by Kourik (2011) such as low capex and opex, providing metered resources, transparency on the cloud computing platforms, storage, and highly advanced processing of large volumes of data. SMEs need to have a guideline on how to approach this as outlined by Kituku (2012).

On challenges facing cloud adoption, the study found out that SMEs' use of cloud computing is slowed down by lack of trust of the effectiveness of cloud service usage and control, difficulty in assessing the costs involved due to the on-demand nature of the services, fear of the firm getting bogged down by IT infrastructure inefficiencies, difficulty in migrating in and out of the cloud and switching providers, cloud providers lacking round-the-clock service resulting in frequent outages, and firms that have adopted cloud services reporting problems with the system. According to Kim and Lee (2009), the issues that affect cloud adoption for SMEs are different from larger organizations. The study does not seem to agree with this statement. Some of the issues Kim mentions are service availability and reliable internet infrastructure are concerns for both large and small organizations.

CHAPTER FIVE:

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the finding of the study and makes conclusion based on the results. The policy implications from the findings and areas for further research are also presented in this chapter.

5.2 Summary

On prevalence of cloud computing, the study established that most SMEs had adopted cloud computing while majority of the SMEs that don't use cloud computing were intending to adopt the same in future. The cloud computing adopters learnt of the service from internet site such as social media, and personal sales or advertisements of the service providers. The findings further indicate that SMEs that had adopted cloud computing were satisfied with the services. Most SMEs used storage and back-up as a service.

On the factors that influenced cloud computing adoption by the SMEs, the findings show the following: availability of cloud computing services, ease of using the same, its relevance to business' tasks and processes, top management or owners support for its adoption, competition in the market and risks inherent in loosing data that is in-house. The findings further show that cloud computing has been beneficial to the SMES as it eliminates or decreases the cost of upgrading the system and maintenance; decreases SMEs' IT costs (such as IT personnel); reduces the cost that would have otherwise been incurred in installing or developing a technology in-house, licensing new software

thereby allowing the SME to use latest version of the technology cheaply; enhances SMEs' data storage capacity; makes data-intensive computing faster; and, increases SMEs' productivity. However, cloud computing does not enhance effectiveness, operation efficiency, or the quality of the work SMEs do.

On the challenges experienced by SMEs when using cloud computing or hindering the adoption thereof, the findings elucidated the following: lack of trust of the effectiveness of cloud service usage and control, difficulty in assessing the costs involved due to the on-demand nature of the services, fear of the firm getting bogged down by IT infrastructure inefficiencies, difficulty in migrating in and out of the cloud and switching providers, cloud providers lacking round-the-clock service resulting in frequent outages, and firms that have adopted cloud services reporting problems with the service.

5.3 Conclusions

Cloud computing is a new computing paradigm which is advantageous for both firms and individuals. It allows adopting computing to access and use the most sophisticated technologies without being required to pay enormous amounts of money to purchase the system; or to develop it in-house. Usually, the service is delivered to SMEs over a network; a private network or a public network.

Cloud computing is not a complex system; and SMEs easily learning how to perform the system. In some cases they do not even recognize the difference; they use the same system without installing it locally. Another main advantage of cloud computing and why SMEs adopt is it's less costly than capital expenditure involved in IT infrastructure. The payment model of cloud computing which is a utility-based payment; is different than

other types of computing. Using the pay-as-you-go method of payment allows SMEs to reduce their costs significantly; and to convert the capital expenditure into operational expenditure. Security and reliability of cloud computing is being questioned by its opponents. Data lock-in, availability of the systems, bandwidth and legal consequences are some other issues that are mentioned by cloud computing opponents

5.4 Recommendation for Policy

SMEs are important players of each market; and they significantly contribute to each economy's GDP and labor force. Although SMEs are not powerful enough to influence the economy individually, overall they have a great impact. Therefore proposing new strategies and technologies that help SMEs become more efficient and effective also have a positive impact on the economy as a whole. One strategy that helps SMEs compete against larger companies is investing in ICT. Cloud computing, just as other IT system or services include but not limited to reliable and secure systems and expert IT staff. Results of this study have both practical and academic implications; and contribute to both business practice and academia. Both researchers and business practitioners benefit from the results of this study. Users can access the service on an on-demand basis; and only pay for the resources that they used.

