

**Determinants of Information Communication Technology Adoption
By Formal Small Enterprises In Urban Kenya**

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Philosophy in Entrepreneurship in the Jomo Kenyatta University of
Agriculture and Technology**

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DECLARATION

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

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DEDICATION

I dedicate this work to the Almighty God who has helped me this far and granted me the opportunity to contribute to the well-being of humanity in Jesus Name, Amen.

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TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	xi
LIST OF FIGURES	xiii
LIST OF APPENDICES	xv
LIST OF ABBREVIATIONS AND ACRONYMS	xvi
DEFINITION OF TERMS	xviii
ABSTRACT	xx
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background Information	1
1.1.1. Small Enterprises.....	1
1.1.2. Information Communication Technology	3
1.1.3. ICT Trends in Kenya.....	4
1.2 Statement of the Problem	5
1.3 Study Objectives	7
1.3.1. General Objective.....	7
1.3.2. Specific Objectives.....	7
1.4 Hypotheses	7
1.5 Justification of the Study.....	8
1.6 Scope of the Study.....	8

1.7	Limitations	9
CHAPTER TWO.....		10
2.0	LITERATURE REVIEW.....	10
2.1	Introduction	10
2.2	Theoretical Framework	10
2.2.1.	Innovation Diffusion Theory (IDT)	10
2.2.2.	ICT Adoption	12
2.2.3.	Perceived ICT Attributes.....	15
2.2.4.	Theory of Planned Behaviour (TPB)	16
2.2.5.	Enterprise Characteristics.....	18
2.2.6.	External Environment	20
2.2.7.	Perceived ICT Barriers.....	22
2.3	Conceptual Framework	24
2.4	Review of Important Literature.....	26
2.4.1.	SME Classification on Formality.....	26
2.5	Empirical Review.....	27
2.5.1.	Perceived ICT Attributes.....	27
2.5.2.	Enterprise Characteristics.....	30
2.5.3.	External Environment	31
2.5.4.	Perceived ICT Barriers.....	31
2.6	Literature Critique	32
2.7	Summary	33
2.8	Research Gaps	33

CHAPTER THREE	35
3.0 RESEARCH METHODOLOGY	35
3.1 Introduction	35
3.2 Research Philosophy	35
3.3 Study Population	36
3.4 Sampling Technique.....	36
3.5 Data Collection Procedures	37
3.5.1. Instruments	38
3.6 Pilot Study	38
3.6.1. Reliability	38
3.6.2. Sampling Adequacy Test	39
3.6.3. Test of Construct Validity	39
3.7 Data Processing and Analysis	39
3.7.1. Conversion of Likert Scale into Category Weights	40
3.7.2. Statistical Model of Analysis	41
3.7.3. Independent Sample T-Test	43
3.8 Ethical Issues.....	43
CHAPTER FOUR	44
4.0 RESEARCH FINDINGS AND DISCUSSION	44
4.1 Introduction	44
4.2 Response Rate	44
4.3 Data Reliability	45
4.3.1. Sampling Adequacy Test	46
4.3.2. Test of Construct Validity	47
4.4 Background Information	47

4.4.1. Business Registration	47
4.4.2. Year of Business Inception	48
4.4.3. Core Business Sector.....	49
4.5 Adoption of ICT	49
4.5.1. Duration of ICT Adoption.....	50
4.5.2. Reasons for not Adopting ICT	51
4.6 Enterprise Characteristics.....	54
4.6.1. Age Bracket of the Entrepreneurs	54
4.6.2. Enterprise Size in Terms of Branches	55
4.6.3. Enterprise Size in Terms of Annual Sales Turnover.....	55
4.6.4. Entrepreneur’s ICT Level of Skills	56
4.6.5. Enterprise Owner(s)	57
4.6.6. Entrepreneur’s View on Basic ICT Skills	58
4.6.7. Entrepreneur’s View on Advanced ICT Skills.....	59
4.6.8. Entrepreneur’s View on Having Internal ICT Specialist	60
4.6.9. Entrepreneur’s View on Having External ICT Specialist	60
4.6.10. Entrepreneur’s View on Having Regular ICT Trainings	61
4.6.11. Enterprise ICT Strategy.....	61
4.6.12. Enterprise Possession of Sufficient ICT Skills	62
4.6.13. Availability of Resources.....	63
4.6.14. Fear of Losing Business Control Due to ICT Adoption.....	63
4.6.15. Influence of Amount of Data Processed on ICT Adoption.....	64
4.6.16. Mean Plot for Enterprise Characteristics	65
4.7 Perceived ICT Attributes.....	66
4.7.1. Relative Advantage of Using ICT	66

4.7.2.	ICT Compatibility With Business Needs	71
4.7.3.	Complexity of ICT in Enterprises	71
4.7.4.	Trialability of ICT in Enterprises	72
4.7.5.	Observability of ICT Results.....	73
4.7.6.	Mean Plot for Perceived ICT Attributes	74
4.8	External Environment	76
4.8.1.	Influence of Customers	76
4.8.2.	Influence of Competitors.....	76
4.8.3.	Influence of Technology Change	77
4.8.4.	Influence of Suppliers	77
4.8.5.	Government Influence.....	78
4.8.6.	Influence of Friends in the Social Networks	80
4.8.7.	Mean Plot for External Environment	81
4.9	Perceived ICT Barriers.....	82
4.9.1.	Implementation Time Required	82
4.9.2.	ICT Requires Training and Change	83
4.9.3.	ICT Comes With Security Issues	84
4.9.4.	Kenyan Laws Governing ICT	85
4.9.5.	Scarce Business Resources.....	85
4.9.6.	Return on Investment	86
4.9.7.	Rapid Technological Changes.....	87
4.9.8.	Running Costs	88
4.9.9.	Lack of Internal Technical Expertise	89
4.9.10.	Mean Plot for Perceived ICT Barriers.....	90
4.10	Mean Plots for all Independent Variables	91

4.11	Logistic Regression	92
4.11.1.	Logistic Model Evaluation	94
CHAPTER FIVE		96
5.0	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	96
5.1	Introduction	96
5.2	Summary of the Findings	96
5.2.1.	ICT Adoption	96
5.2.2.	Influence of Enterprise Characteristics on ICT Adoption.....	96
5.2.3.	Influence of Perceived ICT Attributes on ICT adoptions	98
5.2.4.	Influence of External Environment on ICT Adoption	98
5.2.5.	Influence of Perceived ICT Barriers on ICT Adoption.....	99
5.3	Conclusions of the Findings.....	100
5.4	Recommendations	102
5.5	Recommended Future Research.....	102
REFERENCES		104
APPENDICES.....		113

LIST OF TABLES

Table 2.1:	SMEs Classification on Formality.....	26
Table 3.1:	Questionnaires Distribution.....	37
Table 4.1:	Questionnaire Response Rate	44
Table 4.2:	Survey Response Rate by Other Researchers	45
Table 4.3:	Cronbach Alpha Test for Independent Variables	46
Table 4.4:	Kaiser-Meyer-Olkin (KMO) Test.....	46
Table 4.5:	Level of ICT Education and ICT Adoption.....	57
Table 4.6:	Relationship Between owner(s) Gender and Type of ICT Adopted.....	58
Table 4.7:	Entrepreneur’s View on Need to Have Employees with Basic ICT Skills	59
Table 4.8:	Entrepreneur’s View on Need to Have Employees with Advanced ICT ..	59
Table 4.9:	Entrepreneur’s View on Need to Have Internal ICT Specialist	60
Table 4.10:	Entrepreneur’s View on use of External ICT Specialist.....	61
Table 4.11:	View on Having Regular Training of Employees on use of ICT	61
Table 4.12:	Adequate Resources are Available for use of ICT	63
Table 4.13:	T-Test on Mean Difference of Enterprise Characteristics.....	66
Table 4.14:	ICT has led to Simplification of Work Routines.....	67
Table 4.15:	ICT has led to Reliable Business Communications.....	67
Table 4.16:	Use of ICT has led to Efficient Coordination Among Departments	68
Table 4.17:	Use of ICT has led to Improved Customer Satisfaction	68
Table 4.18:	Use of ICT has Provided new Business Opportunities.....	69
Table 4.19:	Use of ICT has led to Development of new Products and Services	69
Table 4.20:	Use of ICT has led to Reduction in Operations Costs.....	70
Table 4.21:	Use of ICT has led to Increased Productivity	71

Table 4.22:	T-Test on Mean Difference for Perceived ICT Attributes	75
Table 4.23:	Use ICT Because Customers are Using it	76
Table 4.24:	Use ICT Because Competitors are Using it.....	77
Table 4.25:	Use ICT to Match Changes in Technology	77
Table 4.26:	Use ICT Because Supplier are Using it	78
Table 4.27:	Offer of Online Tax Services Positively Influenced use ICT	78
Table 4.28:	Removal on ICT Products Positively Influenced Enterprise to use it	79
Table 4.29:	ICT as a Major Driving Force in Vision 2030 has Influenced it use.....	79
Table 4.30:	Establishment of Digital Villages Made it Possible for use of ICT	80
Table 4.31:	T-Test on Mean Difference	82
Table 4.32:	High cost of ICT Software Reduces its Usage	88
Table 4.33:	High Infrastructure Maintenance Cost of ICT Reduces its Usage	89
Table 4.34:	Lack of Internal Technical Expertise in ICT Reduces its Usage.....	89
Table 4.35:	T-Test on Mean Difference	91
Table 4.36:	T-Test on Mean Difference for Independent Variables.....	92
Table 4.37:	Variables in the Equation	94
Table 4.38:	Classification Observed and Predicted Outcomes of ICT Adoption.....	94
Table 4.39:	Omnibus Tests of Model Coefficients.....	95

LIST OF FIGURES

Figure 2.1:	Rogers' Innovation Diffusion Model	11
Figure 2.2:	Theory of Planned Behavior (TPB).....	18
Figure 2.3:	Factors Affecting ICT Adoption by SMEs.....	18
Figure 2.4:	Conceptual Framework.....	25
Figure 4.1:	Map of Kenya Showing Location of the Towns and Response Rates.....	45
Figure 4.2:	Business Registration	48
Figure 4.3:	Year of Business Inception.....	48
Figure 4.4:	Core Business Sector	49
Figure 4.5:	Overall ICT Adoption by Small Enterprises	50
Figure 4.6:	Number of Years of ICT Usage.....	51
Figure 4.7:	Reasons of not Using ICT	53
Figure 4.8:	Entrepreneur's age in Years	54
Figure 4.9:	Business Branches Network	55
Figure 4.10:	Annual Sales Turn-over (Million-Kenya Shillings)	56
Figure 4.11:	ICT Level of Education of the Entrepreneurs	56
Figure 4.12:	Enterprises Ownership.....	57
Figure 4.13:	Entrepreneur's View on Implementation of ICT strategy.....	62
Figure 4.14:	Enterprise Possess Sufficient ICT Skills	62
Figure 4.15:	Fear of Loss of Business Control if Employees are Allowed to use ICT ..	64
Figure 4.16:	Large Amount of Data Processing Necessitates the use of	64
Figure 4.17:	Mean Plot for Enterprise Characteristics Against ICT Adoption.....	65
Figure 4.18:	ICT is Consistent with Business Needs.....	71
Figure 4.19:	It is Easy to Implement ICT	72

Figure 4.20:	Easy to Test ICT Before Full Implementation	73
Figure 4.21:	Positive Results of Using ICT are Clearly Visible	74
Figure 4.22:	Mean Plot for Perceive ICT Attributes Against ICT Adoption.....	75
Figure 4.23:	Influence of Friends in the Social Network on the use of ICT	81
Figure 4.24:	Mean Plot for External Environment Against ICT Adoption.....	81
Figure 4.25:	Implementation of ICT Requires a lot of Time Which is Scarce	83
Figure 4.26:	ICT Requires Training and Change Whose Costs are High	84
Figure 4.27:	ICT Comes with Security Issues Hence Assurance is Needed.....	84
Figure 4.28:	Kenyan Laws Governing use of ICTs are not Clearly Stipulated	85
Figure 4.29:	Scarce Business Resources are not Enough to Invest in ICT	86
Figure 4.30:	Investment in ICT does not Represent Value for Money	87
Figure 4.31:	Rapid Technological Changes has Increased ICT Costs	87
Figure 4.32:	High ICT Consultancy fee Reduces its Usage.....	88
Figure 4.33:	Mean Plot for Perceived ICT Barriers Against ICT Adoption	90
Figure 4.34:	Mean Plot for Independent Variables Against ICT Adoption	91

LIST OF APPENDICES

Appendix 1: Questionnaire.....	113
Appendix 2: ICT Technological Changes in Kenya.....	131
Appendix 3: Rotated Component Matrix for Enterprise Characteristics	132
Appendix 4: Rotated Component Matrix for Perceived ICT Attributes	134
Appendix 5: Rotated Component Matrix for External Environmental Factors	137
Appendix 6: Rotated Component Matrix for Perceive ICT Barriers	139
Appendix 7: Stage Model of ICT Adoption and Readiness Issues in SMEs	142

LIST OF ABBREVIATIONS AND ACRONYMS

ADSL	Asymmetrical Digital Subscriber Line
CC-TV	Cross Circuit Television
CEO	Chief Executive Officer
DTI	Department of Trade and Industry
DTV	Digital Television
EASSy	Eastern Africa Submarine Cable Systems
EC	Enterprise Characteristics
EE	External Environment
EU	European Union
GPRS	General Packet Radio Service
ICT	Information Communication Technology
IDT	Innovation Diffusion Theory
ISIC	International Standard Industrial Classification
ISPs	Internet Service Providers
ITU	International Telecommunication Union
KMO	Kaiser-Meyer-Olkin
LAN	Local Area Network
MSMEs	Micro, Small and Medium Enterprises
MSN	Micro Soft Network
OECD	Organization of Economic Cooperation and Development
PC	Personal Computer
PEOU	Perceived Ease of Use
PICTA	Perceived ICT Attributes

PICTB	Perceived ICT Barriers
PU	Perceived Usefulness
ROI	Return on Investment
SEACOM	South and East Africa Communication
SME	Small Medium Enterprises
SN	Social Network
SPSS	Statistical Package for the Social Scientists
TEAMS	The East Africa Marine Systems
TPB	Theory of Planned Behaviour
UK	United Kingdom
USA	United States of America
VAT	Value Added Tax
WAP	Wide Area Protocol

DEFINITION OF TERMS

Small enterprises: - are enterprises that have annual sales turnover of between Kenya shillings five hundred thousand and five million (ROK, 2012).

Information and communication technology:- is an umbrella term that includes any communication device or application, encompassing: television, cellular phones, computer and network hardware and software, satellite systems, various services and applications associated with them (Alam & Noor, 2009).

Technology adoption: - is the decision to make full use of an innovation as the best course of action (Tan et al., 2009).

Perceived ICT attributes: - are based on Roger's five constructs of innovation adoption, which are relative advantage, compatibility, complexity, triability and observability (Rogers, 1983).

Enterprise characteristics: - are enterprise features such as ownership, size, sector, core business activities, years of operation, ICT skill levels of employees, information intensity, availability of resources, entrepreneur's ICT education, gender and age (Manueli et al., 2007).

External environment: - constitutes of external stakeholders that interact with the business for example customers, competitors, technology, suppliers, government and social networks (Harindranath et al., 2008).

Perceived ICT barriers: - are possible causes of not using ICT that may include cost, return on investment, skills, infrastructure, legal and regulatory laws (Kapurubandara & Lawson, 2006).

Formal enterprises: - are enterprises that have are registered with relevant authorities, pay taxes, keeps records, have physical address and separate bank accounts for business and personal (Esselaar et al., 2007).

ABSTRACT

In recent years, there has been increased Information Communication Technology (ICT) advancement in Kenya that provides opportunities for small enterprises to improve their business performance. To get a clear understanding of determinants that influence ICT adoption by formal small enterprises in urban Kenya, this study examined the relationship between ICT adoption and enterprise characteristics, perceived ICT attributes, external environment and perceived ICT barriers. It focused on adoption of four ICT namely E-commerce, Internet social network, computerization of business operations and use of cross circuit television (CC-TV). Prior research focused on either one of them while this study has focused on all of them thus making it unique. Descriptive research approach was used whereby constructs from Rogers' innovation diffusion theory (IDT) and theory of planned behaviour (TPB) formed the basis of hypotheses testing. Questionnaires to collect quantitative data were administered to a random sample of four hundred formal small enterprises in Nairobi, Mombasa, Kisumu and Nakuru. Data was analysed using Statistical Package for Social Sciences (SPSS) programme. Results from the research indicated that different factors influence ICT adoption in different directions and magnitude. Enterprises characteristic influenced adoption by 0.990 times, perceived ICT attribute by 1.015, external environment by 1.06 and perceived ICT barrier by 0.977. It was found that majority of small enterprises owners were youth who possessed skills to adopt new ICT in their business operations. Businesses with balanced gender at top management were found to adopt ICT faster than those owned by men alone. Overall, computerization of business operations topped the list of ICT adoption while use of CC-TV trailed. Entrepreneurs identified high cost, lack of training, lack of perceived benefit, data security and

inconsistency as some of the main barriers to adoption. The study recommends demonstration sites equipped with virtual businesses be set up to enable young entrepreneurs train on effective use of ICT. There should be gender balance at the top management to speedup adoption process. Future research to focus on why there is low CC-TV usage, gender variation in adoption, low ICT diversification and why government intervention did not positively influence ICT adoption by formal small enterprises in urban Kenya.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

This study has focused on determining factors that influence Information Communication Technology (ICT) adoption by formal small enterprises in urban Kenya. Empirical research carried out world-over shows that small enterprises that adopt ICT perform better than those which fail to adopt because of its catalytic effect on business performance. However, ICT adoption is not automatic due to scarcity of resources for example financial, human resource with ICT skills, managerial capability that small enterprises have to deal with on daily basis (Tan et al., 2009).

1.1.1. Small Enterprises

Classification of small enterprises varies from country to country but it is based on the annual turnover and number of fulltime employees. In Kenya small enterprises are classified as those that have annual sales turnover of between Kenya shillings five hundred thousand and five million as contained in the micro and small enterprise bill of 2012 (ROK, 2012). Research carried out by Esselaar, Stork, Ndiwalana, & Deen-Swarra, (2007) found that there SMEs can be classified further into informal, semi formal and formal. Informal enterprises are normally owner operated, does not keep records, are not registered with any authority, has not permanent physical address and engages in business to pay daily expenses. Semi formal enterprises on the other hand have less than 10 employees, may distinguish between business and personal finances, may not keep records and may be registered with authority. Formal enterprises are those that are registered with relevant authorities, pay taxes, keeps records, have physical address and separate bank accounts for business and personal. Esselaar et al.

(2007) argued that future research work should focus on each category separately as they respond differently to changes in the external business environment.

In the developed countries, small and medium enterprises (SMEs) account for more than half of all businesses and over half of all employment (Kazi, 2007). While in most African countries, SMEs account for a significant share of production and employment thus being directly connected to poverty alleviation (Wolf, 2001). The growth of small enterprises is both horizontal and vertical. Horizontal growth is represented by new business entrants and micro enterprises graduating into small enterprises while vertical growth occurs when small enterprises graduated into medium enterprises. This growth is determined by decisions made by entrepreneurs on changes taking place in external and internal business environment (Chibelushi & Costello, 2009). One of such changes has been the rapid revolution of Information Communication Technology (ICT) that provides opportunities and poses threats to small enterprises.

Wolf (2001) found that in the 1990s, many SMEs in East Africa, albeit in a limited scale, started to embrace ICT as a growth intervention tool. Nowadays enterprises are increasingly adopting ICT due to the advent of personal computers and operational effectiveness (Alam & Noor, 2009). Alberto and Fernando (2007) argued that the use of ICT could improve business competitiveness with Internet providing numerous opportunities for SMEs to compete equally with large corporations. Mutula and Brakel (2006) argued that the greatest opportunity for small businesses entrepreneurs would derive from their ability to participate in the regional and international market which can be achieved through ICT adoption.

1.1.2. Information Communication Technology

Information communication technology is a broad term that covers any communication device or application, encompassing: television, cellular phones, computer and network hardware and software, satellite systems, various services and applications associated with them (Alam & Noor, 2009). Emergence of rapid innovation of new technologies has changed the nature and scope of enterprise competitiveness and organizational structure (Tan et al., 2009). This has led to a shift of focus in developed economies away from standardized manufacturing activities toward knowledge-based industries and services (Alberto & Fernando, 2007). The economy of twenty first century is largely driven by knowledge that is available to both entrepreneurs and consumers. This knowledge is because of today's business world being deeply influenced by ICT whose application among businesses is widespread (Alam & Noor, 2009). Adoption of ICT enables organizations to develop innovative products and services, which in turn drives economic growth by transforming yesterday's luxuries into better, cheaper, and more efficient goods and services (Gulbranson, Audretsch & Planck, 2008).

Information communication technology is often lauded as catalysts for development not only for industrialized countries but also for developing countries (Esselaar et al., 2007). The production, diffusion and use of knowledge have become crucial factors for enhancing economic growth, job creation, competitiveness and welfare (Hu & Liu, 2006). The importance of ICT as powerful intervention tool for socio-economic development is now widely acknowledged not only among large corporations but also in small business enterprises (Carbonara, 2005; Mutula & Brakel, 2007; World Bank, 2006).

According to Ongori and Migiro (2010) the evolution of ICT has affected the way businesses operate. First, it has changed the industry structures and altered the

degree of competition. Second, it has created a competitive advantage for the businesses, which have adopted. Third, it has improved business operations by increasing productivity, efficiency of internal business operations and connects SMEs more easily and cheaply to external contacts both locally and globally. Tan, Lin, and Eze (2009) citing International Telecommunication Union (ITU) reported that the number of Internet users continues to grow exponentially with bigger increase reported from users in developing countries. Esselar et al. (2007) looked into the use of ICT and its impact on profitability of SMEs in thirteen African countries. Although the study shows that Africa may have the highest growth rate in mobile telephony, it is of a very low base whereby large numbers of Africans do not have permanent access to basic telephony and very few have access to the enhanced ICT services required for effective participation in the economy and society. The study concluded that high cost of communications services across the continent continues to inhibit uptake by consumers.

1.1.3. ICT Trends in Kenya

A major development that took place in Kenya's ICT was the landing of high speed undersea data cables through SEACOM and TEAMS that went live in the second half of 2009 (Deloitte, 2011). This opened new businesses front in outsourcing that is likely to make Kenya's outsourcing globally more competitive and profitable. In the same year, the passage of ICT Bill in 2009 made provisions for e-commerce and digital signatures, which are necessary for enabling online business transaction in Kenya. At the same time, the ICT Bill provides for a broader range of provisions that will deal with risk areas such as online fraud and piracy of intellectual property. The advent of mobile money transfer pioneered by the market leader, Safaricom limited in 2007 created new business opportunities for e-commerce in Kenya. According to Kenya

economic outlook report of 2011, the mobile money banking has reached the unbanked population and helped in reducing the cost of doing business. The success of the mobile banking is illustrated by the exponential growth of the mobile money transfer services that had an estimated customer base of 13 million in 2010 (Deloitte, 2011).

Another major milestone for ICT in Kenya has been the launch of Digital TV (DTV). DTV that will revolutionize television broadcasting as we know it in the coming years since it's highly efficient and interactive. The opportunity to reach more audiences and reduce the cost of broadcasting will appeal to many businesses operating in this space. Currently, only a few TV networks in Kenya are broadcasting using test DTV signals in Nairobi and other locations in Kenya. Kemebiro (2010) argues that full adoption of DTV will take a good number of years although Kenya is one of the first countries in Africa to adopt the standard. He further argues that although Kenya has over 18 million mobile users and 4 million internet users by the end of 2009, the bulk of digital content accessed is international and not local. These means there are opportunities for the development, distribution and monetization of local content. Another area of significant development has been the way social media moved from the sideline of the mainstream in Kenya to one of the most trafficked internet destination. This trend is only bound to increase as more people blog, use Twitter and Facebook.

1.2 Statement of the Problem

Research carried out by Kenya Industrial Research and Development Institute (KIRDI) in 2006 shows that there is gap between small enterprises and Medium enterprises that suggest few of the small enterprises graduate to the Medium level. While small enterprises generate employment and wealth, majority are unable to grow vertically, thus resulting in the gap (Moturi & Ogada, 2006). It is well acknowledged that without

vertical growth it would be difficult for small enterprises to generate sustainable employment and serve as seedbed for industrialization. In their findings, KIRDI identified five major constraints responsible for the gap one of them being lack of technology advancement.

Although ICT adoption studies constitute a significant area of research within the information systems domain (Fichman, 2000), there continues to be a need for better understanding of the factors that drive or inhibit the adoption and use of ICT within the specific context of SMEs (Caldeira & Ward, 2002; Al-Qirim, 2004; Bharati & Chaudhury, 2006). Desktop literature review carried out by Ongori and Migiro (2010) with a focus on ICT adoption in Kenya concluded that there is a need to carryout empirical research in order to have a holistic view on ICT adoption by SMEs in the country. Other researchers such as Kapurubandara and Lawson (2006); Mutula and Brakel (2006); Ssewanyana and Busler (2007) and Temtime, Chinyoka and Shunda (2003) stated that very few studies about ICT adoption have been carried out in developing countries. According to International Telecommunication Union (2006), entrepreneurs that quickly adopt ICT in conjunction with other changes such as ICT training, structural changes within business models and regulatory adjustments have the largest beneficial impact. This means that ICT is an important ingredient of small enterprises growth because of its positive catalytic effect on business performance.

The Kenyan ICT infrastructure has dramatically changed in the recent years posing both opportunities to businesses that will quickly adopt it and threats to those who fail to adopt. Appendix 2 gives the chronological highlights of these changes and their implications as reported by Kemibaro (2010).The government of Kenya in its sessional paper number 2 of 1992 and sessional paper number 2 of 2005 emphasized the importance of small enterprises growth to the country's economic development.

Further, in 2007 the government of Kenya released its major strategic plan commonly referred to as Vision 2030 where ICT and SME growth have been identified as major driving forces for its realization. These underscore the importance of identifying determinants that lead to ICT adoption by formal small enterprises in urban Kenya.

1.3 Study Objectives

1.3.1. General Objective

To determine factors that influence information communication technology adoption by formal small enterprises in urban Kenya.

1.3.2. Specific Objectives

- i) To determine influence of enterprise characteristics on information communication technology adoption by formal small enterprises in urban Kenya.
- ii) To determine influence of perceived information communication technology attributes on ICT adoption by formal small enterprises in urban Kenya.
- iii) To determine influence of external environment on information communication technology adoption by formal small enterprises in urban Kenya.
- iv) To determine influence of perceived information communication technology barriers on ICT adoption by formal small enterprises in urban Kenya.

1.4 Hypotheses

- i) H_0 : Enterprise characteristics does not influences information communication technology adoption by formal small enterprises in urban Kenya
 H_A : Enterprise characteristics influences information communication technology adoption by formal small enterprises in urban Kenya
- ii) H_0 : Perceived information communication technology attributes does not influences its adoption by formal small enterprises in urban Kenya

H_A: Perceived information communication technology attributes influences its adoption by formal small enterprises in urban Kenya

iii) H₀: External environment does not influences information communication technology adoption by formal small enterprises in urban Kenya

H_A: External environment influences information communication technology adoption by formal small enterprises in urban Kenya

iv) H₀: Perceived information communication technology barriers does not hinder its adoption by formal small enterprises in urban Kenya.

H_A: Perceived information communication technology barriers hinder its adoption by formal small enterprises in urban Kenya.

1.5 Justification of the Study

The rapid technological advancement that has taken place in Kenya provides an excellent opportunity for small enterprises to implement ICT in their business model in order to improve their business performance. The information age we are in dictates that the future survival of businesses will depend on technological innovation and utilization. It is thus important to measure the key factors driving the adoption of ICT and provide appropriate recommendations. This will contribute to the existing knowledge on determinants that influence adoption of ICT by formal small enterprises in urban Kenya. Entrepreneurs will use this information in developing ICT strategies that will enhance their business operations. Other users of the research findings will include ICT board of Kenya, Ministry of Labour, Ministry of Information, Ministry of Industrialization and academic researchers.

1.6 Scope of the Study

The research covered four main towns in Kenya namely: Nairobi, Mombasa, Kisumu and Nakuru. Only formal small enterprises that met Esselaar et al. (2007) classification

of SMEs and were within the Kenyan definition of small enterprises were considered in the study. The ICT adoption in this study focused on use of E-commerce, Internet social networks, computerization of business operations and use of cross circuit-television (CC-TV) for business monitoring and security enhancement.

1.7 Limitations

The research focused on only formal small enterprises in the selected urban towns across Kenya. During data collection, the researcher noted that some of the respondents were too busy to find time to answer the questions ending up taking longer time to fill the questionnaire. To overcome the limitation, the researcher had to make repeat trips and telephone call follow-ups.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Research papers and concept papers in the subject of study were sort from various journals for analysis. This focused on analyzing areas of small enterprise development, technology transfer and commercialization of Information Communication Technology (ICT). As a result, research gaps related to the field of study were identified. Existing ICT adoption theories and models are discussed in this chapter with a view of subsequently offering a strong basis for analyzing and interpretation of key ICT adoption drivers and inhibitors.

2.2 Theoretical Framework

Theories discussed in this section will form the bases for testing hypotheses. They are linked to the conceptual framework.

2.2.1. Innovation Diffusion Theory (IDT)

Innovation diffusion model (see Figure 2.1) was introduced by Rogers (1983) and remains the most popular model in the investigation of the behaviour of users in

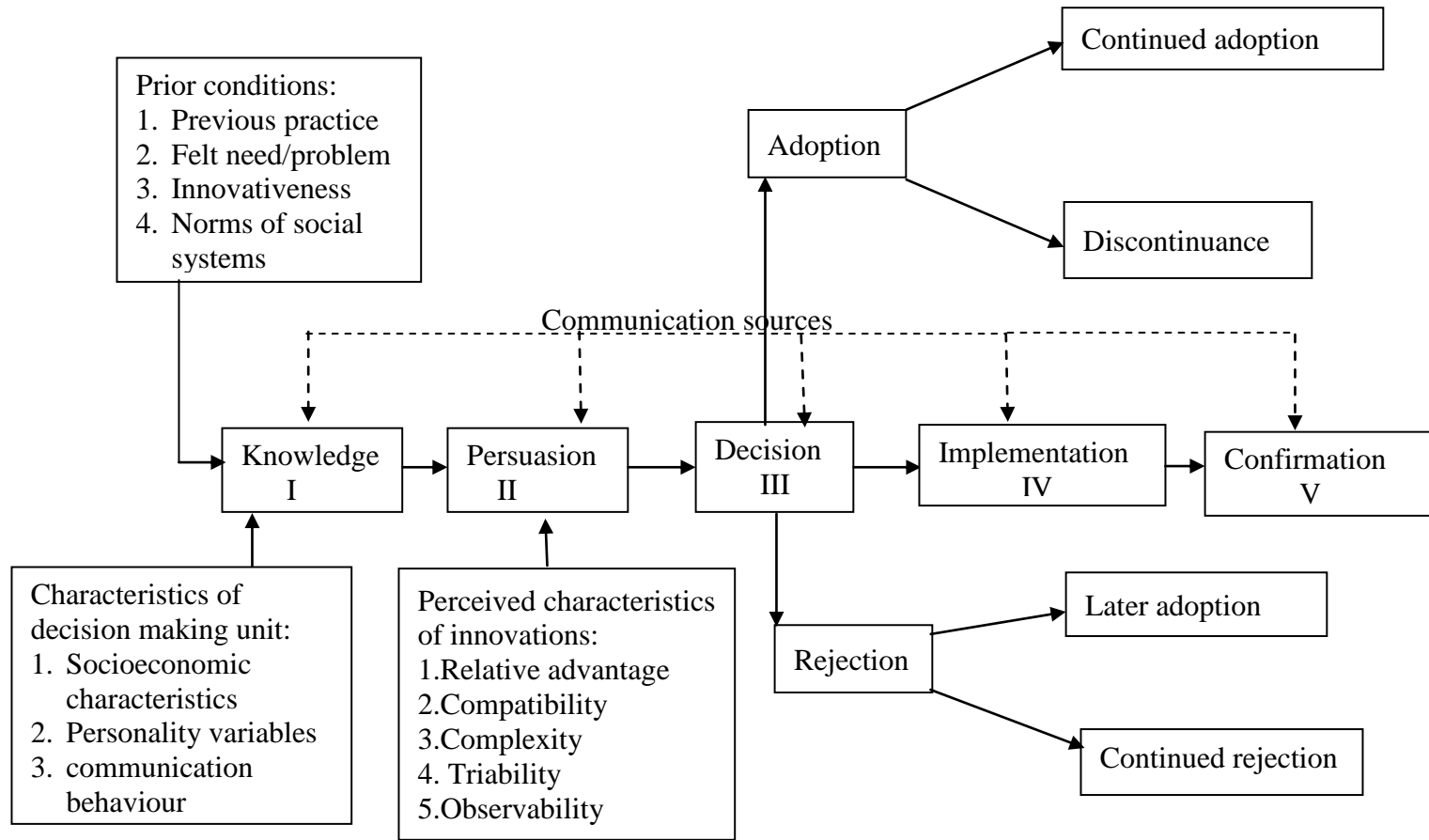


Figure 2.1: Rogers' Innovation Diffusion Model
Source: Rogers (1983)

adopting new technological innovation (Tan et al., 2009). Roger (1983) defines diffusion as a process by which an innovation is communicated through certain channels over a period of time among members of a social system while innovation is an idea, practice or object that is perceived to be new by an individual or other unit of adoption. He further argues that media and interpersonal contacts provide information that influences a person's opinion and judgment. Information filters through the networks and depending on the nature of networks and the roles of its opinion leaders, innovations are either adopted or rejected. Opinion leaders influence an audience through personal contact while intermediaries such as change agents and gatekeepers also contribute to the process of diffusion (Manueli, Latu & Koh, 2007). Roger's work asserts that four main elements that influence the spread of a new idea are: the innovation, communication channels, time, and a social system. These elements work in conjunction with one another. Rogers adds that individuals experience five stages of accepting a new innovation: knowledge, persuasion, decision, implementation, and confirmation. If the innovation is adopted, it spreads via various communication channels. During communication, the idea is rarely evaluated from a scientific standpoint; rather, subjective perceptions of the innovation influence diffusion. The process occurs over time. Finally, social systems determine diffusion, norms on diffusion, roles of opinion leaders and change agents, types of innovation decisions, and innovation consequences.

