# FACTORS INFLUENCING ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN REAL ESTATE FIRMS IN KENYA

## ALICE SOIPAN KARBOLO

## REG NO: B92/82512/2015

RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF MASTER OF ARTS IN VALUATION AND PROPERTY MANAGEMENT UNIVERSITY OF NAIROBI

## JULY 2021

# DECLARATION

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

Signature …………………………… …. …… Date 21$^{st}$ July 2021.

Alice Soipan Karbolo

REG NO: **B92/82512/2015**

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

Signature …………… Date…28$^{th}$ July, 2021

Dr. Luke M. Obala

## ACKNOWLEDGEMENTS

# TABLE OF CONTENTS

vii

# LIST OF TABLES

# LIST OF FIGURES

# ACRONYMS AND ABBREVIATIONS

**ANOVA**:  Analysis of Variance.

**FDI:**          Foreign Direct Investment

**ICT:**          Information and Communication Technology

**IS:**          Information Systems

**KSF**:          Key success factor

**SC:**          Supply chain

**SMEs:**          Small and Medium Enterprises

**TOE**:          Technology-Organization-Environment Model

# ABSTRACT

ICT has become an integral part of daily human activities with a significant impact on the way we live, work and play. ICT has evolved into becoming a multipurpose technology given the critical spillover to the other economic sectors and its role as a cross-industry enabling infrastructure. Access, adoption and usage of ICT have become a key enabler of overall technological readiness for any country. The purpose of this study was to investigate factors influencing the adoption of information and communication technology in Kenya's real estate firms. The study specifically aimed to examine how ICT complexity, ICT user skill, perceived benefit and availability of ICT equipment influenced the adoption of ICT in real estate firms. The study was anchored in four theories, namely resource-based view theory, dynamic capabilities theory, open systems theory and technology acceptance theory. The study adopted a descriptive research design. The total targeted population of professional real estate firms were 83, while real estate agents were 42, which were operating within Nairobi County. Besides, the study sample was 63 that entailed 50% of professional real estate firms and real estate agents. The unit of observation were managers and supervisors. The study used a purposively sampling technique to select one manager and one supervisor from each of the real estate firms in Nairobi County, giving a sample size of 126 of the respondents (managers and supervisors). Primary data was gathered using self- administered questionnaires. The pilot study was conducted to determine the validity and reliability. The research was analyzed using descriptive and inferential statistics. The descriptive statistics involved frequencies, mean and standard deviation, while the inferential statistics entailed correlation analysis and regression analysis. The study found that ICT user skills, perceived benefits and availability of ICT equipment influenced the adoption of ICT positively while complexity influenced the adoption of ICT negatively. The correlation results established that a positive and significant association existed between ICT user skills, perceived benefits, availability of ICT equipment and adoption of ICT while complexity was negatively associated. The regression results revealed that complexity was negatively and significantly related to ICT adoption ($\beta$=-.066, p=0.015). User skills and ICT adoption were positively and significantly related ($\beta$=.323, p=0.000). Furthermore, perceived benefits from ICT were positively and significantly related to ICT adoption ($\beta$=.399, p=0.000). Similarly, the availability of the ICT equipment and ICT adoption was positively and significantly related ($\beta$=.203, p=0.001). The study recommended that real estate firms employ experts with ICT experience to deal with the hardware and software compatibility issues when it occurs in an institution. The installation of an ICT system should be done by skilled personnel. The real estate agencies should use websites and social media to increase their visibility. Furthermore, well-trained personnel should be involved in the coordination of the activities between the firm and clients. Lastly, a comprehensive automated database should be constructed which would avail property and land information on demand.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

Many organizations have implemented the use of information and communication technology (ICT) in order to develop the products and services they offer to their customers. Owuor (2004) defines Information and Communication Technology (ICT) as the technology which supports activities relating to the design, storage, and transmission of data and voice, jointly with their interrelated methods. Based on this definition, ICT signifies the technological standpoint of an information system (IS) and comprise computing, telecommunications and automation activities.. According to Olson and Gordon (1998) an information system is an integrated user-machine system for providing information to support operations, management, analysis and decision-making functions in an organization. From these three definitions, ICT can be viewed as the enabling system that facilitate the processing and flow of information as well as the technologies used in the actual processing that goes on to produce a product or to provide a service to customers.

The evolution of Information and Communication Technologies during the last decade has significantly altered the business landscape on a worldwide scale. Integration of organizations, especially with suppliers and other entities outside organizational borders is known as a supply chain (SC) concept, which emphasized that several different organizations are involved in getting the product to the end user (Rushton et al, 2001; Cooper 1997). The integration of ICT in the business processes resulted in numerous examples of enhanced organizational performance both in developed and developing countries.

There are not only economic benefits which organizations can achieve from adopting and exploiting ICTs, but also the managerial knowledge, skills and experience of owners of real estate firms which have the potential to make a significant difference in exploiting new opportunities offered by ICTs (Matlay, 2000). Chapman *et al* (2000) claim that most managers who lack in- depth understanding of ICTs and their potential benefits would benefit considerably from assistance on how to link technology to specific operational aspects of their business.

Integrated information systems (IS) have taken center stage in changing organizations. Today, IS are found in several organizational operations e.g. production, marketing, communication, logistics, besides having greatly influenced present living. It is now not easy to visualize life without computers, the internet, e-mail, e-business, e-learning, mobile phones and much more. Modern enterprises largely depend on ICT for gathering and distribution of data and information. Other firms and individuals as well are using ICT to transfer money from one party to another. According to Kitur (2006) several organizations including banks, insurance companies, and service companies have adopted ICT and consider it as a key success factor (KSF) for the reason that it has turned out to be the motivating force that is decisive in the production and delivery of goods and services in those industries.

Globalization based on competition, virtualization, or digitalization facilitated by information technology, as well as the transformation to a knowledge-based economy has formed the information age, and all organizations are trying to keep up with information area for becoming knowledge-based organization. However, to achieve this goal depends on the number of successful knowledge workers in the organization and the use of successful, productive, and efficient knowledge throughout the organization. This leads to using knowledge in different ways to achieve organizational goals (Handzic, 2004).

### 1.1.1 Real Estate in Kenya

Real Estate in Kenya is currently undergoing a real estate boom and investors in this sector have been enjoying very high returns (Njuguna, 2016). Kenya real estate industry has been on a roller coaster ride since 2005. The sector not only witnessed the entry of many new domestic realty players but also the arrival of many foreign real estate investment companies including private equity funds, pension funds and development companies entered the sector lured by the high returns on investments. Consequent to the government's policy to allow Foreign Direct Investment (FDI) in this sector, there was a boom in investment and developmental activities (Mose, Njihia, &Magutu, 2013). Kenya's economic revival has seen the construction and real estate sector grow very rapidly and the sector is projected to grow annually by 16.7 percent on average, its GDP rising from 2.3 percent in 2002 to 4.2 percent in 2007 according to the Gok (2012). This has been brought about by growth of ICT in organization resource management which has triggered growth in a number of foreign investors into the country.

Continued improvements in technology have significantly revolutionized the way real estate companies operate in the current business environment. However, the impact on the performance of the real estate sector with the deployment of technology is largely dependent upon the depth of its involvement across the various facets of the operational processes (Syagga, 2010). How real estate players innovate and respond to technological advances will undoubtedly play a major role in differentiating the companies, their projects and offerings in the minds of consumers.

In the long run, the advent of technology exposes the players to numerous challenges, as well as renders new opportunities to improve innovation, product development and customer support. The key to driving growth in such a scenario will nevertheless be dependent upon the willingness

of real estate players to accept sophisticated technologies and seamlessly integrate them within their business operations (Syagga, 2010).

## 1.2 Statement of the Problem

Real Estate industry plays a vital role in national economy. It contributes significantly towards economic growth. In addition, it supports the growth of other sectors in the economy (Zhang, Wang &Zhu, 2012). However, the performance of real estate sector in Kenya is affected by several factors including low rate of adoption and use of ICT. The low rate of adoption is evidenced by the fact that some real estate firms do not have websites, have been reported to have poor records and poor communication with the tenants.

Recent years have seen increased rural urban migration leading to increased population in urban areas. The performance of real estate, in the past couple of years has been admirable. However, today it is confronted with financial, economic, political, social and legal difficulties variables among other variables. There has been a high theoretical property market and hoisted interest for housing in Nairobi (Njuguna, 2016). Operating in an ever-changing environment, the success and survival of real estate firms relies majorly on their innovative ability, and how products and services are delivered. Based on the study by Gitau (2014), emerging trends in technology are shaping the real estate markets and development. According to Mugambi and Karugu (2017), technology is already changing real estate economies and it is expected that by 2030 and beyond it will have reshaped entire sector leading to development of things like smart cities and affordable housing, for the ever- growing middle class. Kenya's rapid development and economic expansion has led to improved quality of the property market.

Although the recent past has seen numerous studies undertaken on real estate, only a limited number focused on ICT and real estate. However, the few that that looked at ICT and real such as Gitau (2014), established that ICT has positive impact on the way real estate firms carry out their activities. Similarly, Nzalu (2013) established that lack of proper technology, variations in interest rates and inflation growth were some of the factors that majorly and significantly determined how real estate grows. The findings confirm the central role ICT plays and can play in real estate market. Despite numerous studies on real estate development, valuation and market, few studies exists that focuses on ICT. As a result such important factors related to ICT like complexity, user skills, availability of ICT equipment and perceived benefits on the adoption of ICT in real estate firms in Kenya have not been examined. Thus, there remains a major gap in knowledge which this study attempts to fill.

## 1.3 General Objective

The general objective of the study was to describe factors influencing adoption of information and communication technology in real estate firms in Kenya.

## 1.3.1 Specific Objectives

The specific study objectives were;

i. To determine the effect of complexity in the adoption of ICT in real estate firms

ii. To establish the effect of ICT user skills in the adoption of ICT in real estate firms.

iii. To establish the perceived benefits of adoption of ICT by real estate firms

iv. To examine the effect of availability of ICT equipment the adoption of ICT in real estate firms

## 1.4 Research Questions

i.      What is the effect of complexity in the adoption of ICT in real estate firms

ii.     To what extent is the effect of ICT user skills on adoption of ICT in real estate firms.

iii.    What is  the perceived benefits of adoption of ICT by real estate firms

iv.    How does  availability of ICT equipment affect the adoption of ICT in real estate firms

## 1.5 Research Hypotheses

i.      **Ho$_1$:** There is no statistical significant relationship between complexity, ICT user skills, perceived benefits, ICT equipment and adoption of information and communication technology in real estate firms in Kenya.

ii.     **H$_{A1}$:** There is a statistical significant relationship between complexity, ICT user skills, perceived benefits, ICT equipment and adoption of information and communication technology in real estate firms in Kenya.

## 1.6 Significance of the Study

The study was justified for the following reasons:

This study provides valuable information to the policy makers and entrepreneurs on development of real estate firms. It may help improve adoption of ICT to overcome stagnation and failure of real estate firms. The study has contributed to the improvement of the general body of knowledge on adoption of information and communication technology in real estate firms. The results of this study will be useful to researchers and scholars, as it forms a basis for further research. The students and academics would use this study as a basis for discussions on the influence of ICT in real estate firms. It is also a source of reference material for future

6

researchers on other related topics; as well as help other academicians who undertake the same topic in their studies.

**1.7 Scope of the study**

The general objective scope of the study was to describe factors influencing the adoption of information and communication technology in real estate firms in Kenya. The geographical scope of the study was Nairobi City County. The time scope was between June 2020 and July 2021.

**1.8 Limitations of the study**

The researcher encountered some challenges in doing the research and notably during the time of data collection. Some of the respondents were unwilling to respond to the questionnaires for fear of exposing the situation of their institution. However, this was mitigated by assuring respondents of confidentiality during the study. Furthermore, the identity of all respondents was concealed in the questionnaires so that they may not withhold any information required from them. Before the instruments' administration, the researcher sought permission through a letter of authority from NACOSTI and the university to conduct the research. This enhanced confidence to the respondents that the information given was used for study only and not for any purposes.

**1.9 Organization of the Study**

The study was organized into five chapters. The chapter included the introduction. Under the study's introduction, the subsection included the background of the study, statement of the problem, research objectives, hypotheses, significance, scope, limitations and finally, the operational definition of key terms. The chapter included the literature review and included the

theoretical review, empirical review and conceptual framework. Chapter three was the research methodology, chapter four data analysis, interpretation and discussion and finally, chapter five entailed summary, conclusions and recommendations of the study.

## 1.10 Operational Definition of Key Terms

**Adoption of ICT:** The adoption of ICT in real estate can be determined by project quality, customer satisfaction and revenue growth

**Availability of ICT equipment:** The availability of ICT equipment in real estate firms can be determined by the level of communication, investment and number of listings

**Complexity:** Complexity in the adoption of ICT in real estate firms refers to the state of the technology being more complicated for easy utilization. This can include hardware compatibility, networks and databases.

**ICT user skills**: ICT user skills incorporate competence, training level and experience in applying the technology in the real estate firms

**Perceived benefits**: Perceived benefits are the expected gains that the real estate will realize after adopting modern technology. This can incorporate information sharing and data storage.

# CHAPTER TWO:

# LITERATURE REVIEW

## 2.1 Introduction

The section reviewed the theoretical foundation and introduction related to the study, empirical review, conceptualization and operationalization. This was done with the fundamental point of enhancing the researcher's comprehension of the study gaps. It discussed the theories to be used for the study, in relation to factors influencing adoption of information and communication technology in real estate firms.

## 2.2 Theoretical Review

The theoretical framework introduces and describes the theory that explains why the research problem under study exists. The study was supported by four theories: Resource Based View Theory, Dynamic Capabilities Theory, Open Systems Theory and Technology Acceptance Theory. These theories were linked with the study variables to bring out their relevance. Thus, the four theories were deemed relevant and significant to inform the relationship between ICT complexity, ICT user skills, ICT benefits, ICT equipment and its adoption.

### 2.2.1 Resource Based View Theory

Resource based view considers firms as sets of resources that produce competitive advantage. This theory is rooted in the work of Penrose (1959) who considered firms as bundles of resources. Wernerfelt (1984) defined resources as those assets which are tied semi permanently to a firm. They are the assets a firm owns and are externally available and transferable. They

include brand names, trade contacts, technology knowledge, efficient procedures and capital. Firms which become resource holders maintain relative positions similar to other holders as long as they act rationally. Borrowing from Porter's five forces, Wernerfelt (1984) contended that entry barriers are resources since they contain mechanisms which make resource holder defensible. Economies of scale are a prime example of a resource which is an entry barrier.

The growth of a firm internally and externally depends on the manner in which its resources are employed. Building on the inroads made by Penrose (1959), Wenerfelt (1984) argued that for the firm, resources and products are two sides of the same coin. In other words, while the firm's profits are directly driven by products, they are indirectly driven by resources which are used for production. Firms may earn super profits by identifying and acquiring resources which are critical to the development of the demanded products. Therefore, the critical task of top management is to develop new and valuable products through the exploitation of core competencies.

Resources enable firms to achieve improved performance both in the short term and in the long term. Barney (2001) argued that firms which possessed resources that are valuable and rare would attain competitive advantage and improved performance in the short term. While extending this line of argument, Newbert (2007) posited that in addition to possessing valuable, rare, inimitable and non-substitutable resources, firms seeking competitive advantage must demonstrate the ability to alter the resources in such a way that the full potential is realized. Strategic implementation skills could ensure proper resource exploitation. Resource based view was more relevant to firms striving for sustained competitive advantage, such as the real estate firms in Kenya as they need to adopt ICT in its operations in order to reduce complexities in the firm and enhance performance of real estate firms.