5.6 Limitations and Future Studies

SMEs cuts across various sectors, for example health, hospitality, manufacturing etc. it would be interesting to focus on particular sectors that may have more need for knowledge management thus need to use cloud computing. This study focused on all the sectors thus no special attention was given to a particular one. A study should also be

carried out for SMEs out of Nairobi County e.g. Eldoret, Mombasa, Kisumu, to establish if their take is different from the ones targeted in Nairobi. This will give a nationwide conclusion on the adoption of cloud computing and the challenges therein.

Performing further researches in this field of study is highly recommended. Cloud computing is a new phenomenon; and not many studies have been conducted in this field. It is recommend that other researchers to test and confirm the proposed conceptual model in other contexts.

Performing a longitudinal study is also useful. Majority of the SMEs who have not adopted cloud computing strongly intend to adopt cloud computing in future. It is useful to recognize whether they actually will adopt cloud computing; or they were intended to adopt cloud computing because of the hype cycle that cloud is in. Longitudinal study also defines whether companies who currently use cloud computing, continue their usage; and whether cloud users are satisfied with the service they received.

REFERENCES

Abhijit Dubey, A., Mohiuddin, J., & Baijal, A. (2008). Emerging Platform Wars in Enterprise Software. *The McKinsey Quarterly*, 6- 18.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes,* 50(2), 179-211

Alam, S. (2009). ICT Adoption in Small and Medium Enterprises: an Empirical Evidence of Service Sectors in Malaysia. *International Journal of Business & Management,* 4(2), 67-72.

Bagchi, S., Kanungo, S., & Dasgupta, S. (2003). Modeling use of enterprise resource planning systems: A path analytic study. *European Journal of Information Systems,* 12(2), 142-158.

Banerjee, P. (2009). An intelligent IT infrastructure for the future. *Proceedings of 15th International Symposium on High performance Computer Architecture,* HPCA, Raleigh, NC, USA.

Behrand, T., Wiebe, E.N., London, J.E., & Johnson, E.C. (2010). Cloud computing adoption and usage in community colleges. *Behaviour & Information Technology, 30*(2), 231-240.

Benioff, M. (2010). Cloud Computing. *Keynote Speech* at the Oracle OpenWorld 2010 Conference.

Bhanoo, S. (2009). Cloud Computing May Curb Video Game Piracy. *CIO*, March 26, 2009

Bilili, S., & Raymond, L. (1993). Information technology: Threats and opportunities for small and medium-sized enterprises. *International Journal of Information Management*, 439-448.

Bitta, M.N. (2012). A Framework to guide companies on adopting cloud computing technologies. *Master of Science Thesis*, Strathmore University.

Bois, R.C. (2010). MEI Computer Technology. *Journal on Why Going "SaaSy" is the New Trend*

Brown, S. A., & Venkatesh, V. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS Quarterly,* 29(3), 399-426.

Buyya, R., Yeo, C.S., Venugopa, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging it platforms: vision, hype, and reality for delivering computing as the 5th utility. *Future Generation Computer Systems,* 25, 599-616.

Capital Market Authority (2010). Capital Raising Opportunities For SMEs: The Development Of Micro-Cap Securities Markets In Kenya. *CMA Publication* 2010.

Chandy, R., & Tellis, G. (1998). Organizing for Radical Product Innovation: The Overlooked Role of Willingness to Cannibalize. *Journal of Marketing Research*, 35 (November), 474–88.

Communications News. (2008). High costs concern SMBs: Small and medium sized companies managing IT cost. *Communications News,* 45(1), 1-8.

Damanpour, F., & Schneider, M. (2006). Initiation, Adoption, and Implementation of Innovation: Effects of Context, Organization, and Leaders. *British Journal of Management*, 17, 215-236.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.

Eagly, A.H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth: Harcourt Brace Jovanovich College Publishers

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, Mass; Don Mills, Ontario: Addison-Wesley Pub. Co.

Foster, I., Zhao, Y., Raico, I., & Lu, S. (2008). Cloud Computing and Grid Computing 360-Degree Compared. *Grid Computing Environments Workshop, 2008. GCE '08*, (pp. 1-10).

FSD Kenya (2008). The Potential for Credit Scoring For SME Lending In Kenya. *Financial Sector Deepening (FSD) Publication*, October.

Galer, S. (2013). Lessons from High-Growth SMEs. *SAPS*, August 23, 2013.

Gartner (2008). Gartner Says Cloud Computing Will Be as Influential As E-business. *Gartner Press,* Retrieved May 17, 2013. http://www.gartner.com/it/page.jsp ?id=707508.