2.2.2. ICT Adoption

At the decision stage in the innovation-decision process, the individual chooses to adopt or reject the innovation. If an innovation has a partial trial basis, it is usually adopted more quickly, since most individuals first want to try the innovation in their own situation and then come to an adoption decision. The vicarious trial can speed up

the innovation-decision process. However, rejection is possible in every stage of the innovation-decision process. Rogers expressed two types of rejection: active rejection and passive rejection. In an active rejection situation, an individual tries an innovation and thinks about adopting it, but later he or she decides not to adopt it. A discontinuance decision, which is to reject an innovation after adopting it earlier, may be considered as an active type of rejection. In a passive rejection (or non-adoption) position, the individual does not think about adopting the innovation at all. Rogers stated that these two types of rejection have not been distinguished and studied enough in past diffusion research. In some cases, the order of the knowledge-persuasion-decision stages can be knowledge-decision-persuasion. Especially in collectivistic cultures such as those in Eastern countries, this order takes place and group influence on adoption of an innovation can transform the personal innovation decision into a collective innovation decision (Rogers, 2003). In any case, however, the implementation stage follows the decision stage.

At the implementation stage, an innovation is put into practice. However, an innovation brings the newness in which some degree of uncertainty is involved in diffusion. Uncertainty about the outcomes of the innovation still can be a problem at this stage. Thus, the implementer may need technical assistance from change agents and others to reduce the degree of uncertainty about the consequences. Moreover, the innovation-decision process will end, since the innovation loses its distinctive quality as the separate identity of the new idea disappears (Rogers, 2003).

At the confirmation stage, the innovation-decision already has been made, but at the confirmation stage the individual looks for support for his or her decision. According to Rogers (2003), this decision can be reversed if the individual is “exposed to conflicting messages about the innovation” (p. 189). However, the individual tends

to stay away from these messages and seeks supportive messages that confirm his or her decision. Thus, attitudes become more crucial at the confirmation stage. Depending on the support for adoption of the innovation and the attitude of the individual, later adoption or discontinuance happens during this stage. Discontinuance may occur during this stage in two ways. First, the individual rejects the innovation to adopt a better innovation replacing it. This type of discontinuance decision is called replacement discontinuance. The other type of discontinuance decision is disenchantment discontinuance. In the latter, the individual rejects the innovation because he or she is not satisfied with its performance. Another reason for this type of discontinuance decision may be that the innovation does not meet the needs of the individual. So, it does not provide a perceived relative advantage, which is the first attribute of innovations and affects the rate of adoption.

There is a consensus among researchers that IDT is a suitable and valid theory for examining the process of adoption. It is recognized as the only theory which has been used to evaluate adoption on the individual and organizational level (Tan et al., 2009). Looi (2004) suggested that the Rogers' innovation diffusion theory is perhaps the most frequently cited theory in most research on diffusion of innovation. He stated that the theory is considered valuable because it attempts to explain factors that influence adoption of an innovation and the manner in which innovations are disseminated through social systems over time. El-hadary (2001) emphasized that one of the major contributions of IDT is the innovation-decision process, which starts with one's knowledge about the existence of the innovation and ends with the confirmation of the adoption/rejection decision.

Braun (2004) argued that Rogers' innovation diffusion theory analyzed the process of diffusion, and mapped the impact of a combination of social, economic, and

technical forces on the process. Quaddus and Hofmeyer (2006) explained that studies on organizational innovation adoption found that adoption occurs in two stages. The first stage is defined as the initiation stage, which is followed by the implementation phase. In the initiation stage, the organization develops an awareness of the innovation, forms an attitude towards it and evaluates the innovation. The actual adoption decision was found to occur between the initiation and the implementation phases. This model was used to test hypotheses 2, 3 and 4.

2.2.3. Perceived ICT Attributes

Rogers identified five intrinsic characteristics of innovation that influence its adoption. First was relative advantage, which is the degree an innovation is perceived as being superior to its predecessor in terms of economic profitability, low initial cost, a decrease in discomfort, savings in time and effort, and the immediacy of the reward. Gemino, Mackay and Reich (2006) highlighted that relative advantage is expressed by perceived benefits. Aghaunor and Fotoh (2006) elaborated that the perceived benefits by managers include cost savings, income generation, potential opportunities in new markets, marketing and publicity. Gemino et al. (2006) conveyed that research has found that relative advantage is the primary reason for encouraging ICT growth and a positive relationship has been identified between perceived advantages and adoption.

Second was compatibility which is the degree an innovation is perceived as being compatible with existing beliefs, experience and needs of potential adopters. A faster rate of adoption occurs when an adopter perceives an innovation as meeting the needs of the client. Alam, Khatibi, Ahmad and Ismail (2007) stated that an innovation is more likely to be adopted if it is compatible with individual job responsibility and value system. Alam et al. (2007) affirmed that organizations should determine the

needs of their customers and then recommend innovations that fulfil those needs. It is therefore anticipated that as needs are met the adoption will occur.

Third was complexity which is the degree an innovation is perceived as being relatively difficult to understand and use. The perceived complexity of an innovation is negatively related to its rate of adoption. Alam et al. (2007) reported that previous studies on the adoption of innovations indicated that the adoption of complex technologies require organizational personnel to possess sufficient technical competencies.

Forth was trialability which is the degree an innovation can be used on a trial basis before confirmation of adoption occurs. Rogers' (1995) studies found that the trialability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. Alam et al. (2007) suggested that trialability has become an important feature of innovation because it provides a means for prospective adopters to reduce their uncertainties regarding unfamiliar technologies or products.

Lastly was observability which is the degree a potential adopter perceives that the results of an innovation are visible to others. Displaying an innovation's superiority in a tangible form will increase the adoption rate. These innovation characteristics will help the individual to either adopt or reject it at the decision stage.

2.2.4. Theory of Planned Behaviour (TPB)

Ajzen (1985) proposed theory of planned behaviour (TPB) model (see Figure 2.2) which suggested that a person's actual behaviour could be determined by considering their prior intentions along with the beliefs that the person would have for a given behaviour. The intention prior to actual behaviour was referred to as behaviour intentions that could be determined by considering both the attitude that a person has towards actual behaviour and the subjective norm associated with the behaviour in

question. Fishbein and Ajzen (1975) suggested that the attitude towards a behaviour(A) can be measured by considering the sum of the product of all silent beliefs (b) about consequences of performing that behaviour and evaluation(e) of those consequences.

$$A = b * e$$

They defined subjective norm associated with behaviour as the person's perception that most people who are important to him think he should or should not perform the behaviour. Subjective norm (SN), according to them could be measured by considering the sum of the product of a person's normative beliefs (nb) and motivation to comply (mc) i.e. $SN = nb * mc$

Thus behavioural intention (BI) of a person to perform behaviour could be calculated as follows: $BI = A + SN$

It also takes into account additional construct: perceived behaviour control (PBC), which refers to the perception of control over performance of a given behaviour. Perceived behaviour control is influenced by the effects of two beliefs: control beliefs and perceived facilitation. Control beliefs include availability of skills, resources and opportunities while perceived facilitation belief is the individual's assessment of available resources for the achievement of a given set of outcomes. This theory will be used to test hypothesis 1.

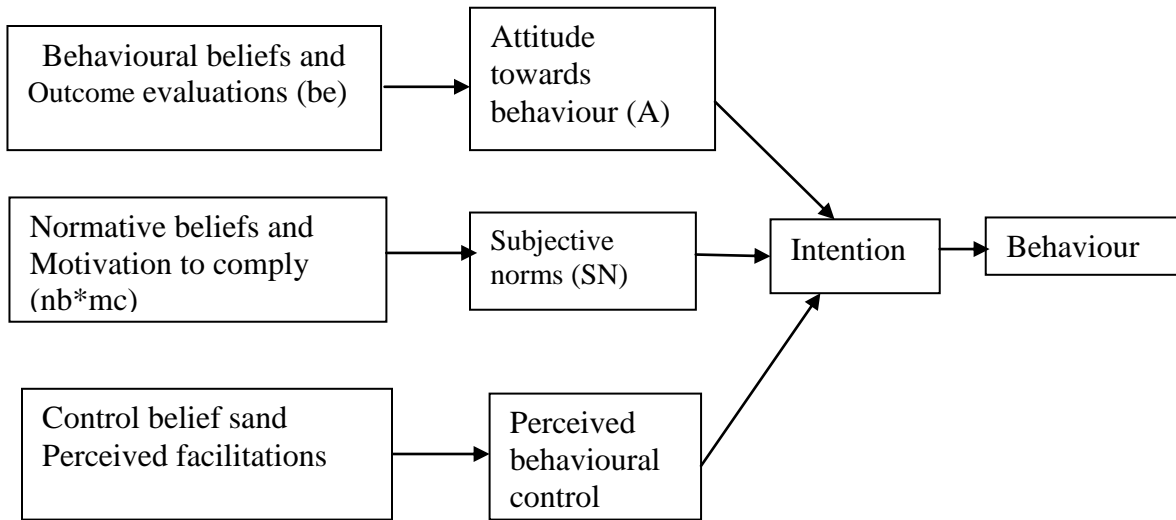


Figure 2.2: Theory of Planned Behavior (TPB)

Source: Mathiason (1991) p. 175 cited by Chuttur (2009) p. 12

2.2.5. Enterprise Characteristics

Previous studies by van Akkeren and Cavaye (1999) cited by Manuel et al. (2007) developed ICT adoption model with three components: entrepreneur characteristics; small enterprise characteristics and return on investment (ROI) as shown in Figure 2.3

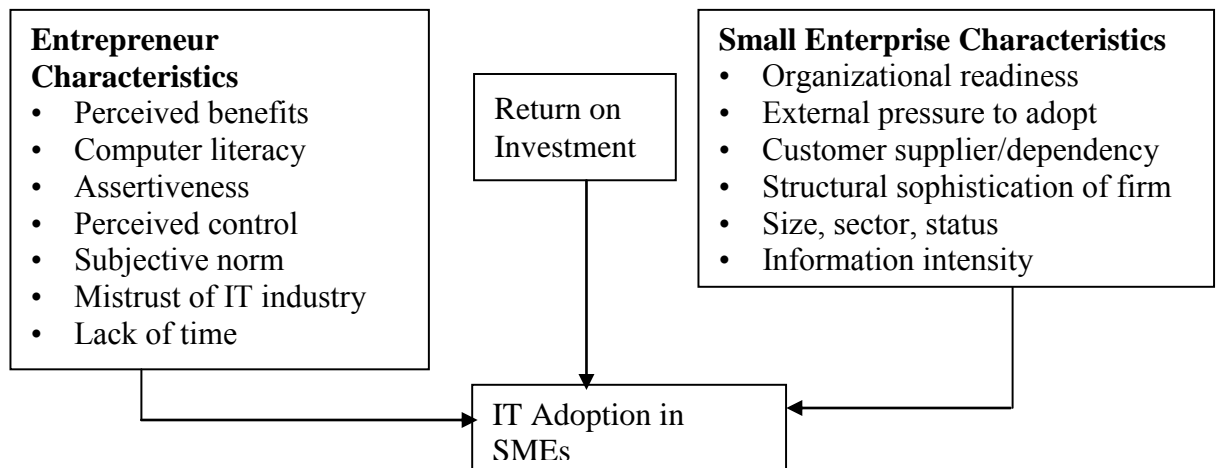


Figure 2.3: Factors Affecting ICT Adoption by SMEs

Source: van Akkeren and Cavaye (1999) cited by Manuelli et al.(2007)

Previous studies indicated that small enterprises that choose not to adopt ICT do so because they may be unfamiliar with the technology and lack organizational readiness (Zappala & Gray, 2006). The enterprise characteristics can be reflected in the size,

type, nature of business as well as ICT expertise and the perceived benefits upheld by management and employees (Gibbs et al., 2007; Manuelli et al., 2007). Change agents for ICT adoption at organizational level may include support and attitude of key decision-makers such as entrepreneurs and chief executive officers (CEO). These key decision-makers have a vital role to play in purchasing, planning and ICT adoption decisions in small businesses. They are expected to have the capacity to respond accordingly to the changing needs of a dynamic business environment .

Existing theories suggested a strong tendency to adopt ICT in small businesses if entrepreneurs and employees have ICT literacy, skills and expertise. Moreover, accesses to internal and external support and motivation from ICT experts are crucial for ICT adoption and business success in SMEs (Windrum de Berranger, 2002). Entrepreneurs viewed as more entrepreneurial, risk-takers, innovative and invariably creative are considered to be critical to the organizational readiness for ICT adoption (Zappala & Gray, 2006; Beckinsale & Ram, 2006). Furthermore, Manuelli et al. (2007) suggested that business actions are driven by the key decision-makers responsible for defining appropriate ICT goals, identifying critical ICT business needs and allocating financial resources to facilitate ICT adoption. Tan, Chong, Lin, and Eze (2010) stressed the unique role of management commitment and perceptions of ICT benefits as an influence in SMEs adoption decision. According to Gray (2006), SMEs planning to invest are also much more likely to provide training and development to their staff and managers. He further suggested that SME entrepreneurs with technical and vocational qualifications are more likely to engage in more innovation activities that include ICT adoption and development of electronic business. In addition, small business owners with appropriate qualifications and ICT skills are more growth-oriented while those without these prerequisite characteristics are more likely to be growth averse.

Further review of literature revealed that age and experience of entrepreneurs are some of the distinctive characteristics that influence on ICT adoption in small businesses (Manueli et al. 2007; Windrum & de Berranger, 2002). In terms of age, the second-generation (youthful) business owners are more likely to be receptive to ICT than their first generation (elderly) counterparts are (Beckinsale & Ram, 2006). Clearly, this view carries an assumption that youthful business owners, born and educated in recent years characterized by advanced technologies and applications in daily activities, have greater awareness of ICT than the elderly generation. However, such studies are mainly looking at Western developed economies and this view may be different in less developed economies such as those found in East African region. According to Gray (2006), resources and capabilities of SMEs, which are both linked to the age and experience of entrepreneur as well as age and size of the firm, are viewed as important attributes for effective innovation and growth.

2.2.6. External Environment

The influence of external pressure from suppliers, customers, competitors, changes in technology and government actions are important predictors that need to be investigated. Researchers have found that trading partners may lead to the entrepreneur perceiving technology as a waste of resources if they have not implemented it (Harindranath et al., 2008). Beckinsale and Levy (2004) identified customers, suppliers, and competitors as sources of information that influence on ICT adoption.

Both industry and government bodies have a role to play in promoting and supporting small business networking through ICT adoption. Alam and Noor (2009) found that government has a significant and strong positive relation to ICT adoption by SMEs. They concluded that due to globalisation of ICT industry, there is a need to understand government's role in contributing to the success of ICT development

Howell and Terziovski (2005) stated that government's primary role is to articulate vision and policy while Smallbone and Welter (2001) argued that direct support measures were not the main role for government. Government is expected to create the framework of conditions for private sector development with a view to supporting their growth and sustainability, particularly in ICT adoption and development of electronic business. A facilitating government works with other stakeholders to leverage resources. In view of these roles, the government is therefore crucial as a standard setting and knowledge dispersing body (Seyal & Rahman, 2003). According to Howell and Terziovski (2005), a weaker SME demand for intervention and support for ICT adoption may indicate that policy-makers are playing more of a leadership role whereas a stronger need for support and ICT access may indicate that policy-makers' role could be more facilitative. If there is a strong demand for ICT in any given business environment, small enterprises and the broader community are likely to adopt ICT.

Social networks of business owners also play a crucial role in driving or inhibiting ICT adoption in SMEs. For example, in communities where culture is viewed as a key factor, particular cultural traits, beliefs and values attached to resources and investment may influence ICT adoption in several different ways (Beckinsale & Ram, 2006; Straub et al., 2002). In addition, the size and type of social structures as well as the nature of social links and preference for personal friendships and contacts (Beckinsale & Ram, 2006) may have positive or negative influence on ICT adoption in SMEs.

Further evidence on social networks (Windrum & de Berranger, 2002) suggested that trust and external company culture are also considered as important factors that can influence SME entrepreneurs' decisions to use their social networks as

sources of business information, knowledge acquisition and adoption of ICT. In addition, increased network density and interconnectivity within network externalities are widely viewed as vital in influencing small businesses to adopt ICT (Gibbs et al., 2007). Given the importance of key decision-makers in ICT adoption decisions at organizational level, it is therefore crucial for entrepreneurs to recognize possible links and partnerships in their social networks (Gibbs et al., 2007; Manuelli et al., 2007; Braun, 2004) as these can bring opportunities and successful ventures.

In terms of positive influence, social networks are crucial to small business owners for sharing information, business experience and technical knowledge especially if the SMEs are experiencing resource constraints that inhibit ICT adoption (Gray, 2006). Increased ICT adoption and connectivity might be expected to help in developing absorptive capacity and reduce the traditional constraints on the ability of SMEs to innovate, while leveraging their flexibility and responsiveness (Gray, 2006). Internet and website adoption, for example, may help SMEs to participate in useful business and social linkages without a strong need for spatial proximity (Gray, 2006).

2.2.7. Perceived ICT Barriers

Large organizations have enough resources to adopt ICT while SMEs have limited financial and human resources. Kapurubandara and Lawson (2006) categorized internal and external barriers that impede adoption of ICT by SMEs in a developing country. The internal barriers include entrepreneur characteristics, firm characteristics, cost and return on investment, and external barriers include infrastructure, social, cultural, political, legal and regulatory. Duan et al. (2002) identified lack of human capital with ICT skills and knowledge as one of the major challenges faced by all European countries, particularly in the UK, Poland and Portugal.

Lal (2007) investigating adoption of ICT by Nigerian SMEs, found that one of the major factors inhibiting ICT diffusion and intensive utilization was poor physical infrastructure. According to literature, other barriers depend on various factors within a country and the level of support that is directed towards the small enterprise sector, increasing growth on inflation rates, interest rates that make it difficult for entrepreneurs to restore their eroding capital and limited access to institutional finance and technical assistance.

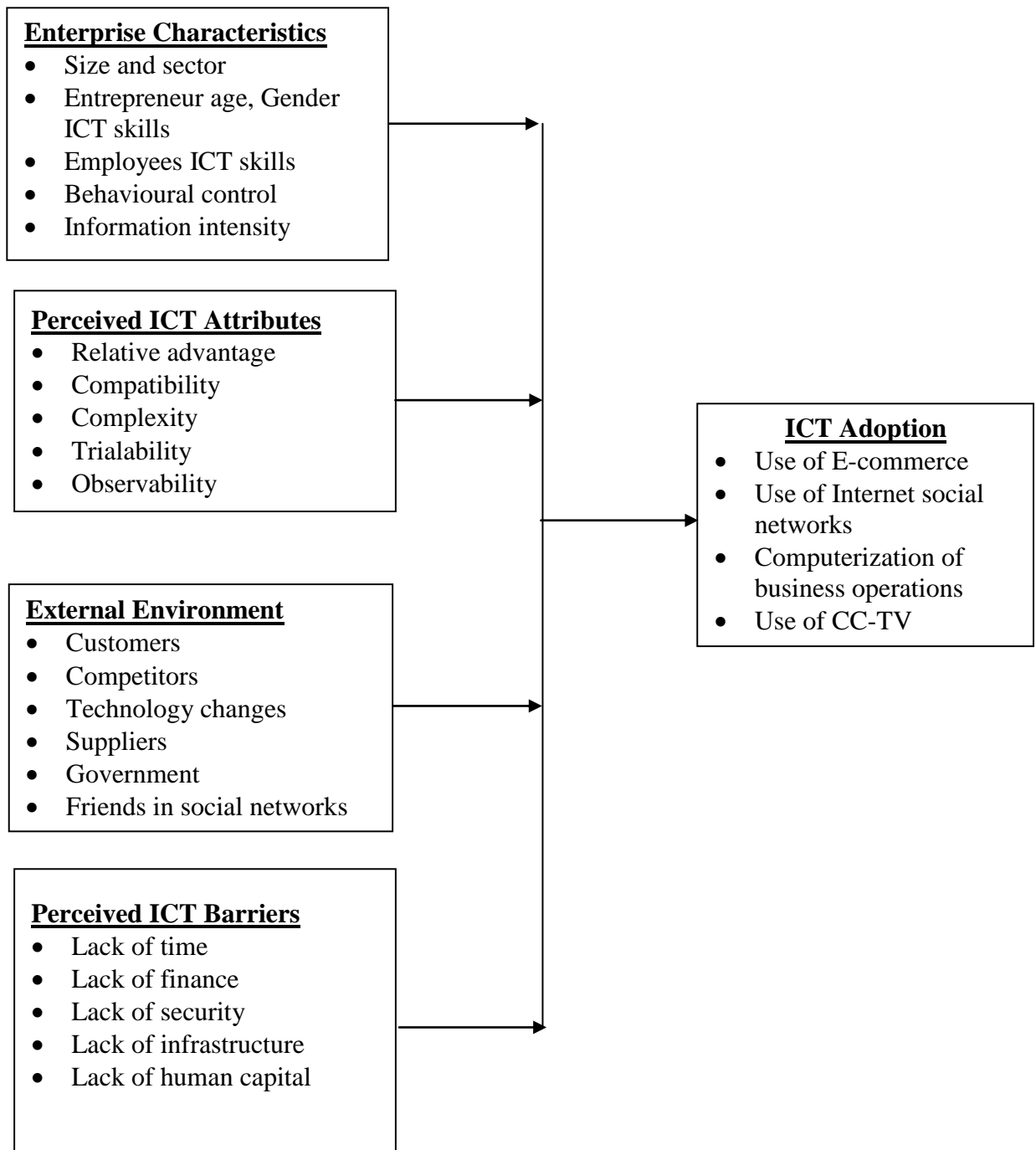
Due to scarce financial resources available to entrepreneurs, large expenditure must be justified by return on investment thus for ICT adoption to take place, future cash-inflows will be an important factor. Cost factor was studied by various ICT adoption researchers (Esselaar et al., 2007; Seyal & Rahim, 2006) found direct and significant relationship between cost and adoption of technology. SMEs will less likely adopt ICT when its initial set-up cost is high (Dixon, Thompson & McAllister, 2002). It appears that small enterprises face specific problems in the formulation of their innovative strategies due to their limited resources and range of technological competencies. The lower the cost of adoption the higher the innovation will be adopted by the company and vice versa.

Duncombe and Heeks (2001) survey on USA SMEs found that 90 % of the surveyed SMEs indicated lack of finance and skills as the main constraints for organization to utilize ICT. They found out that some of the SMEs could not afford to buy a computer or make efficient use of it in the short or even medium term. ICT is only useful if it can be easily be acquired and used. The key obstacle identified by SMEs towards greater possession and use of ICT is its cost. van Akkeren and Harker (2003) argues that return on investment (ROI) is critical for SME's short to medium-term survival thus heavy investment on ICT must be approved by the entrepreneur. The

high cost of ICTs in Africa has been attributed to policy choices that have limited competition, and the absence of regulatory capacity to regulate abuse of market dominance in wholesale and retail pricing (Gillwald, 2005; Gillwald & Esselaar, 2004).

2.3 Conceptual Framework

The conceptual framework for this study depicts the relationship between dependant variable, ICT adoption and four independent variables namely enterprise characteristics, perceived ICT attributes, external environment and perceived ICT barriers as show in Figure 2.4. These variables are contained in the research specific objectives and the hypotheses to be tested. The conceptual framework contains constructs based on theoretical review mainly innovation diffusion theory, theory of planned behaviour and ICT adoption model developed by Akkeren and Cavaye (1999).



Independent variables

Dependent variables

Figure 2.4: Conceptual Framework

2.4 Review of Important Literature

2.4.1. SME Classification on Formality

Studies by Esselaar et al. (2007) shown that small enterprises can be classified further into informal, semi-formal and formal as shown in Table 2.1

Table 2.1: SMEs Classification on Formality

SME	Characteristics
Informal	<ul style="list-style-type: none">-No employees i.e. owner operated-Does not distinguish between business and personal finances-Does not keep records- Is not registered with any authority-Engages in business activities to pay daily expenses
Semi-Formal	<ul style="list-style-type: none">-Less than 10 employees-May not distinguish between business and personal finances-May not keep records-May not pay taxes-May not be registered with any authority
Formal	<ul style="list-style-type: none">-Has between 10 and 49 employees-Keeps records-Has separate bank accounts for business and personal-Pays taxes-Is registered with required authorities-Has physical address and contacts details

Source: Esselaar et al. (2007) p. 89

Esselaar et al. (2007) argued that formal small enterprises are fundamentally different from informal ones in Africa. A formal small enterprise pays taxes, is more likely to export and often its included in the official database while semi-formal businesses remain below the radar screen, does not pay taxes may keep records and does not form part of official database. Informal enterprises on the other hand sell or produce anything that might make money in contrast to the formal ones that have a tendency to concentrate on a single product or set of products. Based on this classification, this study focused on formal small enterprises.

The formal small enterprises are more likely to experience several ICT adoption and implementation challenges given their relatively small sizes; simple structures; shortage of resources and lack of capacity to view ICT strategically (Beckinsale & Ram, 2006). Such distinctive characteristics may bring in other factors that tend to inhibit ICT adoption by small enterprises. According to Manuelli et al. (2007) business size is important in determining the structure and internal ICT requirements for operations. In terms of information intensity, existing theories suggested that SMEs that handle large amounts of information are likely to adopt ICT solutions to improve efficiency, effectiveness and competitiveness (Windrum & de Berranger, 2002; Manuelli et al., 2007).

2.5 Empirical Review

2.5.1. Perceived ICT Attributes

Reviewed literature shows that the greater the benefits perceived by the entrepreneur, the higher the possibility of ICT adoption. Thus perceived benefits are some of the factors that could affect ICT adoption in an enterprise. Giovanni and Mario (2003) found that ICT is able to offer enterprise a wide range of possibilities for improving their competitiveness such as provide mechanisms for getting access to new market opportunities and specialized information services. According to Beckinsale and Ram (2006), perceived benefits of ICT adoption often include focus on improving business efficiency, operational effectiveness and the need to reach out for new markets and opportunities. Organization for Economic Co-operation and Development (OECD) (2004) found out that ICT offers improved information and knowledge management that includes increased speed and reliability of transactions for both internal and external transactions, real-time information access and immediate customer feedback. According to Beckinsale and Ram (2006), the perceived benefits of ICT adoption often

include focus on improving business efficiency; operational effectiveness and the need to reach out for new markets and opportunities.

Tan and Teo (2000) conducted an online survey on online newsgroups on factors influencing adoption of Internet banking using constructs from the theory of planned behaviour and IDT model. All IDT characteristics were used except for observability because it was considered irrelevant. Privacy and security were added as additional dimensions. The multiple linear regression results indicate that relative advantage, compatibility with respondents' values, trialability, experience, needs and risk factors influenced the adoption of Internet banking. Teo and Pok (2003) also conducted an online survey on the adoption of the new wireless application protocol (WAP) enabled mobile phones among Internet users. The IDT model was used along with theory of reasoned action, technology acceptance model and theory of planned behaviour. Only two constructs of IDT- relative advantage and compatibility were used. Relative advantage was found to significantly correlate with WAP-enabled mobile phone adoption.

Limthongchai and Speece (2003) studied E-commerce adoption among owners, presidents and chief executive officers (CEOs) of SMEs in Thailand using IDT. Together with the five IDT characteristics, security was added. Relative advantage, compatibility, security and observability were positively correlated to the rate of E-commerce adoption while complexity recorded a negative correlation. Compatibility emerged as the most important factor. The respondents argued that E-commerce is still insecure and lacks confidentiality. On the other hand, Slyke et al. (2004a) investigated the impact of trust as a factor that influences web-based shopping in three public North American universities. They modified the IDT model (for example, observability was divided into result demonstrability and visibility) and included three constructs on trust

in web merchants, image and voluntaries. Perceived compatibility was found to have the strongest impact on user intention, followed by perceived complexity, relative advantage, and image. Trust in web merchants was found to be a significant predictor but not as strong as the three perceived innovation characteristics.

Syed et al. (2005) investigated perceived benefits of E-commerce adoption in Malaysian electronic manufacturing companies. The study discovered that major factors affecting the adoption of E-commerce in Malaysia include Internet communication costs, easy links with suppliers and customers, tool for future business, time barriers omission and global presence. Similar studies were conducted by Hussin and Noor (2005) used IDT to explore the willingness of Malaysian SMEs in adopting E-commerce among the CEOs or managers of Malaysian SMEs. Relative advantage, observability, and complexity were found to be significantly related to E-commerce adoption. Trialability and compatibility were insignificant. Descriptive statistics revealed that security of payment and virus ranked highest in the list of barriers to E-commerce adoption. Trialability and compatibility were found to be significant while relative advantage was found to be the most important factor.

However, although there are many perceived benefits that have been made available through ICT adoption, there are still many small enterprises that are not taking advantage of ICT. Therefore, perceived benefits are taken into consideration as one of the factors that affects ICT adoption in small enterprises. In the literature on innovation, it is often assumed that an innovation is either adopted or not adopted by individuals or organizations depending on their motivations and beneficial expectations (Iyanda & Ojo, 2008).

2.5.2. Enterprise Characteristics

Zappala and Gray (2006) investigated factors that distinguish small business adopters and non-adopters of ICT and confirmed the importance of organizational support of key decision-makers such as entrepreneurs in ICT adoption process. Other key organizational characteristics that influence ICT adoption include presence of early adopters and access to financial resources. Slyke et al. (2004b) conducted a survey on the influence of culture on consumer-oriented E-commerce adoption in universities in four countries; India, Hong Kong, China, and the USA. They generated a model with seven constructs namely relative advantage, compatibility, ease of use, result demonstrability, image, trust, and computer-based media support index. Culture, trust, perceived relative advantage, compatibility, (ease of use) and result demonstrability were all significant. Perceived image was not significant.