10

### 2.2.2 Dynamic Capabilities Theory

Dynamic capabilities theory focuses on how firms change valuable resources over time through a value creating process. Teece, Pisano and Shuen (1990) working paper was the first contribution to dynamic capabilities theory. Ambrosini and Bowman (2009) defined dynamic capabilities as the firm's ability to integrate, build and configure internal and external competencies to address rapidly changing environment. Through dynamic capabilities, firms avoid developing core rigidities, which inhibit development, generate inertia and stifle innovation (Ambrosini & Bowman, 2009).

Dynamic capability theory explains why many once successful firms struggle to survive or fail completely as the environment changes due to the inability to adapt successfully. Teece, Pisano and Shuen (1997) argued that it is not only the resources that matter but also the mechanisms by which firms learn and accumulate new skills. Dynamic capability is about the capacity of an organization to purposefully create, extend and modify its resource base (Singh, Teece &Winter, 2007).

Dynamic capabilities are process based on value adding mechanisms within the firm. Wang and Ahmed (2007) posited that capabilities are firm's behavioral orientations to constantly integrate, reconfigure, renew and recreate its resources. Firms upgrade and reconstruct core capabilities in response to environmental changes to sustain competitive advantage. The theory was relevant to the study as it indicated the importance of adopting ICT user skills in real estate firms.

### 2.2.3 Open Systems Theory

The open systems theory fosters the view of the interaction between the organization and environment. The interactions consist of movement of people, capital, goods and services. Firms

11

affect and are affected by the environment. Kreitner (2007) argued that all firms are dynamic, evolving and changing in response to the environment. In today's turbulent environment, open systems approach is relevant and meaningful in achieving competitiveness. Organizations operate as open systems and interact with environment through permeable boundaries (Luthans, 2005).

Organizations are characterized by the dynamism of open systems. The characteristics include interaction with the environment, synergy, dynamic equilibrium and equifinality (Kreitner, 2007). Interactions with the environment are enabled through permeable boundaries while through synergy, open systems add to more than the sum of its parts represented by $1+1 = 3$ effect. Conversely, through dynamic equilibrium firms achieve a balance with the environment. On the other hand, equifinality means reaching the same result using different means. Equifinality enables managers to use different bundles of resources, transform them using variety of ways to achieve satisfactory output. Senge (1990) through his fifth discipline popularized the open systems thinking. Borrowing a leaf from Senge (1990), Garvin (1993) argued that to turn new ideas into organizational performance, managers have to solve internal problems, learn through experimentation, and learn from organizational experiences and from others.

The open systems theory was significant to the study has it contributed to the evolution and the operation of firms. The adoption of ICT in real estate firms enable managers to solve internal problems, which is among the perceived benefits of adopting ICT.

## 2.2.4 The Technology Acceptance Theory

This theory was put forward by Fred Davis and according to Davis (1986), perceived usefulness and perceived ease of use determines the individual's intention to use a system with intention to use serving as a mediator of actual system use. The author defines Perceived usefulness as the

degree to which a person believes that using a particular system would enhance his or her job performance while Perceived ease-of-use as the degree to which a person believes that using a particular system would be free from effort. Empirical work by the author to test the reliability of his theory deduced that for adoption to be fully successful must perceive that the technology will indeed increase current performance and be used with much greater ease (Davis 1989).

Segars and Grover (1993) re-examined Adams et al. (1992) replication of the Davis work. They were critical of the measurement model used, and postulated a different model based on three constructs: usefulness, effectiveness, and ease-of-use. They deduced that perceived performance and ease of use were vital for usage of a new technology. The theory was relevant to this study because ICT adoption and availability of ICT equipment are termed as key components for improving the overall performance of any given firm, in this perspective the TAM uses parameters such as increasing the speed of work, job performance, effectiveness, increased productivity and making work easier that will be realized if a given technology is adopted, this must be coupled ease of use of the technology for it to be a success.

**2.3 Concepts of ICT**

The ICT is the technology that supports activities in the organization incorporating the information. The activities performed by the ICT can include data gathering, processing, storing and presenting (Demeke & Olden, 2012). The ICT activities endeavour to increase collaboration and communication. The advantage of the ICT adoption is that it has a definite possibility to change the competitive advantage by reducing information and transaction costs and developing new collective versions to boost the effectiveness of workers (Djatikusumo, 2014).

One of the most crucial benefits of ICT implementation in the building is boosted the performance of employees, lowers mistakes/errors in contract papers, time-saving, enhanced

marketability and also competitiveness and convenience of doing complex duties (Elbeltagi, Sharji, Hardaker, & Elsetouhi, 2013). The components of the ICT can include hardware and software. The hardware components can include computers and the internet, while the software component can incorporate the operating systems (Everett, 2014).

In summary, the components of the ICT system includes hardware, software, data, information, procedure and the user. In the current study, the components of ICT that were looked upon included hardware, software, data, information, procedure and the user. ICT penetrates all elements of life, supplying newer, better, and quicker methods for individuals to communicate, network, look for aid, access to information and also find out what is new in the World (Newbert, 2007). The objectives of the study were considered ideal in determining the extent of the ICT adoption.

## 2.4 Empirical review

This section reviewed literature from prior scholars regarding the effect of ICT complexity, ICT user skills, ICT perceived benefits and availability of ICT in real estate firms.

### 2.4.1 Complexity

Bagozzi, Davis and Warshaw (1992) note that new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them, people form attitudes and intentions toward trying to learn to use the new technology prior to initiating efforts directed at using. Attitudes towards usage and intentions to use may be ill-formed or lacking in conviction or else may occur only after preliminary strivings to learn to use the technology evolve. Moreover, Goling (2012), focused on digital divide on the rate of adoption of ICT among rural and urban Medium enterprises in

Jamaica. It was deduced factors upholding digital adoption included relative advantage, complexity, compatibility, trialability and observability, organization factors such as size and industry, managerial characteristics such as age and attitude.

Alderete (2013) used an Econometric model to test whether ICT access and innovation increases outsourcing in Medium enterprises, the prediction of this model were tested using a LOGIT Model which enabled conclusion to be made that the level of innovation influences the probability of outsourcing among the Medium enterprises but there exists a negative correlation between ICT adoption and access.

Wachira (2015) concluded that ICT not only enhances efficiency but along with the notable benefits comes with security issues, their study was aimed to identify the major threats and how organization can hedge against such risks. The major security threats included viruses and system users, the researcher also deduced that Medium enterprises were attempting to secure their IT assets even though the efforts were uncoordinated, the security roles were unassigned and many Medium enterprises do not have a security budget.

Chowdhury (2011), in the assessment of investments in ICT-Capital and Economic performance of Medium enterprises in East Africa, where concentration was on the work on two major states in East Africa; -Kenya and Tanzania, the study had three main areas of focus that is internal rate of return, labour productivity and market expansion. It was deduced that ICT adoption was positively correlated to Market expansion and negatively correlated to internal rate of return, labour productivity. Modimogale and Kroeze (2011), discussed the role of ICT among Medium enterprises especially in handling competition, it was revealed that the use of traditional tools in operations is a big challenge among Medium enterprises in an attempt to create sustainable competitive advantage, thus the adoption of ICT was the solution irrespective of size. The major

obstacle of adoption of ICT among Medium enterprises included lack of necessary skills and knowledge about strategic use of ICT.

In south east England and Thames valley region, 400 Medium enterprises were studied and the main focus was on adoption and pattern of Medium enterprises when it comes to ICT, focus was keen on the drivers of ICT as well as challenges, it was found that, the attitude of adoption was favorable but massive failure to recognize the strategic advantage of ICT. It was also deduced that massive ignorance of European Union, national and regional wide policy on ICT on Medium enterprises (Mitra, 2009). Earle (2002) deduced that ICT integration is not just an acquisition of hardware and software but it's a holistic process that involves merging ICT with Business process to lead to overall efficiency, effectiveness, economy of the entity. Wang (2007) revealed that integration of ICT with business process is key to enhancing performance in totality for any given entity.

## 2.4.2 ICT User Skills

Golding et al (2008) found that there is a difference in the adoption of ICT by developing and developed nations where developing countries fall behind as a result of barriers. With the widespread reliance on information systems and the development of new technologies in the making of various transactions, the adoption of technology remains a priority (Zarea and Salamzadeh, 2012). However, Idisemi et al, (2011) in his paper found that lack of skills and training for ICT users, costs, inadequate infrastructure, lack of management support, policy and institutional framework are some of the factors that hinder the effective use of ICT in Nigerian SMEs. .

According to a study by Olusola and Oluwaseun (2013) it is revealed that at present the most technologically advanced economy is more capable when the international community embraces the knowledge economy rather than the industrial economy creating, collecting and disseminating information. However Apulu (2011) pointed out in his studies that lack of skills of ICT users is one of the factors that hinders the adoption or effective use of ICT. Duan et al, (2002) identified the lack of ICT skills and knowledge in SMEs as one of the major challenges facing all European countries, especially in the UK, Poland and Portugal. According to Cloete (2003) in a study of SMEs in South Africa they found that ICT acquisition was largely influenced by the unavailability of computer software, other hardware and telecommunications at a reasonable cost; security concerns and uncertain benefits from ICT.

A similar study in China conducted by Kunda and Brooks (2000) confirms that the limited prevalence of computers, the high cost of internet access and the lack of online payment systems are the main barriers to the acquisition of ICT by SMEs directly. Similarly, a study by Lal (2007) on globalization and the adoption of ICT in Nigerian SMEs found that poor infrastructure is a major obstacle to the spread of ICT. Arendt (2008) agrees with previous researchers that the cost of ICT equipment and networks, software, and redesigns are obstacles to the adoption of ICT in many SMEs.

### 2.4.3 Perceived Benefits

Purnomo and Lee (2010) investigated agricultural extension officer's perception of readiness and barriers towards implementation of ICT program. The first finding reveals that they perceived that three out of the four factors of readiness as positive. The e-LRS assessment revealed that they perceived farmer readiness as lowest and thus considered it as a barrier. The second finding reveals that technological and organizational cultures were also seen as the main barriers of ICT program implementation. The third findings show that they felt that the two demographic variables, regency and age, must also be considered when ICT programmes are implemented. The results of this study can provide guidance to the government or relevant organizations when considering readiness and barriers towards implementing ICT programmes.

Alghamdi, Goodwin, and Rampersad (2011) propose a framework comprising of seven dimensions of ICT readiness assessment for governments: e-government organizational ICT strategy, user access, e-government program, ICT architecture, business process and IS, ICT infrastructure, and human resource. The examination shows that the usefulness of the technology is important and should be critically evaluated before purchasing of the equipment. The framework defines the organizational requirements that are necessary for e-government to

resolve the delay of ICT readiness in public-sector organizations in developing countries. Gallego Álvarez et al. (2010) examine determining whether factors of municipal e-government are common to a worldwide municipal view. Findings indicate that the level of improvement in e-government is strongly linked to municipalities that have a significant level of technological development.

In his study Asogwa (2011) studies the level of preparedness of selected African governments in using ICTs to enhance the range and quality of services provided to the citizen and determines the extent and continuous improvement efforts of African leaders towards the attainment of connected government. The findings of the examination reported that the importance of the technology is given a priority before coming to a consensus of introducing to the departments. Also, the findings indicate that several African governments have demonstrated their willingness to apply ICTs in their public administration, but a majority of them are at the emerging and enhanced stages.

Gichoya (2005) examines factors affecting successful implementation of ICT projects in government in the empirical context of Kenya. Findings indicate that its key determinants are finance, infrastructure, attitudes, coordination and strategy. Kottemann (2009) examines the effects of technological readiness, institutional readiness and fiscal readiness on the extent of online government services availability across countries. Findings indicate that significant effects are found in a path model with direct effects of technological readiness and institutional readiness on e-government, and indirect effects of fiscal readiness on e-government mediated through technological readiness. Also, the establishment revealed that the expected benefits that will be obtained from the introduction of the technology influences its adoption in an institution.

## 2.4.4 Availability of ICT Equipment

Hennessy (2010), after conducting research on utilization of ICT in primary and secondary schools in Sub-Saharan Africa, observes that the availability of physical ICT structures, such as computer rooms and electricity, influence the principals' decisions to integrating ICT into their executions. It is then deducted that the availability of electricity and the availing of ICT structures has the capacity to boost the principals' willingness to integrate ICT into the administration tasks. The examination concluded that availability of electricity and the availing of ICT structures were positively and significantly correlated.

Afshari, et.al. (2010) surveyed the extent to which some identified factors including high level of computer access, high level of transformational leadership behaviors, high level of computer competence and strong perceptions of the ICT attributes influenced the principal's integration of ICT in the administration tasks in Iran. The survey indicated that the main factors that influenced the principals' adoption of ICT in the management and administration of schools were the availability of ICT infrastructure. With availability of ICT infrastructure, principals are encouraged to utilize these facilities in order to tap the advantages therein.

Olayemi and Omatayo (2012) set about a study that stressed on the effectiveness of the adoption of ICT-based administration in secondary schools in Ekiti-state, Nigeria. The findings of the study pointed out that the availability of ICT resources was a shot in the arm for the principals to adopt ICT in their administration tasks. The study concluded that the availability of the ICT equipment was an important factor that influenced the effectiveness of the adoption of ICT in the school.

Gichoya (2005) examines the factors affecting successful implementation of ICT projects in government in the empirical context of Kenya. Findings indicate that its key determinants are

finance, infrastructure, attitudes, coordination and strategy. Kottemann (2009) examines the effects of technological readiness, institutional readiness and fiscal readiness on the extent of online government services availability across countries. Findings indicate that significant effects are found in a path model with direct effects of technological readiness and institutional readiness on e-government, and indirect effects of fiscal readiness on e-government mediated through technological readiness.

## 2.5 Conceptual Framework

According to Kombo & Tromp (2009), a concept is an abstract or common idea adopted or derived from certain contexts. The conceptual framework is a set of broad ideas and principles drawn from relevant research areas and used to plan the next presentation. Mugenda and Mugenda (2003) describe the conceptual framework as a fictional model that identifies the learning model and the relationship between dependent and independent variables. Kothari (2004) defines independent variables also known as descriptive variables as the hypothetical cause of dependent variability variables, while the dependent variables refer to the variables the researcher wishes to describe. The purpose of a conceptual framework is to distinguish and define concepts relevant to research and map relationships between them. Such a framework will help researchers to define a concept, determine the area of study or scope of the concept, plan relationships between concepts, and identify gaps in literature (Creswell, 2003).

**Figure 2.1: Conceptual Framework**

**Independent Variables**

```
┌─────────────────────────────┐
│ Complexity                  │
│ • Hardware Compatibility    │─────┐
│ • Networks                  │     │
│ • Databases                 │     │
└─────────────────────────────┘     │
                                     │
┌─────────────────────────────┐     │        Dependent Variable
│ ICT user Skills             │     │
│                             │     │   ┌──────────────────────────┐
│ • Competence                │─────┤   │ Adoption of ICT in Real  │
│ • Training Level            │     ├──▶│ Estates                  │
│ • Experience                │     │   │ • Project Quality        │
└─────────────────────────────┘     │   │ • Customer Satisfaction  │
                                     │   │ • Revenue Growth         │
┌─────────────────────────────┐     │   └──────────────────────────┘
│ Perceived benefits          │     │
│ • Communication             │─────┤
│ • Information Sharing        │     │
│ • Data Storage              │     │
└─────────────────────────────┘     │
┌─────────────────────────────┐     │
│ Availability of ICT equipment│    │
│ • Communication             │     │
│ • Investment                │─────┘
│ • Number of listings        │
└─────────────────────────────┘
```

**Source: Researcher (2021)**

**2.6 Conclusions and Research Gap**

It is clear from the literature that, there is inadequate knowledge about effect of ICT complexity,

ICT user skills, ICT perceived benefits and the effect of the availability of ICT equipment on the

adoption of ICT among real estate firms in Kenya. Real estate firms recognize that ICT output is

as good as the quality of data and direction of analyzing the data that human beings have put into it. It is necessary to examine the gains made by real estate firms through uses of ICT for real estate managers to put much weight in it, both large and small firms can use the information systems and networks to conduct business electronically to make them more convenient, efficient and competitive in today's dynamic global business environment information system.