Global Access Partners (2011). GAP Task Force on Cloud Computing. *Global Access Partners (GAP) and Australian Government's Department of Broadband, Communications and the Digital Economy Report*, May 2011, Australia

Gong, C., Liu, J., Zhang, Q., Chen, H., & Gong, Z. (2010). The characteristics of cloud computing. *39th International Conference on Parallel Processing Workshops.*

Goscinski, A., & Brock, M. (2010). Toward dynamic and attribute based publication, discovery and selection for cloud computing. *Future Generation Computer Systems*, 26, 947-70.

Grossman, R. L. (2009). The Case for Cloud Computing. *IT Professional*, 11(2), 23-27.

Hillesley, R. (2008) Sunny future for cloud computing. September 15, 2013 http://www.itpro.co.uk/604230/sunnyfuture-for-cloud-computing/2

Iacovou, C., Benbasat, I., & Dexter, A. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS Quarterly*, 19(4), 465-485.

ICPAK (2013). *Definition of an SME in Kenya*. Retrieved September 05, 2013, http://www.

icpak.com/index.php?option=com_content&view=category&id=34%3Aicpak&layout=blog&limitstart=15

Irani, J. M. (2008). Cloud computing: New rage among net community. September 5. 2013, http://economictimes.indiatimes.com/articleshow/msid-3446192,prtpage-1.cms.

Jae-Nam, L., & Young-Gul, K. (2005). Understanding outsourcing partnership: A comparison of three theoretical perspectives. *IEEE Transactions on Engineering Management*, 52(1), 43-58.

Kagwe, W. (2012). Cloud computing to pick up pace in Kenya. *The Star,* November 2, 2012.

Khan, S., Zhang, B., Khan, F., & Chen, S. (2011). Business intelligence in the cloud: A case of Pakistan. *2011 IEEE International Conference on Cloud Computing and Intelligence Systems (CCIS)*, (pp. 536-540).

Khisa, I. (2013). Cloud Computing Firms Scramble for EA Market. *Daily Nation,* April 23, 2013.

Kim, W., Kim, S.D., Lee, E., & Lee, S. (2009). Adoption issues for cloud computing. Proceedings of 7th International Conference on Advances in Mobile Computing and Multimedia MoMM 09 (2009), ACM Press.

Kituku, K.M. (2012). Adoption of cloud computing in Kenya by firms listed in the Nairobi Stock Exchange. *Unpublished MBA Project*, University of Nairobi.

Kiveu, M. (2013). Enhancing Market Access in SMEs in Kenya Using ICT. *Paper For Presentation At The 2nd National Science*, Technology And Innovation Week (13-17th May, 2013)

Kothari C. R. (2012). *Research Methodology, 2nd Ed.* New Delhi: New Age International Publishers.

Kourik, J.L. (2011). For Small and Medium Size Enterprises (SME) Deliberating Cloud Computing: A Proposed Approach. *Proceedings of the 5th European conference on European computing conference*, 11-15 April 2011.

Kuan, K. K., & Chau, P.Y. (2001). A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework. *Information and Management, 38*, 507-521.

Law, P.K. (2010). A theory of reasoned action model of accounting students' career choice in public accounting practices in the post-Enron. *Journal of Applied Accounting Research 11(1),* 58-73.

Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems, 111*(7), 363-97.

Marshall, C., & Rossman, G.B. (2006). *Designing qualitative research, 4th Ed.* London: SAGE Publications. Ltd.

Mbuvi, D. (2012). Enterprise considerations for cloud computing. *CIO East Africa,* May 30, 2012

McFedries, P. (2008). The Cloud is The Computer. (Technically Speaking). *IEEE Spectrum,* 45(8), 20.

Mell, P., & Grance, T. (2009). The NIST Definition of Cloud Computing. *National Institute of Standards and Technology, Information Technology Laboratory,* July, 1 - 25.

Michael, B., Makarius, M., & Samuel, M. (2009). Management Of Business Challenges Among Small And Micro Enterprises In Nairobi-Kenya. *KCA Journal of Business Management,* 2(1), 45-51.

Miller, M. (2008). *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*. Indianapolis: Que Publishing Ltd.

Mishra, A.N., & Agarwal, R. (2010). Technological Frames, Organizational Capabilities and Post-Adoption IT Use: An Empirical Investigation of Electronic Procurement. *Information Systems Research*, 21(2), 249-270.

Mugenda, O.M., & Mugenda, A.G. (2003). *Research Methods; Quantitative and Qualitative Approaches.* Nairobi: African Centre for Technology Studies (ACTS) Press.