In the area of gender, Slyke et al. (2005) adopted the IDT to understand gender-based differences in consumer E-commerce adoption. Trust and ease of use were added as two important constructs. Their findings acknowledged the existence of gender differences in influencing E-commerce adoption. Their findings indicate that emphasis on relative advantages and result demonstrability can attract men's attention while visibility of E-commerce may be more effective in drawing women. Perceived compatibility and visibility has greater impacts for women. No difference was found for perceived ease of use and web merchant trustworthiness.

Irrespective of the approach used, Zappala and Gray (2006) argued that the key decision-makers such as entrepreneurs need to be personally ready for ICT adoption that can take them to the next stages in the process of adoption. Accordingly, they defined ICT adoption readiness as the psychological and practical point at which an individual is prepared to proceed to the next stage determined by a particular mix of

experience, capabilities, resources, education, age, peer pressure, business imperatives, motivation and circumstance. Researchers argue that none of the models alone adequately explains or predicts the adoption of ICT by small firms. Therefore, other distinctive behavioural characteristics of small enterprises such as size, structure, type of industry and business operations need to be considered in explaining ICT adoption in small firms (Manueli et al., 2007).

2.5.3. External Environment

Adoption of the ICT enables businesses to compete on a global scale, with improved efficiency, and closer customer and supplier relationships (Chong, Pervan, & Bauer, 2001). Some empirical studies by Harindranath, Dyerson, and Barnes (2008); Dedrick, Gurbaxani, and Kraemer (2003); Kohli and Devaraj (2003) confirms the positive effect of ICT on firm performance in terms of productivity, profitability, market value and market share. Their study also reveals that ICT has some effect in terms of intermediate performance measures, such as process efficiency, service quality, cost saving, organization and process flexibility and customer satisfaction.

2.5.4. Perceived ICT Barriers

Wymer and Regan (2005)'s study of SMEs from the United States of America (USA) emphasised cost as the major determining factor for ICT adoption. Swedish research points towards SMEs engaging in E-commerce in an evolutionary rather than a revolutionary manner, with SMEs changing the way they conduct business only very slowly (Eriksson & Hultman, 2005). Research into electronic commerce adoption amongst New Zealand SMEs shows that unless there are strong driving factors there was a marked reluctance to commit scarce resources to perceived risky ICT initiatives (Al-Qirim, 2006). In the USA, Bharadwaj and Soni (2007) found that a major reason for enterprises not engaging in E-commerce was their perception that it was not

strategically important for them. SMEs are often constrained by the lack of skills, managerial capabilities, as well as the scarcity of internal and external relationships such as skilled personnel, partner organisations and networks that enable them to exploit ICT strategically (Ritchie & Brindley, 2005; Stroeken, 2001).

2.6 Literature Critique

Gray (2006) observed that SMEs oriented towards competition and growth may lack the resources and personal capabilities to adopt ICT and manage growth successfully. This contradicts findings by Tan et al. (2009); Alam and Noor (2009) who argued that ICT adoption was necessary for SMEs growth. Manuelli et al. (2007) argued that little or no technology use reflects low ICT readiness and a strong reluctance for ICT adoption. They further suggested business size as key in determining the structure and internal ICT requirements for the operations. In terms of information intensity, the existing theories suggested that SMEs that handle large amounts of information are more likely to adopt ICT solutions in order to improve efficiency, effectiveness and competitiveness (Windrum & de Berranger, 2002; Manuelli et al., 2007).

Smallbone, and Welter (2001) research on ICT adoption by SMEs in Ukraine, Belarus and Moldova, suggested that many enterprises could be set up, survive and even grow without government direct intervention. They attributed this to the commitment and creativity of entrepreneurs in mobilizing resources and flexibility in adapting to hostile external environments. This is a short-term measure as argued by Alam and Noor (2009) that the impact of government policies and initiatives has been shown to have direct stimulation to the supply of information, which produces faster technology adoption.

Literature reviewed in chapter two reveals that majority of the researchers have focused their study on use of internet as a measure of ICT adoption. ICT is a broad

term that covers hardware, software, satellite systems, various services and applications thus inclusion of other forms of ICT in a study would give a more comprehensive picture of the adoption.

2.7 Summary

From the systematic review of distinctive behavioural characteristics of small firms and the existing theories and models of technology adoption, it is clear that the development of a theoretical framework, which integrates the most common ICT adoption attributes in SMEs, is still an ongoing process. In this view, various researchers have focused on hybrid systems involving innovation diffusion theory, theory of reasoned action, theory of planned behaviour and technology acceptance model. In view of the theories and models discussed, this study was carried out using constructs from Roger's innovation diffusion theory mainly relative advantage, compatibility, complexity, trialability, and observability and behavioural control construct from theory of planned behaviour for testing hypotheses.

2.8 Research Gaps

Tan et al. (2009); Alam and Noor (2009) suggests that future studies should include SMEs in diverse geographical location and in different sectors in order to capture diversity influence on ICT adoption. Tan et al. (2009) further suggests future research to include more variables such as benefits, barriers, types of ICT applications, organizational culture, individual characteristics of entrepreneurs, and environmental characteristics for example government policies and network infrastructure that might affect ICT adoption. Mpofu et al. (2008) suggests future work to include use of quantitative methods in empirical research that may be concerned with investigation of the interrelationships between identified key ICT adoptions attributes in SMEs. Desktop literature review carried out by Ongori and Migiro (2010) with a focus on ICT

adoption in Kenya concludes that there is a need to carryout empirical research in order to have a holistic view on ICTs adoption by SMEs in the country. Other researchers such as Kapurubandara and Lawson (2006); Mutula and Brakel (2006); Ssewanyana and Busler (2007); Temtime, Chinyoka and Shunda (2003) stated that very few studies about ICT adoption have been carried out in developing countries.

Therefore, this study seeks to fill these gaps by collecting data from formal small enterprises located in different geographical locations. The enterprises will cut across various business sectors in order to make the study holistic. While prior research mainly focused on the five characteristics of an innovation (relative advantage, compatibility, complexity, trialability and observability) in determining adoption decisions, this study has broadened the variables to include enterprise characteristics, ICT attributes, external environment and perceived barriers. In order to give a more comprehensive picture of ICT adoption in Kenya by form small enterprises, this study will use four ICT services (e-commerce, Internet social network, computerization and use of CC-TV) as a measure of its adoption.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter is organized to cover sections on research design, population and sampling techniques, data collection instruments, pilot test, data processing and analysis, data reliability and validity and finally conclusion. Each of these sections is discussed in relation to research specific objectives and hypotheses being tested.

3.2 Research Philosophy

The research philosophy used was positivism where hypotheses were generated using existing theories and tested through data analysis. It involved descriptive studies to establish relationship between dependant variable ICT adoption by formal small enterprises and four independent variables as shown on the conceptual framework. Survey strategy was used to help test the four hypotheses of this study. According to Saunders and Lewis (2009) survey is a popular and common method in business and management research and is mostly frequently used to answer who, what, where, and how questions. In addition, survey design allows for collection of large amount of data from a sizeable population in a highly economical way. Quantitative data collection using questionnaires was carried out in the urban towns of Nairobi, Mombasa, Kisumu and Nakuru. The duration of the data collection was from 22nd November 2011 to 31st January 2012 hence the study is cross-sectional in nature. Similar previous studies used the same design (Alam & Noor, 2009; Tan et al., 2009; Bagchi & Udo, 2007; Harindranath, et al., 2008).

3.3 Study Population

Population of the study comprised all formal small enterprises in urban towns of Kenya who are registered by Kenya Revenue Authority (KRA) as active payers of value added tax (VAT) and have an annual sales turnover of between Kenya shillings five hundred thousand and five million. The classification of small enterprises used in this study is that of Esselaar et al. (2007) discussed under Section 2.2.2 in Table 2.1 and Kenya micro and small enterprises bill 2012. Under the new Kenyan law, firms with an annual turnover of below five hundred thousand Kenya shillings and employing less than ten people are classified as micro enterprises while those with an annual turnover of between five hundred thousand Kenya shilling and five million and employing between ten and fifteen people are classified as small enterprises. A total of two 2008 small enterprises met this criteria and were used as the sample frame.

3.4 Sampling Technique

The sample size selected for the study was four hundred respondents randomly selected from Nairobi, Mombasa, Kisumu and Nakuru as shown in Table 3.1. The distribution of the questionnaires were based on the proportion of small enterprises in the KRA database. Saunders and Lewis (2009) and Sekaran (2003) argues that a sample size of 322 is enough for a population of 2,000 at 95% confidence level and 5% margin of error for the results to be generalized.

Table 3.1: Questionnaires Distribution

Town of operation	No. of questionnaires	Percentage of the total
Nairobi	200	50.0%
Mombasa	100	25.0%
Kisumu	50	12.5%
Nakuru	50	12.5%
Total	400	100.0%

Previous studies used similar sample size for example, Alam and Noor (2009) used 400, Tan et al (2009) used 406, Harindranath et al. (2008) used 378 while Esselaar et al. (2007) used 280.

3.5 Data Collection Procedures

The respondents were contacted by the researcher and introduced to the questionnaire. Since entrepreneurs are very busy people, a period of four weeks was given for them to answer the questions. Post-paid envelopes with the researcher's postal address were left so that once the questionnaires were filled they could be posted. Contact mobile number and email address of the researcher was given to the respondents for any clarification. Follow up telephone calls were made after two weeks and at the end to the four weeks to find out if the questionnaires were posted and to thank them for participating in the research. This approach ensured a response rate of 56% as opposed to the average response rate of 30% recommended by Saunders and Lewis (2009). Other researchers such as Alam and Noor (2009); Bagchi and Udo (2007); Harindranath, et al. (2008) and Tan et al. (2009) have used similar data collection procedure in similar studies.

3.5.1. Instruments

A questionnaire developed by the researcher was used (see Appendix 1) to collect data. It consisted of six sections and a total of fifty nine questions that were answered by the entrepreneurs for an estimated time of sixty minutes. Previous studies by Harindranath et al. (2008) used a questionnaire with six sections and a total of seventy four questions that took thirty to forty minutes to fill using telephone survey method

3.6 Pilot Study

In order to establish face validity of the questionnaire, it was subjected to a pre-test by carrying out survey on fifteen respondents in Nakuru who were similar to the final study respondents. The pilot test revealed that the research needed to focus on particular ICT thus Section B of the questionnaire was narrowed from twenty questions to four questions focusing on e-commerce, Internet social networks, computerization of business operations and use of CC-TV. The independent variable section of the questionnaire was also revised in order for the variables to be tested for each of the four areas of ICT. Finally, four open-ended questions were included where respondents could provide additional information on the ICT adoption. This provided additional insight that was helpful in explaining quantitative results.

3.6.1. Reliability

Reliability refers to the extent to which data collection techniques and analysis procedures will yield similar findings by other observers. The measurement of reliability provides consistency in the measurement of variables. Internal consistency reliability is the most commonly used psychometric measure assessing survey instrument and scales (Zhang, Waszink, & Wijngaard, 2000). Cronbach alpha (α) is the basic formula for determining the reliability based on internal consistency (Kim & Cha, 2002). The standard minimum value of alpha is 0.7 recommended by Nunnally (1978)

and Malhotra (2004). Constructs used in this study were tested for internal consistency reliability where values greater than 0.7 indicated presences of a strong internal consistency in the measurement.

3.6.2. Sampling Adequacy Test

Kaiser-Meyer-Olkin (KMO) test on sampling adequacy was carried out to determining if the sampling was adequate to yield distinct and reliable factors. Kaiser (1974) cited by Field (2005) recommends accepting values greater than 0.5. Field (2005), citing Hutcheson and Sofroniou (1999), states that values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values above 0.9 are superb. Since the analysis did not involve determination of correlation, Bartlett test was not carried out.

3.6.3. Test of Construct Validity

Validity is concerned with whether the findings will really be about ICT adoption. To be able to determine this, a factor analysis was conducted in order to develop factors that help in explaining the role of the constructs in ICT adoption. The principal axis factoring method with varimax rotation was performed on the questions to insure good construct validity. Previous studies by Tan et al.(2009) used the same method which has been widely accepted as a reliable for factor analysis (Alexander & Colgate, 2000). A loading of 0.30 and above was used as argued by other researchers such as Hair, Anderson, Tatham and Black (1998); Norman and Streiner (1994). Extraction was done by specifying four factors to be extracted since the study involved four independent variables as advocated by Field (2005).

3.7 Data Processing and Analysis

The dependant variable, ICT adoption data was coded as 1 or 0 for adoption or non-adoption respectively while data from independent variables was coded using a five-

point Likert scale that were converted into category weights for each respondent. By use of SPSS, descriptive statistics as well as inferential statistics were generated. The statistical significance of the overall logistic regression model was tested using chi-square's likelihood ratio test and Wald test while individual regression coefficients was tested using Wald chi-square statistics. Goodness-of-fit statistics were generated to assess fit of the logistic model against actual outcomes. Predicted probabilities were validated using actual outcome to determine if high probabilities are indeed associated with events and low probabilities with non-events.

3.7.1. Conversion of Likert Scale into Category Weights

The conversion was done by determining the frequency distribution of all respondents by categories for each item. Since no two attitude statement are exactly the alike, it was anticipated that no two frequency distribution would be exactly alike. If for example a response to a particular question had the following frequency distribution:

Strongly disagree = 0.10, disagree= 0.40, uncertain= 0.25, agree= 0.15 and strongly agree= 0.1 the conversion into category weight followed five steps as follows:

i) Cumulate class frequencies:

SD	D	UC	A	SA
0.100	0.500	0.750	0.900	1.000

ii) Divide sample class frequency by 2:

0.050	0.200	0.125	0.075	0.050
-------	-------	-------	-------	-------

iii) Subtract these have class frequencies from the cumulated frequencies obtained in (i) above:

0.050	0.300	.625	.825	.950
-------	-------	------	------	------

iv) Convert the cumulative proportions obtained in © above to normal deviates by referring to a table with cumulative proportions:

-1.645	-0.524	0.319	0.935	1.645
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v) Make all values zero or positive by adding appropriate constant:

0.000	1.121	1.964	2.580	3.290
-------	-------	-------	-------	-------

These five values in e) were the assigned to the persons within the respective categories for example anybody who agreed to the question was coded in SPSS 2.580 instead of 4.

3.7.2. Statistical Model of Analysis

The research involved testing hypotheses about the relationship between categorical outcome dependant variable, ICT adoption, and four continuous independent variables. Thus logistic regression model was used in the analysis. Peng, Lee, and Ingersoll (2002) citing other researchers, argue that from early 1980s, logistic regression has become more popular for analysing statistical data with binomial distribution given its availability in statistical packages such as SPSS.

The central mathematical concept that underlies logistic regression is the logit: the natural logarithm of an odds ratio (Peng et al., 2002). According to Peng et al. (2002) logistic regression is well suited for describing and testing hypotheses about relationships between a categorical outcome variable and one or more categorical or continuous predictor variables.

The following logical model was tested using Wald chi-square χ^2

$$\text{Logit (Y) = natural log (odds) = } \ln \frac{\pi}{1-\pi} = \alpha + \beta X \quad (1)$$

$$\pi = \text{probability(Y= outcome of interest | X = x, a specific value of X)} = \frac{e^{\alpha+\beta x}}{1+ e^{\alpha+\beta x}} \quad (2)$$

where π is the probability of the outcome of interest in this case ICT adoption, α is the Y intercept, β is the regression coefficient of the independent variable and $e = 2.71828$ is the base of the system of natural logarithms. X can be categorical or continuous, but Y is always categorical. According to equation 1, the relationship between logit (Y)

and X is linear. Yet, according to equation 2, the relationship between the probability of Y and X is nonlinear. For this reason, the natural log transformation of the odds in equation 1 is necessary to make the relationship between a categorical outcome variable and its predictor(s) linear. The value of the coefficient β determines the direction of the relationship between X and the logit of Y. When β is greater than zero, larger (or smaller) X values are associated with larger (or smaller) logits of Y. Conversely, if β is less than zero, larger (or smaller) X values are associated with smaller (or larger) logits of Y. Within the framework of inferential statistics, the null hypothesis states that β equals zero, or there is no linear relationship in the population. Rejecting such a null hypothesis implies that a linear relationship exists between X and the logit of Y. If a predictor is binary, then the odds ratio is equal to e, the natural logarithm base, raised to the exponent of the slope β (e^β).

$$\text{Logit (Y)} = \ln \left(\frac{\pi}{1-\pi} \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Therefore,

$$\pi = \text{Probability (Y= ICT Adoption | } X_1 = x_1, X_2 = x_2, X_3 = x_3, X_4 = x_4)$$

$$= \frac{e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4)}}{1 + e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4)}}$$

where π is the probability of the event, ICT adoption, α is the Y intercept, β s are regression coefficients, and Xs are a set of predictors i.e. X_1 = enterprise Characteristics X_2 = perceived ICT attributes, X_3 = external environment, X_4 = perceived ICT barriers. α and β s are typically estimated by the maximum likelihood (ML) method, which is preferred over the weighted least squares approach by authors, such as Heberman

(1978) and Schlesselman (1982). The ML method is designed to maximize the likelihood of reproducing the data given the parameter estimates. The null hypothesis underlying the overall model states that all β s equal zero. A rejection of this null hypothesis implies that at least one β does not equal zero in the population, which means that the logistic regression equation predicts the probability of the outcome better than the mean of the dependent variable Y. The interpretation of results is rendered using the odds ratio for both categorical and continuous predictors.

3.7.3. Independent Sample T-Test

The independent sample t-test is suitable when examining the nature of two variables at a time with an eye towards answering the basic question: on whether the two variables are related. It compares the mean scores of two groups and assesses the statistical significance of the difference between them (Landau & Everitt, 2005). It is appropriate for analyzing data in this research as we seek to understand how the various variables affect adoption of ICT. It is used to test the null hypothesis that the means of two populations are the same. An alternate hypothesis is that the means of the two groups are significantly different.

3.8 Ethical Issues

The researcher carried out the study following strict ethical standards that included none disclosure of the respondent's identity, data collected was only used for research purposes and last but not the least data generated and analysed was from the respondents. The researcher cited and referenced source of information used in the study and was fully involved during the entire research period.

CHAPTER FOUR

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter discusses research findings for the data collected from four urban towns of Kenya namely Nairobi, Mombasa, Kisumu and Nakuru. It is divided into nine sections covering response rate, data reliability, factor analysis, background information of the enterprises, dependant variable ICT adoption and the four independent variables of the information communication technology adoption.

4.2 Response Rate

Questionnaire response rate from all the towns in the study were over 50% as shown in Table 4.1. The overall response rate was 56%, which is higher than the average response rate of 30% for survey research recommended by Saunders and Lewis (2009).

Table 4.1: Questionnaire Response Rate

Location of Enterprise	No. of Questionnaires Given out	Questionnaires Returned	Percentage Response
Nairobi	200	102	51 %
Mombasa	100	54	54 %
Kisumu	50	32	64 %
Nakuru	50	36	72 %
Total	400	224	56 %

Research papers reviewed showed that the response rate varies a lot as shown in Table 4.2. Thus the response rate of 56% was within the current range.

Table 4.2: Survey Response Rate by Other Researchers

Researchers	No. of Questionnaires Given out	Questionnaires Returned	Percent Response
Alam and Noor (2009)	400	193	48.25 %
Ssewanyana and Busler (2007)	143	110	76.92 %
Mutula and Brakel (2007)	159	55	34.5 %
Chiwere and Dick (2008)	398	232	58.29 %

Location of towns in the study cut across Kenya as shown in Figure 4.1. This coupled by over 50% response rate is an indication that the sample was representative of small formal urban enterprises in Kenya.



Figure 4.1: Map of Kenya Showing Location of the Towns and Response Rates

4.3 Data Reliability

Reliability refers to the extent to which data collection techniques and analysis procedures will yield similar findings by prior researchers. Measurement of reliability provides consistency in the measurement of variables. Internal consistency reliability is

the most commonly used psychometric measure assessing survey instrument and scales (Zhang, Waszink, & Wijngaard, 2000). Cronbach alpha (α) is the basic formula for determining the reliability based on internal consistency (Kim & Cha, 2002). Constructs used in this study were tested for internal consistency reliability using Cronbach alpha (α) test as depicted in Table 4.3. According to Nunnally (1978) and Malhotra (2004) the standard minimum value of alpha is 0.7. Thus the values of 0.918, 0.926, 0.959 and 0.978 are sufficient confirmation of data reliability for the four independent variables.

Table 4.3: Cronbach Alpha Test for Independent Variables

Independent Variable	Number of Items	Cronbach Alpha
Enterprise Characteristics	40	0.918
Perceived ICT Attributes	48	0.926
External Environment	40	0.959
Perceived ICT Barrier	48	0.978

4.3.1. Sampling Adequacy Test

Kaiser-Meyer-Olkin (KMO) test on sampling adequacy was carried out to determine if the sampling was adequate to yield distinct and reliable factors. Kaiser (1974) cited by Field (2005) recommends accepting values greater than 0.5. Results in Table 4.4 indicate that the sampling was adequate for all the four variables hence factor analysis was appropriate.

Table 4.4: Kaiser-Meyer-Olkin (KMO) Test

	Enterprise Characteristics	Perceived ICT Attributes	External Environment	Perceived Barrier
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.770	0.794	0.665	0.800

4.3.2. Test of Construct Validity

Validity is concerned with whether the findings will really be about ICT adoption. To be able to determine this, factor analysis was conducted in order to develop factors that help in explaining the role of the constructs in ICT adoption. The principal axis factoring method with varimax rotation was performed on the questions to ensure good construct validity. Previous studies by Tan et al. (2009) used the same method which has been widely accepted as reliable for factor analysis (Alexander & Colgate, 2000). A loading of 0.30 and above was used as argued by other researchers e.g. Hair, Anderson, Tatham and Black (1998); Norman and Streiner (1994). Extraction was done by specifying four factors to be extracted since the study involved four independent variables as advocated by Field (2005).

Factor analysis results in Appendices 3, 4, 5 and 6 indicate that factors related to use of E-commerce, Internet social networks, computerization of business operations and use of CC-TV for business monitoring were selected for the four independent variables of the study. According to Field (2005), factor analysis is an exploratory tool and should only be used to help the researcher to make various decisions for example on variables to include in the regression analysis. Based on the results all the factors will be used in subsequent analysis since they all loaded above 0.30.

4.4 Background Information

4.4.1. Business Registration

Majority of the enterprises are registered as limited companies (66%) while sole proprietorship and partnership constituted 16% and 18% respectively as shown in Figure 4.2. This could be attributed to the fact that limited companies have limited liabilities hence cushioning the entrepreneurs in case of bankruptcy or other business risks.

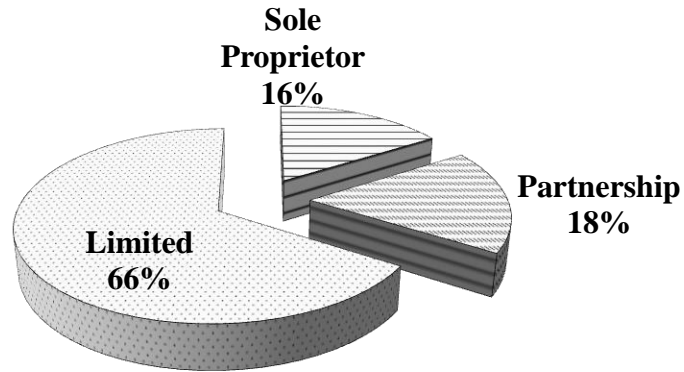


Figure 4.2: Business Registration

4.4.2. Year of Business Inception

The study found that 54% of small enterprises were started between year 2000 and 2009 as shown in Figure 4.3. This corresponds with the growth of country's gross domestic product (GDP) from 0.3% in 2002 to 7.1% in 2007 (*Kenya Economic Survey, 2011*). According to Deloitte report on Kenya economic review 2011, this was against the background of macroeconomic stability, increased credit to private sector, low inflation pressure and improved weather conditions (Deloitte, 2011). Additionally, majority of the business that started as small enterprises from 1960 to 1989 may have grown vertically into medium enterprises or have died out hence the low percentages.

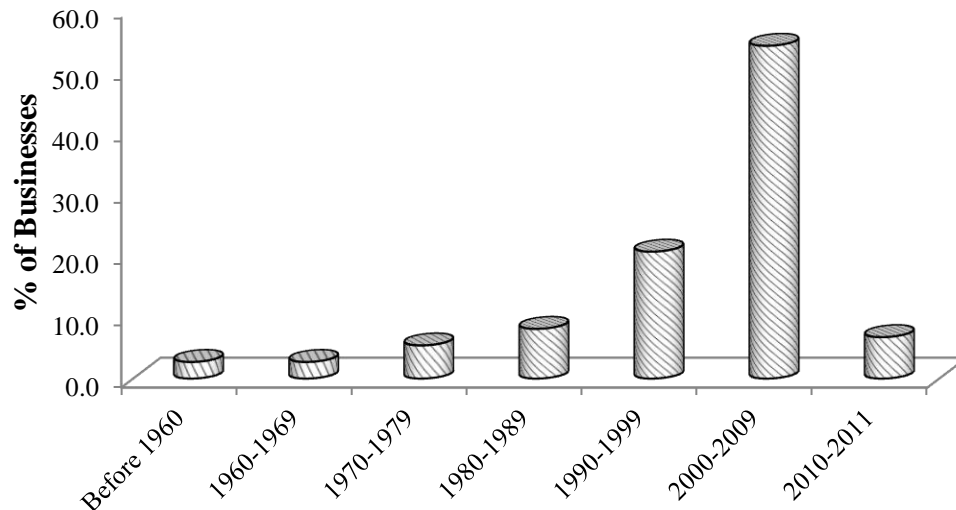


Figure 4.3: Year of Business Inception

4.4.3. Core Business Sector

The researcher found out that 19.6% of the enterprises are engaged in supply of office equipment that ranges from furnisher to computers and other ICT related items as depicted in Figure 4.4. This could be due to demand from new businesses that started from the year 2000. Business consultancy services are also on demand as reflected by the 12.5% of small enterprises engaged in it. Of all the small enterprises surveyed, only 4.5% are engaged in manufacturing possibly due to the high cost of fixed assets needed in production processes. Overall, the results shows that the sample taken includes all major sectors thus, making it representative of the population of small formal enterprises in urban Kenya.

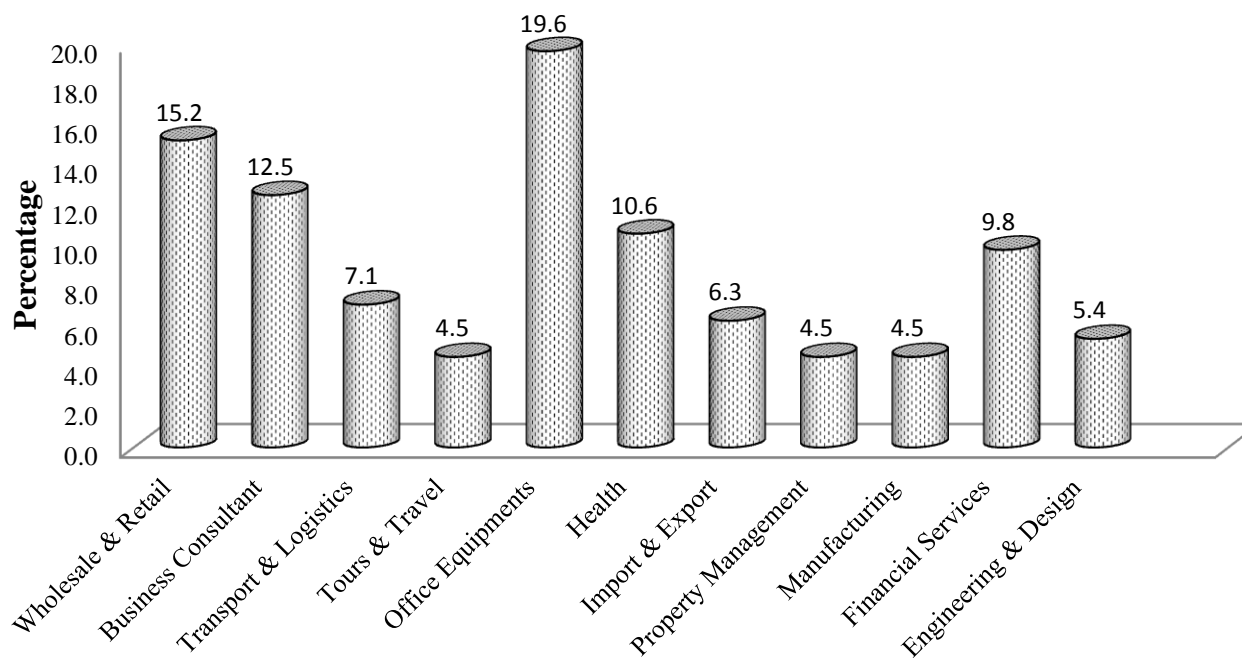


Figure 4.4: Core Business Sector

4.5 Adoption of ICT

Since ICT is a very broad field, the study sought to investigate four main areas of adoption namely: Use of E-commerce in sale or purchase of products/services online;

Use of Internet social networks such as Facebook, Twitter, Yahoo Messenger, MSN Messenger and Skype in marketing, customer service and information gathering; Computerization of business operations i.e. networked computers through which business transactions are generated; Lastly use of Cross Circuit-Television (CC-TV) which is a series of cameras mounted in and around the business premises connected to television set for business monitoring and security.

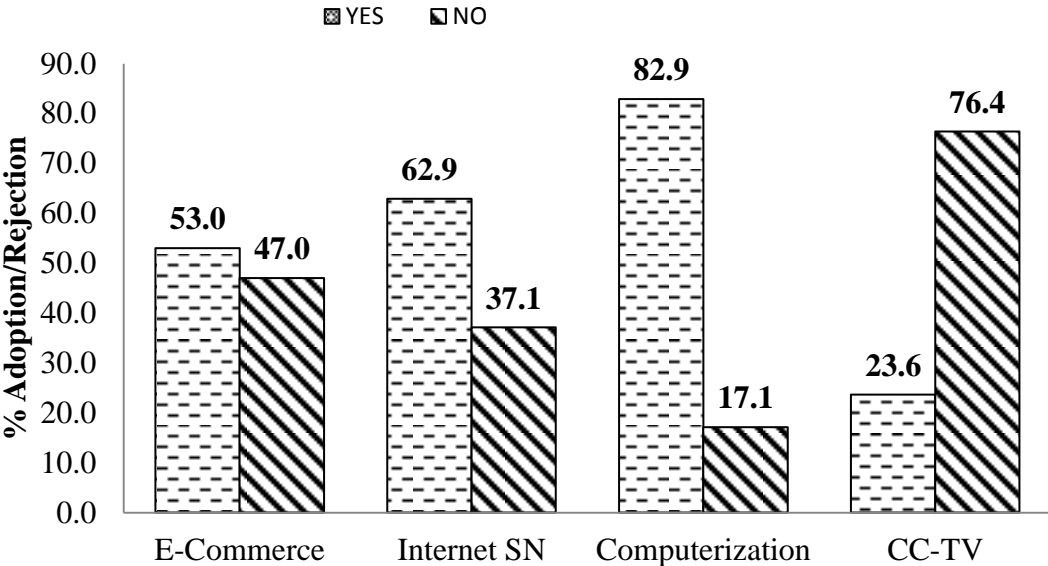


Figure 4.5: Overall ICT Adoption by Small Enterprises

4.5.1. Duration of ICT Adoption

Among the four areas of ICT adoption investigated, computerization of business operations topped the ICT adoption with 82.9% usage followed by Internet social networks 62.9%, use E-commerce 53.0% while use of CC-TV trailed with 23.6% as shown in Figure 4.5. Based on these findings and by using Zappala and Gray (2006) stage model of ICT adoption, it appears that majority of small enterprises in urban Kenya are in intermediate stage of ICT adoption (see Appendix 7). Small enterprises that have adopted ICT have done so in the last seven years with a peak in the last 2 to 4 years as depicted in Figure 4.6. This is could be attributed to improved Internet

communication due to the landing of three fiber optic cables in 2009, approval of ICT media bill in 2009 among other changes detailed by Kemibaró (2010) in Appendix 2.