In Kenya, studies on factors influencing adoption of information and communication technology have been based on utilization of ICT in resource management and effects on infrastructural development as a key economic enabler. Awinda (2012) researched on relationship between real estate's returns and equity markets returns in Kenya and (Virtual Capital Limited, 2008) undertook a study on the Viability of Real Estate Investment Trusts in Kenya to seek opinions of the investing public as well as research undertaken to understand how a Real Estate Investment Trusts market operates in other more developed capital markets. This study is therefore conducted so as to bridge the existing gaps.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter presents the research methodology for the study. It outlines the procedures and modalities that were used in data collection, analysis and presentation of the study results. It covers research design, population, sample size and sampling procedure, data collection methods and data analysis.

## 3.2 Research Design

Research design is a program that directs research into the process of collecting, analyzing and interpreting perceptions; the researcher's methodology and tools used to collect and evaluate information, to answer course research questions (Mugenda & Mugenda, 2013). This study adopted a descriptive research design. Mugenda (2008) describes a descriptive research as an attempt to collect data from members of the population in order to determine the current status at that point in time with respect to one or more variables under study. The use of descriptive research design was justifiable since it offered the researcher an opportunity to collect data across real estate firms and empirically test the relationship(s) of the constructs along its conceptualization of adoption of information and communication technology in real estate firms.

## 3.3 Target Population

The population has been defined as the total collection of elements about which we wish to make some inferences (Cooper et al., 2014). This may comprise the entire group of individuals, events

or objects having observable characteristics. According to the Kenya Real Estate Developers Association (2018) 83 professional real estate firms and 41 real estate agents operating within Nairobi County. Therefore, the total targeted population was 124 who comprised of professional real estate firms and real estate agents operating within Nairobi County. The chosen real estate category (professional real estate firms and real estate agents) was considered reliable to give comprehensive information concerning the operations of the real estate firms in the country. The units of observation were managers and supervisors from selected real estate firms in Nairobi County.

## 3.4 Sample size and sampling procedures

The sample size is a subset of the population (Creswell, 2003). The sampling technique refers to the process by which a relatively small number of individuals, objects, or events are selected from the entire population (Cooper & Schindler, 2014). The sample size of the study was 50% of the target population. Thus 50% of 83 professional real estate firms and 41 real estate agents were used as the sample size. According to Mugenda and Mugenda (2003), for a sample to be considered as a good representation, it should be above 30%. Therefore, the sample size was 42 professional real estate firms and 21 real estate agents. Stratified random sampling was used to classify the population into strata. A stratified sampling technique is used when the targeted population is not homogeneous (Alyahya & Rowe, 2016). The study randomly picked one manager and one supervisor from each of the real estate firms. The sample size of real estate firms is presented in Table 3.1.

**Table 3.1: Sample size**

| Real Estate Category | Population (firms) | 50% of population (firms) |
|---|---|---|
| Professional Real Estate Firms | 83 | 42 |
| Real Estate Agents | 41 | 21 |
| Total | 124 | 63 |

**Source: Kenya Real Estate Developers Association, (2018)**

### 3.5 Data Collection Procedure

Prior to the issuance of the questionnaires, the researcher sought approval with an authorized letter from NACOSTI and the University of Nairobi for research. Key data were collected using self-administered questionnaires. Creswell and Poth (2017) specify that a questionnaire is a set of guiding list developed by the researcher, the answers to which are recorded by the respondents. Closed questions provided more structured answers to make tangible recommendations. The questionnaire for the study consisted of two sections. The first part incorporated demographics and operational features that are designed to clarify key issues including accounting criteria for the respondent while the second part takes into account the variability of the investigation. With the help of a research assistant, the researcher distributed the questionnaires directly to the managers and supervisors from the professional real estate firms and real estate agents. The respondents were given two weeks to fill the questionnaires. However, those questionnaires that were not be dully filled after two weeks were omitted during data analysis.

### 3.6 Validity and Reliability

Prior to undertaking the research, a pilot study was conducted by administering a questionnaire to different members of the Kenya Real Estate Developers Association. The study used 10% of the sample size; therefore, 12 respondents were employed. The justification of the 10% was obtained from Kothari (2004), who indicated that a pilot study should be conducted using a range of between 1% to 10% of a sample size. This helped to assess whether respondents understood the questions well and that the questions asked provided the researcher with the necessary research information. Errors and bias found in the tool have been changed for clarity and accuracy. The final questions were printed to be used to collect information from respondents.

## 3.7 Data Analysis and Presentation

Mugenda and Mugenda (2003) have shown that data analysis is a process of bringing order, structure and meaning to the bulk of the data collected. Collected data is sorted, categorized, coded and analyzed. This is done using descriptive and inferential statistics. The descriptive statistics include mean, frequency, percentages and standard deviation while the inferential statistics include correlation analysis and regression analysis. The study sought to examine whether their existed any association between complexity, user skills, perceived benefits and ICT equipment. Correlation analysis was conducted to examine whether the association between the independent variable and the dependent variable was negative or positive. Besides, the correlation analysis was conducted to examine whether there existed multicollinearity. Multicollinearity refers to a state where two or more independent variables are correlated. The regression analysis was conducted to examine the relationship between the independent variables (complexity, user skills, perceived benefits and ICT Equipment) and dependent variable (adoption of ICT). The regression analysis included model fitness, analysis of variance (ANOVA) and regression coefficient. The model fitness examined the percentage of the dependent variable's variations that is explained by the independent variables. Analysis of variance examined whether the independent variables were significant in determining the dependent variable. Lastly, the regression of coefficient evaluated the strength of the relationship between independent variables and dependent variable

## 3.7.1 Empirical Model

Multiple regression analysis model was used to bring out the relationship between independent variables (ICT complexity, ICT user skills, ICT perceived benefits, availability of ICT

equipment and the dependent variable (adoption of ICT in real estate firms in Kenya). The model was;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e$$

Where: -

Y= Adoption of ICT in real estate firms

$X_1$ = complexity

$X_2$ =ICT user skills

$X_3$ = perceived benefits

X4 = Availability of ICT equipment

$\beta_0$ = Constant

**e**=Error term of the model.

Graphs, tables, and pie charts were used to analyze frequency and percentages while tables were prepared using each variable or indicator.

### 3.7.2 Variable definition and measurement

The variable definition and measurement that yielded the statistical outcomes are presented in Table 3.2

**Table 3.2: Variable definition and measurement**

| Variable | Variable type | Measurement/ Indicator | Measurement scale |
|---|---|---|---|
| Complexity | Independent variable | • Hardware Compatibility<br>• Networks<br>• Databases | Ordinal |
| ICT user Skills | Independent variable | • Competence<br>• Training Level<br>• Experience | Ordinal |
| Perceived benefits | Independent variable | • Communication<br>• Information Sharing<br>• Data Storage | Ordinal |
| Availability of ICT equipment | Independent variable | • Communication<br>• Investment | Ordinal |

| Adoption of ICT in Real Estates | Dependent variable | • Number of listings<br>• Project Quality<br>• Customer Satisfaction<br>• Revenue Growth | Ordinal |
|---|---|---|---|

**Source: (Researcher, 2021)**

# CHAPTER FOUR

# DATA ANALYSIS, INTERPRETATION AND DISCUSSION

## 4.1 Introduction

This chapter summarizes the findings that the researcher obtained after conducting the investigation. It contains the response rate, the demographics, descriptive statistics and inferential statistics. The inferential statistics entails the correlation analysis and the regression analysis (model fitness, analysis of variance and the multiple regression analysis).

## 4.2 Response Rate

The number of questionnaires that were administered to the respondents (managers and supervisors) were 126. Out of the total questionnaires only 114 questionnaires were duly filled and returned as presented in Table 4.1.

**Table 4.1: Response Rate**

| Response | Returned | | Unreturned | | Percentage |
|---|---|---|---|---|---|
| | **Managers** | **Supervisors** | **Managers** | **Supervisors** | |
| Professional Real Estate Firms | 35 | 39 | 7 | 3 | 88.10 |
| Real Estate Agents | 19 | 21 | 2 | 0 | 95.24 |
| **Total** | **54** | **60** | **9** | **3** | **90.48** |

**Source: Study Data (2021)**

The findings from Table 4.1 show that the average percentage of the returned questionnaires was 90.48 percent. According to Mugenda and Mugenda (2003) and Kothari (2004), a response rate

of more than 50% is sufficient for the descriptive study. Babie (2004) also emphasized that the return rate of more than 50% is acceptable for analysis and publication, 60% positive and 70% positive. Based on these assertions from renowned scholars, the average response rate in the current study was above 70% hence very good for the study

## 4.3 Reliability Test

Reliability is the consistency of estimation, or how much an instrument measures a similar way each time it is utilized under the same condition with related subjects (Golafshani, 2003). The study used 10% of the sample size and thus, 12 respondents were used for piloting. Cronbach's test was carried out to determine the reliability of the data collecting instrument. Table 4.2 presents the reliability results.

**Table 4:2 Reliability Results**

| Variable | Number of items | Cronbach alpha | Comments |
|---|---|---|---|
| Complexity | 5 | 0.853 | Reliable |
| ICT user skills | 5 | 0.781 | Reliable |
| Perceived benefits | 5 | 0.805 | Reliable |
| Availability of ICT equipment | 5 | 0.773 | Reliable |
| ICT adoption | 5 | 0.867 | Reliable |

**Source: Study Data (2021)**

The study results presented in Table 4.2 show that Cronbach's alpha coefficients for all the items were all above 0.7, indicating that the instruments were adequately reliable for the measurement. Taber (2018) suggests that Cronbach's alpha values of items included in the study should not be lower than 0.7. Also, according to Golafshani (2003), Cronbach alpha should not be lower than 0.7, while Gliem and Gliem (2003) recommend a Cronbach alpha should exceed 0.7.

**4.4 Demographics**

This section consists of information that describes basic characteristics of the respondents and the institutions such as gender of the respondents, age brackets of the respondents, level of education of the respondents, duration in real estate industry, area of focus of the institution, age of the institution and the work force size

**4.4.1 Gender of the respondents**

The researcher sought to examine the gender of the respondents (managers and supervisors) and the findings found are outlined in Figure 4.1

**Figure 4.1: Gender of the respondents**
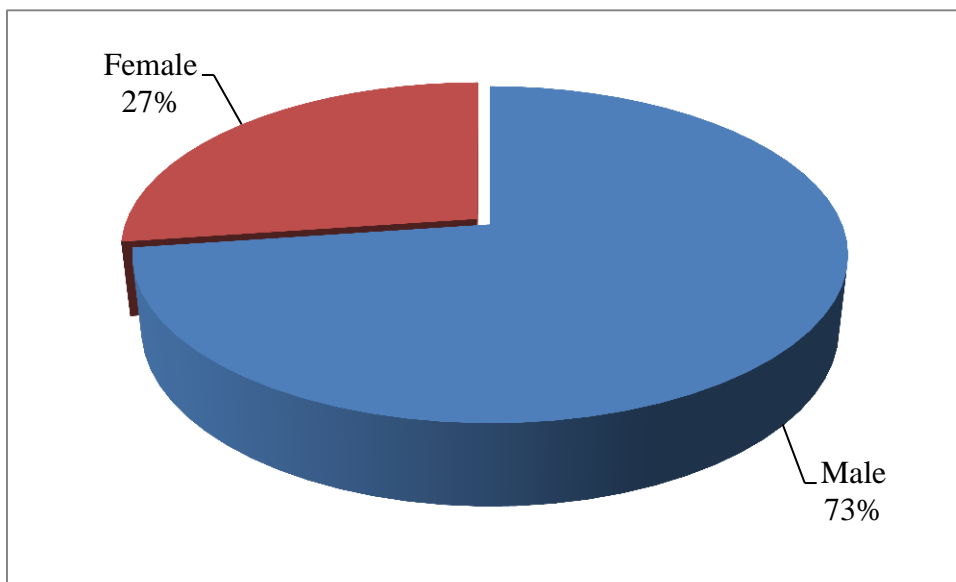


**Source: Study Data (2021)**

The results presented in figure 4.1 show that the majority (73%) of the managers and supervisors in professional real estate firms and real estate agents were male, while 27% were female. This indicated that the majority of the respondents were men. Thus, there is a need to empower

women to compete with the men in society and to have a gender balance in the participation in the managerial positions within the institutions.

**4.4.2 Age bracket of the respondents**

The researcher sought to establish the age bracket of the respondents. The results are presented in Figure 4.2.

**Figure 4.2: Age bracket of the respondents**
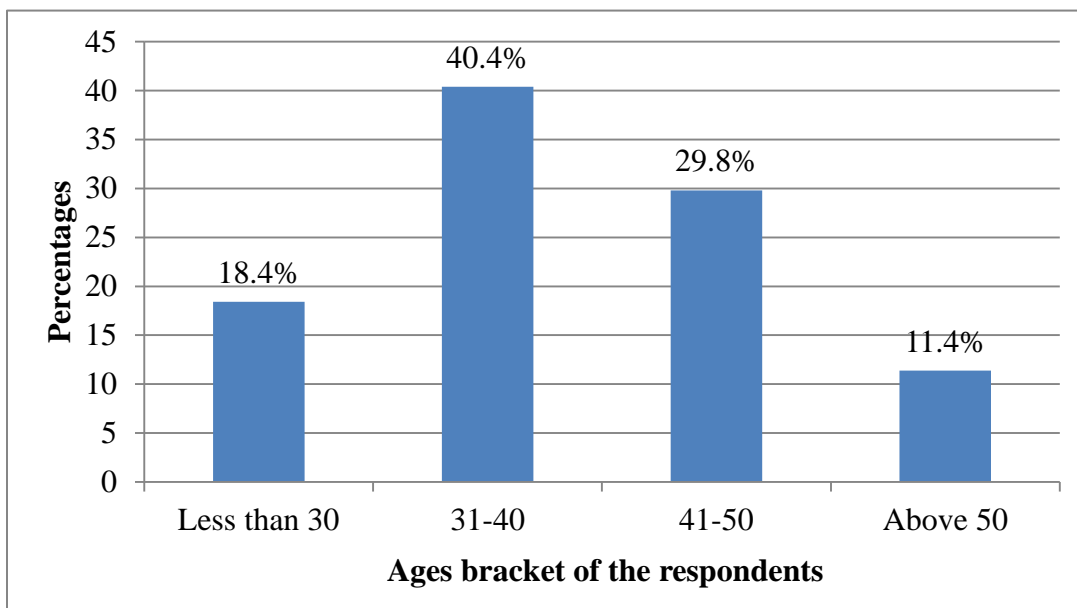


**Source: Study Data (2021)**

Based on the results in Figure 4.2, the majority (40.4%) of the respondents (managers and supervisors in professional real estate firms and real estate) aged between 31 and 40 years. Similarly, those aged between 41 and 50 years were 29.8% and 18.4% were less than 30 years. Lastly, 11.4% of the respondents were above 50 years. This implied that 70.2% (40.4%+29.8%) of the respondents were aged between 31 and 50 years, thus were more energetic and resourceful in their positions as the managers and supervisors.