Nairobi City Council, (2012). Business Registration and Permit Roll.

Parikh, T. S. (2009). Engineering Rural Development. *Communications of the ACM*, 52(1), 54-63.

Pornwasin A. (2013). SMEs to fuel cloud computing. *The Nation,* February 26, 2013.

Republic of Kenya. (2006). *Economic Survey*. Ministry of Planning and National Development, CBS. Nairobi: Government Printer.

Rogers, E.M. (1995). *Diffusion of innovations, 5th ed.* New York, Free Press.

Rogers, E.M. (2003). *Diffusion of innovations, 5th ed.* New York: Free Press.

Ryan, P. S., Merchant, R., & Falvey, S. (2011). Regulation of the Cloud in India. *Journal of Internet Law,* 26(1), 52-71.

Saleem, R. (2011). Cloud Computing's Effect On Enterprises: Cost and Security. *Master's Thesis*, Lund University

Schmerken, I. (2012). The Rise of Cloud Computing on Wall Street. *Wall Street & Technology,* January 20, 2012.

Shahonya, E. (2011). Cloud Computing Offers Big Gains and Challenges to Firms. *Daily Nation,* December 12, 2011.

Srinivasan, R., Lilien, G.L., & Rangaswamy, A. (2002). The Role of. Technological Opportunism in Radical Technology Adoption: An Application to e-Business. *Journal of Marketing,* 66(3), 47-60.

Sunday, F. (2013). SME's shores up revenue for cloud computing providers. *Standard Newspaper,* July 9, 2013.

Tan, M., & Lin, T.T. (2012). Exploring Organizational Adoption of Cloud Computing in Singapore. *The 19th ITS Biennial Conference,* 18 - 21 November 2012, Thailand.

Tehrani, S.R. (2013). Factors Influencing the Adoption of Cloud Computing by Small and Medium-Sized Enterprises (SMEs). *Master Thesis Paper 1179*, Ryerson University, Ontario.

Thong, J.Y. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems*, 15(4), 187-214.

Throng, D. (2010). How Cloud Computing Enhances Competitive Advantages: A Research Model for Small Businesses. *The Business Review,* 59-65

Welsh, J.A., & White, J.F. (1981). A small business is not a little big business. *Harvard Business Review,* 59(4), 18–32

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, 16(1), 85-102.

Yates, D.S., Moore, D.S., & Starnes, D.S. (2008). *The Practice of Statistics, 3rd Ed.* Freeman.

APPENDICES

Appendix I: Introductory Letter

Dear Sir/Madam,

RE: REQUEST FOR DATA COLLECTION

I am studying for an MBA degree at the University of Nairobi and in partial fulfillment of the course, I am required to write a research project. The subject of my research is "Factors Influencing Cloud Computing Adoption by Kenya's Small and Medium Enterprises: A Survey of SMEs in Nairobi County".

You have been selected to participate in this study/survey and I would kindly request for your assistance in filling the attached questionnaire.

The information provided is strictly for academic purpose and will be handled with strict confidence. Your assistance and co-operation will be highly appreciated.

A copy of the research report would be availed to you upon request.

Yours Sincerely,

Balcha Agesa Sabwa

Appendix II: Questionnaire

Instructions: Please read the questions and answer them either by filling in the blank spaces or ticking the check boxes [/] or tables

SECTION A: GENERAL INFORMATION

1. What is your gender?

   Male   [ ]   Female   [ ]

2. What is your age bracket?

   Less than 25 years   [ ]   26 – 35 years   [ ]

   36 – 45 years   [ ]   Above 45 years   [ ]

3. What is the current position that you hold?

   (i) Owner   [ ]   Management   [ ]

   (ii) Supervisor   [ ]   Employee   [ ]

4. How many employees are employed by the company/business entity on permanent basis?

   (i) Up to 5 employees   [ ]   6 – 10 employees   [ ]

   (ii) 11 – 15 employees   [ ]   16 – 20 employees   [ ]

   (iii) More than 20 employees   [ ]

5. What industry or economic sector does your company belong to?

   Hospitality (hotel)   [ ]   Travel and accommodation   [ ]

   Retail Trade (e.g. shop)   [ ]   Manufacturing   [ ]

   Service (consultancy)   [ ]   Any other:……………………………….

SECTION B: PREVALENCE OF CLOUD COMPUTING ADOPTION

6. Has your company adopted cloud computing (if no to this question, go to question 7, 10, 11 and 13 only)?

   (i) Yes   [ ]   (ii)   No   [ ]

7. If no to question 6 (firm has not adopted cloud computing), how would rate the firm's intention to use cloud computing?