The analysis showed that enterprises not using any form of ICT were 18, those using only one were 206, those using two were 163, those using three were 102 while those using all the four ICTs were 19 out of the 224 respondents. This indicates that 92% of the small enterprises are using one form of the ICT, which is a step in the right direction towards ICT diversification.

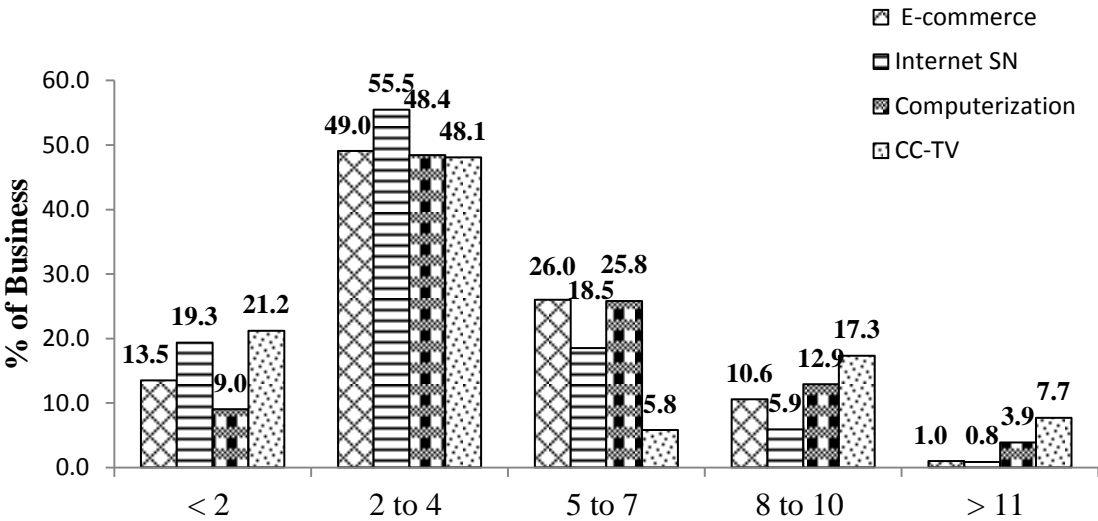


Figure 4.6: Number of Years of ICT Usage

4.5.2. Reasons for not Adopting ICT

The study found that enterprises that are not using E-commerce sighted inconsistency with business needs (37.1%) as the major reason of not using it followed by no perceived benefit (22.5%). This confirms Bharadwaj and Soni (2007) findings in USA that the major reason for enterprises not engaging in E-commerce is their perception that it is not strategically important for them. Majority of the entrepreneurs who are not using it indicated that their businesses required physical interaction with the customers and suppliers.

In the case of Internet social networks, 29% singled out inconsistency with business as the major cause of not using it with a number sighting possibility of employees misusing it through online chatting with friends. Lack of training (27.5%) was also highlighted as a reason of not adopting Internet social network. Small enterprises that had not computerized their business operations sited no perceived benefit and lack of data security (22.5% and 15.0% respectively) as the main reasons they had not adopted it. Majority of the respondents who are not using CC-TV indicated that the small physical size of their businesses did not warrant its use. They also cited inconsistency with business needs, costs of implementation, and no perceived benefit (32.9%, 27.5% and 24.8%, respectively) as the main reasons of not adopting CC-TV as shown in Figure 4.7.

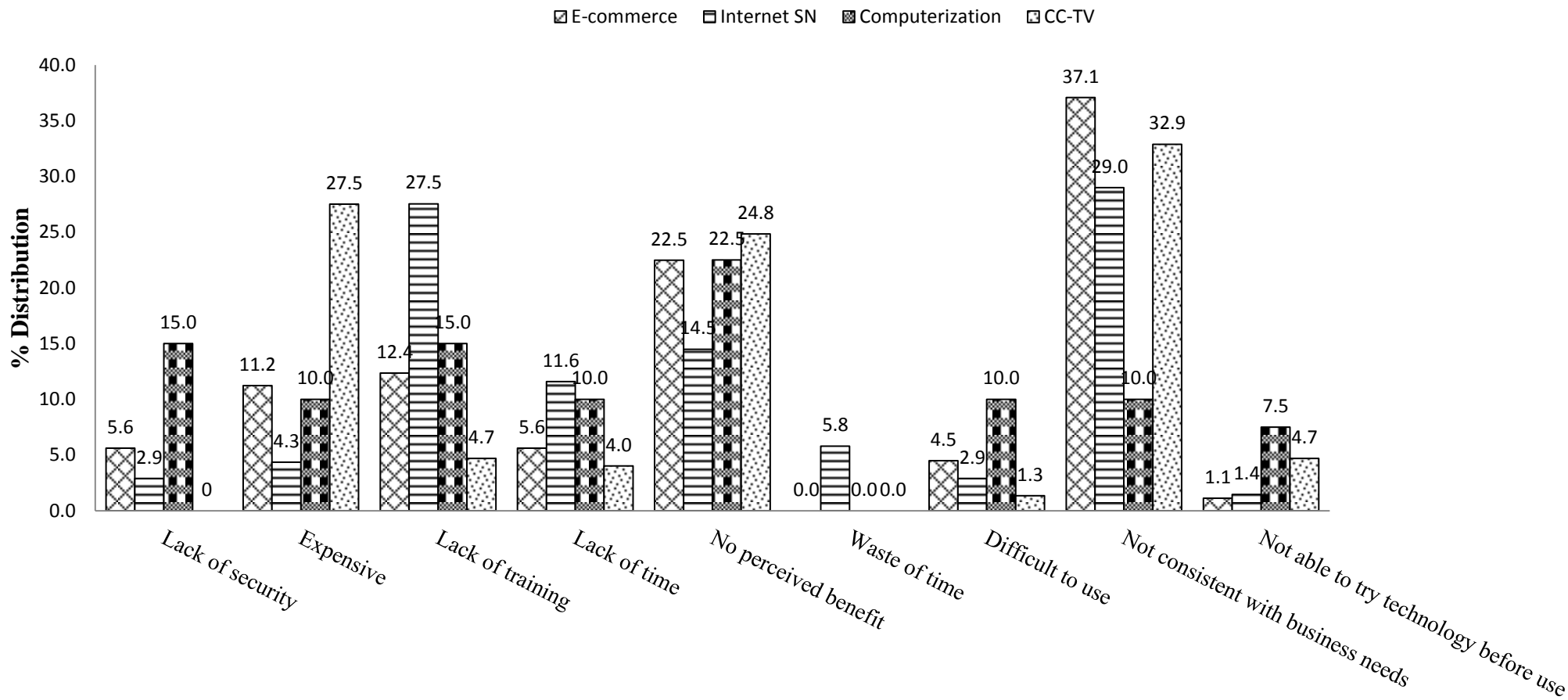


Figure 4.7: Reasons of not Using ICT

4.6 Enterprise Characteristics

In this section, enterprises characteristics were established by analysing data related to entrepreneur(s) age bracket, enterprise size in terms of number of branches and annual sales turn-over, entrepreneur's level of ICT education, gender, entrepreneur's view on employees level of ICT skills, use of ICT specialists, need for regular training, setting of ICT strategy and last but not the least importance of ICT in relation amount of data processed. The results of the analyses are discussed in subsequent sections.

4.6.1. Age Bracket of the Entrepreneurs

The results of the study shows that 58.5% of the entrepreneurs are between 20 to 45 years old (see Figure 4.8). These findings are supported by previous research by Backinsale and Ram (2006) and Manuelli et al. (2007) who found that youthful business owners below 45 years old are more likely to take up ICT than older ones. The reason could be due to the fact that youthful business owners are educated in recent years characterized by advanced technologies and applications in daily activities hence have greater awareness of ICT than elderly once.

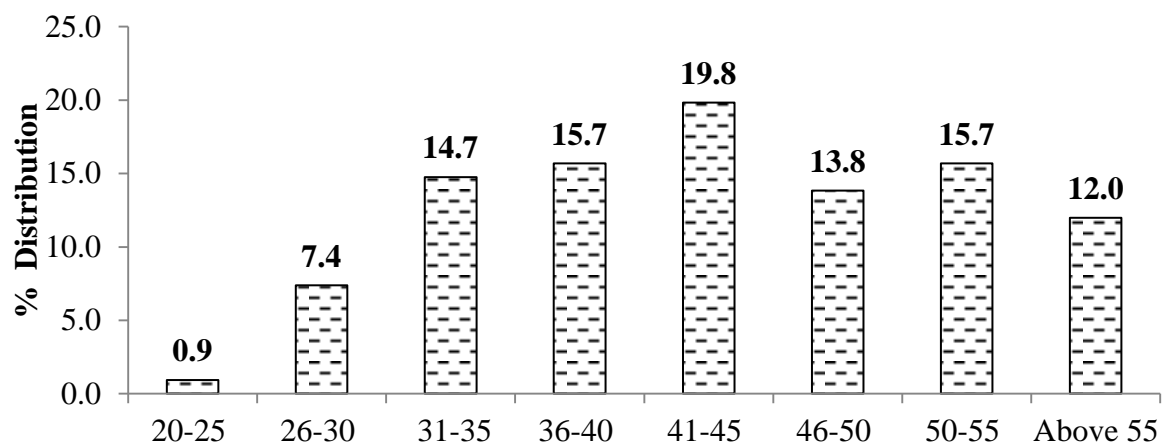


Figure 4.8: Entrepreneur's age in Years

4.6.2. Enterprise Size in Terms of Branches

As shown in Figure 4.9, 68.3% of small enterprises have only one branch meaning that vertical growth has not taken place.

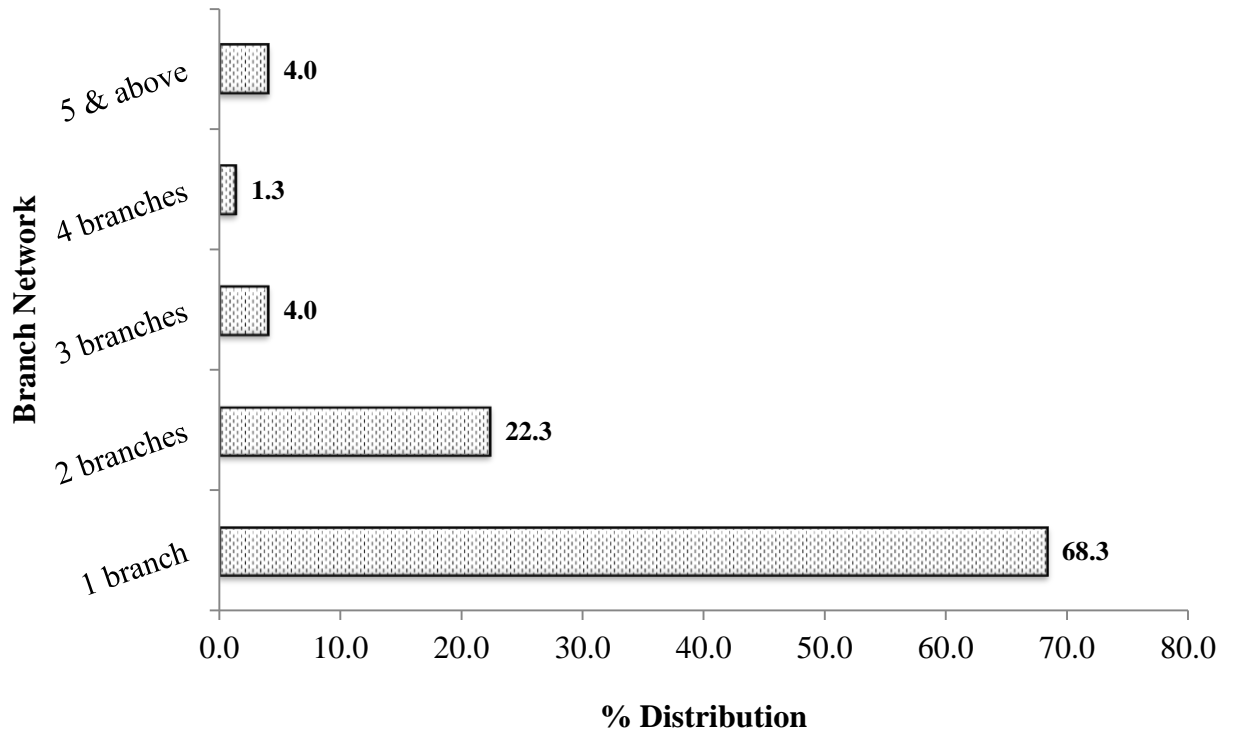


Figure 4.9: Business Branches Network

4.6.3. Enterprise Size in Terms of Annual Sales Turnover

The results indicate that 57.6% of enterprises had annual sales turnover of between 4.1 and 5.0 million Kenya shillings as shown in Figure 4.10. The trend shows that most of small enterprises with lower annual sales turnover have not registered with KRA leading to low percentages of those sampled.

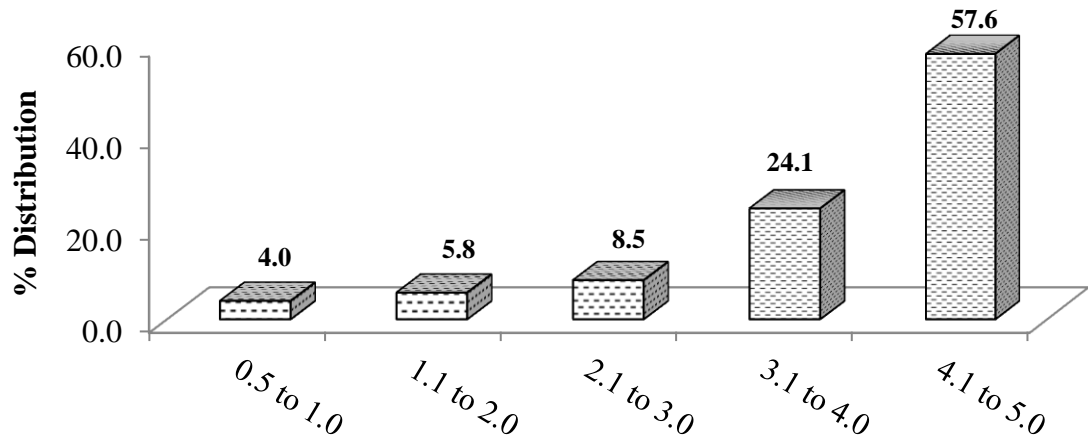


Figure 4.10: Annual Sales Turn-over (Million-Kenya Shillings)

4.6.4. Entrepreneur's ICT Level of Skills

The survey found that majority of the entrepreneurs had basic ICT skills (44.4%) and 50.9% had undergone formal ICT training for instant, have certificate and above as depicted in Figure 4.11.

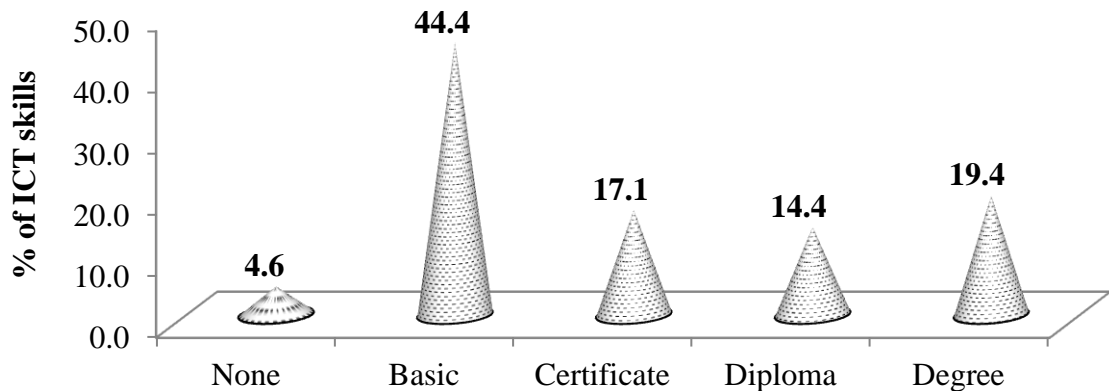


Figure 4.11: ICT Level of Education of the Entrepreneurs

The cross tabulation results in Table 4.5 indicates that the higher the level of ICT education of the entrepreneur, the higher the likelihood of adoption of E-commerce, Internet social network and computerization of business operations. However, the trend was not observed in the case of CC-TV. Mutua and Wasike (2009) had similar results

where they found that a manager with some training in ICT was likely to influence adoption of ICT in a firm.

Table 4.5: Level of ICT Education and ICT Adoption

ICT		Entrepreneur's ICT Level of Skills				
		None	Basic	Certificate	Diploma	Degree
Use E-commerce	No	6(75%)	55(59%)	17(36%)	7(24%)	13(31%)
	Yes	2 (25%)	39 (41%)	20(54%)	23(76%)	29(69%)
Use of Internet Social Networks	No	10(100%)	43(45%)	17(46%)	5(16%)	5(12%)
	Yes	0(0%)	52(55%)	20(54%)	26(84%)	37(88%)
Computerization	No	4(40%)	27(28%)	2(5%)	3(10%)	2(5%)
	Yes	6(60%)	69(72%)	35(95%)	28(90%)	40(95%)
Use of CC-TV	No	6(60%)	76(79%)	28(76%)	23(74%)	29(72%)
	Yes	4(40%)	20(21%)	9(24%)	8(26%)	11(28%)

4.6.5. Enterprise Owner(s)

The researcher found that 75% of the enterprise owners are male while only 12% are female. Businesses co-owned by both male and female entrepreneurs constitute 13% of the businesses surveyed as indicated in Figure 4.12.

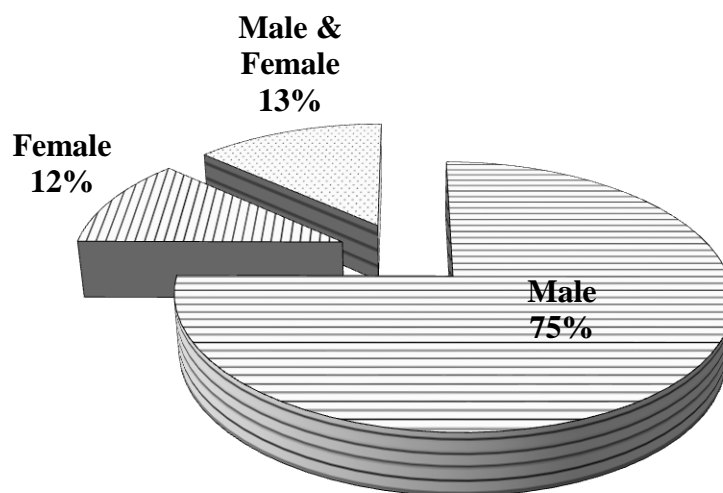


Figure 4.12: Enterprises Ownership

Results in Table 4.6 shows that enterprises owned by women were more likely to adopt E-commerce, Internet social network and computerization of business operations, 76%, 88% and 84% respectively as opposed to men owned enterprises, 48.7%, 61.1% and 82.8%. However, in the case of CC-TV, men owned enterprises were more likely to adopt (33.9%) than women owned (4.0%). As expected the adoption by business co-owned by both male and female falls between the percentages of business purely owned by men or women. In the area of gender, Slyke et al. (2005) acknowledged the existence of gender differences in influencing E-commerce adoption. Their findings indicated that emphasis on relative advantages and result demonstrability can attract men's attention while visibility of E-commerce may be more effective in drawing women.

Table 4.6: Relationship Between owner(s) Gender and Type of ICT Adopted

		Business Ownership			
		Male	Female	Male & Female	%Total
Use E-commerce	No	81(51%)	6(24%)	13(45%)	47%
	Yes	77(49%)	19(76%)	16(55%)	53%
Use of Internet social network	No	63(39%)	3(12%)	14(48%)	37%
	Yes	99(61%)	22(88%)	15(52%)	63%
Computerization of business operations	No	28(17%)	4(16%)	6(21%)	17%
	Yes	135(83%)	21(84%)	23(79%)	83%
Use of CC-TV	No	121(66%)	24(96%)	19(68%)	76%
	Yes	41(34%)	1(4%)	9(32%)	24%

4.6.6. Entrepreneur's View on Basic ICT Skills

In order to gauge the level of importance entrepreneurs placed on having ICT skilled labour force, they were asked five questions as illustrated in the Tables 4.7, 4.8, 4.9, 4.10 and 4.11. The results in Table 4.7 indicates that the entrepreneurs strongly felt it is important to have employees with basic skills in E-commerce, Internet social networks

and computerization of business operations as evident from high percentages of over 80% for both important and very important. However in the case of use of CC-TV for business monitoring and security, only 55.5% felt the same which may have a bearing in the low adoption of CC-TV (see Figure 4.5).

Table 4.7: Entrepreneur’s View on Need to Have Employees with Basic ICT Skills

Level of Importance	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
% Not Important	0.9	1.8	0.9	12.8
% Least Important	0.9	7.8	0.0	10.4
% Uncertain	7.3	10.0	0.9	21.3
% Important	36.5	35.6	25.1	35.1
% Very Important	54.3	44.7	73.1	20.4
% Total	100.0	100.0	100.0	100.0

4.6.7. Entrepreneur’s View on Advanced ICT Skills

The results in Table 4.8 indicates that the entrepreneurs strongly felt it is important to have employees with advanced skills in E-commerce and computerization of business operations as evident from high percentages of over 80% for both important and very important. However in the case of use of Internet social network, 64.3% felt the same while in the use CC-TV for business monitoring, only 41.8% felt the same. This drop in the felling of entrepreneurs on need to have employees with advanced skills in Internet social network and CC-TV may imply that they think basic skills are enough to carry out their business functions.

Table 4.8: Entrepreneur’s View on Need to Have Employees with Advanced ICT

Level of Importance	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
% Not Important	0.9	5.5	0.9	12.7
% Least Important	3.3	7.3	2.3	19.7
% Uncertain	13.1	22.8	5.5	25.8
% Important	41.1	30.1	35.6	22.1
% Very Important	41.6	34.2	55.7	19.7
% Total	100.0	100.0	100.0	100.0

4.6.8. Entrepreneur’s View on Having Internal ICT Specialist

The study found that entrepreneurs felt it was important to have internal specialist in E-commerce and computerization of business operations as evident from percentages 69.3% and 77.8% for both important and very important in Table 4.9. However in the case of use of Internet social network, only 52.5% felt the same while in the use CC-TV for business monitoring and security, only 42.7% felt the same.

Table 4.9: Entrepreneur’s View on Need to Have Internal ICT Specialist

Level of Importance	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
% Not Important	4.7	12.4	6.3	15.0
% Least Important	12.7	18.9	9.5	21.1
% Uncertain	13.2	16.1	6.3	21.1
% Important	31.1	31.8	32.1	25.8
% Very Important	38.2	20.7	45.7	16.9
% Total	100.0	100.0	100.0	100.0

4.6.9. Entrepreneur’s View on Having External ICT Specialist

The results in Table 4.10 indicates that the entrepreneurs who felt it was important to have external specialist in E-commerce, Internet social network ,computerization of business operations and use of CC-TV were 54.0% , 43.3%, 62.7% and 34.3% respectively for both important and very important. It is important to note that the level of those that were uncertain was over 20% for all cases apart from computerization of business operation which had 13.4%. The data in Table 4.7, 4.8 and 4.9 further shows that entrepreneurs are keener in developing internal ICT skills as opposed to depending on external ICT experts. This is contrary to Windrum de Berranger (2002) findings where he stated that external support and motivation from ICT experts are crucial for ICT adoption in SMEs.

Table 4.10: Entrepreneur’s View on use of External ICT Specialist

Level of Importance	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
% Not Important	7.4	11.6	9.2	15.0
% Least Important	16.7	23.7	14.7	20.7
% Uncertain	21.9	21.4	13.4	30.0
% Important	32.1	27.0	36.4	23.5
% Very Important	21.9	16.3	26.3	10.8
% Total	100.0	100.0	100.0	100.0

4.6.10. Entrepreneur’s View on Having Regular ICT Trainings

The study found that entrepreneurs felt it was important to carryout regular training in E-commerce and computerization of business operations as evident from percentages 84.2% and 94.6% for both important and very important (see Table 4.11). However in the case of use of Internet social network, only 65.8% felt the same while in the use CC-TV for business monitoring, only 48.3% felt the same. The findings agree with Ssewanyana and Busler (2007) on the need to have ICT trained personnel in Uganda.

Table 4.11: View on Having Regular Training of Employees on use of ICT

Level of Importance	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
% Not Important	1.9	5.0	1.8	9.9
% Least Important	5.6	14.6	1.8	12.7
% Uncertain	8.4	14.6	1.8	29.1
% Important	34.0	30.6	36.7	25.8
% Very Important	50.2	35.2	57.9	22.5
% Total	100.0	100.0	100.0	100.0

4.6.11. Enterprise ICT Strategy

The entrepreneurs indicated a strong support of having an ICT strategy for computerization of business operations, E-commerce, Internet social network and lastly CC-TV as shown by the high percentages of important and very important (see Figure 4.13). This strong support indicates that the formal small enterprises in urban Kenya are moving towards advance level of ICT adoption where ICT is an integral part of business strategy (Zappala & Gray, 2006).

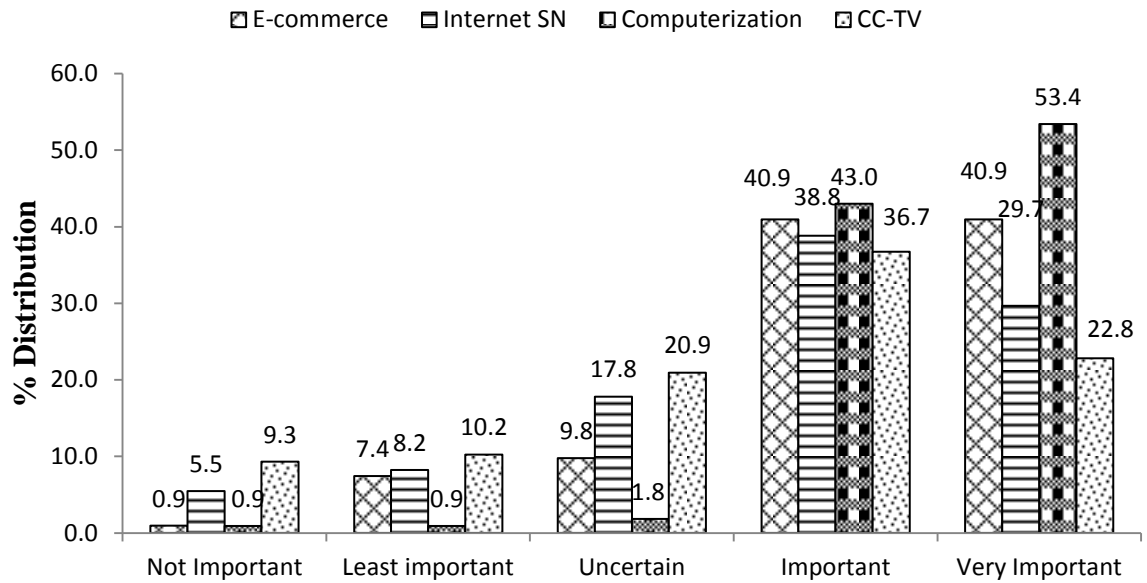


Figure 4.13: Entrepreneur's View on Implementation of ICT strategy

4.6.12. Enterprise Possession of Sufficient ICT Skills

The study found that over 68% of entrepreneurs either agreed or strongly agreed that their firms possess sufficient skills to enable them use E-commerce, Internet social networks and computerization of business operations (see Figure 4.14). On the other hand, only 39.6% felt the same for the use of CC-TV again explaining a possible reason of the low adoption of the technology.

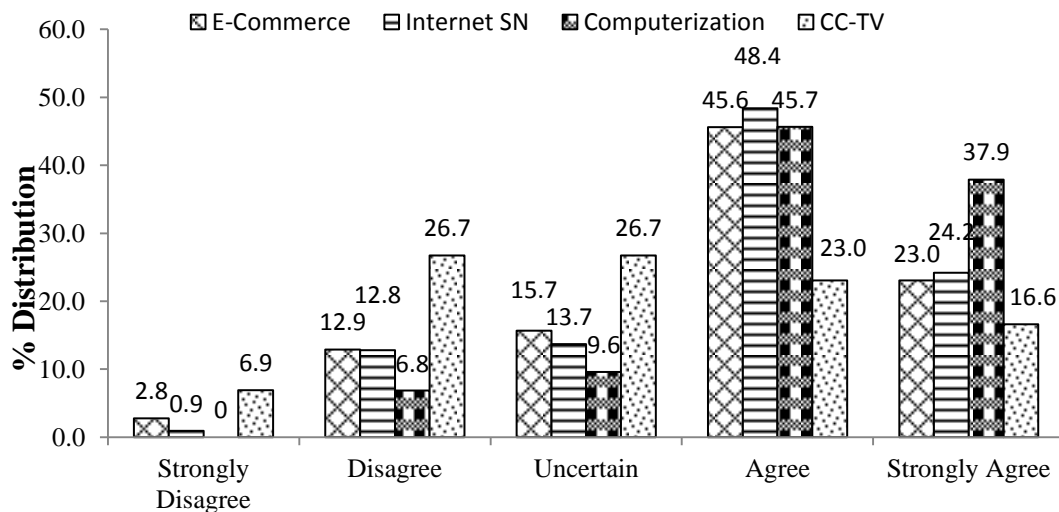


Figure 4.14: Enterprise Possess Sufficient ICT Skills

4.6.13. Availability of Resources

Over 50% of the entrepreneurs felt their firms had adequate resources for use in E-commerce, Internet social network and computerization of business operations. Only 40.7% felt the same for CC-TV as shown in Table 4.12. However, the level of uncertainty is high for E-commerce, Internet social network and CC-TV 22.0%, 14.9% and 24.7% respectively. This coupled with 19% disagreement means the enterprises ability to have adequate resources for ICT adoption is fifty-fifty.

Table 4.12: Adequate Resources are Available for use of ICT

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	7.0%	3.2%	3.2%	15.3%
Disagree	19.6%	16.7%	12.2%	29.3%
Uncertain	22.0%	14.9%	7.7%	24.7%
Agee	30.8%	45.7%	47.1%	17.7%
S. Agree	20.6%	19.5%	29.9%	13.0%

4.6.14. Fear of Losing Business Control Due to ICT Adoption

In all cases (see Figure 4.15), majority of entrepreneurs disagreed that they will lose business control if they allowed employees use ICT. This could be due to the fact that 95.4% of the entrepreneurs have basic ICT skills and above as shown in Figure 4.11. Gray (2006) concluded the same that entrepreneurs with technical and vocational qualifications are more likely to engage in innovative activities that includes ICT adoption.