### 4.4.3 Level of education

The study further sought to establish the level of education of the respondents and the results are presented in Figure 4.3

**Figure 4.3: Level of education of the respondents**
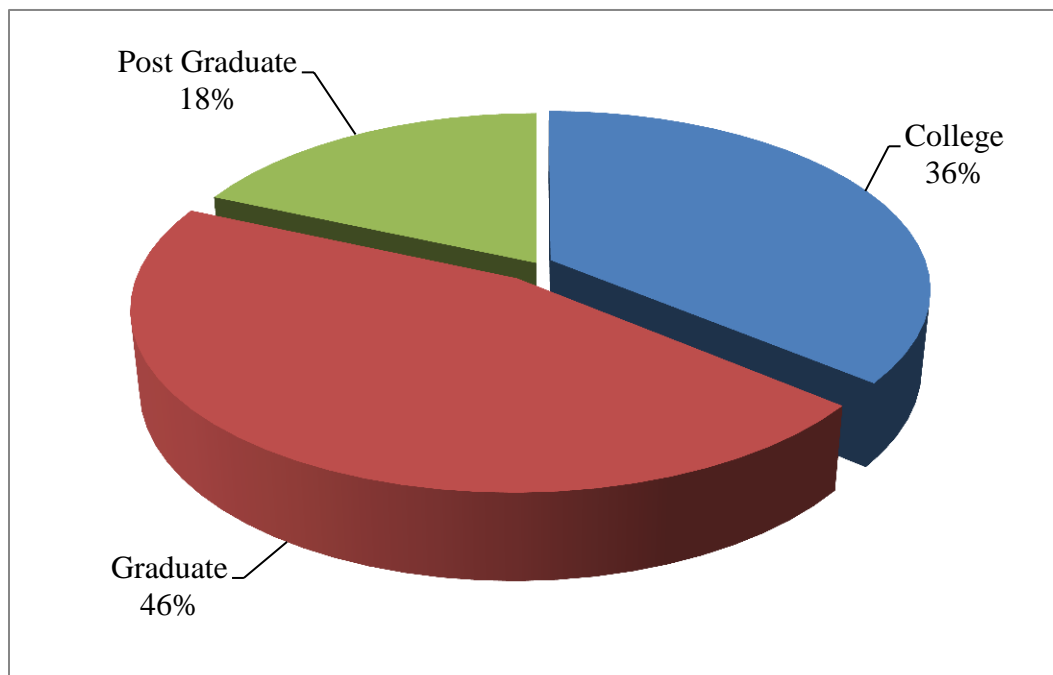


**Source: Study Data (2021)**

The respondents (managers and supervisors) from Figure 4.3 show the majority (46%) of the managers and supervisors in professional real estate firms and real estate agents were graduates. Besides, 36% had diplomas (college) and 18% were post graduate. This implied that most of the respondents were well educated, thus knowledgeable about their roles and responsibilities in the workplace.

### 4.4.4 Duration in real estate industry

The researcher sought to examine the duration the respondents (managers and supervisors) have been in the real estate industry. The results of duration of the managers and supervisors in the real estate industry is presented in Figure 4.4.

**Figure 4.4 Duration in real estate industry**
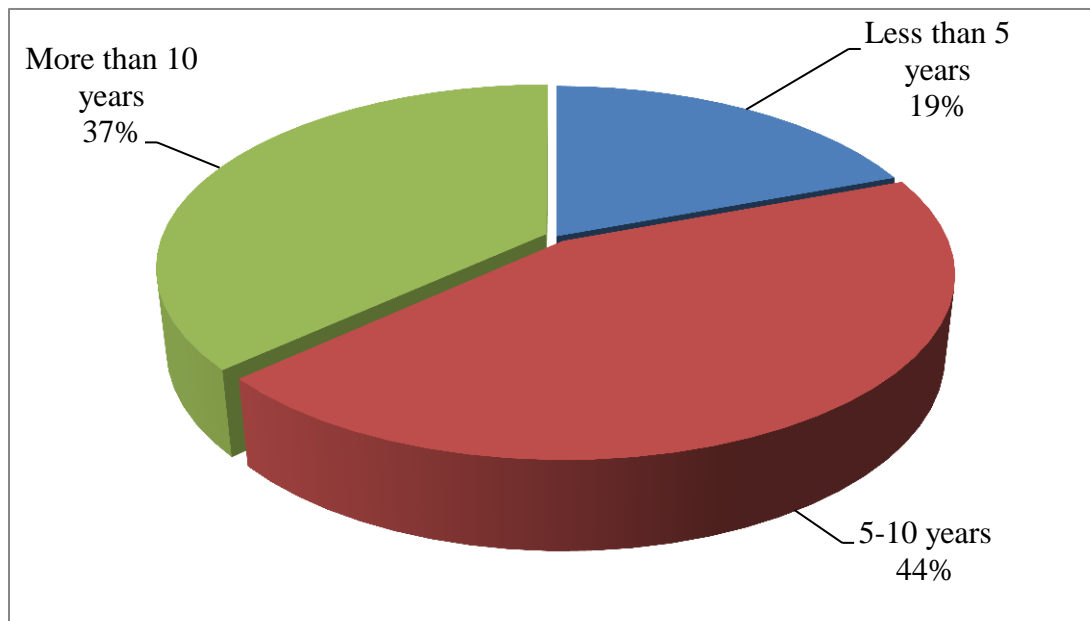


**Source: Study Data (2021)**

The results presented in Figure 4.4 shows that majority of the managers and supervisors had worked in the real estate industry for between 5 and 10 years. Those who had worked in the industry for more than 10 years were 37%. Lastly, 19% of the managers and supervisors had worked in the industry for less than 5 years. The results implied that the majority, 81% (44%+37%) of the managers and supervisors, had worked in the real estate industry for more than 5 years. Therefore, this implied the respondents had a lot of information and experience

concerning the real estate industry and their views were reliable for making deductions concerning the real estate sector in Nairobi County.

### 4.4.5 Area of focus of the institution

The study sought to establish the area of focus of the institutions and the results are presented in Figure 4.5

**Figure 4.5: Area of focus of the institution**
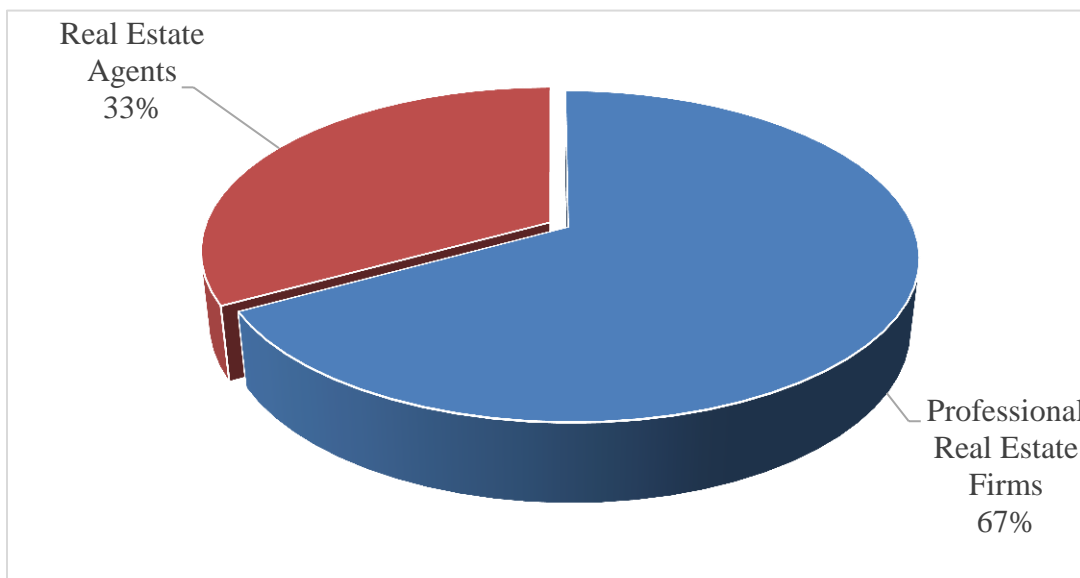


**Source: Study Data (2021)**

Based on the results presented in Figure 4.5, the majority 67% (83), of the real estate firms in Nairobi County were service professional firm offer.  Besides, real estate agents were 33% (41). This implied that the majority of the institutions in the real estate firms in Nairobi County were professional real estate firms and mostly involved the engineers, planners, contractors, architects and surveyors. These categories of the people ensured effective planning and execution of property development projects; hence were more informed on matters to do with the ICT

adoption in firms. Therefore, the researcher was confident with the opinions of the respondents while making conclusions about ICT adoption.

**4.4.6 Age of the institution**

The researcher sought to establish the number of years the institution has been in operation and the results are presented in Figure 4.6

**Figure 4.6: Age of the institution**
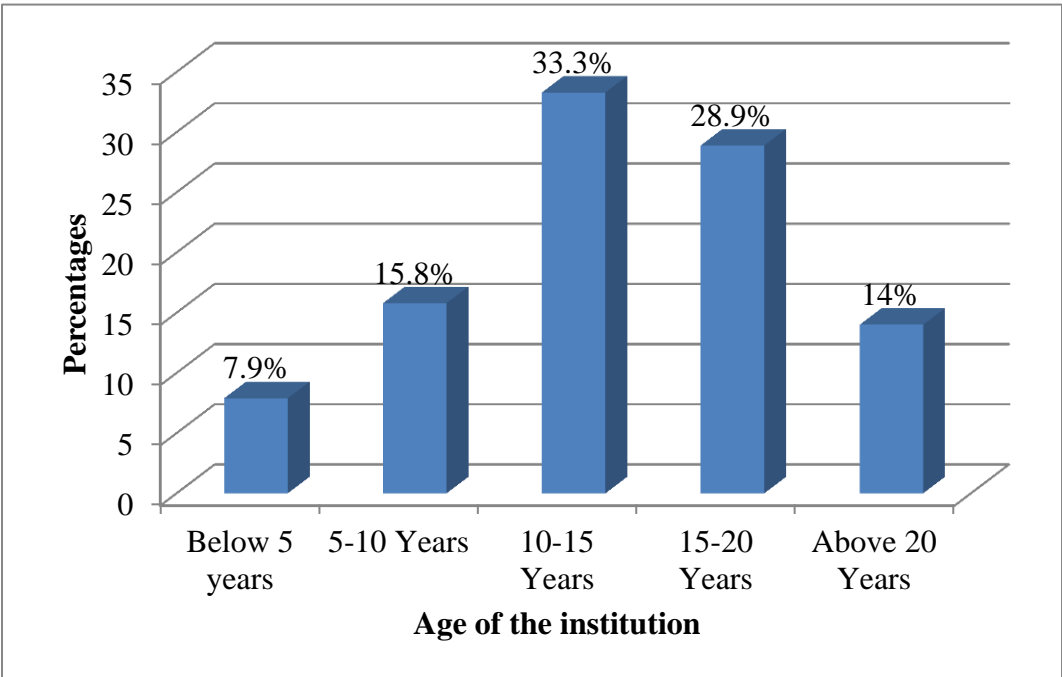


**Source: Study Data (2021)**

Based on the presentation in Figure 4.6, the majority (33.3%) of the real estate firms in Nairobi County have been operational for a period of 10 to 15 years. Besides, 28.9% had been in operation for between 15 and 20 years. Likewise, 15.8% were in service for 5 to 10 years, 14% above 20 years and lastly, those that had been in operation for less than 5 years were 7.9%. This implied that 62.2% (33.3% +28.9%) of the real estate institutions in Nairobi County has been in

operation for a period of between 10 and 20 years. Therefore, those institutions were reliable to respond to the survey queries more appropriately since they have been in operation for long and they have a lot of experience in the industry.

**4.4.7 Workforce size**

The researcher sought to examine the workforce size of the real estate institutions in Nairobi County and the findings are presented in figure 4.7.

**Figure 4.7: Workforce size**
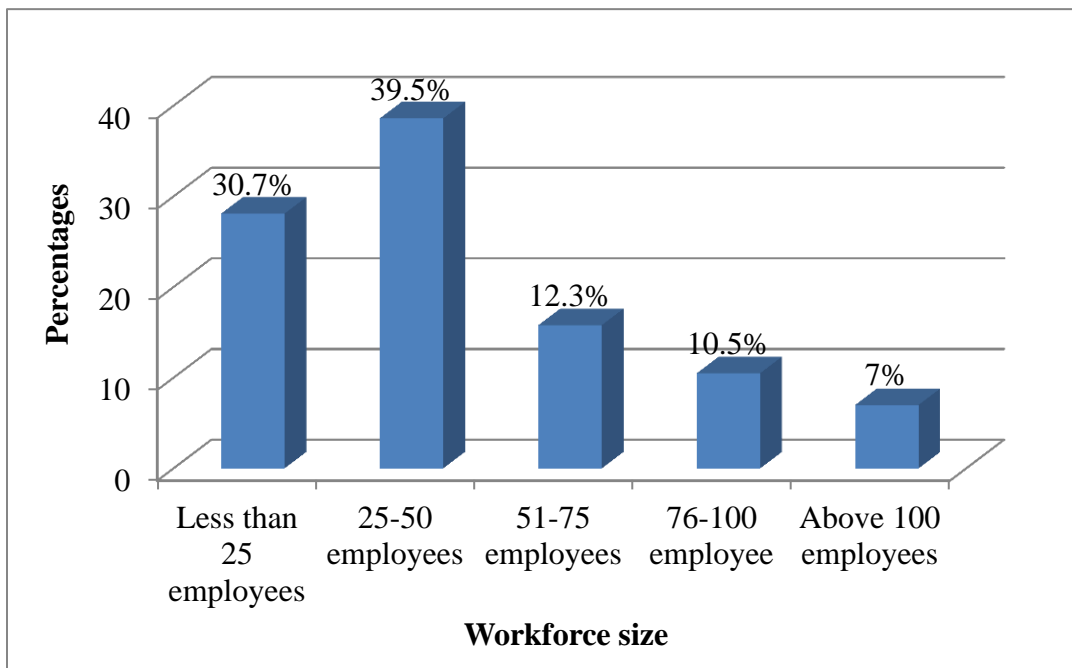


**Source: Study Data (2021)**

Based on the findings in figure 4.7, the majority (39.5%) of the institutions had a workforce size of between 25 and 50 employees. Likewise, 30.7 % of the institutions had a workforce size of less than 25 employees. Furthermore, 12.3% of the institutions had employees of between 51 and 75. Similarly, 10.5% of the respondents had between 76 and 100 employees. Lastly, institutions with 100 and above employees were 7%. This implied that the majority (38.6%+28.1%) of the

institutions had less than 50 employees. Therefore, this signified that employees in those institutions were small and manageable. Consequently, it was easy for the researcher to receive extensive information concerning the stance of the employees toward ICT adoption in the institutions.

## 4.5 Field Results on Complexity, ICT User Skills, Perceived Benefits, Availability of ICT Equipment and Adoption of ICT in Real Estate Firms

This section presents the field results on complexity, ICT user skills, perceived benefits, availability of ICT equipment and adoption of ICT in real estate firms

### 4.5.1 Field Results of Complexity

The first objective was to determine the effect of complexity in the adoption of ICT in real estate firms in Kenya. The field results of complexity are presented in Table 4.3

**Table 4.3: Field Results of Complexity**

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|
| The firm experiences hardware and software compatibility issues | 6.10% | 10.50% | 14.90% | 50.00% | 18.40% | 3.64 | 1.09 |
| Installation of ICT system requires skilled personnel | 3.50% | 7.90% | 4.40% | 43.00% | 41.20% | 4.11 | 1.04 |
| Employees need to be trained on how to use computers | 7.00% | 6.10% | 5.30% | 64.00% | 17.50% | 3.79 | 0.98 |
| Trained employees are able to use computers efficiently | 4.40% | 11.40% | 7.90% | 29.80% | 46.50% | 4.03 | 1.19 |
| ICT has enhanced the profitability of the company | 1.80% | 7.00% | 15.80% | 32.50% | 43.00% | 4.08 | 1.01 |
| **Average** | | | | | | **3.93** | **1.06** |

**Source: Study Data (2021)**

Based on the study results in Table 4.3, the mean score of the survey questions concerning whether the firm experiences hardware and software compatibility issues was 3.64, with a standard deviation of 1.09. This implied that companies need to examine the compatibility of the hardware and software before the purchase. This will enable the easy adoption of ICT in those real estate firms. Besides, the majority of the respondents agreed that the installation of ICT system requires skilled personnel, although their responses varied and this was supported with a mean score of 4.11 and a standard deviation of 1.04. Likewise, the mean score of the statement of whether employees need to be trained on how to use computers was 3.79, with a standard deviation of 0.98. This indicated that skilled personnel were key for adopting ICT in real estate firms, thus a need to emphasize much in employing expertise in ICT. Employees need to be trained regularly on how to use computers for convenient communication.