   Do not intent to use cloud computing   [ ]

   Might consider using cloud computing   [ ]

   Intend to use cloud computing   [ ]

8. If currently using cloud computing, kindly rate your level of satisfaction with the service?

   Very dissatisfied   [ ]   Dissatisfied   [ ]

   Neutral   [ ]   Satisfied   [ ]

   Very satisfied   [ ]

9. What cloud computing service does the firm currently use? (Tick all that applies)

   Infrastructure as a Service (data center & storage services)   [ ]

   Storage as a Service (disaster recovery, security services & hosted applications) [ ]

   Back-up as a Service (data archiving & backup and recovery)   [ ]

   Any other (specify)……………………………………………………………….

10. Kindly indicate where you learnt (main source of information) about cloud computing?

   Not aware of Cloud Computing   [ ]   Social Media   [ ]

   TV, Radio or Newspapers   [ ]   Friends/family   [ ]

   School (learning institution)   [ ]   Cloud providers   [ ]

SECTION B: FACTORS THAT INFLUENCE THE DECISION TO ADOPT CLOUD COMPUTING

11. The following are factors that influence adoption of cloud computing, kindly indicate the extent to which you agree with the statements with regard to your company?

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The benefit of adopting cloud computing outweighs its cost					
Cloud computing services offered are relevant to the company's business or task coupled by risks to data					
Unreliability of in-sourced IT services drove us into cloud computing					
The need to have data backup necessitated the move to cloud computing					
It is ease to use cloud computing					
Top management support cloud computing adoption					
The company is ready for cloud computing adoption					
The human resource is well-trained to handle cloud computing (IT) services					
Our customers expect us to use technology such as cloud computing					
Competition in the market has made adoption of cloud computing mandatory					
Availability of cloud computing services has enabled use adopt the same					
Any other? Please specify: ………………………………………………………………………………... ………………………………………………………………………………………					

12. The following questions seeks to evaluate the cost and benefits of cloud computing; kindly indicate your level of agreement with the statements with regard to your firm.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using cloud computing enables us accomplish tasks more quickly					
Using cloud computing improve the quality of the work we do					
Using cloud computing makes it easier for us to do our job					
Using cloud computing enhance our effectiveness and operation efficiency on the job					
Using cloud computing increases our company's productivity					
Cloud computing enhances our company's data storage capacity					
Compared to traditional computing, cloud computing makes data-intensive computing faster					
Cloud computing allows us to use the latest version of the technology cheaply					
The pay-as-you-go model of payment makes cloud computing an attractive solution					
Overall I think using cloud computing is advantageous for the business					
Cloud computing has decreased our capital expenditure or investment in new infrastructure					
Cloud computing eliminates the cost of licensing new software					
Deployment process of cloud computing involves a negligible amount of time and effort					
Cloud computing eliminates or decreases the cost of upgrading the system and maintenance					
Cloud computing decreases our IT costs (such as IT personnel)					
Training process on using cloud takes a lot of time and effort					
All our employees need to be trained in order to use the cloud					
The overall cost of using cloud computing is less than the cost of installing or developing a technology in-house					

SECTION C: CHALLENGES FACING CLOUD COMPUTING ADOPTION

13. Below are factor hindering or limiting the use and/or adoption of cloud, kindly rate

the level of your agreement as applicable to your firm?

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
No reason to throw away existing system					
Unaware of computing services or available options					
Limited resources of cash to operate cloud					
Concerns over security of cloud computing					
Do not trust the uptime or speed of cloud services					
Firms that have adopted cloud services report problems with the system					
Discouraged by the IT provider					
Cloud computing can expose the firm to data security risks and minimize information privacy					
I don't trust the effectiveness of cloud service usage and control					
With cloud computing, my firm can get bogged down by IT infrastructure inefficiencies					
Difficulty in assessing the costs involved due to the on-demand nature of the services					
Difficulty in migrating in and out of the cloud and switching providers					
The firm would spend more for the bandwidth than it would on hardware and in-house software					
Cloud providers still lack round-the-clock service resulting in frequent outages					
Any other? Please specify: …………………………………………………………………………... …………………………………………………………………………					

14. What, in your view, should be done to encourage cloud computing adoption and minimize the challenges to such adoption?

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THANK YOU FOR RESPONDING TO THE QUESTIONS