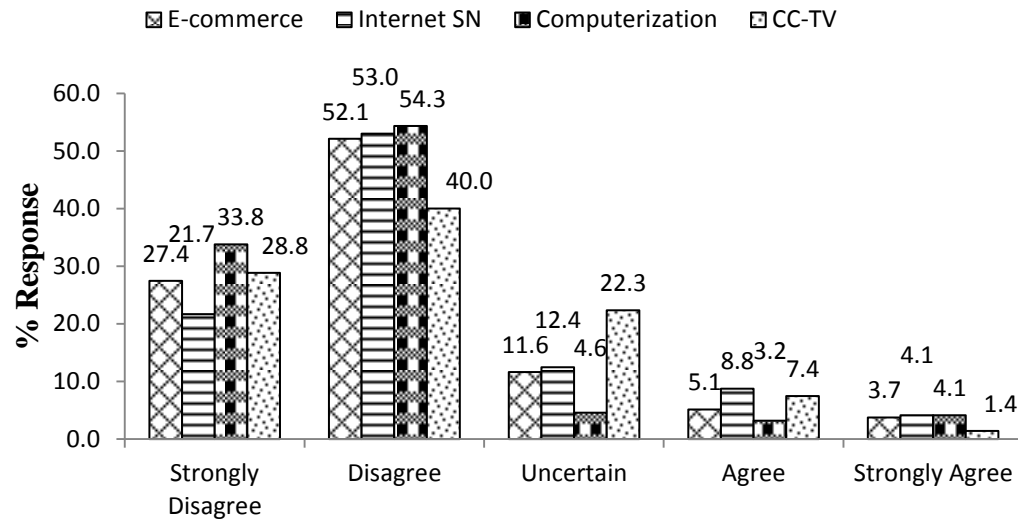


Figure 4.15: Fear of Loss of Business Control if Employees are Allowed to use ICT

4.6.15. Influence of Amount of Data Processed on ICT Adoption

Enterprises that use E-commerce, computerization of business operations and Internet social networks do so partly due to large amount of data that needs to be processed. This is clear from the high percentages of those that agree and strongly agree as illustrated in Figure 4.16. Use of CC-TV is weakly supported by data intensity since 36.5% of the respondents were uncertain while 35.1% either disagreed or strongly disagreed to the statement.

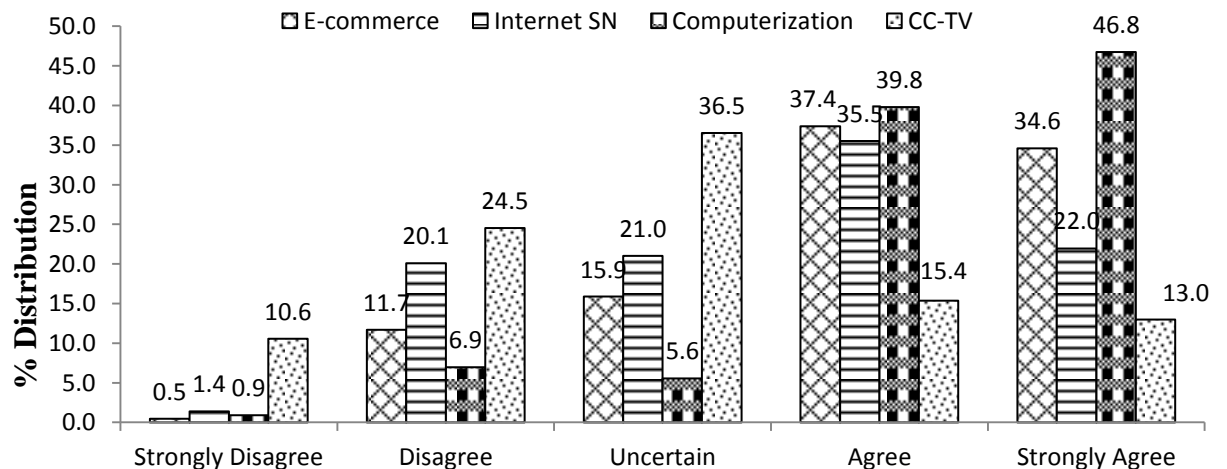


Figure 4.16: Large Amount of Data Processing Necessitates the use of ICT

4.6.16. Mean Plot for Enterprise Characteristics

Independent t-test on means of ICT adoption shows that entrepreneurs who adopt are more influenced by enterprise characteristics than those who have not adopted as depicted in Figure 4.17. These findings agree with Mutua and Wasike (2009) on ICT adoption and performance by small and medium enterprises in Kenya where they found that the main determinants of adoption of ICT are the size of the firm, formal registration, and if a manager has some Internet training.

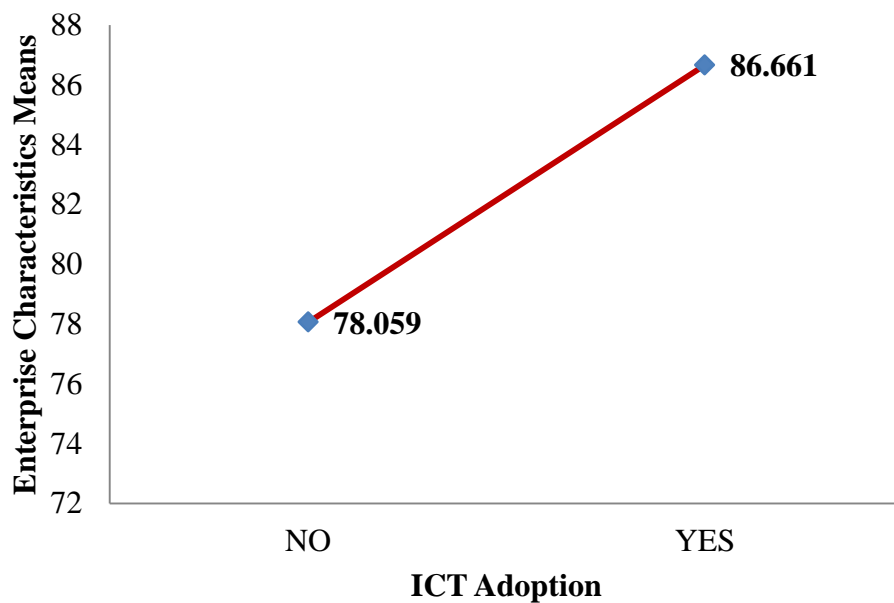


Figure 4.17: Mean Plot for Enterprise Characteristics Against ICT Adoption

The independent t-test of means is based on the hypothesis that the means of enterprise characteristics for adopters and non-adopters are equal. That is:

$$H_0: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} = 0$$

$$H_1: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} \neq 0$$

The results in Table 4.13 indicate that the difference between sample means for adopters and non-adopters is -8.60176 which is significant at $\alpha = 0.05$. Thus, study rejects the null hypothesis and concludes that there is a difference between the two

means. The findings are 95% confident that the difference between the mean numbers of influence of enterprise characteristics is 8.60176 lower for non adopters than adopters. Gray (2006); van Akkeren and Cavaye (1999) and Manuelli (2007) found that age and experience of entrepreneur as well as age and size of a firm were important attributes of effective ICT adoption.

Table 4.13: T-Test on Mean Difference of Enterprise Characteristics

	Adoption	N	Mean	Mean Difference	Std. Deviation	Std. Error Mean	t	Sig.
EC	NO	61	78.059	-8.601760	15.747	2.016	-3.664	0.000
	YES	163	86.661		15.601	1.222		

4.7 Perceived ICT Attributes

This section contains result of the five perceived ICT attributes contained in Roger's diffusion model of technology for the adoption by small formal enterprises in Kenya. The attributes are: relative advantage, compatibility, complexity, trialability and observability.

4.7.1. Relative Advantage of Using ICT

(i) Simplification of Work Routines

Results in Table 4.14 indicate that 99.5% of the respondents either agreed or strongly agreed that computerization of business operations led to simplification of work routines. This is contrary to Alam and Noor, (2009) findings on ICT adoption in Malaysia who found that the respondents did not think that computerization simplified their work. In the case of E-commerce, Internet social networks, 89.1% and 75.5% respectively felt that their adoption led to simplification of work routines. CC-TV scored the least with on 43.2% agreeing that its adoption led to simplification of work routine while 46.0% were uncertain.

Table 4.14: ICT has led to Simplification of Work Routines

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.0%	2.7%	0.5%	1.9%
Disagree	0.0%	1.8%	0.0%	9.0%
Uncertain	10.9%	20.0%	0.0%	46.0%
Agee	37.0%	31.4%	30.0%	26.1%
S. Agree	52.1%	44.1%	69.5%	17.1%

(ii) Reliable Business Communications

The study found that 95.0% of the respondents either agreed or strongly agreed that computerization of business operations led to reliable business communications (see Table 4.15). This is closely followed by E-commerce and Internet social networks with 85.1% and 76.5% respectively. The findings are similar to those of Tan et al. (2009) on Internet based ICT adoption. CC-TV scored the least with only 38.5% agreeing that its adoption led to reliable communication while 47.9% were uncertain.

Table 4.15: ICT has led to Reliable Business Communications

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.9%	0.9%	0.9%	5.6%
Disagree	0.0%	0.9%	0.9%	8.0%
Uncertain	14.0%	21.6%	3.2%	47.9%
Agee	38.1%	33.3%	26.1%	22.1%
S. Agree	47.0%	43.2%	68.9%	16.4%

(iii) Efficient Coordination

The result in Table 4.16 indicates that 94.9% of the respondents either agreed or strongly agreed that computerization of business operations led to efficient coordination among departments. In the case of E-commerce and Internet social networks the percentages of those who felt the same were lower at 81.3% and 66.2% respectively. The findings are similar to those of Beckinsale and Ram (2006) who concluded that perceived benefits of ICT adoption often include focus on improving

business efficiency. CC-TV scored the least with only 40.5% agreeing that their adoption led to efficient coordination among department while 43.4% were uncertain. This is could be attributed to the low adoption (23.6%) reported in Figure 4.5.

Table 4.16: Use of ICT has led to Efficient Coordination Among Departments

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.0%	2.8%	0.9%	2.9%
Disagree	0.0%	5.6%	1.4%	13.2%
Uncertain	18.7%	25.5%	2.8%	43.4%
Agee	46.3%	41.7%	40.8%	22.9%
S. Agree	35.0%	24.5%	54.1%	17.6%

(iv) Improved Customer Satisfaction

The result in Table 4.17 indicates majority of respondents either agreed or strongly agreed that use of E-commerce, Internet social networks and computerization of business operations has led to improved customers satisfaction (78.6%, 65.7% and 89.9% respectively). Earlier studies by Lauder and Westall (1997) found that ICT impacts include cheaper and faster communications, better customer and supplier relations, more effective and efficient marketing, product and service development and better access to information and training. CC-TV scored the least with only 33.2% agreeing that its adoption led to improved customer satisfaction while 47.3% were uncertain.

Table 4.17: Use of ICT has led to Improved Customer Satisfaction

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.5%	2.8%	0.5%	7.8%
Disagree	3.3%	4.6%	2.8%	11.7%
Uncertain	17.6%	26.9%	6.9%	47.3%
Agee	44.3%	37.0%	40.8%	21.5%
S. Agree	34.3%	28.7%	49.1%	11.7%

The study found that majority of respondents either agreed or strongly agreed that use of E-commerce, Internet social networks and computerization of business operations has provided new business opportunities (79.7%, 78.0% and 85.5% respectively) as show in Table 4.18. Earlier research by Beckinsale and Ram (2006); Giovanni and Mario (2003) found that ICT adoption led to development of new markets and opportunities. CC-TV scored the least with only 34.3% agreeing that its adoption has provided new business opportunities while 44.8% were uncertain.

Table 4.18: Use of ICT has Provided new Business Opportunities

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.9%	2.8%	0.0%	8.1%
Disagree	1.9%	0.9%	4.5%	12.9%
Uncertain	17.6%	18.3%	10.0%	44.8%
Agee	36.6%	40.4%	44.1%	21.9%
S. Agree	43.1%	37.6%	41.4%	12.4%

(v) Development of New Products and Services

The result in Table 4.19 indicates majority of respondents either agreed or strongly agreed that use of E-commerce, Internet social networks and computerization of business operations has led to development of new products and services (72.9%, 65.6% and 72.7% respectively) which agrees with OECD (2004) findings. Cross circuit-television scored the least with only 32.7% agreeing that it led to development of new products and services while 45.0% were uncertain.

Table 4.19: Use of ICT has led to Development of new Products and Services

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	1.9%	1.8%	1.8%	8.1%
Disagree	4.7%	3.7%	5.9%	14.2%
Uncertain	20.6%	28.9%	19.5%	45.0%
Agee	34.6%	39.9%	40.9%	24.2%
S. Agree	38.3%	25.7%	31.8%	8.5%

(vi) Reduction in Operations Costs

The study shows that majority of respondents either agreed or strongly agreed that use of E-commerce, Internet social networks and computerization of business operations has led to reduction in operating costs (73.5%, 67.4% and 85.5% respectively) which agrees with Tan et al. (2009) findings. CC-TV scored the least with only 35.9% agreeing that it led to development of new products and services while 46.3% were uncertain.

Table 4.20: Use of ICT has led to Reduction in Operations Costs

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.9%	4.6%	2.7%	7.0%
Disagree	7.1%	9.6%	1.8%	10.9%
Uncertain	18.4%	18.3%	9.9%	46.3%
Agee	35.8%	39.4%	43.2%	25.9%
S. Agree	37.7%	28.0%	42.3%	10.0%

(vii) Increased Productivity

The result in Table 4.21 indicates majority of respondents either agreed or strongly agreed that use of E-commerce and computerization of business operations led to increased productivity (75.7% and 86.4% respectively) which agrees with OECD (2004) findings. The researcher found that only 54.1% of the respondents felt the same for Internet social network. Most of the respondents cited misuse of Internet by employees to chat with friends during working hours as the main cause of low productivity. Cross circuit-television scored the least with only 31.7% agreeing that it has led to increased productivity while 48.3% were uncertain. This consist high percentage of uncertainty in all the eight perceived benefits of CC-TV is a major contributor to its low adoption rate of 23.6% shown in Figure 4.5.

Table 4.21: Use of ICT has led to Increased Productivity

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.0%	2.7%	0.0%	6.8%
Disagree	3.3%	11.8%	3.6%	13.2%
Uncertain	21.0%	31.4%	9.9%	48.3%
Agee	45.3%	31.4%	45.0%	24.4%
S. Agree	30.4%	22.7%	41.4%	7.3%

4.7.2. ICT Compatibility With Business Needs

Over 79% of entrepreneurs agreed that E-commerce and computerization of business operations are compatible with their business needs. This concurs with Tan et al. (2009) findings. On the other hand, 29.7% and 34.1% were uncertain about compatibility of Internet social network and CC-TV respectively to their business needs as depicted in Figure 4.18. This uncertainty could be attributed to the fact that the two ICT are relatively new in the Kenyan market (Kemibaro, 2010).

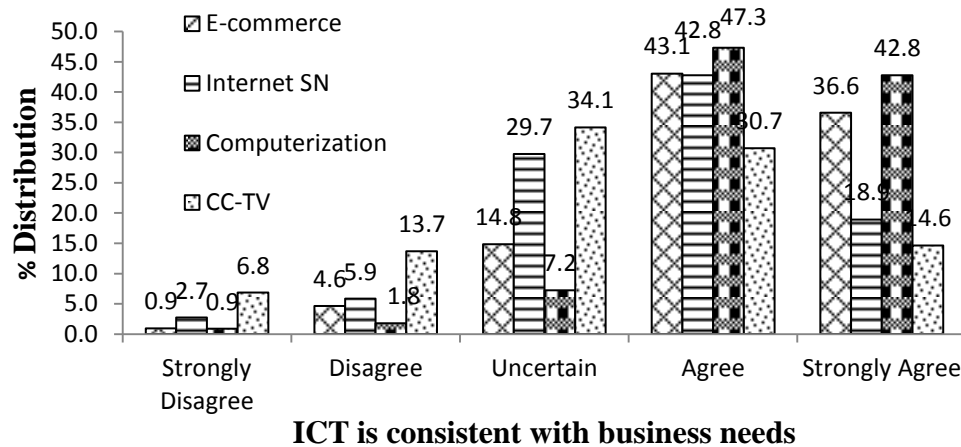


Figure 4.18: ICT is Consistent with Business Needs

4.7.3. Complexity of ICT in Enterprises

The level of uncertainty of the respondents on the ease of implementation of E-commerce and CC-TV are high i.e. 29.6% and 31.6% while 72.8% agreed that implementation of computerization of business operation is easy (see Figure 4.19). This

could be due to the fact that business normally first computerizes their operations before the move to higher level of ICT adoption as cited by Zappala and Gray (2006).

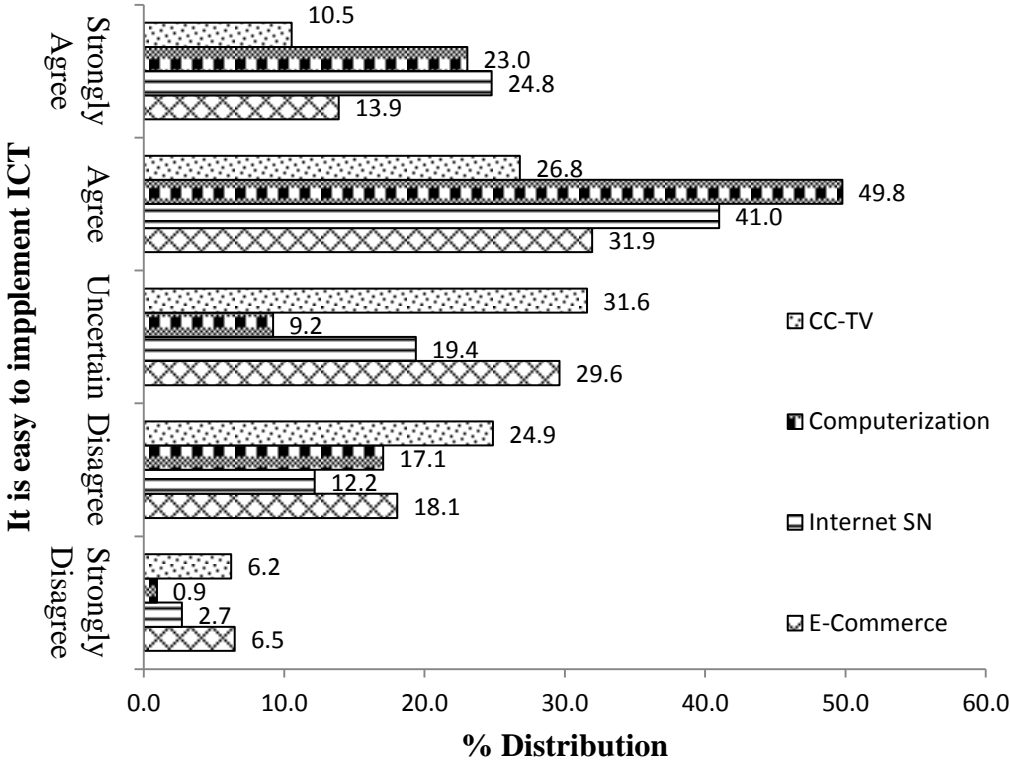


Figure 4.19: It is Easy to Implement ICT

4.7.4. Trialability of ICT in Enterprises

The study found that that in all cases over 20% of the respondents were uncertain about the ease of testing of the ICT before full implementation (see Figure 4.21). This coupled by the fact that over 12% also disagreed that it’s easy to test the ICTs before full implementation means that decisions about adoption may take longer than if they were able to pre-test. This contradicts Tan et al. (2009) study on Internet based ICT adoption in Malaysian SMEs where they found that trialability had no association with ICT adoption.

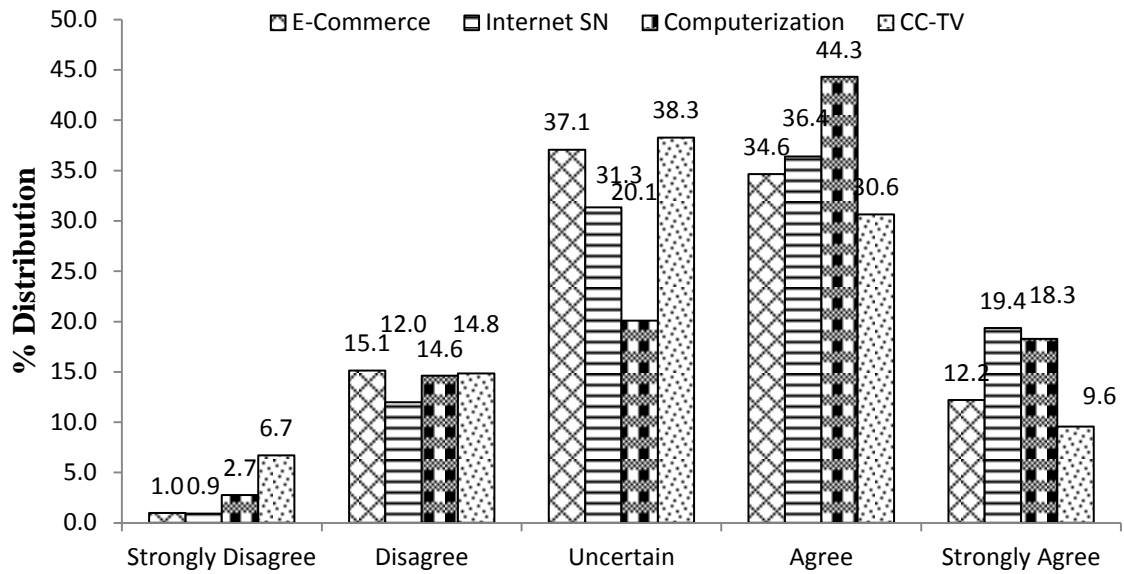


Figure 4.20: Easy to Test ICT Before Full Implementation

4.7.5. Observability of ICT Results

The researcher found that that over 70% of the respondents agreed that observability of positive results of E-commerce, Internet social network and computerization of business operations influenced their adoption decisions (see Figure 4.21). Of key importance is that the level of observability is closely mirrored in the level of ICT adoption depicted in Figure 4.5. Limthongchai and Speece (2003), Slyke et al. (2004b) and Tan et al. (2009) had similar results. However, the level of uncertainty is high for CC-TV for instance 39.5% that may have contributed to low adoption.

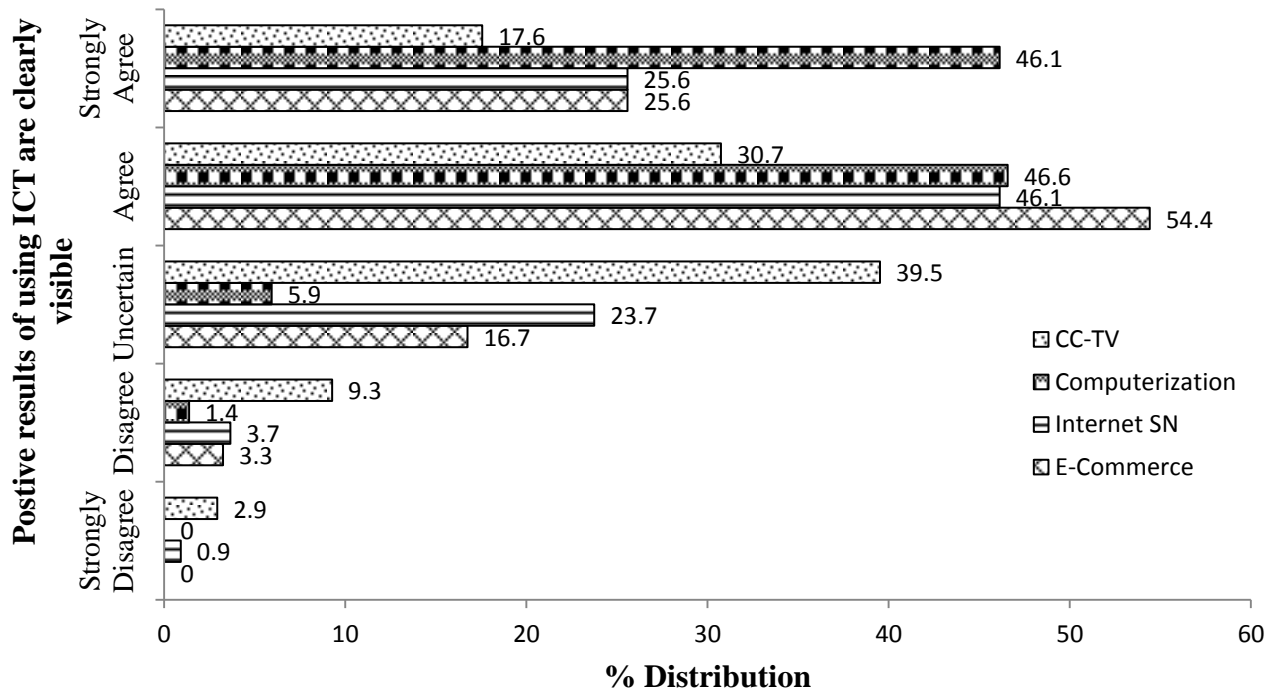


Figure 4.21: Positive Results of Using ICT are Clearly Visible

4.7.6. Mean Plot for Perceived ICT Attributes

Independent t-test on means of ICT adoption shows that entrepreneurs who adopt are more influenced by perceived ICT adoption than those who have not adopted as depicted in Figure 4.22

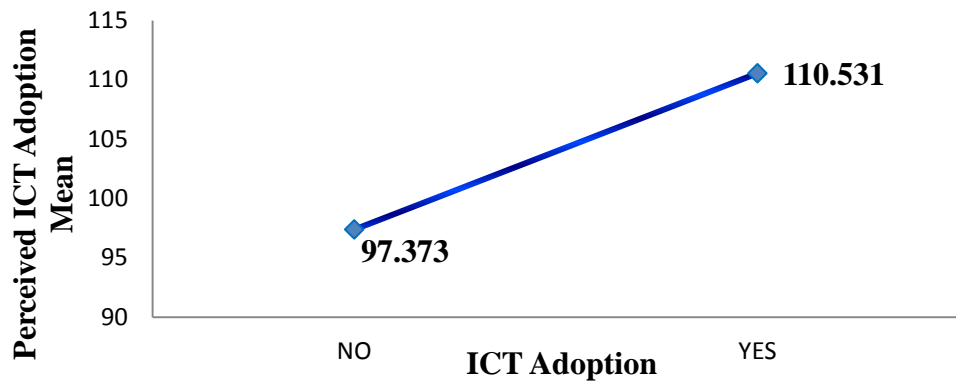


Figure 4.22: Mean Plot for Perceive ICT Attributes Against ICT Adoption

The independent t-test of means is based on the hypothesis that the means of perceived ICT attributes for adopters and non-adopters are equal. That is:

$$H_0: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} = 0$$

$$H_1: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} \neq 0$$

The results in Table 4.22 indicate that the difference between sample means for adopters and non-adopters is -13.158 which is significant at $\alpha = 0.05$. The study rejects the null hypothesis and concludes that there is a difference between the two means. Thus, findings are 95% confident that the difference between the mean numbers of influence of perceived ICT attributes are 13.158 lower for non adopters than adopters. The findings are confirms previous research work by Alam and Noor (2009); Beckinsale and Ram (2006); Gemino et al. (2006); Giovanni and Mario (2003) and Tan et al. (2009).

Table 4.22: T-Test on Mean Difference for Perceived ICT Attributes

	Adoption	N	Mean	Mean Difference	Std. Deviation	Std. Error Mean	t	Sig.
PICTA	NO	61	97.373	-13.158	15.169	1.534	-5.315	0.000
	YES	163	110.531		19.594	2.216		

4.8 External Environment

The external environment in which the enterprises operate is bound to influence their ICT adoption either positively or negatively. In this section, the influence of the following players was analysed: customers, competitors, technology, suppliers, government and friends in social networks.

4.8.1. Influence of Customers

The results in Table 4.23 indicate the respondents were indifferent on the influence of customers in their decision to use of E-commerce and Internet social networks. 52.5% of the respondents felt customer's computerization of their business operations has influenced them to follow suit while 58.7% disagreed that they used CC-TV because customers were using it. These mixed results show that the influence of customers varies from across the ICT. Prior research by Harindranath et al. (2008) had found that business partners such as customers and suppliers positively influenced small enterprises to adopt new technology.

Table 4.23: Use ICT Because Customers are Using it

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	7.4%	5.0%	7.2%	18.8%
Disagree	31.2%	31.7%	33.0%	39.9%
Uncertain	14.9%	16.3%	7.2%	24.4%
Agee	32.6%	30.8%	30.3%	10.3%
S. Agree	14.0%	16.3%	22.2%	6.6%

4.8.2. Influence of Competitors

The researcher found that the respondents were indifferent on the influence of competitors in their decision to use of E-commerce, Internet social networks and computerization of business operations. However, 17.7% and 19.2% were uncertain of the direction of influence for the case of E-commerce and Internet social network respectively as seen in Table 4.24. The percentage of those who disagreed or strongly

disagreed that they used CC-TV because competitors were using it was at 61.8%. The findings of this research are contrary to Beckinsale and Levy (2004) findings that identified customers, suppliers, and competitors as sources of information that influence on ICT adoption.

Table 4.24: Use ICT Because Competitors are Using it

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	9.3%	8.2%	8.7%	21.1%
Disagree	38.1%	40.2%	37.0%	40.7%
Uncertain	17.7%	19.2%	9.6%	23.0%
Agee	21.4%	19.6%	24.7%	10.5%
S. Agree	13.5%	12.8%	20.1%	4.8%

4.8.3. Influence of Technology Change

The results in Table 4.25 indicates majority of respondents either agreed or strongly agreed that they use of E-commerce, Internet social networks and computerization of business operations to match changes in technology (72.8%, 76.5% and 91.3% respectively). Only 37.0% of respondents felt the same for CC-TV.

Table 4.25: Use ICT to Match Changes in Technology

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	3.3%	1.8%	0.9%	16.4%
Disagree	8.5%	7.8%	2.8%	22.5%
Uncertain	15.5%	13.8%	5.1%	23.9%
Agee	29.1%	37.3%	40.6%	17.8%
S. Agree	43.7%	39.2%	50.7%	19.2%

4.8.4. Influence of Suppliers

The results in Table 4.26 indicate that the respondents were indifferent on the influence of suppliers on their decision to use of E-commerce, Internet social networks and computerization of business operations. However, 19.2% and 16.0% were uncertain of the direction of influence for the case of E-commerce and Internet social network respectively. It was found that 54.8% disagreed or strongly disagreed that they use CC-

TV because suppliers are using it. The findings of this research are contrary to Beckinsale and Levy (2004) findings that identified customers, suppliers, and competitors as sources of information that influence on ICT adoption.

Table 4.26: Use ICT Because Supplier are Using it

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	8.0%	6.9%	6.8%	17.8%
Disagree	29.6%	33.2%	30.6%	37.0%
Uncertain	19.2%	18.0%	8.2%	27.9%
Agee	24.9%	26.3%	27.4%	10.6%
S. Agree	18.3%	15.7%	26.9%	6.7%

4.8.5. Government Influence

(i) Government's Offer of Online tax Services

The results in Table 4.27 indicate that apart from computerization of business operations where 53.9% agreed or strongly agreed that they were influenced to adopt by government offer online tax services, all other ICTs recorded below 50% level of influence.

Table 4.27: Offer of Online Tax Services Positively Influenced use ICT

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	10.7%	12.0%	9.7%	22.6%
Disagree	26.0%	30.4%	24.9%	37.3%
Uncertain	14.9%	18.9%	11.5%	22.2%
Agee	25.1%	22.1%	28.6%	13.2%
S. Agree	23.3%	16.6%	25.3%	4.7%

(ii) Government's VAT Removal

The respondents were uncertainty as to whether removal of VAT from ICT products positively influenced their decision to adopt i.e. E-commerce (29.8%), Internet social network (32.4%), Computerization (25.0%) and CC-TV (38.1%) as shown in

Table 4.28. This could mean the government intervention was not properly marketed to the small enterprises. Another observation is that apart from computerization of

business operations where 50.0% agreed or strongly agreed that they were influenced to adopt by government's VAT removal on ICT products, all other ICTs recorded below 50% level of influence.

Table 4.28: Removal on ICT Products Positively Influenced Enterprise to use it

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	6.5%	7.8%	7.3%	15.2%
Disagree	19.5%	21.9%	17.7%	19.0%
Uncertain	29.8%	32.4%	25.0%	38.1%
Agee	21.9%	19.2%	24.1%	17.6%
S. Agree	22.3%	18.7%	25.9%	10.0%

(iii) Government's Inclusion of ICT in Vision 2030

The results in Table 4.27 indicate that approximately 50% of the respondents either agreed or strongly agreed that government actions of including ICT in vision 2030 had influenced them to adopt E-commerce (52.1%), Internet social network (49.8%), Computerization (54.3%) while only 28.6% felt the same in the use of CC-TV. This may imply that half of the entrepreneurs have not grasp the importance of embracing ICT in relation to Kenya Vision 2030.