Moreover, the mean score of the statement regarding whether trained employees (managers and supervisors can use computers efficiently was 4.03, with a standard deviation of 1.19. This purported that employees in the institutions need to be trained so that they can use computers efficiently. Similarly, the mean score of the survey question relating to whether ICT enhances the profitability of the company was 4.08 and the standard deviation was 1.01. This indicated that companies need to be emphasized much one ICT to improve the profitability of the companies. In conclusion, the average mean score of the survey question relating to the complexity was 3.93, with a standard deviation of 1.06. This implied that real estate firms need to emphasize much on the complexity of the software and hardware prior to making the purchases. This will facilitate technology and easy usage of the technology that is been introduced.

### 4.5.2 Field Results of ICT user skills

The second objective of the study was to establish the effect of ICT user skills in the adoption of ICT in real estate firms in Kenya. Thus, the study results are on ICT user skills are presented in Table 4.4

**Table 4.4: Field Results ICT user skills**

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|
| Many real estate agencies use websites and social media | 4.40% | 12.30% | 11.40% | 21.90% | 50.00% | 4.01 | 1.23 |
| Innovation in technology has facilitated communication in the company | 2.60% | 8.80% | 12.30% | 31.60% | 44.70% | 4.07 | 1.08 |
| Customer service technology enhance the development of real estate | 1.80% | 4.40% | 3.50% | 57.90% | 32.50% | 4.15 | 0.82 |
| We receive frequent updates on emerging issues in real estate industry | 6.10% | 6.10% | 7.00% | 39.50% | 41.20% | 4.04 | 1.04 |
| Our employees need to be taught on how to use computers | 3.50% | 9.60% | 4.40% | 36.00% | 46.50% | 4.12 | 1.10 |
| **Average** | | | | | | **4.08** | **1.05** |

**Source: Study Data (2021)**

As per the field results presented in Table 4.4, the mean score of the statement concerning whether many real estate agencies use websites and social media was 4.01, with a standard deviation of 1.23. This implied that websites and social media are significant in stimulating the adoption of ICT and thus, companies need to embark on websites and social media to expand their visibility. Moreover, the mean score of whether technology innovation has facilitated communication in the company was 4.07, with a standard deviation of 1.08. This meant that

companies need to expand its innovation in technology to enhance the passage of information from one entity to another. Likewise, the mean score of the statement regarding whether customer service technology improves the real estate development was 4.15, with a standard deviation of 0.82. This designated that customer service technology is essential and needs to be utilized to the real estate companies to enhance sustainability.

Furthermore, the survey question of whether employees need to be taught how to use computers was 4.12, with a standard deviation of 1.10. This illustrated that training is one factor that needs to be given priority in the institutions during the plans to introduce new technology Training increases the skills and understanding in matters to do with the adoption of the technology. Lastly, the average mean score of the survey questions concerning ICT user skills was 4.08, with a standard deviation of 1.05. This implied that ICT user skills are key in determining the adoption of ICT. Thus, companies need to invest in enhancing the skills of its employees and any other staff.

Besides, depending on the respondent's opinions, the researcher sought to establish whether user skills influence the adoption of ICT in real estate firms in Kenya. The findings are presented in figure 4.8

**Figure 4.8: User skills and adoption of ICT**
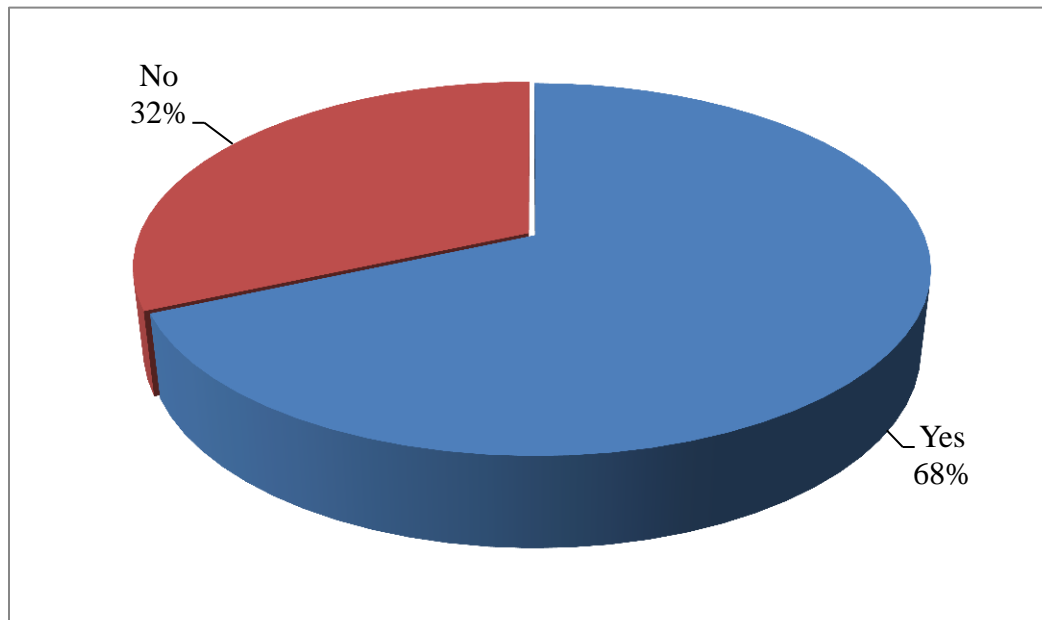


**Source: Study Data (2021)**

Based on the results presented in figure 4.8, it was established that 68% of the total respondents agreed (said Yes) that user skills influence the adoption of ICT in real estate firms in Kenya while 32% disagreed (said No) with the statement. This implied that user skills are crucial and influence the adoption of ICT among real estate firms. These skills are needed to efficiently use the elementary functions of information and communication technologies to retrieve, assess, store, produce, present, communicate and participate in collaborative networks through the internet.

**4.5.3: Field Results of Perceived Benefits of ICT adoption**

The third objective of the study was to analyse the effect of perceived benefits in the adoption of ICT in real estate firms in Kenya. The field results of the perceived benefits of ICT adoption are presented in Table 4.5

**Table 4.5 Field Results of Perceived benefits of ICT adoption**

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|
| Marketing process has been made easy through implementation of new technology. | 6.10% | 16.70% | 7.90% | 0.342 | 35.10% | 3.75 | 1.27 |
| Coordination between the firm and clients has been enhanced through ICT adoption | 5.30% | 18.40% | 4.40% | 0.333 | 38.60% | 3.82 | 1.07 |
| Technology has made construction work to be more efficient | 2.60% | 8.80% | 6.10% | 0.570 | 25.40% | 3.94 | 0.95 |
| Technology has reduced wastage and cost of construction projects | 3.50% | 14.90% | 10.50% | 0.404 | 30.70% | 3.80 | 1.14 |
| Technology has enhanced construction work to be more efficient | 1.80% | 10.50% | 9.60% | 0.439 | 34.20% | 3.98 | 1.01 |
| **Average** | | | | | | **3.86** | **1.09** |

**Source: Study Data (2021)**

Based on the field results presented in table 4.5, the mean score of the survey question concerning if the marketing process has been made easy through the implementation of new technology was 3.75, with a standard deviation of 1.27. This implied that real estate firms' marketing process had influenced the implementation of new technology. Thus, companies need to develop an effective marketing process to stimulate new technology's implementation. Also, the mean score of the statement relating to whether coordination between the firm and clients has been enhanced through ICT adoption was 3.82, with a standard deviation of 1.07. This indicated that ICT adoption is essential and it improves the efficient coordination between the firm and clients; thus companies need to adopt it.

Likewise, the mean score of the statement relating to whether technology has reduced wastage and cost of construction projects was 3.80, with a standard deviation of 1.14. This implied that

even if the ICT installation is expensive, it improves the performance in the long run. Real estate companies need to advocate more use of the technology so that the efficiency is enhanced. Furthermore, the mean score of the statement concerning if technology has enhanced construction work to be more efficient was 3.98, with a standard deviation of 1.01. This signified that technology adoption is useful in enhancing the efficiency of the institutions. Finally, the average mean score of the survey questions concerning whether perceived benefits influenced the ICT adoption was 3.86, with a standard deviation of 1.09. This implied that the perceived benefits are key in determining the ICT's introduction in the real estate companies. When the perceived benefits seem to be high, companies are motivated to introduce the technology. In contrast, when the benefits seem insignificant, companies may not be willing to advance their organizations' technology. Therefore, companies need to evaluate the benefits expected from introducing a particular technology before the initiation process.

Furthermore, based on the opinions of the respondents, the researcher sought to establish whether perceived benefits influence the adoption of ICT in real estate firms in Kenya and the outcome is shown in figure 4.9

**Figure 4.9: Perceived Benefits and ICT adoption**
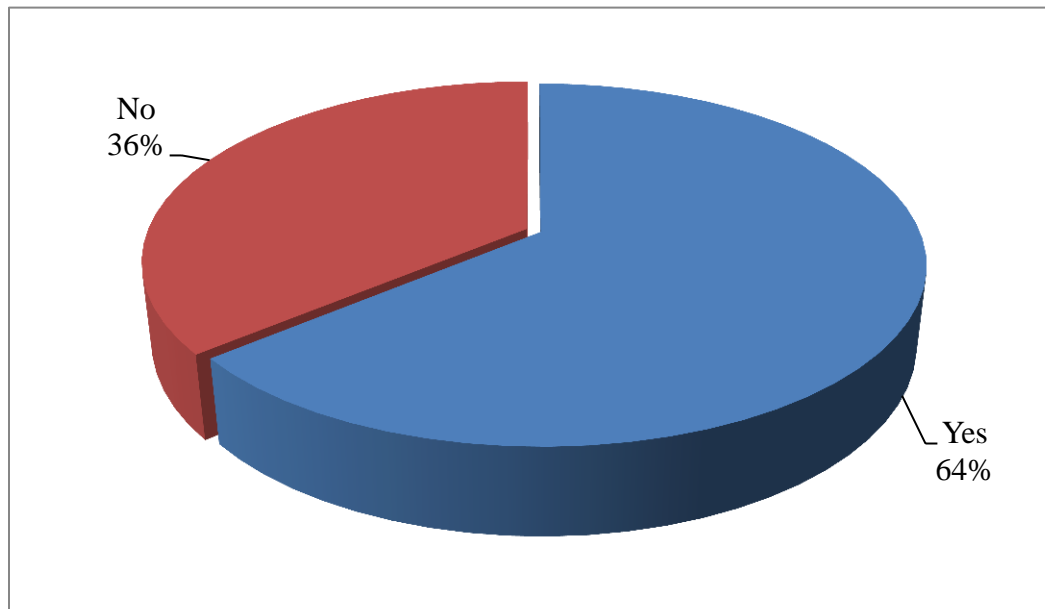


**Source: Study Data (2021)**

Based on the opinions of the respondents, 64% agreed (said yes) that the perceived benefits influence the adoption of ICT in real estate firms in Kenya, while 36% disagreed ( said no) that the anticipated benefits do not alter the adoption of ICT in real estate firms in Kenya. This implied that ICT adoption by the real estate firms in Kenya relies on the perceived benefits. In situations where the perceived benefits are more, the companies will be willing to introduce the technology in their firms. Thus, the perceived benefits are vital and influenced the decision making of whether to adopt a particular technology or not.

**4.5.4 Field Results of availability of ICT equipment**

 The fourth objective of the study was to examine the effect of availability of ICT equipment and the adoption of ICT in real estate firms in Kenya. The field results of availability of ICT equipment is presented in Table 4.6

**Table 4.6: Field Results of availability of ICT equipment**

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|
| Online listing has enhanced communication between home buyers and home sellers | 3.50% | 7.00% | 5.3% | 40.40% | 43.90% | 4.14 | 1.04 |
| The company has been able to install modern ICT equipment | 4.40% | 7.90% | 8.8% | 62.30% | 16.70% | 3.79 | 0.96 |
| Technology has increased investments of the company | 2.60% | 10.50% | 3.5% | 55.30% | 28.10% | 3.96 | 0.99 |
| Trainings and workshops should be conducted on matters pertaining information technology. | 7.00% | 6.10% | 2.6% | 43.00% | 41.20% | 4.05 | 1.15 |
| ICT has raised the quality of real estates in Kenya to international standards | 1.80% | 5.30% | 6.1% | 48.20% | 38.60% | 4.17 | 0.89 |
| **Average** | | | | | | **4.02** | **1.01** |

**Source: Study Data (2021)**

Based on the field results of availability of ICT equipment and the adoption of ICT presented in Table 4.6, the mean score of whether the online listing has enhanced communication between home buyers and home sellers was 4.14, with a standard deviation of 1.04. This implied that online listing enhances communication between home buyers and home sellers and thus should be introduced within the companies. This will enhance effective communication between different stakeholders, hence mutual understanding. Moreover, a mean score of 3.96 and a standard deviation of 0.99 were obtained from the statement on whether technology has increased investments of the company. This indicated that the introduction of technology is essential, and it increases the investment opportunities of the company. Hence, the company needs to introduce technology in their firms to broaden investment opportunities.

Besides, the mean score of the statement of whether training and workshops should be conducted on matters about information technology was 4.05, with a standard deviation of 1.15. This implied that training and attending of the workshops are essential and it increases the employees' efficiency. When employees undergo training, it improves their skills and knowledge of the job and builds their confidence in their abilities. This improves their performance and makes them work more efficiently and effectively. The mean score of whether ICT has raised the quality of real estate in Kenya to international standards was 4.17, with a standard deviation of 0.89. This indicated that ICT is essential in advancing the quality of the projects been undertaken. The average mean score of the statement concerning the availability of ICT equipment and ICT. adoption was 4.02, with a standard deviation of 1.01. This implied that ICT equipment is key and they influence the extent of adoption of the ICT within the real estate firms. The availability of effective ICT equipment enhances the easy adoption of modern technology. Thus, real estate firms need to emphasize the ICT equipment within their institutions to strengthen ICT adoption and expand their performance.

Moreover, according to the opinion of the respondents, the researcher sought to determine whether the availability of ICT equipment influence the adoption of ICT in real estate firms in Kenya. The findings are presented in figure 4.10

**Figure 4.10: ICT equipment and ICT adoption**
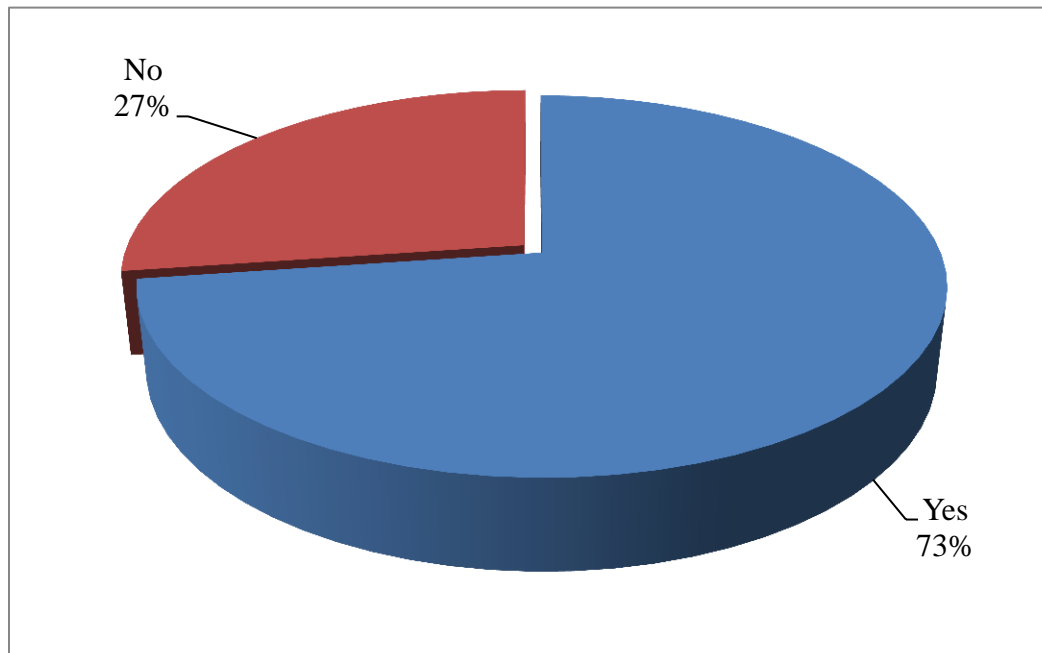


**Source: Study Data (2021)**

As shown in figure 4.10, 73% of the total respondents agreed (said yes) that the availability of ICT equipment influence the adoption of ICT in real estate firms in Kenya, while 27% disagreed ( said no) that availability of ICT equipment does not influence the adoption of ICT in real estate firms in Kenya. This signified that ICT equipment is crucial and influences the adoption of the technology within the firms. Thus, the companies need to check on the equipment's durability before introducing technology in their firms. This will enable the introduced technology to be put into practice rather than just introducing technology that is not meaningful to the organization.