Table 4.29: ICT as a Major Driving Force in Vision 2030 has Influenced it use

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	5.5%	6.4%	7.2%	15.4%
Disagree	23.0%	24.7%	24.4%	29.4%
Uncertain	19.4%	19.2%	14.0%	26.6%
Agee	28.1%	28.3%	29.4%	13.6%
S. Agree	24.0%	21.5%	24.9%	15.0%

(iv) Government's Establishment of Digital Villages

The study indicate that the level of uncertainty was high on the influence of digital villages in ICT adoption decisions i.e. E-commerce (24.9%), Internet social network (25.1%), Computerization (24.7.0%) and CC-TV (32.1%) as shown in Table 4.30. This could mean the role of digital villages is not known by the small enterprises. Prior

research work by Alam and Noor (2009), Howell and Terziovski (2005), Seyal and Rahman (2003), and Smallbone and Welter (2001) found that government played a significant role in positively influencing ICT adoption. This is not the case for Kenyan formal small enterprises that seems to have negative opinion on the influence of major government's ICT intervention measures.

Table 4.30: Establishment of Digital Villages Made it Possible for use of ICT

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	7.8%	8.7%	9.8%	14.2%
Disagree	31.8%	33.8%	31.6%	35.4%
Uncertain	24.9%	25.1%	24.7%	32.1%
Agee	18.9%	16.0%	18.1%	9.0%
S. Agree	16.6%	16.4%	15.8%	9.4%

4.8.6. Influence of Friends in the Social Networks

Over 60% of the respondents agreed that friends in the social networks influenced their decision to use of E-commerce, Internet social networks or computerization of business operations as shown in Figure 4.23. This is supported by Braun (2004), Gibbs et al. (2007), Gray (2006), and Manuelli et al. (2007), findings that social networks plays a significant role in influencing decision making to adopt ICT. In the use of CC-TV, 40.5% of the respondents either disagreed or strongly disagreed while 29.5% were uncertain about the influence of friends in the social network.

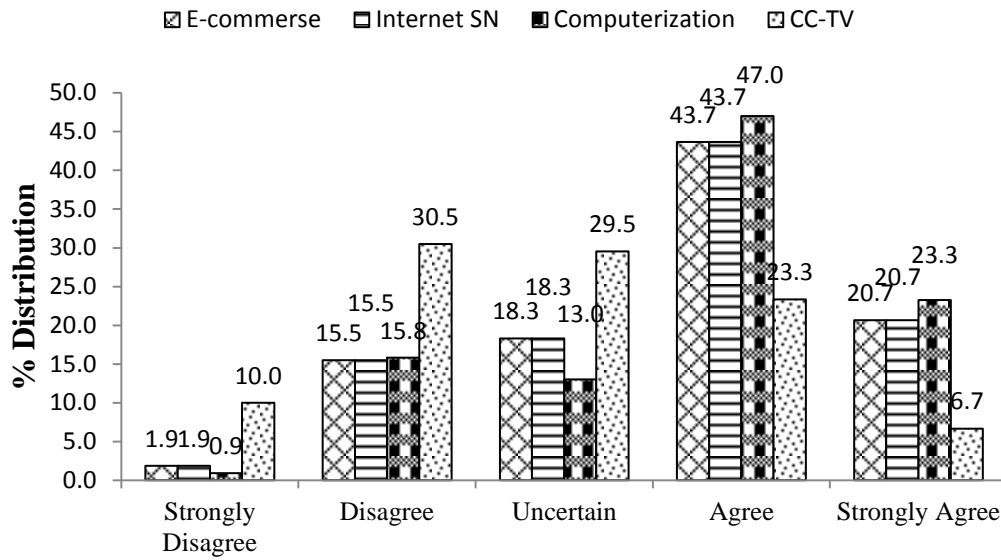


Figure 4.23: Influence of Friends in the Social Network on the use of ICT

4.8.7. Mean Plot for External Environment

Independent t-test on means of ICT adoption shows that entrepreneurs who adopt are more influenced by external environmental factors than those who have not adopted as depicted in Figure 4.24.

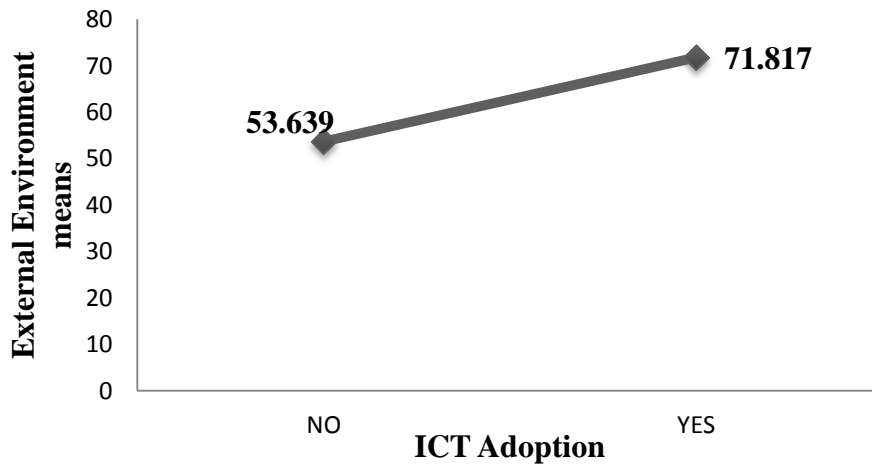


Figure 4.24: Mean Plot for External Environment Against ICT Adoption

The independent t-test of means is based on the hypothesis that the means of external environmental factors for adopters and non-adopters are equal. That is:

$$H_0: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} = 0$$

$$H_1: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} \neq 0$$

The results in Table 4.31 indicate that the difference between sample means for adopters and non-adopters is 18.177 which is significant at $\alpha = 0.05$. The researcher rejects the null hypothesis and concludes that there is a difference between the two means. Thus, study is 95% confident that the difference between the mean numbers for the influence of external environment is 18.177 lower for non-adopters than adopters. Prior work by Aghaunor and Fotoh (2006); Beckinsale and Ram (2006) and Alam and Noor (2009) found that external environmental factors positively influenced technology adoption by enterprises.

Table 4.31: T-Test on Mean Difference

	Adoption	N	Mean	Mean Difference	Std. Deviation	Std. Error Mean	t	Sig.
EE	NO	61	53.639	-18.177	17.311	2.216	-6.597	0.000
	YES	163	71.817		18.730	1.467		

4.9 Perceived ICT Barriers

The sub-variables analysed in this section as possible barriers to ICT adoption were: time required in implementing, cost of implementation and maintenance of the infrastructure, rapid changes in technology, security and legal issues, return on investments, and lastly lack of internal ICT skills.

4.9.1. Implementation Time Required

The respondents were indifferent on lack of time being a limiting factor in implementation of the various ICT whereby those who disagreed were almost equal to those who agreed as shown in Figure 4.25. CC-TV recorded the highest percentage (33.6%) of respondents who were uncertain whether time was a constraining factor.

Prior research by Jones et al. (2003) on adoption of E-commerce indicated that, respondents felt they did not have sufficient time to maintain E-commerce system up and running.

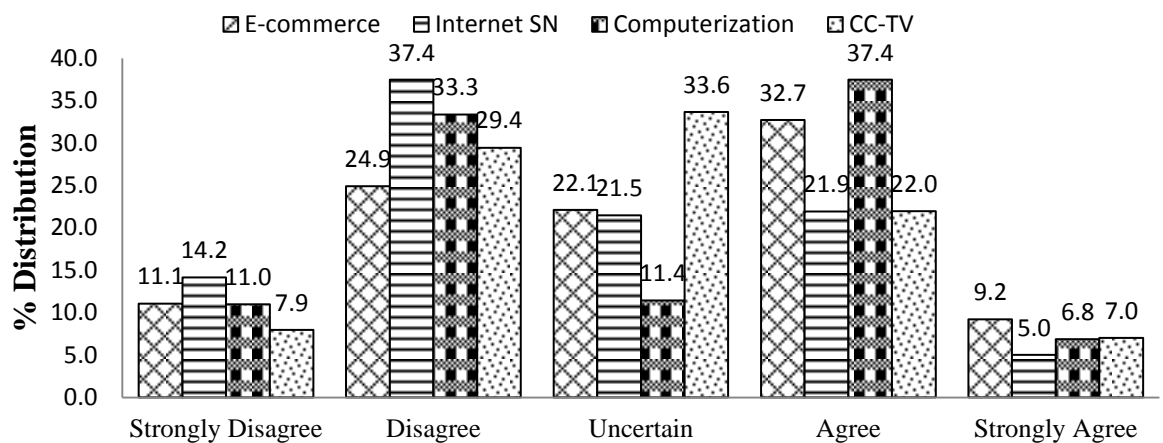


Figure 4.25: Implementation of ICT Requires a lot of Time Which is Scarce

4.9.2. ICT Requires Training and Change

On the issue of training and change needed for the adoption of new technology to be effective, majority of the respondents disagreed that the costs for training and change were high as depicted in Figure 4.26. This perception is important in encouraging adoption because when the entrepreneur perceives costs are low he/she is likely to allocate funds. This assertion is supported by Poon and Swatman (1999) research findings that when an entrepreneur perceives low cost of adoption of new technology he/she is likely to adopt it.

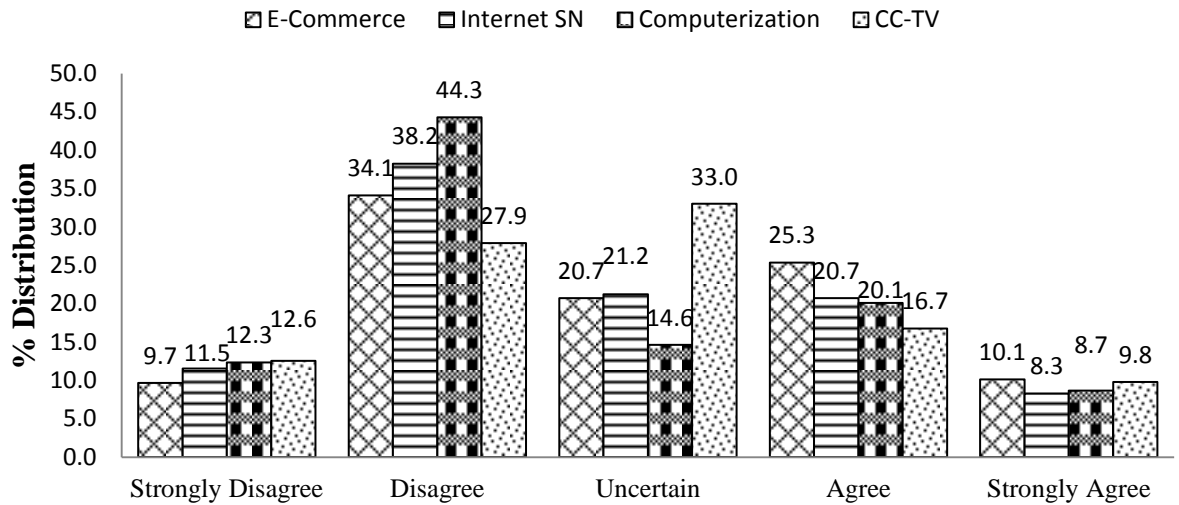


Figure 4.26: ICT Requires Training and Change Whose Costs are High

4.9.3. ICT Comes With Security Issues

Majority of the respondents indicated that they must be assured of the safety of ICT before they can adopt. This is deduced from Figure 4.27 where percentages of those who either agreed or strongly agreed are over 60% for E-commerce, Internet social networks and computerization of business operation. This implies that if the entrepreneurs perceive a certain ICT to be insecure they will not adopt it and the vice versa.

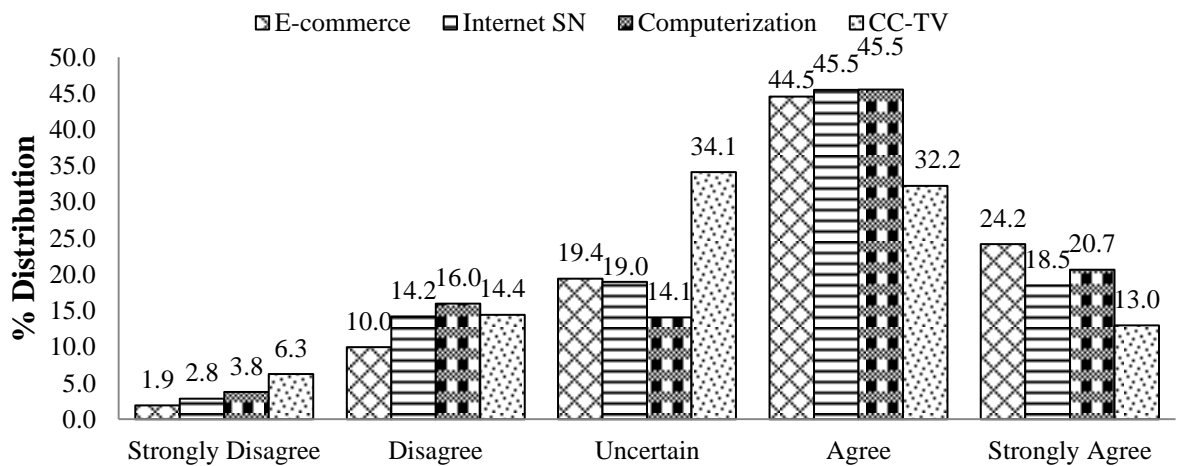


Figure 4.27: ICT Comes with Security Issues Hence Assurance is Needed

4.9.4. Kenyan Laws Governing ICT

Majority of the respondents agreed that Kenyan laws governing the use of ICT are not clearly stipulated. However, over 30% were uncertain as illustrated in Figure 4.28, which implies they are lack information. This can have negative implications in adoption decisions. In the open ended section of the questionnaire, some respondents sited that their failure to adopt E-commerce and other online transactions is because court cases involving online fraud are in most instances dismissed for lack of evidence. Prior research work by Gillwald (2005); Gillwald and Esselaar (2004) support this notion where they found that lack of regulator capacity had hindered ICT adoption in Africa.

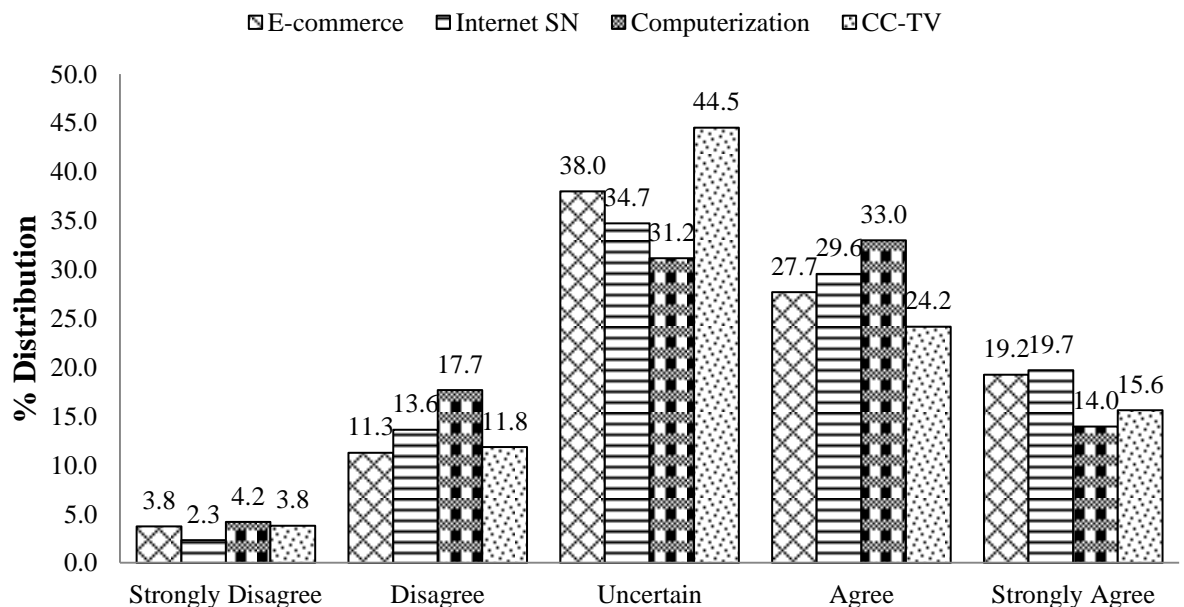


Figure 4.28: Kenyan Laws Governing use of ICTs are not Clearly Stipulated

4.9.5. Scarce Business Resources

Results illustrated in Figure 4.29 indicate that over 44% of the respondents felt they did not have enough resources to invest in ICT. However, in the case of Internet social networks and computerization of business operations over 35% disagreed that

resources were not sufficient which helps to explain the high adoption of the two as depicted in Figure 4.5. The findings contradict Duncombe and Heeks (2001) survey on USA SMEs who found that 90 % of SMEs indicated lack of finance as a major constraint.

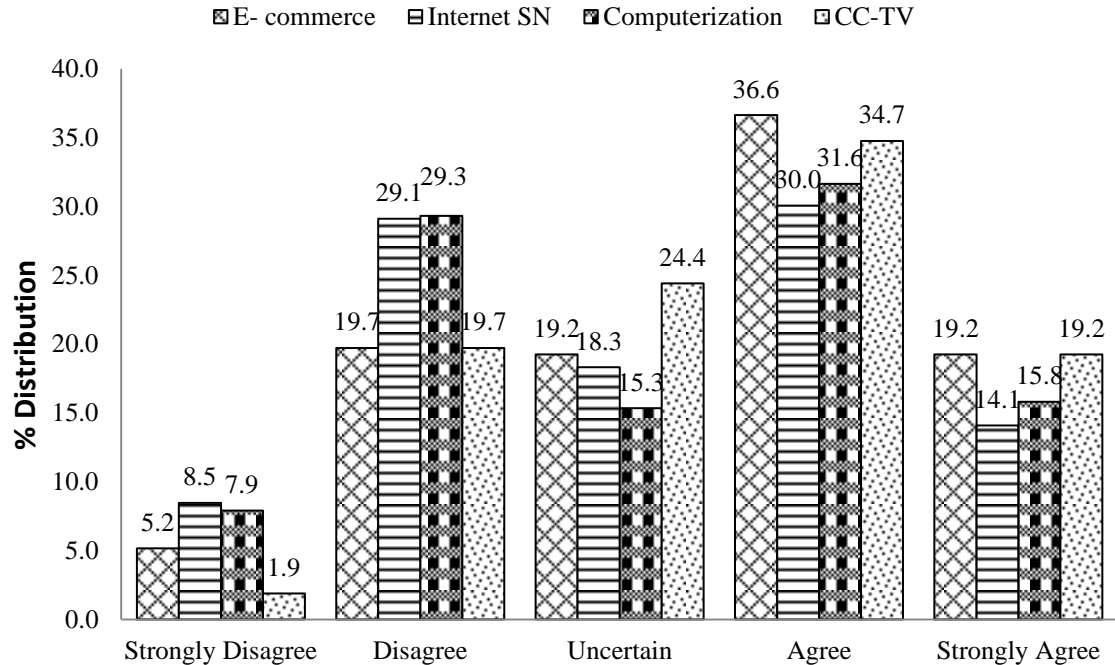


Figure 4.29: Scarce Business Resources are not Enough to Invest in ICT

4.9.6. Return on Investment

Majority of responds disagreed that investment in ICT does not represent value for money as illustrated in Figure 4.30. Based on this finding, the entrepreneurs are likely to be adopted since they can justify by return on investment. This is supported by Kapurubandara and Lawson (2006) findings that there is direct relationship between cost overrun and return on investment for ICT adoption by SMEs.

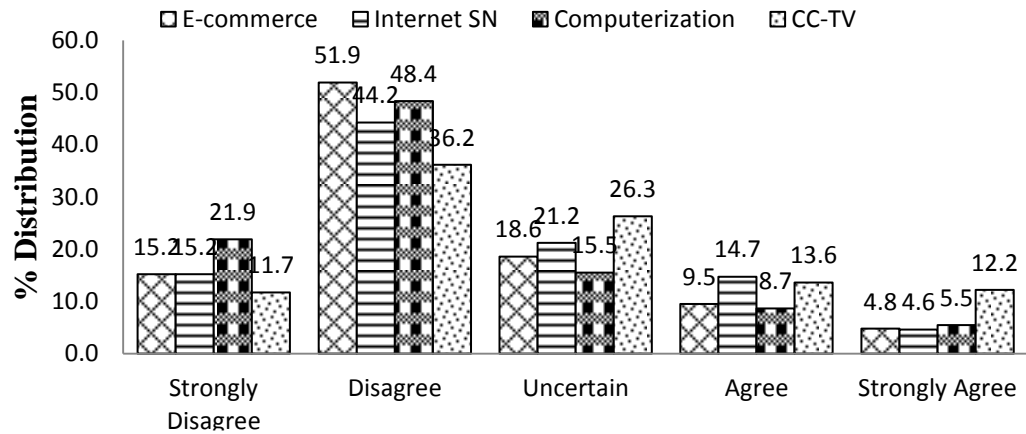


Figure 4.30: Investment in ICT does not Represent Value for Money

4.9.7. Rapid Technological Changes

Over 40% of the respondents disagreed that rapid changes in technology has increased ICT costs as indicated in Figure 4.31. This could be related to the return on investments results discussed earlier whereby changes in technology are seen to add value to the business. This is supported by Alberto and Fernando (2007) finding that technological changes leads to improved business competitiveness.

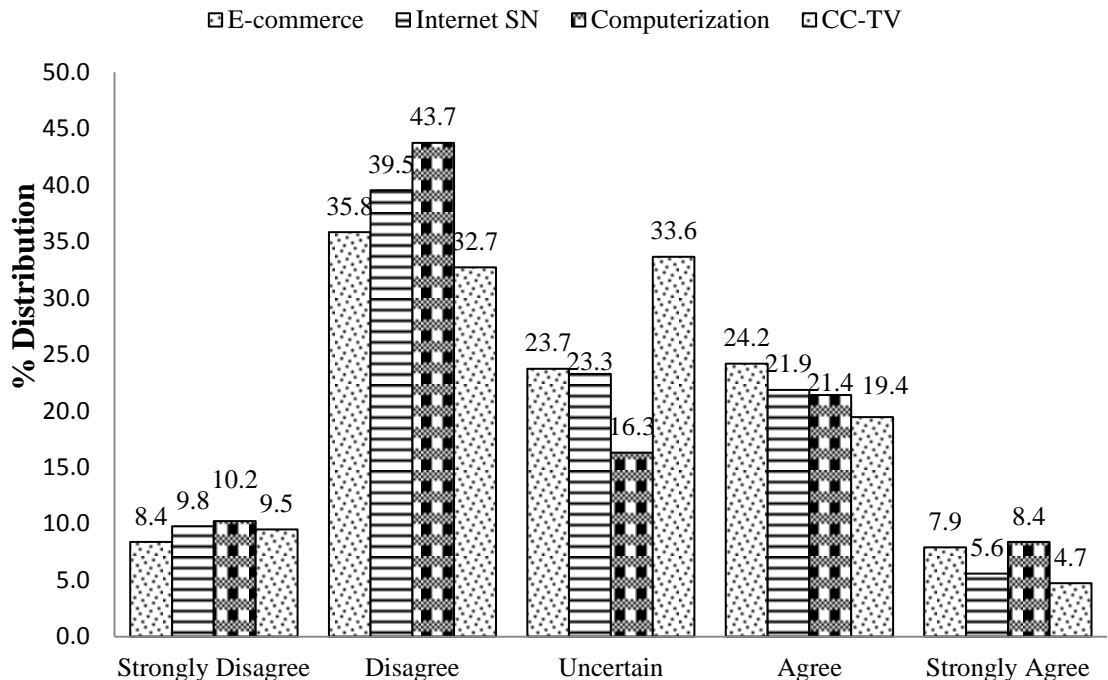


Figure 4.31: Rapid Technological Changes has Increased ICT Costs

4.9.8. Running Costs

(i) ICT Consultancy Charges

The respondents were indifferent that high ICT consultancy fee reduced its usage whereby those who disagreed were almost equal to those who agreed as shown in Figure 4.32. Prior research by Seyal and Rahim (2006) found direct and significant relationship between cost and adoption of technology.

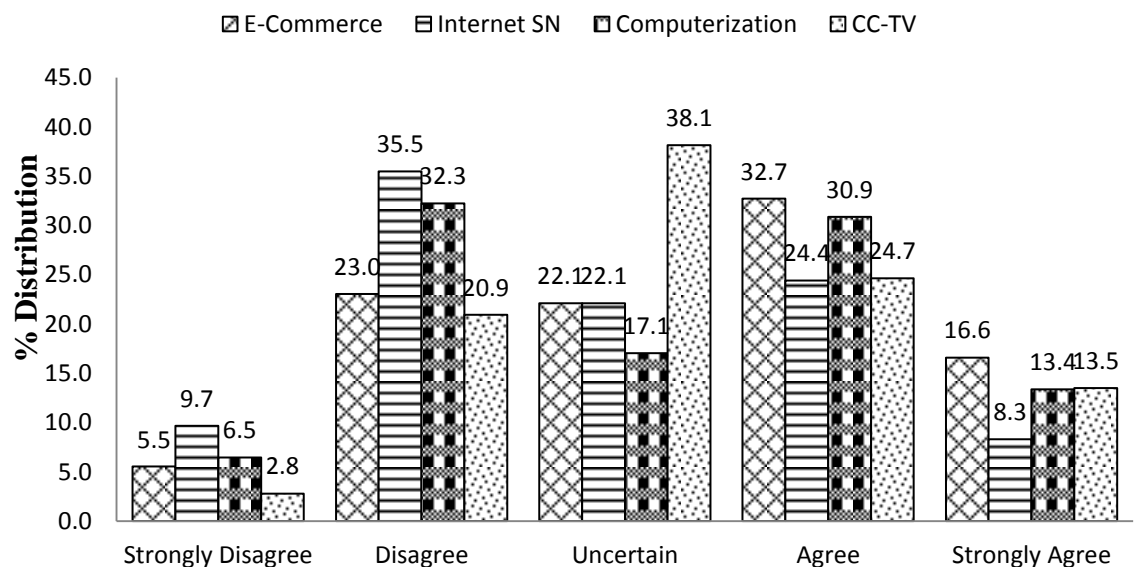


Figure 4.32: High ICT Consultancy fee Reduces its Usage

(ii) Cost of ICT Software

Over 50% of the respondents agreed that high cost of E-commerce, computerization and CC-TV software reduces their usage in business as shown in Table 4.32. However, only 36.4% felt the same for Internet social network mainly because most of software needed to access Internet in can be downloaded free of charge.

Table 4.32: High cost of ICT Software Reduces its Usage

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	0.5%	4.1%	2.3%	0.5%
Disagree	16.1%	35.5%	17.8%	14.9%
Uncertain	20.7%	24.0%	20.1%	30.7%
Agee	41.9%	26.7%	44.3%	35.8%
S. Agree	20.7%	9.7%	15.5%	18.1%

(iii) Infrastructure Maintenance Cost

Over 50% of the respondents agreed that high maintenance cost of E-commerce, computerization and CC-TV reduces their usage in business as shown in Table 4.33. However, only 39.1% felt the same for Internet social network mainly because the application is accessible on various platforms such as computer, mobile phone, cyber café just to mention a few. Previous research by Lal (2007) investigating adoption of ICT by Nigerian SMEs supports this notion where he found that the major factor affecting ICT diffusion was poor internal and external infrastructure.

Table 4.33: High Infrastructure Maintenance Cost of ICT Reduces its Usage

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	1.4%	4.6%	1.8%	0.9%
Disagree	18.9%	30.9%	24.0%	16.3%
Uncertain	25.3%	25.3%	18.9%	30.7%
Agee	35.5%	26.7%	36.9%	33.5%
S. Agree	18.9%	12.4%	18.5%	18.6%

4.9.9. Lack of Internal Technical Expertise

The study found that over 50% of the respondents agreed that they lacked internal expertise which reduced usage of ICT as shown in Table 4.34. Previous research by Zappala and Gray (2006); Gibbs et al. (2007); van Akkeren and Cavaye (1999); Manuelli et al. (2007) found that enterprises with internal expertise were more likely to adopt new technology than those without which concurs with the findings of this study.

Table 4.34: Lack of Internal Technical Expertise in ICT Reduces its Usage

Level of Agreement	ICT			
	E-Commerce	Internet SN	Computerization	CC-TV
S. Disagree	2.8%	5.1%	4.6%	4.7%
Disagree	18.9%	25.8%	21.2%	11.6%
Uncertain	12.4%	14.7%	6.0%	25.6%
Agee	46.1%	41.9%	48.8%	44.7%
S. Agree	19.8%	12.4%	19.4%	13.5%

4.9.10. Mean Plot for Perceived ICT Barriers

Independent t-test on means of ICT adoption shows that entrepreneurs who adopt are less influenced by perceived ICT barriers than those who have not adopted as shown in Figure 4.33.

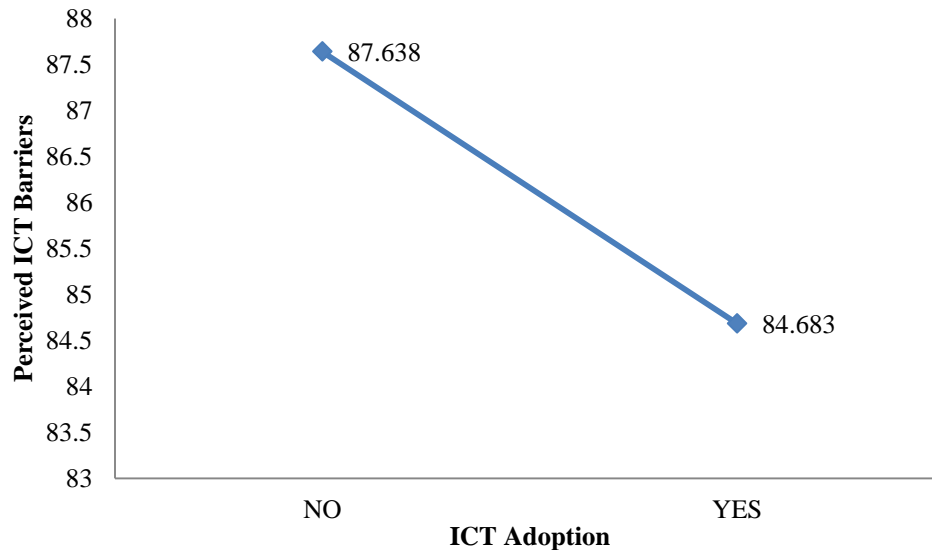


Figure 4.33: Mean Plot for Perceived ICT Barriers Against ICT Adoption

The independent t-test of means is based on the hypothesis that the means of perceived ICT barriers for adopters and non-adopters are equal. That is:

$$H_0: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} = 0$$

$$H_1: \mu_{\text{Non Adopter}} - \mu_{\text{Adopter}} \neq 0$$

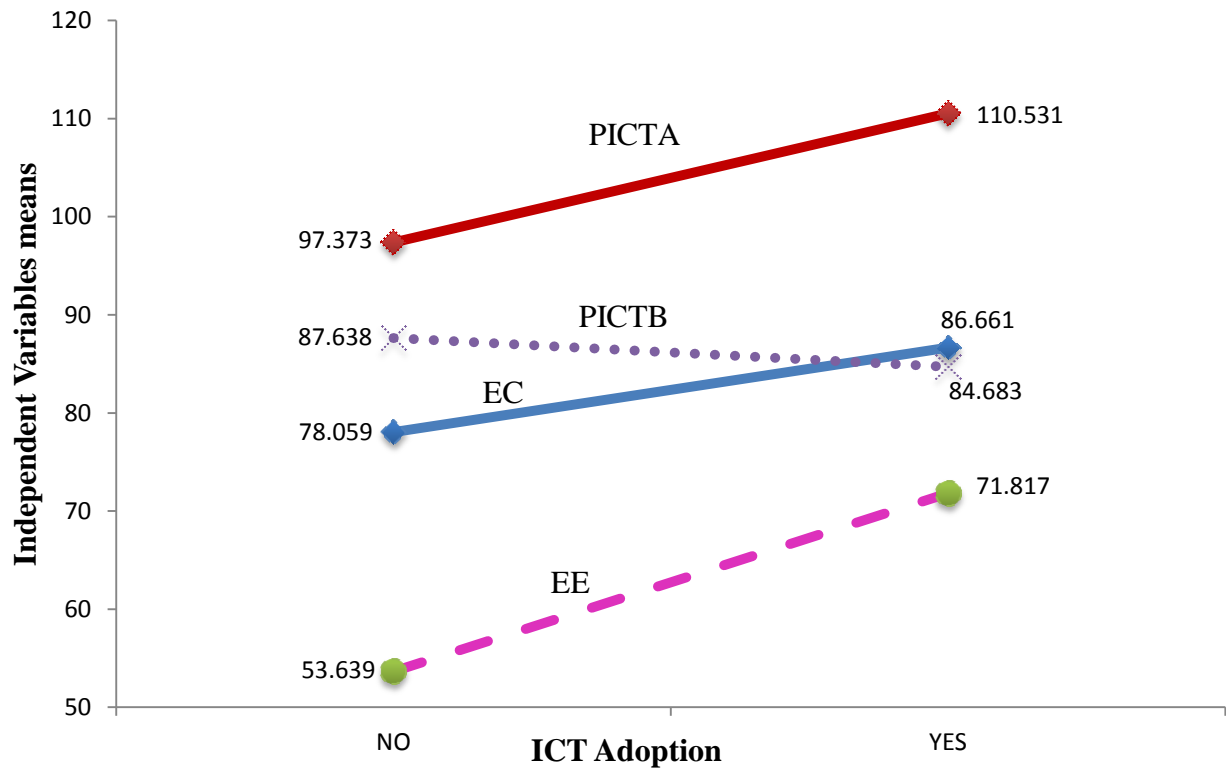
The results in Table 4.35 indicate that the difference between sample means for adopters and non-adopters is 2.955 which is not significant at $\alpha = 0.05$. The research fails to reject the null hypothesis and conclude that there is no difference between the two means. This findings are supported by Tan et al. (2009) who found that out of eight perceived ICT barriers they investigated only two (unsuitability for business and lack of security) were significant among SMEs in Malaysia.