**4.5.5 : Field Results of availability of ICT adoption**

The dependent variable in the study was ICT adoption. The Field Results of availability of ICT adoption is presented in Table 4.7

**Table 4.7: Field Results of availability of ICT adoption**

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|
| Real estate business has used modern technology in various aspects of its operations | 4.40% | 12.30% | 11.4% | 40.40% | 31.60% | 3.82 | 1.14 |
| Level of investment in real estate have increased significantly for the past 5 years | 5.30% | 7.90% | 7.0% | 32.50% | 47.40% | 4.09 | 1.16 |
| Real estate companies have witnessed significant growth in number of listings annually in the past 5 years | 2.60% | 5.30% | 4.4% | 60.50% | 27.20% | 4.06 | 0.76 |
| Income from rent have significantly increased for the past 5 years | 3.50% | 8.80% | 3.5% | 42.10% | 42.10% | 4.11 | 1.06 |
| Errors have been minimized in the construction projects | 1.80% | 6.10% | 9.6% | 54.40% | 28.10% | 4.01 | 0.89 |
| **Average** | | | | | | **4.02** | **1.00** |

**Source: Study Data (2021)**

Based on the field results of availability of ICT adoption presented in Table 4.7, the mean score of the survey question of whether the real estate business used modern technology in various aspects of its operations was 3.82, with a standard deviation of 1.14. This implied that most of the companies had introduced the technology in their firms to enhance sustainability. Other real estate firms also need to dwell much on adopting modern technology to transform their operations. In addition, the mean score of the survey question concerning if the level of investment in real estate has increased significantly for the past 5 years was 4.09, with a standard deviation of 1.14. This indicated that the introduction of modern technology has broadened investment opportunities. Likewise, the mean score of the statement concerning whether income from rent has significantly increased for the past 5 years was 4.11 with a standard deviation of

1.06. This implied that the adoption of technology is significant in enhancing the performance of the organizations. Advancement in modern technology enables companies to have more extensive investment opportunities, thus increase the performance.

Furthermore, the mean score of the statement on whether errors have been minimized in the construction projects was 4.01 and the standard deviation was 0.89. This meant that the introduction of technology has increased the companies' efficiency and thus, it is significant to embrace modern technology. Lastly, the average mean score of the narratives regarding ICT adoption in the real estate's in Kenya was 4.02, including a standard deviation of 1.00. This implied that ICT adoption is vital in improving the efficiency and durability of real estate firms. Technology has advanced the conducting of the activities into a more efficient one. Thus, real estate needs to invest much in developing information and communication technology to expand its visibility and increase efficiency.

## 4.6 Inferential Statistics

The inferential statistics will entail the correlation analysis and regression analysis

### 4.6.1 Correlations Analysis

The study sought to examine whether their existed any association between complexity, user skills, perceived benefits and ICT equipment. Correlation analysis was conducted to examine whether the association between the independent variable and the dependent variable is negative or positive. This will enable the researcher to proceed with other tests. Besides, the correlation analysis was conducted to examine whether there existed multicollinearity. Multicollinearity refers to a state where two or more independent variables are correlated. It occurs when the correlation between variables is more than 0.8. Therefore, correlation results are shown in Table 4.8

**Table 4.8: Correlations Analysis**

| Statement | | Adoption of ICT | Complexity | User skills | Perceived Benefits | ICT Equipment |
|---|---|---|---|---|---|---|
| Adoption of ICT | Pearson Correlation | 1.000 | | | | |
| | Sig. (2-tailed) | | | | | |
| Complexity | Pearson Correlation | -.523** | 1.000 | | | |
| | Sig. (2-tailed) | 0.000 | | | | |
| User skills | Pearson Correlation | .724** | -.467** | 1.000 | | |
| | Sig. (2-tailed) | 0.000 | 0.000 | | | |
| Perceived Benefits | Pearson Correlation | .769** | -.449** | .580** | 1.000 | |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | | |
| ICT Equipment | Pearson Correlation | .554** | -.200* | .445** | .440** | 1.000 |
| | Sig. (2-tailed) | 0.000 | 0.033 | 0.000 | 0.000 | |

**Source: Study Data (2021)**

The results in table 4.7 show that complexity and ICT Adoption were negatively and significantly associated (r= -0.523, p=0.000). Also, it was established that the user skills and adoption of the ICT was positively and significantly associated (r=0.724, p=0.000). Similarly, a positive and significant association was found between perceived benefits and adoption of the ICT (r=0.769, p=0.000). Lastly, the availability of the ICT equipment and adoption of the ICT was positively and significantly associated (r=0.554, p=0.000). The results also showed a lack of multicollinearity since none of the variables had a correlation coefficient of more than 0.8. This intimated that the complexity, user skills, perceived benefits and ICT Equipment were vital and determined the adoption of ICT by the real estate firms.

The results concur with the findings of Chowdhury (2011) who revealed that ICT adoption was positively correlated to expansion and negatively correlated to internal rate of return, Labour productivity. Also, Hennessy (2010) revealed that availability of electricity and the availing of ICT structures were positively and significantly correlated. Furthermore, Kottemann (2009) revealed that the expected benefits from a technology to be introduced highly influences its adoption in an institution. Likewise, Afshari, et.al. (2010) indicated that the main factors that influenced the principals' adoption of ICT in the management and administration of schools were the availability of ICT infrastructure.

### 4.6.2 Regression Analysis

The regression analysis was conducted to examine the relations between the independent variables (complexity, user skills, perceived benefits and ICT Equipment) and dependent variable (adoption of ICT). The regression analysis determines the influence of the independent variables on a dependent variable. The regression analysis included model fitness, analysis of variance (ANOVA) and regression coefficient. The model fitness examined the percentage of the dependent variable's variations that is explained by the independent variables. Analysis of variance examined whether the independent variables were significant in determining the dependent variable. Lastly, the regression of coefficient evaluated the strength of the relationship between complexity, user skills, perceived benefits, ICT Equipment and adoption of ICT. The results of Regression Analysis were presented in Table 4.9, 4.10 and 4.11.

**Table 4.9: Model Fitness**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1 | .864a | 0.746 | 0.737 | 0.199776 |

a Predictors: (Constant), complexity, user skills, perceived benefits, ICT equipment

**Source: Study Data (2021)**

The results from Table 4.9 shows that complexity, user skills, perceived benefits and availability of ICT equipment were found to be satisfactory in explaining the ICT adoption in Real Estates in Nairobi County. This was supported by the coefficient of determination, also known as the R square of 0.746 (74.6%). This implied that complexity, user skills, perceived benefits and availability of ICT equipment explained 74.6% of the variations in the dependent variable, which is the adoption of ICT.

The results are in agreement with the findings of Apulu (2011), who pointed out that deficiency in ICT user skills hinders the adoption of ICT's effective utilization. Furthermore, Wegene and Olden (2012) showed that the application and introduction of ICT are highly influenced by user skills, ICT equipment and the benefits that is expected from the technology. Besides, Kottemann (2009) revealed that the expected benefits from a technology to be introduced highly influence its adoption in an institution.

Similarly, Table 4.10 provides the results on the analysis of variance (ANOVA).

**Table 4.10: Analysis of Variance (ANOVA).**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 12.793 | 4 | 3.198 | 80.133 | .000b |
| | Residual | 4.35 | 109 | 0.04 | | |
| | Total | 17.143 | 113 | | | |

a Dependent Variable: Adoption of ICT
b Predictors: (Constant), ICT equipment, user skills, perceived benefits, complexity

**Source: Study Data (2021)**

The results indicated that the overall model was statistically significant. The results implied that complexity, user skills, perceived benefits and availability of ICT equipment were found to be good predictors explaining the ICT adoption in real estate firms in Nairobi County. This was supported by an F statistic of 80.133 and the reported p-value of 0.000, which was less than the

conventional probability significance level of 0.05. This indicated that complexity, user skills, perceived benefits and availability of ICT equipment were statistically significant to explain the adoption of ICT in Real Estates in Nairobi County. The results concurred with the findings of Kottemann (2009), who revealed that the expected benefits from a technology to be introduced profoundly influence its adoption in an institution. Also, Hennessy (2010) concluded that the availability of electricity and the availing of ICT structures were positively and significantly correlated.

Besides, the regressions of coefficient results are presented in Table 4.11.

**Table 4.11: Regression of Coefficient**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.556 | 0.316 | | 1.761 | 0.081 |
| | Complexity | -0.066 | 0.027 | -0.140 | -2.470 | 0.015 |
| | User skills | 0.323 | 0.065 | 0.321 | 4.995 | 0.000 |
| | Perceived Benefits | 0.399 | 0.058 | 0.436 | 6.889 | 0.000 |
| | ICT Equipment | 0.203 | 0.059 | 0.191 | 3.424 | 0.001 |

a Dependent Variable: Adoption of ICT

**Source: Study Data (2021)**

The multiple regression model was;

$$Y = 0.556 - 0.066X_1 + 0.323X_2 + 0.399X_3 + 0.203X_4$$

The results from Table 4.11 showed that complexity was negatively and significantly related to ICT adoption ($\beta$=-.066, p=0.015). This was supported by a calculated t-statistic of 2.470 that is larger than the critical t-statistic of 1.96. This meant that a unitary increase of the in the technology system's complexity leads to a decrease in the ICT adoption by the real estate firms in Nairobi County by 0.66 units holding other factors constant. The results concur with Goling

(2012) findings, who revealed that factors that decrease the adoption of the ICT to firms include complexity, compatibility, trialability observability and managerial characteristics such as age and attitude.

Similarly, the findings showed that user skills and ICT adoption were positively and significantly related (β=.0.323, p=0.000). This was supported by a calculated t-statistic of 4.995 that is larger than the critical t-statistic of 1.96. This suggested that one unit's improvement in user skills will lead to an increase in the ICT adoption within the real estate firms in Nairobi County by 0.323 units holding other factors fixed.  The findings are in agreement with the results that were obtained by Idisemi et al., (2011) who revealed that that lack of ICT user skills and training, cost, inadequate infrastructure, lack of management support, policy and institutional framework are among factors that hinder the utilization of sophisticated ICT effectively in Nigerian SMEs.

Moreover, it was established that ICT's perceived benefits were positively and significantly related to ICT adoption (β=.0.399, p=0.000). This was supported by a calculated t-statistic of 6.889 that is larger than the critical t-statistic of 1.96. The findings implied that when the perceived benefits of ICT are increased by one unit by holding the other factors constant, the ICT adoption will increase by 0.399. The results are in agreement with the findings of Kottemann (2009), who revealed that the expected benefits from a technology to be introduced profoundly influence its adoption in an institution. Also, Alghamdi, Goodwin and Rampersad (2011) showed that the usefulness of the technology is essential and should be critically evaluated before purchasing.

Furthermore, the availability of the ICT equipment and ICT adoption was positively and significantly related (β=.203, p=0.000). This was supported by a calculated t-statistic of 3.424 that was larger than the critical t-statistic of 1.96. This implied that when the availability of the

ICT equipment increases by one unit, the ICT adoption will also increase by 0.203, holding the other factors constant. The results concur with the findings of Hennessy (2010), who revealed that the availability of electricity and the availing of ICT structures were positively and significantly correlated. Besides, Olayemi and Omatayo (2012) concluded that the availability of ICT equipment was an important factor that influenced the effectiveness of ICT adoption in the school.

### 4.6.3 Hypotheses Testing

Hypotheses were tested using multiple linear regression analysis as represented in Table 4.10.

### 4.6.3.1 Hypothesis Testing for complexity

The first hypothesis to be tested was:

**Ho$_1$:** There is no statistical significant relationship between complexity and the adoption of ICT in real estate firms in Kenya.

The hypothesis was tested by using linear regression and determined using p-value. The acceptance/rejection criterion was that, if the p value is less than 0.05, we reject the H$_{01}$ but if it is more than 0.05, the Ho$_1$ is not rejected. Therefore, the null hypothesis is that complexity has no significant effect on the adoption of ICT in real estate firms in Kenya. Results in Table 4.10 shows that the p-value was 0.015. This was supported by a calculated t-statistic of 2.470 that is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a statistically significant relationship between complexity and the adoption of ICT in real estate firms in Kenya.

### 4.6.3.2 Hypothesis Testing for ICT user skills

The second hypothesis to be tested was;

**Ho$_2$:** There is no statistically significant relationship between ICT user skills and the adoption of ICT in real estate firms in Kenya.

The hypothesis was tested by using linear regression and determined using p-value. The acceptance/rejection criterion was that, if the p value is less than 0.05, we reject the H$_{02}$ but if it is more than 0.05, the Ho$_2$ is not rejected. Therefore, the null hypothesis is that ICT user skills have no significant effect on the adoption of ICT in real estate firms in Kenya. Results in Table 4.10 shows that the p-value was 0.000. This was supported by a calculated t-statistic of 4.995 that is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a statistically significant relationship between ICT user skills and the adoption of ICT in real estate firms in Kenya.

### 4.6.3.3 Hypothesis testing for perceived benefits

The third hypothesis to be tested was;

**Ho$_3$:** There is no statistically significant relationship between perceived benefits and the adoption of ICT in real estate firms in Nairobi.

The hypothesis was tested by using linear regression and determined using p-value. The acceptance/rejection criterion was that, if the p value is less than 0.05, we reject the H$_{01}$ but if it is more than 0.05, the Ho$_3$ is not rejected. Therefore, the null hypothesis is that perceived benefits have no significant effect on the adoption of ICT in real estate firms in Kenya. Results in Table 4.10 shows that the p-value was 0.000. This was supported by a calculated t-statistic of 6.889 that is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a statistically significant relationship between perceived benefits and the adoption of ICT in real estate firms in Kenya.

### 4.6.3.4 Hypothesis testing for ICT equipment

The fourth hypothesis to be tested was;

**Ho$_4$:** There is no statistical significant relationship between ICT equipment and the adoption of ICT in real estate firms in Kenya.

The hypothesis was tested by using linear regression and determined using p-value. The acceptance/rejection criterion was that, if the p value is less than 0.05, we reject the H$_{04}$ but if it is more than 0.05, the Ho$_1$ is not rejected. Therefore, the null hypothesis is that ICT equipment has no significant effect on the adoption of ICT in real estate firms in Nairobi. Results in Table 4.10 shows that the p-value was 0.001. This was supported by a calculated t-statistic of 3.424 that was larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that there is a statistically significant relationship between ICT equipment and the adoption of ICT in real estate firms in Kenya.

### 4.7 Discussion of Findings

The model fitness showed that complexity, user skills, perceived benefits and availability of ICT equipment explained 74.6% of the variations in ICT adoption among the real estate firms in Nairobi County. Likewise, from the analysis of variance, complexity, user skills, perceived benefits and availability of ICT equipment were found to be good predictors explaining the ICT adoption in real estate firms in Nairobi County. This was supported by an F statistic of 80.133 and the reported p-value of 0.000, which was less than the conventional probability significance level of 0.05.

In addition, from the descriptive statistics, the average mean score of the survey question relating to the complexity was 3.93, with a standard deviation of 1.06. This implied that the majority of

the respondents agreed with the statement concerning complexity; nevertheless, their responses varied. Further, it was established that complexity and ICT Adoption was negatively and significantly associated (r=-0.523, p=0.000). Besides, complexity was negatively and significantly related to ICT adoption (β=-.066, p=0.015). This was supported by a calculated t-statistic of 2.470 that is larger than the critical t-statistic of 1.96. This meant that an increase in complexity of technology leads to a decrease in the ICT adoption by the real estate firms in Nairobi County by 0.066 units holding other factors constant. The results concur with the findings of Wegene and Olden (2012) who noted that the application and introduction of the ICT is highly influenced by user skills, ICT equipment and the benefits that is expected from the technology. Also, Modimogale and Kroeze (2011) reported the major obstacle of adoption of ICT among Medium enterprises included a lack of necessary skills and knowledge about the strategic use of ICT.

Moreover, from the descriptive statistics, the average mean score of the survey questions concerning ICT user skills was 4.08, with a standard deviation of 1.05. This implied that the majority of the respondents agreed with the survey questions concerning user skills and the ICT use in the real estate firms but with differing opinions. Also, it was established that the user skills and adoption of the ICT was positively and significantly associated (r=0.724, p=0.000). Similarly, the findings showed that user skills and ICT adoption were positively and significantly related (β=.323, p=0.000). This was supported by a calculated t-statistic of 4.995 that is larger than the critical t-statistic of 1.96. This suggested that one unit's improvement in user skills will lead to an increase in the ICT adoption within the real estate firms in Nairobi County by 0.323 units holding other factors fixed. The results concur with the findings of Apulu (2011), who pointed out that deficiencies in ICT user skills are one of the factors that have hindered adoption

59

or effective utilization of ICT. Also, Okwuonu (2013) found that user skills influence the ICT adoption among institutions in Nigeria positively in that when those intended to use technology have the necessary skills, it becomes easy for the institution to introduce the anticipated technology with less resistance.

Furthermore, based on the descriptive statistics, the average mean score of the survey questions concerning whether perceived benefits influenced the ICT adoption was 3.86, with a standard deviation of 1.09. This implied that the majority of the respondents agreed with the survey questions; however, their responses varied. Similarly, a positive and significant association was found between perceived benefits and adoption of the ICT (r=0.769, p=0.000). Moreover, it was established that ICT's perceived benefits were positively and significantly related to ICT adoption (β=.399, p=0.018). The findings implied that when the perceived benefits of ICT are increased by one unit by holding the other factors constant, the ICT adoption will increase by 0.399.

Likewise, from the descriptive statistics, the average mean score of the statement concerning the availability of ICT equipment and ICT adoption was 4.02, with a standard deviation of 1.01. This implied that the majority of the respondents agreed with the survey questions, but their opinions varied. In addition, the availability of the ICT equipment and adoption of the ICT was positively and significantly associated (r=0.554, p=0.000). Furthermore, the availability of the ICT equipment and ICT adoption was positively and significantly related (β=.203, p=0.000). This implied that when the availability of the ICT equipment increases by one unit, the ICT adoption will also increase by 0.203 units holding other factors constant. The results concur with the findings of Hennessy (2010) revealed that the availability of electricity and the availing of ICT structures were positively and significantly correlated. Further, Afshari, et.al. (2010) indicated

that the main factors that influenced the principals' adoption of ICT in the management and administration of schools were the availability of ICT infrastructure.

## CHAPTER FIVE

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Introduction

This section presents the summary, conclusions and recommendations of the study. The findings discussed in this chapter and the outcomes were drawn from the results obtained. The limitations of the study is also outlined and finally, the suggestions for further studies.

### 5.2 Summary of the Study

The model fitness showed that complexity, user skills, perceived benefits and availability of ICT equipment explained 74.6% of the variations in ICT adoption among the real estate firms in Nairobi County. Likewise, from the analysis of variance, complexity, user skills, perceived benefits and availability of ICT equipment were found to be good predictors explaining the ICT adoption in real estate firms in Nairobi County. This implied that before adopting the technology to the real estate companies, they need to look at complexity, user skills, perceived benefits and availability of ICT equipment.

### 5.2.1 Complexity and ICT adoption

The first objective of the study was to determine the effect of complexity in the adoption of ICT in real estate firms in Kenya. Based on the descriptive statistics, it was established that the mean score of the survey questions relating to the complexity was 3.93, with a standard deviation of 1.06. This indicated that companies need to be emphasized much on ICT to improve the profitability of the companies. They need to review the complexity of the software and hardware

before making the purchases. This will minimize introducing a particular technology that is not beneficial to the company.

Likewise, correlation results showed there was a negative and significant association between complexity and ICT Adoption (r=-0.523, p=0.000). Moreover, regression results indicated that complexity was negatively and significantly related to ICT adoption ($\beta$=-.323, p=0.015). This implied that a unitary increase in the technology system's complexity leads to a decrease in the ICT adoption by the real estate firms in Nairobi County by 0.323 units holding other factors constant. The results concur with the findings of Modimogale and Kroeze (2011) reported the major obstacle of adoption of ICT among Medium enterprises included a lack of necessary skills and knowledge about the strategic use of ICT. Also, Goling (2012) revealed that factors that increase the adoption of ICT to firms include relative advantage, complexity, compatibility, trialability observability, and managerial characteristics such as age and attitude.

### 5.2.2 ICT user skills and ICT adoption

The second objective of the study was to establish the effect of ICT user skills in the adoption of ICT in real estate firms in Kenya. As per the descriptive statistics, it was determined that the average mean score of the survey questions relating to ICT user skills was 4.08, with a standard deviation of 1.05. This showed that training is one factor that needs to be given priority in the institutions during the plans of introducing new technology. Training increases the skills and understanding in matters to do with the adoption of the technology. These skills are needed to efficiently use the elementary functions of information and communication technologies to retrieve, assess, store, produce, present, communicate and participate in collaborative networks through the internet.

Moreover, correlation results showed that user skills and ICT adoption were positively and significantly associated (r=0.724, p=0.000). Similarly, regression results showed that user skills and ICT adoption were positively and significantly related (β=.323, p=0.000). This implied that one unit's improvement in user skills will lead to an increase in the ICT adoption within the real estate firms in Nairobi County by 0.724 units holding other factors fixed. The results concur with the findings of Okwuonu (2013) found that user skills influence the ICT adoption among institutions in Nigeria positively in that when those intended to use technology have the necessary skills, it becomes easy for the institution to introduce the anticipated technology with less resistance. Similarly, Idisemi et al. (2011) established that that lack of ICT user skills and training, cost, inadequate infrastructure, management support, policy and institutional framework are among factors that hinder the utilization of sophisticated ICT effectively in Nigerian SMEs.

### 5.2.3 perceived benefits and ICT adoption

The third objective of the study was to analyze the effect of perceived benefits in the adoption of ICT in real estate firms in Kenya. Based on the descriptive statistics, the average mean score of the survey questions concerning the perceived benefits and ICT adoption was 3.86, with a standard deviation of 1.09. This implied that when the perceived benefits seem to be high, companies are motivated to introduce the technology. In contrast, when the benefits seem insignificant, companies may not be willing to advance their organizations' technology. Therefore, companies need to evaluate the benefits expected from introducing a particular technology before the initiation process.

Likewise, correlation results showed a positive and significant association between perceived benefits and adoption of the ICT (r=0.769, p=0.000). Furthermore, it regression results established that ICT's perceived benefits were positively and significantly related to ICT

63

adoption (β=.399, p=0.000). The findings implied that when the perceived benefits of ICT are increased by one unit by holding the other factors constant, the ICT adoption will also increase by 0.399 units. The results are in agreement with the findings of Alghamdi, Goodwin and Rampersad (2011) that revealed that the usefulness of the technology is essential and should be critically evaluated before purchasing. In addition, Asogwa (2011) reported that the importance of the technology is given a priority before coming to a consensus of introducing to the departments.

**5.2.4 Availability of ICT equipment and ICT adoption**

The fourth objective of the study was to examine the effect of the availability of ICT equipment on the adoption of ICT in real estate firms in Kenya. As per the descriptive statistics obtained, the average mean score of the survey question concerning the availability of ICT equipment was 4.02, with a standard deviation of 1.01. This illustrated that introduction of technology is essential and broadens the investment opportunities. The availability of effective ICT equipment enhances the easy adoption of modern technology. Thus, real estate firms need to emphasize the ICT equipment within their institutions to strengthen ICT adoption and expand their performance.

Besides, the correlation results indicated that availability of ICT equipment and the adoption of ICT were positively and significantly associated (r=0.554, p=0.000). Furthermore, regression results revealed the availability of the ICT equipment and ICT adoption was positively and significantly related (β=.203, p=0.001). This implied that when the availability of the ICT equipment increases by one unit, the ICT adoption will also increase by 0.446, holding the other factors constant. The results concur with the findings of Olayemi and Omatayo (2012), who revealed that the availability of ICT equipment was an important factor that influenced the

effectiveness of ICT adoption in the school. Further, Hennessy (2010) established that the availability of electricity and the availing of ICT structures were positively and significantly correlated.

## 5.3 Conclusions

Based on the correlation results, the study concluded complexity and ICT adoption was negatively and significantly associated. Moreover, as per the regression results complexity was negatively and significantly related to ICT adoption. Besides, the study concluded that complexity entails a firm experiencing hardware and software compatibility issues. Likewise, the study concluded that the installation of ICT system requires skilled personnel and therefore, employees need to be trained on how to use computers. Moreover, the study concluded that trained employees could use computers efficiently. Further, the study concluded that ICT adoption enhances the profitability of the company.

Similarly, the study concluded that user skills and ICT adoption were positively and significantly associated. Based on the regression analysis, user skills and ICT adoption were positively and significantly related. Moreover, the study concluded that many real estate agencies use websites and social media and the innovation in technology has expedited communication in the companies. In addition, the study concluded that customer service technology had enhanced the development of real estate.

Further, the study concluded that a positive and significant association was found between perceived benefits and adoption of the ICT. Furthermore, it was established that ICT's perceived benefits were positively and significantly related to ICT adoption. Similarly, the study concluded that marketing process had been made accessible through the implementation of new technology. Likewise, the study concluded that coordination between the firm and clients had been enhanced

through ICT adoption and the technology has made construction work to be more efficient. In addition, the study concluded that technology has reduced wastage and cost of construction projects

Lastly, based on the correlation analysis, the study concluded that the availability of ICT equipment and the adoption of ICT were positively and significantly associated. Furthermore, the regression analysis showed that the availability of the ICT equipment and ICT adoption was positively and significantly related. Moreover, the study concluded that online listing had enhanced communication between home buyers and home sellers. Besides, the study concluded that technology has increased investments of the real estate companies and further the ICT adoption has raised the quality of real estates in Kenya to international standards.

## 5.4 Recommendations

Based on the findings, the study recommended that real estate firms need to employ experts with ICT experience to deal with the hardware and software compatibility issues when it occurs in an institution. The study also recommended that the installation of an ICT system should be done by skilled personnel. Moreover, the study recommended that many real estate agencies should use websites and social media to increase their visibility. Besides, the study recommended that real estate firms should dwell much on customer service technology to enhance communication with the clients. Besides, the study recommended that the institutions should develop a system that enables it to receive frequent updates on emerging issues in the real estate industry.

Furthermore, the study recommended that well-trained personnel should be involved in the coordination of the activities between the firm and clients. Besides, regular workshops and training, such as twice a year, should be carried out for real estate professionals to let them know

what new information technology is available and how it can be used. The workshops will enable the professionals to state what they require so that it can be produced.

Similarly, the study recommended that real estate firms encompass online listings to develop communication between home buyers and home sellers. Besides, the study recommended that most advanced technology should be adopted to raise the quality of real estates in Kenya to international standards. Lastly, the study recommended that a comprehensive automated database should be constructed which would avail property and land information on demand. This would lead to real estate professionals and surveyors accessing relevant information on land in a timely and easy manner. Security measures should be taken to protect valuable data by introducing effective ICT equipment.

## 5.6 Suggestions for Further Studies

The study suggested that another study should be conducted to examine factors influencing the adoption of information and communication technology in real estate firms in other parts of the country apart from Nairobi. This will be key in comparison with the results of the current study and further identification of more research gaps for future studies. Moreover, another study can be conducted to examine the impact and benefits of introducing a geographic information system in real estates.

# REFERENCES

Achimugu, P., Oluwagbemi, O. Oluranti, A and Afolabi B. (2009). "Adoption of Information and Communication Technologies in Developing Countries. An Impact Analysis." *Journal of Information Technology Impact*, 9 (1), 37-46.

Adesoji, F. (2011). Undergraduate students perception of the effectiveness of ICT use in improving teaching and learning in Ekiti State University, Ado-Ekiti, Nigeria. *International Journal of Library and Information Science*, *4*(7), 121-130.

Afshari, M., Bakar, K. A., Luan, W. S., Afshari, M., & Fooi, F. S., (2010). Computer Use by Secondary School Principals. *Turkish Online Journal of Educational Technology-TOJET*, *9*(3), 8-25.

Alderete, M. V. (2013). Do information and communication technology access and innovation increase outsourcing in small and medium enterprises?. *JISTEM-Journal of Information Systems and Technology Management*, *10*, 303-322.

Alghamdi, I. A., Goodwin, R., & Rampersad, G. (2011). A suggested e-government framework for assessing organizational e-readiness in developing countries. In *International Conference on Informatics Engineering and Information Science* (pp. 479-498). Springer, Berlin, Heidelberg.

Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International journal of management reviews*, *11*(1), 29-49.

Apulu, I., (2011). Issues of ICT adoption among SMEs in Nigeria. *Int.J. Management Practice*, 6(1), 69-73.

Arendt, L. (2008) Barriers to ICT in SMEs: how to bridge the digital divide? *Journal of Systems and Information Technology,* (2), pp. 93-108.

Asogwa, B. E. (2011). The state of e-government readiness in Africa: A comparative web assessment of selected African countries. *Journal of Internet and Information Systems*, *2*(3), 43-57.

Awinda, O., M. (2012). The relationship between the real estate returns and equity market returns in Kenya. (Thesis, Strathmore University)

Babbie, E. (2004). *The practice of social research*. Belmont, California.

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of management*, *27*(6), 643-650.

Borgman, H. P., B. Bahli, H. Heier and F. Schewski (2013), "*Cloudrise: Exploring Cloud Computing Adoption and Governance with the TOE Framework,*" in HICSS 2013: 46th Hawaii International Conference on System Sciences, Wailea, HI, USA.

Chapman, T., R., Papastathopoulos, A., & Beneki, C. (2000). Does Entrepreneurial Experience and Strategy Really Matter for ICT Performance? A Greek Cross-Border Empirical Study. *Electronic Journal of Information Systems Evaluation*, *13*(2), pp177-186.

Chowdhury, M. K. 2011). A*ssessment of investments in ICT-Capital and Economic performance of Medium enterprises in East Africa. International Journal of Technology, 4(2), 18-31*

Cloete, E. (2003). SMEs in South Africa: acceptance and adoption of e-commerce. In *The economic and social impacts of e-commerce* (pp. 121-134). IGI Global.

Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods. Data Preparation and Description*. McGraw-Hill Irwi. Boston

Cooper, R. K. (1997). Applying emotional intelligence in the workplace. *Training & development*, *51*(12), 31-39.

Creswell, J. W. (2003). A framework for design. *Research design: Qualitative, quantitative, and mixed methods approaches*, 9-11.

Creswell, J. W., & Poth, C. N. (2017). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications

Davis, M. and Danning, K. (2001). Transition to virtual learning. Association for Learning.