Table 4.35: T-Test on Mean Difference

	Adoption	N	Mean	Mean Difference	Std. Deviation	Std. Error Mean	t	Sig.
PICTB	NO	61	87.637	2.955	14.556	1.863	1.451	0.148
	YES	163	84.682		13.186	1.032		

4.10 Mean Plots for all Independent Variables

The mean plot in Figure 4.34 graphically shows the direction of influence of the four independent variables on ICT adoption by formal small enterprises in urban Kenya.



Key:

EC= Enterprise Characteristics; PICTA= Perceived ICT Attributes; EE= External Environment; PICTB= Perceived ICT Barriers

Figure 4:34: Mean Plot for Independent Variables Against ICT Adoption

Mean difference of the independent variables shown in Table 4.36 indicate that external environment had the greatest influence on adopters than non-adopters by

(18.177) followed by perceived ICT attributes (13.158) followed by enterprise characteristics (8.601). Perceived ICT barriers influenced non-adopters more than adopters by (2.955).

Table 4.36: T-Test on Mean Difference for Independent Variables

	Adoption	N	Mean	Mean Difference	Std. Deviation	Std. Error Mean	t	Sig.
EC	NO	61	78.059	-8.601	15.747	2.016	-3.664	0.000
	YES	163	86.661		15.601	1.222		
PICTA	NO	61	97.373	-13.158	15.169	1.942	-5.315	0.000
	YES	163	110.531		19.594	1.534		
EE	NO	61	53.639	-18.177	17.311	2.216	-6.597	0.000
	YES	163	71.817		18.730	1.467		
PICTB	NO	61	87.637	2.955	14.556	1.863	1.451	0.148
	YES	163	84.682		13.186	1.032		

4.11 Logistic Regression

Regression analysis was carried out as discussed in Section 3.8.1 of this document using category weights for the five point Likert's scale questions. The statistical model was fitted as follows:

$$\text{Logit (Y)} = \ln \left(\frac{\pi}{1-\pi} \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Therefore,

$$\pi = \text{Probability (Y= ICT Adoption | } X_1 = x_1, X_2 = x_2, X_3 = x_3, X_4 = x_4)$$

$$= \frac{e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4)}}{1 + e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4)}}$$

where π is the probability of the event, ICT adoption occurring, α is the Y intercept, β s are regression coefficients, and Xs are a set of predictors for example $X_1 =$ enterprise

characteristics (EC), X_2 = perceived ICT attributes (PICTA), X_3 = external environment (EE), X_4 = perceived ICT barriers (PICTB) and ε is the error term.

The study found that enterprise characteristics negatively influenced ICT adoption for example increases adoption by 0.990 (see Table 4.37) which implies that the internal business environment of formal small enterprises is not conducive for adoption of ICT. This study found that 68.3% of enterprises have only one branch and 57.6% have annual sales between 4.1 and 5.0 million Kenya shillings (see Figure 4.9 and 4.10) these coupled by the fact that 44.4% of entrepreneurs have only basic ICT skills (see Figure 4.11) could be the reason for negative influence on adoption. The beta coefficient is not significant meaning that there is no difference between those who adopt and those who do not thus the study accepts the null hypothesis. Prior research by Van Akkeren and Harker (2003) cited small enterprise size, sector and low information intensity as factors that hinder ICT adoption. On the other hand, the model shows that perceived ICT attributes have positive influence on ICT adoption for example increases adoption by 1.015 which agrees with the findings of Tan et al. (2009); Giovanni and Mario (2003); Alam et al. (2009). However, the beta coefficient is insignificant implying that there is no difference between those who adopted and those who have not adopted thus the study accepts the null hypothesis.

The external environmental factors which included technological changes, government, customers, supplies and competitors actions had positive significant influence on ICT adoption for example increases adoption by 1.016. The study rejects the null hypothesis and concludes that external environment significantly influences adoption of ICT in positive direction. This concurs with previous research by Mpofo et al. (2008), and Harindranath et al. (2008) but disagrees with Alam and Noor (2009) finding in Malaysia that external pressure was not significant in influencing ICT

adoption among small enterprises. Lastly, perceived ICT barriers influenced ICT adoption negatively for example increases adoption by 0.977 but was not significant thus the study accepts the null hypothesis which is in agreement with prior research by Tan et al. (2009).

Table 4.37: Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EC	-.010	.015	.464	1	.496	.990	.960	1.020
PICTA	.015	.013	1.442	1	.230	1.015	.990	1.041
EE	.059	.014	18.595	1	.000	1.060	1.032	1.089
PICTB	-.023	.013	3.002	1	.083	.977	.952	1.003
Constant	-1.414	1.588	.793	1	.373	.243		

$$\text{Logit (ICT Adoption)} = -1.414 - 0.01\text{EC} + 0.015\text{PICTA} + 0.059\text{EE} - 0.023\text{PICTB}$$

4.11.1. Logistic Model Evaluation

Classification of both observed and predicted outcomes shows 72.8% of overall correct prediction (see Table 4.38).

Table 4.38: Classification Observed and Predicted Outcomes of ICT Adoption

Observed	Predicted		% Correct
	No	Yes	
No	0	61	0
Yes	0	163	100
Overall % Correct			72.8

Results in Table 4.39 shows -2 log likelihood Chi square distribution for the logistic regression has p value of 0.000 hence the study concludes that the four variables are statistically significant. According to Tranmer and Elliot (2007), -2 log likelihood is a measure of how well the model explains variations in the outcome of interest thus the significance of the variables implies that they collectively explain variation in ICT adoption by formal small enterprises. Hosmer and Lemeshow (H-L) tests of the

goodness-of-fit of the model was insignificant at 95% confidence level suggesting that the model was well fitted to the data.

Table 4.39: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	47.706	4	.000
	Block	47.706	4	.000
	Model	47.706	4	.000

Model Summary:

-2 Log likelihood 214.622 ; Cox & Snell R Square 0.192 ; Nagelkerke R Square 0.278

Hosmer and Lemeshow (H-L) test of Goodness-of-fit

Chi-Square: 12.707 df: 8 Sig.: 0.122

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings, gives conclusions and recommendations based on the four research hypotheses of this study. The main objective of the research was to determine factors that influence information communication adoption by formal small enterprises in urban Kenya.

5.2 Summary of the Findings

5.2.1. ICT Adoption

Small enterprises that have adopted ICT have done so in the last seven years with a peak in the last two to four years. This is could be attributed to improved Internet communication due to the landing of three fibre optic cables in 2009 and approval of ICT media bill in 2009. The study found that computerization of business processes was widely done by majority of enterprises, followed by use of Internet social network then E-commerce and lastly use of CC-TV. It was further found that over fifty percent of enterprises that were using more than one forms of ICT. Based on these findings and by using Zappala and Gray (2006) stage model of ICT adoption, it appears that majority of small enterprises in urban Kenya are in intermediate stage of ICT adoption.

5.2.2. Influence of Enterprise Characteristics on ICT Adoption

The findings of this study is that entrepreneur's ICT skills as well as employees basic skills and advances skills in ICT plays a major positive role in adoption of E-commerce, computerization of business operations and use of CC-TV for business monitoring and security. However, advanced skills in Internet social networks among employees negatively affects its adoption. The entrepreneurs were more inclined to use

internal ICT specialists than external ones which is contrary to Windrum de Berranger (2002) findings where he argued that external support and motivation from ICT experts are crucial for ICT adoption by SMEs. It was found that the higher the level of ICT education of the entrepreneur, the higher the likelihood of ICT adoption. Mutula and Wasike (2009) had similar results where they found that a manager with some training in ICT was likely to influence adoption of ICT in a firm.

Women entrepreneurs were found to be more likely to adopt E-commerce, Internet social network and computerization of business than men entrepreneurs who only prevailed in the use of CC-TV for business monitoring and security enhancement. Younger entrepreneurs were more likely to adopt E-commerce, Internet social network and computerization business operations than older generation with exception in the use of CC-TV where older generations prevailed. These findings concurred with Gray (2006); van Akkeren and Cavaye (1999) and Manuelli (2007) who found that age and experience of entrepreneur as well as age and size of a firm were important attributes of effective ICT adoption.

The entrepreneurs did not feel threatened that adoption of any of the ICT would diminish their say in their businesses. This could be attributed to the fact the a majority of entrepreneurs were ICT literate which is supported by Gray (2006) findings that entrepreneurs with technical or vocational qualifications were more likely to engage in innovative activities which includes ICT adoption. Majority of the entrepreneurs agreed that having an ICT strategy for their business was important and that they had sufficient resources for its implementation. It was noted that in most cases over 20% of entrepreneurs were uncertain in answering questions related to use of CC-TV. Overall, enterprise characteristics were found to influence more on the adopters than non-adopters its influence on ICT adoption was found to be 0.990.

5.2.3. Influence of Perceived ICT Attributes on ICT adoptions

Majority of entrepreneurs agreed that relative advantages of using ICT, which included simplification of work routines, provision of reliable business communication, efficient coordination, improved customer satisfaction, creation of new business opportunities, new product and services development, reduction of operation cost and increase in productivity led to adoption of E-commerce, Internet social networks and computerization of business operations. The same trend was observed in other ICT attribute such as compatibility, complexity, triability and observability. The findings agreed with Beckinsale and Ram (2006); Tan et al. (2009), but were contrary to Alam and Noor (2009) who found that the respondents did not think that computerization simplified their work.

In the case of use of CC-TV, majority of entrepreneurs disagree that the relative advantages, compatibility, complexity, triability and observability of using it led to its adoption. It was noted that the percentage of respondents who were uncertain was over 30%. Overall, perceived ICT attributes were found to influence more on the adopters than non-adopters. Its influence on ICT adoption was found to be 1.015 times.

5.2.4. Influence of External Environment on ICT Adoption

The study found that adoption of E-commerce, Internet social network and computerization of business operations were positively influenced by customers, suppliers, competitors and government actions. Majority of respondents agreed that changes in technology positively influenced adoption of E-commerce, Internet social networks and computerization of business operations. This finding are supported by prior findings of Alberto and Fernando (2007) and Gulbranson et al. (2008) that rapid innovation of new technology leads to its adoption by organizations in order to be competitive in the global market.

Government intervention measures such as offer of online tax services, removal of VAT from ICT products, establishment of digital villagers and inclusion of ICT in government's long-term strategy (Vision 2030) had minimal effect on ICT adoption. This could mean that the interventions are not known by the small enterprises. Prior research work by Alam and Noor (2009), Howell and Terziovski (2005), Seyal and Rahman (2003), and Smallbone and Welter (2001) found that government played a significant role in positively influencing ICT adoption. This is not the case for Kenyan formal small enterprises that seems to have negative opinion on the influence.

Majority respondents disagreed that changes in the external environment influenced their decision to adopt CC-TV where over 20% were uncertain. External environmental factors were found to be the main influencers of ICT adoption. The logistic regression shows that external environment influenced adoption by 1.060 times. Prior work by Aghaunor and Fotoh (2006); Beckinsale and Ram (2006) and Alam and Noor (2009) found that external environmental factors positively influenced technology adoption by enterprises.

5.2.5. Influence of Perceived ICT Barriers on ICT Adoption

The study found that enterprises that are not using E-commerce sighted inconsistency with business needs as the major reason of not using it followed by no perceived benefit. This confirms Bharadwaj and Soni (2007) findings in USA that the major reason for enterprises not engaging in E-commerce was their perception that it was not strategically important for them. Majority of the entrepreneurs who are not using it indicated that their businesses required physical interaction with the customers and suppliers.

In the case of Internet social networks, majority of entrepreneurs singled out inconsistency with business as the major cause of not using it with a number sighting

possibility of employees misusing it through online chatting with friends. Lack of training was also highlighted as a reason of not adopting Internet social network. Small enterprises that had not computerized their business operations cited no perceived benefit and lack of data security as the main reasons they had not adopted it. Majority of the respondents who are not using CC-TV indicated that the small physical size of their businesses did not warrant its use. They also cited inconsistency with business needs, costs of implementation, and no perceived benefit as so of the reasons as to why they have not adopted it.

The study further found that majority of entrepreneurs felt that Kenyan laws governing the use of ICT were not being enforced by the law courts where cases involving online transactions were dismissed for lack of evidence. Overall, entrepreneurs were indifferent on the influence of perceived ICT barriers on ICT Adoption. It is further supported by the fact that the independent t-test of the means of perceived ICT barriers was insignificant and the mean difference between adopters and non-adopters was only 2.9552. Logistic model shows that perceived ICT barriers influence ICT adoption by 0.977 times. This findings are supported by Tan et al. (2009) who found that out of eight perceived ICT barriers they investigated only two (unsuitability for business and lack of security) were significant among SMEs in Malaysia.

5.3 Conclusions of the Findings

It is evident from the research that different factors influence ICT adoption in different directions and magnitude. Of importance in this study is that fact young entrepreneurs are the majority formal small enterprises owners who possess the skills to adopt new ICTs in their business operations. Entrepreneurs do not suffer from inferiority complex thus there are open to new ideas of using ICT in their businesses which can be

attributed to the fact that most of them have basic ICT skills and above. Businesses co-owned by a man and woman will adopt ICT faster than those owned by men alone while women entrepreneurs top the list in adoption of ICT. These are in line with theory of reasoned action and ICT adoption model developed by van Akkeren and Cavaye (1999).

Overall, computerization of business operations topped the list of ICT adoption since it forms the basis on which other areas of ICT are anchored. However, Internet social networks led to decline in employee productivity due to some of them misusing it by chatting with friends online for long hours. When used in the right way it facilitates communication and large data handling. Entrepreneurs can use ICT as an avenue of venturing into new markets and new product development. The study concluded that external environmental factors apart from government intervention programs have direct influence on ICT adoption. As such, entrepreneurs should constantly scan it in order to identify opportunities and threats, which, can be addressed by adopting new technological innovations in line with Roger's innovation diffusion theory.

Adoption of CC-TV as a means for business monitoring and maintenance of security was low (23.6%) mainly because majority of entrepreneurs were not sure of its value to their businesses. Some respondents indicated that the small size of their businesses did not warrant its use. This is true given that majority of the enterprises have a single branch with low annual turnovers. The study concluded that high percentages of entrepreneurs who were uncertain on the adoption of CC-TV might imply that they do not have sufficient information that would help them in making a decision on whether to use it or not.

5.4 Recommendations

The study recommends the following:

- i) That training institutions in collaboration with ICT board of Kenya and relevant line ministries should come up with ICT demonstration sites equipped with virtual businesses that could be used to train young entrepreneurs on how to effectively use ICT in their businesses. This would help them to try ICT, see its positive results and resolve issues of business compatibility before launching them in their businesses.
- ii) In order to increase usage of CC-TV for business monitoring and security enhancement, the government should consider giving appropriate incentives such as duty waiver on imported CC-TV gadgets, recovery of purchase costs by including it in input VAT just to mention a few.
- iii) Small enterprises should have well balance gender representation in its top management as it leads to higher rate of ICT adoption.
- (iv) The government should focus more in marketing its ICT intervention programs to formal small enterprises in urban Kenya.

5.5 Recommended Future Research

The study recommends future research to focus on:

- i) Factors responsible for gender variation in ICT adoption where women entrepreneurs lead in adoption of E-commerce, Internet social network and computerization of business operations but not in the use of CC-TV for business monitoring and security enhancement. This will help to come up with remedies so as to increase overall ICT adoption.
- ii) Reasons as to why 27.2% of small enterprises have only applied one form of ICT hence not benefit from ICT diversification. This is because computerization

of business operations is turning to be a “hygiene” factor in small formal enterprises in Kenya thus competitive advantage will in future be base of on what ICT is anchored to it and how it is being utilized. To this end, continuous learning is necessary and development of innovative products and services is inevitable through adoption of other forms of ICTs.

- iii) Use of CC-TV is known to improve business monitoring and security enhancement but this study found less than a quarter of the entrepreneurs were using it. It therefore recommends future research work investigate why majority of small enterprises are not using CC-TV.
- iv) Reasons as to why government programs aimed at influencing ICT adoption by enterprises has failed to do so in the case of formal small enterprises operating in urban Kenya.

REFERENCES

- Aghaunor, L., & Fotoh, X. (2006). Factors Affecting Ecommerce adoption in Nigerian Banks. *Jonkoping International Business School*. Jonkoping University.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl, & J. Beckmann (Eds.). *Action control: From cognition to behaviour*. New York: Springer-Verlag.
- Alam.S., Khatibi, A., Ahmad, M., & Ishmail, H (2007). Factors affecting E-commerce adoption in the Electronic Manufacturing Companies in Malaysia. *International Journal of Commerce and Management*, 17(1/2), 125-139.
- Alam, S., & Noor, M. K. M. (2009). ICT adoption in small and medium enterprises: an empirical evidence of service sector in Malaysia. *International Journal of Business and Management*, 4(2), 112-125.
- Alberto, B. M., & Fernando, L.L.(2007). A firm-level analysis of determinants of ICT adoption in Spain. *Technovation*, 27, 352-366.
- Alexander, N., & Colgate, M. (2000). Retail financial services: transaction to relationship marketing. *European Journal of Marketing*, 34(8), 938-953.
- Alonso, F., & Fitzgerald, G. (2004). A multi-theoretical framework to study SMEs e-business progression .*Proceedings of the European & Mediterranean Conference on Information Systems*, Tunis, 25-27 July. Retrieved from [http:// uxisweb1.brunel.ac.uk/iseingsites/EMCIS/ EMCIS2004/subsite/papers/EMCIS-103.pdf](http://uxisweb1.brunel.ac.uk/iseingsites/EMCIS/EMCIS2004/subsite/papers/EMCIS-103.pdf).
- Al-Qirim, N. (2004). *Electronic commerce in small to medium sized enterprises: frameworks, issues and implications*. Hershey, PA: Idea Group Publishing.
- Al-Qirim, N. (2006). Personas of E-commerce adoption in small businesses in New Zealand. *Journal of Electronic Commerce in Organizations*, 4(3), 17-45.
- Ashrafi, R., & Murtaza, M. (2008). Use and impact of ICT on SMEs in Oman. *The Electronic Information Systems Evaluations*, 11(3), 125-138.
- Bagchi, K., & Udo, G. (2007). Empirically testing factors that drive ICT adoption in Africa and OECD set of nations. *Issues in Information Systems*, 7(2), 45-52.
- Bagozzi, R. P. (2007). The legacy of technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8(4), 244-254.
- Beckinsale M., & Ram, M. (2006). Delivering ICT to ethnic minority businesses: an action- research approach. *Environment and planning C: Government and Policy*, 24(6), 847 – 867.

- Beckinsale, M., & Levy, M. (2004). *SMEs and Internet adoption strategy: Who do SMEs listen to?* Retrieved from <http://csrc.lse.ac.uk/asp/aspecis/20040016.pdf>.
- Bharadwaj, P. N., & Soni, R. G. (2007). E-commerce usage and perception of E-commerce issues among small firms: Results and implications from an empirical study. *Journal of Small Business Management*, 45(4), 501-521.
- Bharati, P., & Chaudhury, A. (2006). Current status of technology adoption: Micro, small and medium manufacturing firms in Boston. *Communications of the ACM*, 49(10), 88-93.
- Braun P. (2004). *Regional Tourism Networks: The nexus between ICT diffusion and change in Australia*. Centre for Regional Innovation & Competitiveness, University of Ballarat, Australia.
- Caldeira, M. M., & Ward, J. M. (2002). Understanding the successful adoption and use of IS/IT in SMEs: an explanation from Portuguese manufacturing industries. *Information Systems Journal*, 12, 121-152.
- Carbonara N. (2005). Information and communication technology and geographical clusters: opportunities and spread. *Technovation*, 25(3), 213-222.
- Chibelushi, C., & Costello, P. (2009). Challenges Facing West Midlands ICT-Oriented SMEs. *Journal of Small Business and Enterprise Development*, 16 (2), 210-239.
- Churchill, G. A., & Brown, T. J. (2000). *Basic marketing research*. Thompson Corporation, USA.
- Chong, S., Pervan, G., & Bauer, C. (2001). Implementation success of Internet-based electronic commerce for small-and medium-sized enterprises in Australia. 14th *International Bled Electronic Commerce Conference*. Bled, Slovenia, June 25-26.
- Chowdhury, S., & Wolf, S. (2003). Use of ICTs and economic performance of small and medium enterprises in East Africa. *Discussion Paper No. 2003/06, WIDER*, United Nations University.
- Chuttur, M. Y. (2009). Overview of the technology acceptance model: Origins, development and future directions, Indiana University, USA. *Sprouts: Working papers on Information Systems*, 9(37). Retrieved from <http://sprouts.aisnet.org/9-37>.
- Dedrick, J., Gurbaxani, V., & Kraemer, K.L. (2003). Information technology and economic performance: a critical review of the empirical evidence. *ACM Computing Surveys*, 35(1), 1-28.
- Department of Trade and Industry (DTI) (2001). *Business in the information age: International benchmarking report*. London: Department of Trade and Industry.
- Deloitte, (2011). *A New Twist: Economic Outlook*. Deloitte and Touche 2011.

- Dixon, T., Thompson, R., & McAllister, P. (2002). *The value of ICT for SMEs in the UK: A critical literature review*. College of Estate Management, Reading.
- Duan, Y., Roisin, M., David, H., Stanislaw, S., Henry, S., Virgilio, M. & Joao, A. (2002). Addressing ICTs skill challenges in SMEs: insights from three country investigations. *Journal of European Industrial Training*, 26(9), 430-441.
- Duncombe, R., & Heeks, R. (2001). Information and communication technologies and small enterprise in Africa. Lesson from Botswana. Retrieved from <http://www.sed.manchester.ac.uk/idpm/research/is/ictsme/full/section2.doc>.
- El-Hadary, O. (2001). Security and the Factors Affecting the Acceptance of B2B Digital Marketplaces in Egypt. *USAID Egypt*.
- Eriksson, L.T., & Hultman, J. (2005). One digital leap or a step-by-step approach? – An empirical study of E-commerce development amongst Swedish SMEs. *International Journal of Electronic Business*, 3(5), 447-460.
- Ernst & Young (commissioned by the National Office for the Information Economy (NOIE) of Australia) (2001). *Advancing with E-commerce*. Retrieved from <http://www.noie.gov.au>.
- Esselaar, C., Stork, A., Ndiwalana, M., & Deen-Swarra, (2007). ICT usage and its impact on profitability of SMEs in 13 African Countries. *The MIT Press*, 4(1), 87-100.
- Esselaar, S., Gillwald, A., & Stork, C. (2007). *Telecommunications sector performance in 16 African countries: A supply side analysis of policy outcomes*. RIA LINK Centre, University of the Witwatersrand. Retrieved from <http://www.researchICTafrica.net>.
- Fichman, R.G. (2000). The diffusion and assimilation of information technology innovations. In Zmud R.W., (Ed.), *Framing the domains of IT management: Projecting the future through the past*. Cincinnati: Pinnaflex Education Resources.
- Field, A. (2005). *Research Methods II: Factor analysis on SPSS*. Upper Saddle River, NJ: Pearson Education.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behaviour: Introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gemino, A., MacKay, N., & Reich, B. (2006). Executive Decisions about Website Adoption in Small and Medium-Sized Enterprises. *Journal of IT Management*, 17(1), 26-36.
- Gibbs S., Sequeira J., & White, M. M. (2007). Social networks and technology adoption in small business. *International Journal of Globalisation and Small Business*, 2(1), 66-87.

- Gillwald, A., & Stork, C. (2008). Towards evidence-based ICT policy and regulation: *ICT access and usage in Africa, 1(2)*. Retrieved from <http://www.researchICTafrica.net>.
- Gillwald, A. (2005). *Towards an African e-Index*. The LINK Centre, Wits University School of Public and Development Management, Johannesburg. Retrieved from <http://link.wits.ac.za/research/e-index.html>.
- Gillwald, A., & Esselaar, S. (2004). *South African ICT sector performance review*. Wits University School of Public and Development Management, Johannesburg.
- Giovanni, F., & Mario, A. (2003). Small company attitude towards ICT based solutions: some key-elements to improve it. *Educational Technology & Society, 6(1)*.
- Gray, C.W.J (2006). Stage models of ICT adoption in small firm. In: Zappala, S. and Gray, C (Eds.), *Impact of E-commerce on consumers and small firms*. London, Ashgate, 3-20.
- Gulbranson, C. A., Audretsch, D. B, Planck, M. (2008). *Proof of concept centers: Accelerating the commercialization of university innovation*. Kauffman Foundation.
- Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Pearson Education.
- Harindranath, G., Dyerson, R., & Barnes, D. (2008). ICT in small firms: factors affecting the adoption and use of ICT in Southeast England SMEs. *Proceedings of the 2008 European Conference on Information Systems (ECIS)*. Galway, Ireland. ECIS, 2008.
- Heberman, S. (1978). *Analysis of qualitative data*. (1). New York: Academic press.
- Houghton, K. A., & Winklhofer, H. (2004). The Effect of Website and E-commerce adoption on the relationship between SMEs and their export intermediaries. *International Small Business Journal, 22(4)*, 369-388.
- Howell, A., & Terziowski M. (2005). *E-commerce, communities and government - a snapshot of the Australian experience*. *Communities and Technologies*. Netherlands: Springer Publisher.
- Hu K., & Liu H. (2006). *The relationship among the resource of incubators, firms type and performance: An empirical study of academic incubators in Taiwan*. IAMOT, Yuan-Ze University, Taiwan.
- Hussin, H., & Noor, R.M. (2005). Innovating business through E-commerce: explore the willingness of Malaysian SMEs. *Proceedings of the 2nd International Conference on Innovations in Information Technology*. Dubai, UAE.

- Kapurubandara, M., & Lawson, R. (2006). Barriers to adopting ICT and E-commerce with SMEs in developing countries: an exploratory study in Sri Lanka. *Proceedings of the Conference of COLLECTeR*. Adelaide, 9thDecember, 1-13.
- Kazi, A.U. (2007). Small and medium business enterprises and the use and adoption of information and communication technology: a study of legal issues and legal perspectives. *International Journal of Organisational Behaviour*, 12(1), 144-160.
- Kemibaro, M., (2010). *A review of Kenya's ICT position in 2009*. Retrieved from <http://www.moseskemibaro.com/2010/01/02/a-review-of-kenyas-ict-position-in-2009>.
- Kenya Economic Survey, (2011). International Monetary Fund Country Report No 12/14.
- Kim, W. G., & Cha, Y. (2002). Antecedents and consequences of relationship quality in hotel industry. *Hospitality Management*, 21, 321-338.
- Kohli, R., & Devraj, S. (2003). Measuring information technology payoff: a meta-analysis of structural variables in firm-level empirical research. *Information System Research*, 14(2), 127-145.
- Lal, K. (2007). Globalisation and the adoption of ICTs in Nigerian SMEs. *Science Technology & Society*, 12, 217-244.
- Landau, S., & Everitt, B. S. (2005). *A Handbook of Statistical Analyses using SPSS*. New York: Chapman & Hall
- Lauder, G., & Westhall, A. (1997). *Small firms on-line*. Commission on public policy and British Business.
- Limthongchai, P., & Speece, M. W. (2003). The effect of perceived characteristics of innovation on E-commerce adoption by SMEs in Thailand. *Proceedings of the 7th International Conference on Global Business and Economic Development*. Bangkok, Thailand.
- Looi, H. (2004). A Model of Factors Influencing Electronic Commerce Adoption among Small and Medium Enterprises in Brunei Darussalam International. *Journal of Information Technology*, 10 (1).
- Lyanda, O., & Ojo, S. O. (2008). Motivation, influences, and perceived effects of ICT adoption in Botswana organizations. *International Journal of Emerging Markets*, 3 (3), 311-322.
- Malhotra, N. K. (2004). *Marketing research: An applied orientation*. Upper Saddle River, NJ: Pearson Education.
- Manueli, K., Latu, S., & Koh, D. (2007). *ICT Adoption models*. 20th Annual Conference of the National Advisory Committee on Computing Qualifications (NACCQ), Nelson, New Zealand. Retrieved from <http://www.naccq.ac.nz>.

- Moturi, C. , & Ogada, T. (2006). The role of research and development in the industrialization process in kenya. Kenya Industrial Research and Development Institute. Technical workshop on Industrialization 22nd November 2006, KICC, Nairobi.
- Mpofu, C. K., Milne D. & Watkins-Mathys, L. (2008). *ICT adoption and development of e-business among SMEs in South Africa*. PhD Research, Buckinghamshire New University, Faculty of Enterprise& Innovation, United Kingdom.
- Mutula, S. M., & Brakel, P. (2006). E-readiness of SMEs in the ICT Sectors in Botswana with Respect to Information Access. *Emerald Group Publishing Limited*, 24(3), 402-417.
- Mutula, S. M., & Brakel, P. (2007). ICT skills readiness for the emerging global digital economy among small businesses in developing countries. Case study of Botswana. *Emerald Group Publishing Limited* 25(2), 231-245.
- Mutua, M. J., & Wasike, S. K. W. (2009). Special research project on ICT and economic development in Africa. African Economic Research Consortium (AERC). www.aercafrica.org.
- Nunnally, J. C. (1978). *Psychometric theory* (2ndEd.).New York: McGraw Hill.
- Ongori, H., & Migiro, O. S. (2010). Information and communication technology adoption in SMEs: Literature review. *Journal of Chinese Entrepreneurship*, 2(1), 93-104.doi: 10.1108/17561391011019041.
- Organization of Economic Cooperation and Development (OECD) (2004). *ICT, E-Business and SMEs*. In 2nd OECD Conference of Ministers Responsible for Small and Medium-Sized Enterprises (SMEs). OECD: Paris.
- Pedersen, P. E. (2003). Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. Retrieved from http://ikt.hia.no/perrep/earlyadopt_paper.pdf.
- Peng, C. J., Lee, K. L.,& Ingersoll, G.M. (2002). An introduction to logistic regression analysis and reporting. *The Journal of Education Research*, 3-14.
- Pool, P. W., Parnell, J. A., Spillan, J. E., Carraher, S., & Lester, D. L. (2006). Are SMEs meeting the challenge of integrating E-commerce into their businesses? A review of the development, challenges and opportunities, *International Journal of Information Technology and management*, 12, 121-152.
- Poon, S., & Swatman, P. (1999). An exploratory study of small business Internet commerce issues. *Information and Management*, 35, 9-18.
- Quaddus, M., & Hofmeyer, G. (2006). Factors influencing the adoption of B2B trading exchanges in Small Businesses in Western Australia: A Field study Approach. *The Tenth Pacific Asia Conference on Information Systems* (PACIS 2006).