Demeke, W., & Olden, A. (2012). Researching the adoption of ICT in Ethiopia: a case study of small hotels in Addis Ababa. In *Aslib Proceedings* (Vol. 64, No. 5, pp. 519-528). Emerald Group Publishing Limited.

Demeke, W., & Olden, A. (2012, September). Researching the adoption of ICT in Ethiopia: a case study of small hotels in Addis Ababa. In *Aslib Proceedings*. Emerald Group Publishing Limited.

Djatikusumo,D.S (2014).Determinants of SMEs Adoption of Information Communication Technology (ICT) and their impact on Organization Performance in Indonesia,10-60.

Duan, Y., Mullins, R., Hamblin, D., Stanek, S., Sroka, H., Mavhado, V., Araujo, J. (2002) "Addressing ICTs Skill Challenges in SMEs: Insights from three country investigations", *Journal of European Industrial Training*, 26 (9), 430-441.

Earle, R. S. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational technology-saddle brooks then Englewood Cliffs NJ-*, *42*(1), 5-13.

Elbeltagi, I., Sharji, Y. A., Hardaker, G., &Elsetouhi, A. (2013). The Role of the Owner-Manager in SMEs' Adoption of Information and Communication Technology in the United Arab Emirates. *Journal of Global Information Management*, 21(2), 23-50.

Everett, R. F. (2014). A crack in the foundation: Why SWOT might be less than effective in market sensing analysis. *Journal of Marketing & Management*.

Farhoomand, A. (2009). Study on ICT Adoption in Hong Kong SMEs.

Gallego-Álvarez, I., Rodríguez-Domínguez, L., & García-Sánchez, I. M. (2010). Are determining factors of municipal E-government common to a worldwide municipal view? An intra-country comparison. *Government Information Quarterly*, *27*(4), 423-430.

Garvin, D. A. (1993). *Building a learning organization* (Vol. 71, No. 4, pp. 78-91). July-August: Harvard Business Review.

Gichoya, D. (2005). Factors affecting the successful implementation of ICT projects in government. *the Electronic Journal of e-government*, *3*(4), 175-184.

Gitau, S. W. (2014). *The application of information technology in real estate firms in Kenya* (Doctoral dissertation, University of Nairobi).

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach'salpha reliability coefficient for Likert-type scales. Midwest Researchto-Practice Conference in Adult, Continuing, and Community Education

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, *8*(4), 597-606.

Golding, P., Donaldson, O., Tennant, V. and Black, K. (2008). An Analysis of Factors Affecting the Adoption of ICT by MSMEs in Rural and Urban Jamaica.

Handzic., R., (2004). Intelligent participation: Communicating knowledge in cross-functional project teams. *International Journal of Knowledge Management Studies*, *3*(3-4), 180-194.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.

Hennessy, S. (2010). Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *Itupale online journal of African studies*, *2*(1), 39-54.

Ibeh, K., Wilson, J., & Chizema, A. (2012). The internationalization of African firms 1995–2011: Review and implications. *Thunderbird International Business Review*, *54*(4), 411-427.

Idisemi, A., & Ann, L. (2011). The benefits of ICT adoption: An empirical study of Nigerian SMEs. In *Proceedings of the European Conference on Information Management* (Vol. 483).

Ifinedo, P. (2011). An empirical analysis of factors influencing Internet/e-business technologies adoption by SMEs in Canada, *International Journal of Information Technology & Decision Making*, 10( 4), 731–766.

Ifinedo, P. (2011). An empirical analysis of factors influencing Internet/e-business technologies adoption by SMEs in Canada. *International Journal of Information Technology & Decision Making*, 10( 4), 731–766.

Irefin, I. A., Abdul-Azeez, I. A., Tijani, A. A.(2012 ). An Investigative Study Of The Factors Affecting The Adoption Of information and Communication Technology In Small and Medium Scale Enterprises In Nigeria. *Australian Journal of Business and Management Research*, 2(02 ),1-9.

Kabanda,S. (2011).E-Commerce Institutionalization is not for us": SMEs perception of E-Commerce in Tanzania. *The African Journal of Information Systems*.3 (1), 1-16.

Kitur, S. (2006): A *Survey of the Strategic Role of Information and Communication Technology among Insurance Companies in Kenya*; An unpublished MBA project, UoN.

Kollberg, M., & Dreyer, H. (2006, June). Exploring the impact of ICT on integration in supply chain control: a research model. In *Proceedings of the 2006 EurOMA Conference in Strathclyde, Scotland* (Vol. 1, p. 285).

Kombo, D.K. & Tromp, L.A. (2006). Proposal and Thesis Writing: An Introduction. Kiambu: Paulines Publications Africa

Kothari, C. (2004). *Research Methodology: Methods & Techniques*, 2nd edition.New age International Publishers, New Delhi, India

Kottemann, J. E. (2009). The effects of technological, institutional and fiscal readiness on the extent of nations'e-government. *Electronic Government, an International Journal*, *6*(3), 327-341.

Kuang, W., Chen, C., & Wang, Q. (2020). Home purchase restriction, real estate investment, and corporate innovation. *Frontiers of Business Research in China*, *14*(1), 1-21.

Kunda, D., & Brooks, L. (2000). Identifying and classifying processes (traditional and soft factors) that support COTS component selection: a case study. *European Journal of Information Systems*, *9*(4), 226-234.

Ladokun, I. O., Osunwole, O. O., & Olaoye, B. O. (2013). Information and Communication Technology in Small and Medium Enterprises: Factors affecting the Adoption and use of ICT in Nigeria. *International Journal of Academic Research in Economics and Management Sciences*, *2*(6), 74.

Lal, K. (2007). Globalization and Adoption of ICTs in Nigerian SMEs, *Science, Technology Society*, 12 (2), 217-244.

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of management*, *33*(3), 321-349.

Matlay, H., (2000). Adoption of ICT and e- commerce in small businesses: an HEI- based consultancy perspective. *Journal of small business and enterprise development*, 2(5), 18-27

Mitra, J. (2009). Regional cluster formation: a case study of the software cluster in Birmingham, UK. *Enterprise Support Systems: An International Perspective, Sage, New Delhi*, 65-88.

Modimogale, L., & Jan, H. (2011). The role of ICT within small and medium enterprises in Gauteng. *Communications of the IBIMA*.

Modimogale, L., & Kroeze, J. H. (2011). The Role of ICT within Small and Medium Enterprises in Gauteng.

Mose, M., Njihia, M., &Magutu, O. (2013): The Critical Success Factors and Challenges in E-procurement Adoption among Large Scale Manufacturers in Nairobi Kenya. *European Scientific Journal,* 32(60), pp. 234-396.

Mugambi, E. N., & Karugu, W. N. (2017). Effect of entrepreneurial marketing on performance of real estate enterprises: A case of Optiven Limited in Nairobi, Kenya. *International Academic Journal of Innovation, Leadership and Entrepreneurship*, *2*(1), 26-45.

Mugenda, O. M. &Mugenda, A. G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Kiambu, KE: Acts Press

Mugenda, O.M and Mugenda A.G. (1999) *Research Methods-Qualitative and Quantitative Approaches* Acts Press, Nairobi

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. *Strategic management journal*, *28*(2), 121-146.

Njuguna, K. N. (2016). Assessment of health and safety management on construction sites in Kenya: a case of construction projects in Nairobi County. *Nairobi: Jomo Kenyatta University of Agriculture and Technology*.

North, D. C. (1991). Institutions. *Journal of economic perspectives*, *5*(1), 97-112.

North, D. C. (2016). Institutions and economic theory. *The american economist*, *61*(1), 72-76.

Nzalu, F. M. (2013). *An Assessment of the factors affecting the growth in real estate investment in Kenya* (Doctoral dissertation, University of Nairobi).

Olayemi, A., & Omotayo, K. (2012). ICT adoption and effective secondary school administration in Ekiti-state, Nigeria. European Journal of Educational Studies Vol. 4(1), pp. 60-64.

Oliver, C. (1997). Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic management journal*, 697-713.

Olson, H. and Gordon, D. (1998): *Management Information systems Conceptual Foundations, Structure, and Development*. McGraw-Hill Series in Management Information Systems, Second Edition.

Olusola, A., & Oluwaseun, Y. (2013). An appraisal of the impact of information technology (IT) on Nigeria small and medium enterprises (SMEs) performance. *International Journal of Academic Research in Management (IJARM) Vol*, *2*, 140-152.

Orodho J.A. (2005). *Elements of Education and Social Science Research Methods*. Kanezja Publishers

Owuor, O. (2004): *The use of Information Technology as a facilitator of Business Process Re-engineering*; An unpublished MBA project, UoN.

Penrose Edith, T. (1959). The Theory of the Growth of the Firm. *New York and Oxford*.

Purnomo, S., & Lee, Y. H. (2010). An assessment of readiness and barriers towards ICT program implementation: Perceptions of agricultural extension officers in Indonesia. *International Journal of Education and Development using ICT*, *6*(3), 19-36.

Rushton, A., Oxley, J. and Croucher, P. (2001). *The handbook of logistics and distribution management*, K. Page, London.

Senge, P. M. (1990). (1990a). The fifth discipline: The art and practice of the learning organization. New York: Doubleday.

Sibiya, T.G. (2003). *Information and Communication Technology and Education*. In Proceedings of the 11th annual conference on improving cooperation among researchers, policy formulators and implementors of policy in mathematics, science and technology education, SAARMSTE. Putsoa, B. et al (Eds),pp.26-32.

Singh, A., Gonzalez, E. T., & Thomson, S. B. (Eds.). (2012). *Millennium development goals and community initiatives in the Asia Pacific*. Springer Science & Business Media.

Syagga, P. M. (2010). Determinants of Accessibility to Quality Housing by the Low/Middle Income Earners in Kenya. *International Journal of Innovative Research and Knowledge*, *2*(5), 102-115.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273-1296.

Wachira, D. T. (2015). *Adoption And Integration Of Information And Communication Technology, And Performance Of Deposit Taking Sacco's In Nairobi City County* (Doctoral dissertation, University of Nairobi).

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International journal of management reviews*, *9*(1), 31-51.

Wang, Q., & Woo, H. L. (2007). Systematic planning for ICT integration in topic learning. *Educational technology & society*, *10*(1), 148-156.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, *5*(2), 171-180.

Zarea, H., & Salamzadeh, A. (2012). Identification of Output Performance Indicators in Commercialization of University Research: An AHP based Study of EFQM Model. *Journal of Entrepreneurship Development*, *4*(15), 85-104.

Zucker, L. G. (1987). Institutional theories of organization. *Annual review of sociology*, *13*(1), 443-464.

<div align="center">**APPENDICES**</div>

## Appendix I: Introduction Letter

Date……………………………

Dear Respondent,

I am a graduate student of Master of Arts in valuation and property management at University of Nairobi. As part of the requirement for graduation, I am undertaking a research to establish *"factors influencing adoption of information and communication technology in real estate firms in Kenya"* The purpose of this letter is to kindly request you to spare your time and complete this questionnaire or respond to the questions therein. The information obtained will be purely for this study only and will be treated with utmost confidentiality. Your wealth of knowledge in completing the questionnaire will be of great value and will be highly appreciated.

Thank you for your cooperation and assistance.

Regards,

Alice Soipan

**Appendix II: Questionnaire**

This questionnaire sought to establish factors influencing adoption of information and communication technology in real estate firms in Kenya.

<u>**Section A: Demographic Information**</u>

    **i)**     <u>**Personal information**</u>

1. What is your gender?

    a) Male                           [ ]

    b) Female                      [ ]

2. How old are you? (Years)

    a) Less than 30:               [ ]

    b) 31-40:                      [ ]

    c) 41-50:                      [ ]

    d) Above 50:                 [ ]

3. What is your level of education?

    a) College                   [ ]

    b) Graduate                [ ]

    c) Post Graduate         [ ]

4. For how long have you been in the real estate industry?

    a) Less than 5 years               [ ]

    b) 5-10 years                      [ ]

    c) More than 10 years      [ ]

    **ii)**     <u>**Institutions iinformation**</u>

    1. Real estate category?

        a) Professional Real Estate Firms

        b) Real Estate Agents

2. How long has the institution been in operation?

    a) Below 5 years

    b) 5-10 Years

    c) Above 10 years

3. What is the workforce size in your institution?

        a) Less than 25 employees

b) 25-50 employees

c) 51-75 employees

d) 76-100 employee

e) Above 100 employees

## Section B:  Complexity and ICT Adoption

This section is concerned with assessing the influence of complexity on ICT adoption of real estate firms in Kenya

Where 1= strongly disagree, 2= disagree, 3= neutral, 4, =Agree and 5 =Strongly agree. Please tick appropriately.

| | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| The firm experiences hardware and software compatibility issues | | | | | |
| Installation of ICT system requires skilled personnel | | | | | |
| Employees need to be trained on how to use computers | | | | | |
| Trained employees are able to use computers efficiently | | | | | |
| ICT has enhances the profitability of the company | | | | | |

In your opinion, does complexity influence the adoption of ICT in real estate firms in Kenya?

1) Yes                              [ ]
2) No                               [ ]

## Section C: User skills and Adoption of ICT

This section was concerned with assessing the influence of user skills on adoption of ICT in real estate firms in Kenya.

Where 1= strongly disagree, 2= disagree, 3= neutral, 4, =Agree and 5 =Strongly agree. Please tick appropriately.

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Many real estate agencies use websites and social media | | | | | |
| Innovation in technology has facilitate communication in the company | | | | | |
| Customer service technology enhance the development of real estate | | | | | |
| We receive frequent updates on emerging issues in real estate industry | | | | | |
| Our employees need to be taught on how to use computers | | | | | |

In your opinion, do user skills influence the adoption of ICT in real estate firms in Kenya?

1. Yes               [ ]
2. No                [ ]

## Section D: Perceived Benefits and Adoption of ICT

This section was concerned with assessing the influence of perceived benefits on adoption of ICT in real estate firms in Kenya.

Where 1= strongly disagree, 2= disagree, 3= neutral, 4, =Agree and 5 =Strongly agree. Please tick appropriately.

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Marketing process has been made easy through implementation of new technology. | | | | | |
| Coordination between the firm and clients has been enhanced. | | | | | |
| Technology has made construction work to be more efficient | | | | | |
| Technology has reduced wastage and cost of construction projects | | | | | |
| Technology has enhanced construction work to be more efficient | | | | | |

In your opinion, does perceived benefits influence the adoption of ICT in real estate firms in Kenya?

1. Yes                    [  ]
2. No                     [  ]

## Section E: Availability of ICT Equipment and adoption of ICT

This section was concerned with assessing the influence of availability of ICT equipment on the adoption of ICT in real estate firms in Kenya.

Where 1= strongly disagree, 2= disagree, 3= neutral, 4, =Agree and 5 =Strongly agree. Please tick appropriately.

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Online listing has enhanced communication between home buyers and home sellers | | | | | |
| The company has been able to install modern ICT equipment | | | | | |
| Technology has increased investments of the company | | | | | |
| Trainings and workshops should be conducted on matters pertaining information technology. | | | | | |
| ICT has raised the quality of real estates in Kenya to international standards | | | | | |

In your opinion, does availability of ICT equipment influence the adoption of ICT in real estate firms in Kenya?

1. Yes                    [ ]
2. No                     [ ]

## Section F: Adoption of ICT

This section was concerned with assessing the influence of adoption of ICT in real estate firms in Kenya.

Where 1= strongly disagree, 2= disagree, 3= neutral, 4, =Agree and 5 =Strongly agree. Please tick appropriately.

| Statement | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Real estate business has not been able to use modern technology in various aspects of its operations | | | | | |
| Level of investment in real estate have increased significantly for the past 5 years | | | | | |
| Real estate companies have witnessed significant growth in number of listings annually in the past 5 years | | | | | |
| Income from rent have significantly increased for the past 5 years | | | | | |
| Errors have been minimized in the construction projects | | | | | |