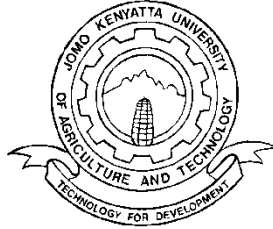
- Republic of Kenya (1992). *Small Enterprise and Jua Kali Development in Kenya*. Sessional paper No. 2. Nairobi: Government printer.
- Republic of Kenya (2005). *Development of micro and small enterprises for wealth and employment creation for poverty reduction*. Sessional paper No.2. Nairobi: Government printer.
- Republic of Kenya (2007). *Kenya vision 2030: A globally competitive and prosperous Kenya*. Nairobi: Government printer.
- Republic of Kenya (2012). *Micro and Small Enterprises (MSE) Bill 2012*. Nairobi: Government printer.
- Ritchie, B., & Brindley, C. (2005). ICT adoption by SMEs: Implications for relationships and management. *New Technology, Work and Employment*, 20, (3), 205-217.
- Rogers, E. M. (1983). *Diffusion of innovations*. New York: Free Press.
- Rogers, E. M. (1995). *Diffusion of innovations* (5thed.). New York: Free Press.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. (5thed.). Essex: Pearson Education.
- Schlesselman, J. J. (1982). *Case control studies: Design, control, analysis*. New York: Oxford University Press.
- Sekaran, U. (2003). *Research methods for business: A skill building approach*. New York: Wiley.
- Seyal ,A. H., & Rahman, M. N. A. (2003). A Preliminary investigation of E-commerce adoption in small & medium enterprises in Brunei. *Journal of Global Information Technology Management*, 6(2), 6- 25.
- Seyal, A. H., & Rahim, M.M. (2006). A preliminary investigation of electronic data interchange adoption in Bruneian small business organisations. *The Electronic Journal of Information Systems in Developing Countries*, 24(4), 1-21.
- Shiels, H., Mclvor, R., & O'Relly, D. (2003). Understanding the implications of ICT adoption: insights from SMEs. *Logistics Information Management*, 16 (5), 312-326.
- Slyke, C. V., Belanger, F., & Comunale, C. L. (2004a). Factors influencing the adoption of web-based shopping: the impact of trust. *Database for Advanced in Information Systems*, 35 (2), 32-49.

- Slyke, C. V., Belanger, F., & Hightower, R. (2005). Understanding gender-based differences in consumer E-commerce adoption. *Proceedings of the 2005 Southern Association for Information Systems Conference*. Savannah, GA.
- Slyke, C. V., Lou, H., Belanger, F., & Sridhar, V. (2004b). The influence of culture on consumer-oriented electronic commerce adoption. *Proceedings of the 7th Annual Conference of the Southern Association for Information Systems*. Savannah, GA.
- Smallbone D., & Welter F. (2001). The role of government in SME development in transition economies. *International Small Business Journal*, 19(4), 63-77.
- Ssewanyana, J., & Busler, M. (2007). Adoption and usage of ICT in developing countries: Case of Ugandan firms. *International Journal of Education and Development using ICT*, 3(3), 49-59. Retrieved from <http://ijedict.dec.uwi.edu/viewarticle.php?id=349>.
- Stork, C., & Esselaar, S. (2006). *SME e-access and usage*. Johannesburg: Axius publishing.
- Stroeken, J. H. M. (2001). The adoption of IT by SMEs: The Dutch case. *Journal of Enterprising Culture*, 9(1), 129-152.
- Tan, K. S., Chong, C. S., Lin, B., & Eze, U. C. (2009). Internet-based ICT adoption: evidence from Malaysian SMEs. *Industrial Management & Data Systems* 109(2), 224-244.
- Tan, M., & Teo, T. S. H. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1(5), 1-42.
- Temtime, Z. T., Chinyoka, S. V., & Shunda, J. P. W. (2003). Toward strategic use of IT in SMEs: A developing country perspective. *Information Management & Computer Security*, 11(5), 230-237.
- Teo, T. S. H., & Pok, S. H. (2003). Adoption of WAP-enabled mobile phones among Internet users. *The International Journal of Management Science*, 31(6), 483-498.
- Tranmer, M. & Elliot, M. (2007). Binary Logistic Regression. Cathie Marsh Centre for Census and Survey Research.
- van Akkeren, J., & Harker, D. (2003). The mobile Internet and small business: An exploratory study of needs, use and adoption with full adopters of technology. *Journal of Research and Practice in information Technology*, 35(3), 2005-220.
- van Akkeren, J., & Cavaye A. L. (1999). Baby S to Little S: Small business IT market readiness and overcoming their fear factor. *Proceedings of the 10th Australasian Conference on Information Systems (ACIS99)*, 1071-1083). Wellington, New Zealand.

- Windrum P., & de Berranger P (2002). The Adoption of e-business technology by SMEs. Presented at *MERIT - Infonomics Research Memorandum Series*, 1-32.
- Wolf, S. (2001). *Determinants and impact of ICT use for African SMEs: Implications for rural South Africa*. Centre for Development Research (ZEF Bonn), Bonn University, TIPS (Trade and Industrial Policy Strategies), Annual Forum.
- World Bank (2006). Information and communications for development – global trends and policies, Chapter 4: *the role of ICT in doing business*. Retrieved from http://www.rru.worldbank.org/documents/other/Chapter4_ICT_in_DoingBusiness.pdf.
- Wymer, S. A., & Regan, E. A. (2005). Factors influencing E-commerce adoption and use by small and medium businesses. *Electronic Markets*, 15(4), 438-453.
- Zappala S., & Gray C. W. J. (eds.) (2006). *Impact of E-commerce on consumers and small firms*, London, Ashgate. *Effective e-business*. Published: Century Press.
- Zhang, Z., Waszink, A., & Wijngaard, J. (2000). An instrument for measuring TQM implementation for Chinese manufacturing companies. *International Journal of Quality and Reliability Management*, 17(7), 730-755.

APPENDICES

Appendix 1: Questionnaire



Daniel M Wanyoike
PhD Student in Entrepreneurship
Jomo Kenyatta University of Science and Technology (JKUAT)
Nairobi CBD Campus

7th November 2011

Dear Sir/Madam,

RE: ICT Adoption by Formal Enterprises in Urban Kenya

{Your views on factors influencing (positively or negatively) on ICT adoption}

This questionnaire is part of my PhD research to determine factors that influence information communication technology (ICT) adoption by formal enterprises in urban Kenya. Your responses are important in enabling me to obtain as full an understanding as possible of this topical issue.

The questionnaire should take you about fifteen minutes to complete. Please answer the questions in the spaces provided. If you wish to add further comments, please feel free to do so. The information you provide will be treated in the **strictest confidence**. You will notice that you are not asked to include your name or address anywhere in the questionnaire. The answers you provide will be used as the main data set for my research work in entrepreneurship at the School of Human Resource Development, JKUAT.

Please return the completed questionnaire to the undersigned, by **30th November 2011** in the enclosed stamped and addressed envelope. If you have any questions or would like further information, please do not hesitate to call me on my mobile number **0720-390894** or e-mail danwanyoike@yahoo.com.

Thank you for your help.

Yours sincerely,

Daniel Wanyoike.

A) Business Background Information

1. Is the business registered as:
 - a) Sole proprietor_____b) Partnership _____c) Limited _____
2. In which town is the business located? _____
3. Which year did your business operations start? _____
4. What is the core business activity?

B) ICT Adoption

Please **tick** Yes or No for the following ICT facilities and answer the follow-up questions.

Type of ICT Facility	Business Usage		If Yes :- Give number of years of usage	If no: - Give reasons (see choices in next page)
	Yes	No		
Use of E-commerce i.e. sale of products/services online, purchases online.				
Use of Internet social networks i.e. Facebook, Twitter, Yahoo Messenger MSN Messenger or Skype in marketing, customer service and information gathering.				
Computerization of business operations i.e. networked computers through which business transactions are generated.				
Use of Cross Circuit-TV (CC-TV) i.e. a series of cameras connected to TV for business monitoring and security.				

CHOICES: - Reasons for not using ICT

1. Lack of security
2. Expensive
3. Lack of training
4. Lack of time
5. No perceived benefits
6. Waste of time
7. Difficult to use
8. Not consistent with business needs
9. Not able to try the technology before use
10. Others (specify)

C) Enterprise Characteristics (EC)

1. Age bracket:

- a) 20-25_____ b) 26-30 _____ c) 31-35 _____ d) 36-40 _____ e) 41-45 _____
 e) 46-50_____ f) 50 - 55_____ g) Above 55_____

2. Number of business branches____; Locations of the branches_____

3. What are the business annual sales turn-over?

- a) 0.5 to 1.0 Million _____ b) 1.1 to 2.0 Millions _____ c) 2.1 to 3.0 Millions _____
 d) 3.1 to 4.0 Millions _____ e) 4.1 to 5.0 Millions _____

4. Entrepreneur ICT skills:

- a) None_____ b) Basic_____ c) Certificate_____ d) Diploma_____
 e) Degree _____ Others (specify)_____

5. Owner gender: a) Male___ b) Female_____ c) Co-owned (Man & Woman)___

Please tick appropriately whether you: strongly agree, agree, uncertain, disagree or strongly disagree to the following statements

	Very important	Important	Uncertain	Least important	Not important
6. a)What is your view on need to have employees with basic E-commerce skills?					
b) What is your view on need to have employees with basic Internet social network skills?					
c) What is your view on need to have employees with basic business computerization skills?					
d) What is your view on need to have employees with basic CC-TV skills?					

	Very important	Important	Uncertain	Least important	Not important
7 a) What is your view on need to have employees with advanced E-commerce skills?					
b) What is your view on need to have employees with advanced Internet social network skills?					
c) What is your view on need to have employees with advanced business computerization skills?					
d) What is your view on need to have employees with advanced CC-TV skills?					
8 a) What is your view on need to have internal E-commerce specialist?					
b) What is your view on need to have internal Internet social network specialist?					
c) What is your view on need to have internal business computerization specialist?					
d) What is your view on need to have internal CC-TV specialist?					
9. a) What is your view on use of external E-commerce specialist?					
b)What is your view on use of external Internet social network specialist?					
c)What is your view on use of external computerization of business operations specialist?					
d)What is your view on use of external CC- TV specialist?					
10. a)What is your view on regular training of employees on use of E-commerce?					
b)What is your view on regular training of employees on use of Internet social networks?					

	Very important	Important	Uncertain	Least important	Not important
c) What is your view on regular training of employees on computerization of business operation?					
d) What is your view on regular training of employees on use of CC-TV?					
11. a) What is your view of having an E-commerce strategy for your business?					
b) What is your view of having an Internet social network strategy for your business?					
c) What is your view of having strategy on business computerization?					
d) What is your view of having a strategy on use of CC-TV for business monitoring and security?					
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
12. a) My company possess sufficient skills to enable use of E-commerce					
b) My company possess sufficient skills to enable use of Internet social networks					
c) My company possess sufficient skills to enable computerization of business operations					
d) My company possess sufficient skills to enable use of CC-TV					
13. a) Adequate resources are available for use of E-commerce					
b) Adequate resources are available for use of Internet social networks					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) Adequate resources are available for computerization of business operations					
d) Adequate resources are available for use of CC-TV					
14. a) I will lose business control if I allow employees to use E-commerce					
b) I will lose business control if I allow employees to use Internet social networks.					
c) I will lose business control if I allow employees to use computerized business operations.					
d) I will lose business control if I allow employees to use CC-TV.					
15. a) Large amount of data processing necessitates the use of E-commerce					
b) Large amount of data processing necessitates the use of Internet social networks					
c) Large amount of data processing necessitates the use of computerized business operations					
d) Large amount of data processing necessitates the use of CC-TV					

D) Perceived ICT Attributes (PICTA)

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1. a) E-commerce has led to simplification of work routines					
b) Internet social networks has led to simplification of work routines					
c) Computerization of business operations has led to simplification of work routines					
d) Use of CC-TV has led to simplification of work routines					
2. a) E-commerce has led to speedy and reliable business communications					
b) Internet social networks has led to speedy and reliable business communications					
c) Computerization of business operations has led to speedy and reliable business communications					
d) Use of CC-TV has led to speedy and reliable business communications					
3 a) Use of E-commerce has led to efficient coordination among departments					
b) Use of Internet social networks has led to efficient coordination among departments					
c) Computerization of business operations has led to efficient coordination among departments					
d) Use of CC-TV has led to efficient coordination among departments					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
4. a) E-commerce has improved customer satisfaction					
b) Internet social networks has improved customer satisfaction					
c) Computerization of business operations has improved customer satisfaction					
d) Use of CC-TV has improved customer satisfaction					
5. a) Use of E-commerce enables my business to benefit from various business opportunities					
b) Use of Internet social networks enables my business to benefit from various business opportunities					
c) Computerization of business operations enables my business to benefit from various business opportunities					
d) Use of CC-TV enables my business to benefit from various business opportunities					
6. a) E-commerce has led to development of new product and services					
b) Internet social networks has led to development of new product and services					
c) Computerization of business operations has led to development of new product and services					
d) Use of CC-TV has led to development of new product & services					
7. a) E-commerce has led to reduction in operation costs					
b) Internet social networks has led to reduction in operation costs					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) Computerization of business operations has led to reduction in operation costs					
d) Use of CC-TV has led to reduction in operation costs					
8. a) E-commerce has led to increased productivity					
b) Internet social networks has led to increased productivity					
c) Computerization of business operations has led to increased productivity					
d) Use of CC-TV has led to increased productivity					
9. a) E-commerce is consistent with business needs					
b) Internet social networks is consistent with business needs					
c) Computerization of business operations is consistent with business needs					
d) Use of CC-TV is consistent with business needs					
10.a) It is easy to implement E-commerce					
b) It is easy to implement Internet social networks					
c) It is easy to computerize business operations					
d) It is easy to install and use CC-TV					
11. a) It is easy to test E-commerce before full implementation					
b) It is easy to test Internet social networks before implementation					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) It is easy to test computerization of business operations before full implementation					
d) It is easy to test CC-TV before full implementation					
12.a) Positive results of using E-commerce are clearly visible					
b) Positive results of using Internet social networks are clearly visible					
c) Positive results of computerization of business operations are clearly visible					
d) Positive results of using CC-TV are clearly visible					

(E) External Environment (EE)

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1.a) I use E-commerce since customers are using it.					
b) I use Internet social networks since customers are using it.					
c) I use computerized business operations since customers are using it.					
d) I use CC-TV since customers are using it.					
2. a) I use E-commerce since competitors are using it.					
b) I use Internet social networks since competitors are using it.					
c) I use computerized business operations since competitors are using it.					
d) I use CC-TV since competitors are using it.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
3. a) I use E-commerce to match changes in technology					
b) I use Internet social networks to match changes in technology					
c) I use computerized business operations to match changes in technology					
d) I use CC-TV to match changes in technology					
4. a) I use e-commerce since suppliers are using it.					
b) I use Internet social networks since suppliers are using it.					
c) I use computerized business operations since suppliers are using					
d) I use CC-TV since suppliers are using it.					
5. a) Government's offer of online tax services positively influenced my business to use E-commerce					
b) Government's offer of online tax services positively influenced my business to use Internet social networks.					
c) Government's offer of online tax services positively influenced my business to computerize operations					
d) Government's offer of online tax services positively influenced business to use CC-TV					
6. a) Government's VAT removal on ICT products positively influenced use of E-commerce.					
b) Government's VAT removal on ICT products positively influenced use of Internet social networks.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) Government's VAT removal on ICT products positively influenced computerization of business operations.					
d) Government's VAT removal on ICT products positively influenced use of CC-TV.					
7. a) Inclusion of ICT as one of the major driving force in vision 2030 has influenced my company to use E-commerce.					
b) Inclusion of ICT as one of the major driving force in vision 2030 has influenced my company to use Internet social networks.					
c) Inclusion of ICT as one of the major driving force in vision 2030 has influenced my company to computerize operations.					
d) Inclusion of ICT as one of the major driving force in vision 2030 has led to use CC-TV					
8. a) Establishment of digital villages has made it possible for my business to use E-commerce					
b) Establishment of digital villages has made it possible for my business to use Internet social networks					
c) Establishment of digital villages has made it possible for my business to computerize operations					
d) Establishment of digital villages has made it possible for my business to use CC-TV					
9. a) Friends in social networks have positively influenced use of E-commerce.					
b) Friends in social networks have positively influenced use of Internet social networks.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) Friends in social networks have positively influenced use of computerized business operations.					
d) Friends in social networks have positively influenced use of CC-TV.					

F) Perceived ICT Barriers (PICTB)

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1. a) Implementation of E-commerce requires a lot of time which is a challenge					
b) Implementation of Internet social network requires a lot of time which is a challenge					
c) Implementation of computerized business operation requires a lot of time which is a challenge					
d) Implementation of CC-TV requires a lot of time which is a challenge					
2. a) E-commerce requires training and change which are costly to the company and returns are not guaranteed.					
b) Internet social networks requires training and change which are costly to the company and returns are not guaranteed.					
c) Computerization of business operations requires training and change which are costly to the company and returns are not guaranteed.					
d) CC-TV requires training and change which are costly to the company and returns are not guaranteed.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
3. a) E-commerce comes with security issues hence company must first be assured of its information security before using it.					
b) Internet social networks come with security issues hence company must first be assured of its information security before using.					
c) Computerization of business operations comes with security issues hence company must first be assured of its information security					
d) CC-TV comes with security issues hence company must first be assured of its information security before using it.					
4. a) Kenyan laws governing use of E-commerce are not clearly stipulated					
b) Kenyan laws governing use of Internet social networks in business are not clearly stipulated.					
c) Kenyan laws governing use of computerized systems in business are not clearly stipulated.					
d) Kenyan laws governing use of CC-TV in business are not clearly stipulated.					
5. a) Scarce business resources are not enough to invest in E-commerce.					
b) Scarce business resources are not enough to invest in Internet social networks.					
c) Scarce business resources are not enough to invest in computerization of business operations.					
d) Scarce business resources are not enough to invest in CC-TV.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
6. a) Investment in E-commerce does not represent value for money. b) Investment in Internet social networks does not represent value for money. c) Investment in computerized business operations does not represent value for money. d) Investment in CC-TV does not represent value for money.					
7. a) Rapid technological changes has increased E-commerce costs hence reducing its usage. b) Rapid technological changes has increased Internet social networks costs hence reducing its usage. c) Rapid technological changes has increased computerization costs of business operations hence reducing its usage d) Rapid technological changes has increased CC-TV costs hence reducing its usage.					
8. a) High E-commerce consultancy fee reduces its usage. b) High Internet social networks consultancy fee reduces its usage. c) High computerization consultancy fee reduces its usage. d) High CC-TV consultancy fee reduces its usage.					
9. a) High cost of E-commerce software reduces its usage. b) High cost of Internet social networks software leads to reduced usage.					

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
c) High cost of business operation computerization software leads to reduced usage.					
d) High cost CC-TV software leads to reduced usage.					
10. a) High infrastructure maintenance cost of E-commerce reduces its usage.					
b) High infrastructure maintenance cost of Internet social networks reduces its usage.					
c) High infrastructure maintenance cost of computerized system reduces its usage.					
d) High infrastructure maintenance cost of CC-TV reduces its usage.					
11. a) Lack of internal technical expertise in E-commerce reduces its usage.					
b) Lack of internal technical expertise in Internet social network reduces its usage.					
c) Lack of internal technical expertise in business computerization reduces its usage.					
d) Lack of internal technical expertise in CC-TV reduces its usage.					

In your own words, what are the **main factors** that **influence** your organization **use** or **non-use** of: -

a) E- commerce

b) Internet social networks

c) Computerization of business operations

d) Close Circuit –TV in monitoring business transactions and security

Appendix 2: ICT Technological Changes in Kenya

Year	ICT Infrastructure Introduced	Implications
2000	Safaricom Limited and Kencel Licensed to operate mobile communications	- Change in mode of communication - Business transaction done outside office setting
2000	Dial up Internet connection through fixed telephone lines	- Email use in business communication
2005	Telekom Limited introduced Asymmetric Digital Subscriber Line (ADSL) faster Internet connection through fixed phone lines	- More business started using Emails in their communications - Development of business websites
2006/2007	Government zero rated tax on imported computers and computer accessories	- More businesses could afford purchasing computers
2008	Safaricom Limited and Zain Limited started offering data services via mobile phones	-Internet services on mobile - Decline in cyber café businesses
2009	Undersea fiber optic cable lands in Mombasa i.e. (the East African Marine System (TEAMS), Eastern Africa Submarine Cable System (EASSy), and South and East Africa Communication (SEACOM)	-Increased data speed - Reduction on Internet cost - Video conferencing now possible - Business outsourcing opportunities - Risk of computer virus attack
2009	ICT Media bill approved	- Makes provisions for E-commerce and digital signatures which are key for enabling online business in Kenya. -Has provision to deal with risk areas such as online fraud and piracy of intellectual property.
2007	Mobile money transfer (Mpesa) launched by Safaricom but picks up in 2009. Other plays join in e.g. Zain Limited and Econet limited	- Mobile money unanimously endorsed by the business community as they signed up for MPesaservices. - Banks who we're the largest opponents of MPesa in Kenya are integrating mobile money services in their product line.
2010	Mobile banking services introduced through Safaricom and Equity bank partnership referred as "M-Kesho". Family bank introduced "Pesa Pap" partnership with Safaricom	- Internet based business transaction such as E-commerce now possible where payment is via mobile phone

2009/2010 budget	<ul style="list-style-type: none"> - Tax was removed from digital and video cameras. -Mobile phones were exempted from value added tax (VAT). -1.3 billion Kenya shilling was allocated to the establishment of mobile computer labs country-wide. -Internet Service Providers (ISPs) were allowed to offset taxable income against the cost of purchasing Internet bandwidth. -Wear and tear on telecommunications infrastructure was increased from 12.5% to 20%. -Tax was also reduced on purchasing certain types on computer softwares. 	The 2009/10 budget was designed to increase ICT usage in the Kenyan economy.
2009	Social networks such as Facebook and Twitter, blogs etc. gain popularity among the Kenyans on mobile phones	<ul style="list-style-type: none"> - Forms a key marketing tool - Important given Kenya has over 18 million mobile users and 4 million Internet users.
2009	Launch of Digital Television (DTV)	<ul style="list-style-type: none"> - Will revolutionize television broadcasting as we know it in the coming years since it's highly efficient and interactive.

Source: Adapted from Kemibaro (2010)

Appendix 3: Rotated Component Matrix for Enterprise Characteristics

	Factors			
	1	2	3	4
What is your view on need to have employees with advanced CC-TV skills?	.828			
I will lose business control if I allow employees to use CC-TV.	.803			
What is your view on need to have internal CC-TV specialist?	.786			
What is your view on regular training of employees on use of CC- TV?	.740			
What is your view on need to have employees with basic CC-TV skills?	.738			

Adequate resources are available for use of CC-TV	.690
Large amount of data processing necessitates the use of CC-TV in order to be efficient and	.677
My company possess sufficient skills to enable use of CC-TV	.585
What is your view on use of external CC- TV specialist?	.561
What is your view of having a strategy on use of CC-TV for business monitoring and security?	.421
I will lose business control if I allow employees to use computerized business operations.	.779
What is your view on regular training of employees on computerization of business operations?	.765
What is your view on need to have internal business computerization specialist?	.748
Adequate resources are available for computerization of business operations	.748
What is your view on need to have employees with advanced business computerization skills?	.657
What is your view on need to have employees with basic business computerization skills?	.650
What is your view of having strategy on business computerization?	.631
My company possess sufficient skills to enable computerization of business operations	.628
What is your view on use of external computerization of business operations specialist?	.442
Large amount of data processing necessitates the use of computerized business operations	.387
What is your view on need to have employees with advanced Internet social network skills?	.784
Adequate resources are available for use of Internet social networks	.781
What is your view on need to have internal Internet social network specialist?	.747
I will lose business control if I allow employees to use Internet social networks.	.731
What is your view on regular training of employees on use of Internet social networks?	.662
What is your view on need to have employees with basic Internet social network skills?	.603
Large amount of data processing necessitates the use of Internet social networks	.565
What is your view on use of external Internet social network specialist?	.541

My company possess sufficient skills to enable use of Internet social networks	.496
What is your view of having an Internet social network strategy for your business?	.467
Adequate resources are available for use of E-commerce	.774
I will lose business control if I allow employees to use E-commerce	.680
What is your view on need to have internal E-commerce specialist?	.676
My company possess sufficient skills to enable use of E-commerce	.654
What is your view on need to have employees with advanced E-commerce skills?	.594
What is your view on regular training of employees on use of E-commerce?	.547
What is your view on need to have employees with basic E-commerce skills?	-.528
What is your view on use of external E-commerce specialist?	.490
Large amount of data processing necessitates the use of E-commerce in order to be efficient and effective	.444
What is your view of having an E-commerce strategy for your business?	.410

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 7 iterations.

Appendix 4: Rotated Component Matrix for Perceived ICT Attributes

	Factors			
	1	2	3	4
Use of CC-TV has led to efficient coordination among departments	.841			
Use of CC-TV has led to simplification of work routines	.779			
Use of CC-TV has improved customer satisfaction	.761			
Use of CC-TV has led to speedy and reliable business communications	.744			
Use of CC-TV has led to increased productivity	.736			

It is easy to test CC-TV before full implementation	.690
Use of CC-TV is consistent with business needs	.672
Use of CC-TV has led to development of new product & services	.672
It is easy to install and use CC-TV	.665
Use of CC-TV has led to reduction in operation costs	.654
Positive results of using CC-TV are clearly visible	.646
Use of CC-TV has provided new business opportunities	.642
Internet social networks has led to simplification of work routines	.783
Internet social networks is consistent with business needs	.739
Internet social networks has led to speedy and reliable business communications	.739
Internet social networks has led to efficient coordination among departments	.728
Internet social networks has improved customer satisfaction	.707
Internet social networks has led to development of new product and services	.705
Internet social networks has led to increased productivity	.646
Internet social networks has provided new business opportunities	.636
Positive results of using Internet social networks are clearly visible	.608
Internet social networks has led to reduction in operation costs	.591
It is easy to implement Internet social networks	.568
It is easy to test Internet social networks before full implementation	.550
It is easy to test E-commerce before full implementation	.788
It is easy to implement E-commerce	.734
E-commerce has led to increased productivity	.684
E-commerce has led to reduction in operation costs	.670

E-commerce has improved customer satisfaction	.639
E-commerce has provided new business opportunities	.602
E-commerce has led to efficient coordination among departments	.587
E-commerce has led to simplification of work routines	.561
E-commerce has led to speedy and reliable business communications	.499
E-commerce has led to development of new product and services	.499
E-commerce is consistent with business needs	.463
Positive results of using E-commerce are clearly visible	.453
It is easy to test computerization of business operations before full implementation	.735
Computerization of business operations has led to increased productivity	.650
It is easy to computerize business operations	.646
Computerization of business operations has led to reduction in operation costs	.589
Computerization of business operations has provided new business opportunities	.516
Computerization of business operations has improved customer satisfaction	.514
Computerization of business operations has led to development of new product and services	.433
Computerization of business operations has led to efficient coordination among departments	.402
Positive results of computerization of business operations are clearly visible	.353
Computerization of business operations is consistent with business needs	.319
Computerization of business operations has led to simplification of work routines	.311
Computerization of business operations has led to speedy and reliable business communications	.305

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.

Appendix 5: Rotated Component Matrix for External Environmental Factors

	Factors			
	1	2	3	4
I use E-commerce since competitors are using it.	.780			
I use e-commerce since suppliers are using it.	.728			
Government's VAT removal on ICT products positively influenced use of E-commerce.	.718			
Inclusion of ICT as driving force in vision 2030 has influenced my company to use E-commerce.	.708			
Establishment of digital villages has made it possible for my business to use E-commerce	.681			
I use E-commerce since customers are using it.	.620			
Friends in social networks have positively influenced use of E-commerce	.564			
I use E-commerce to match changes in technology	.485			
Government's offer of online tax services positively influenced my business to use E-commerce	.482			
I use Internet social networks since competitors are using it.		.815		
Government's VAT removal on ICT products positively influenced use of Internet social networks.		.756		
I use Internet social networks since suppliers are using it.		.675		
Inclusion of ICT as driving force in vision 2030 has influenced my company to use Internet social networks		.637		
Establishment of digital villages has made it possible for my business to use Internet social networks		.610		
I use Internet social networks to match changes in technology		.580		
Friends in social networks have positively influenced use of Internet social networks.		.560		
Government's offer of online tax services positively influenced my business to use Internet social networks.		.487		
I use Internet social networks since customers are using it.		.441		

I use CC-TV since competitors are using it.	.740
Government's VAT removal on ICT products positively influenced use of CC-TV.	.723
Government's offer of online tax services positively influenced my business to use CC-TV	.708
I use CC-TV since customers are using it.	.703
I use CC-TV since suppliers are using it.	.696
I use CC-TV to match changes in technology	.693
Inclusion of ICT as one of the major driving force in vision 2030 has influenced my company to use CC-TV	.653
Establishment of digital villages has made it possible for my business to use CC-TV	.612
Friends in social networks have positively influenced use of CC-TV.	.534
I use computerized business operations since competitors are using it.	.837
I use computerized business operations since suppliers are using	.749
Government's VAT removal on ICT products positively influenced computerization of business operations.	.713
Inclusion of ICT as driving force in vision 2030 has influenced my company to computerize operations.	.690
I use computerized business operations since customers are using it.	.678
Establishment of digital villages has made it possible for my business to computerize operations	.585
Friends in social networks have positively influenced use of computerized business operations.	.554
Government's offer of online tax services positively influenced my business to computerize operations	.496
I use computerized business operations to match changes in technology	.371

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 7 iterations.

Appendix 6: Rotated Component Matrix for Perceive ICT Barriers

	Factors			
	1	2	3	4
High infrastructure maintenance cost of CC-TV reduces its usage.	.765			
Kenyan laws governing use of CC-TV are not clearly stipulated	.752			
High cost CC-TV software leads to reduced usage.	.740			
CC-TV comes with security issues hence company must first be assured of its information security	.680			
High CC-TV consultancy fee reduces its usage.	.647			
Lack of internal technical expertise in CC-TV reduces its usage.	.628			
Scarce business resources are not enough to invest in CC-TV.	.567			
Implementation of CC-TV requires a lot of time which is a challenge	.542			
CC-TV requires training and change which are costly to the company and returns are not guaranteed.	.474			
Rapid technological changes have increased CC-TV costs hence reducing its usage.	.447			
Investment in CC-TV does not represent value for money.	.316			
High infrastructure maintenance cost of E-commerce reduces its usage.		.843		
Kenyan laws governing use of E-commerce are not clearly stipulated		.759		
High cost of E-commerce software reduces its usage.		.716		
Lack of internal technical expertise in E-commerce reduces its usage.		.688		
High E-commerce consultancy fee reduces its usage.		.659		
E-commerce requires training and change which are costly to the company and returns are not guaranteed.		.710		
Investment in E-commerce does not represent value for money.		.680		
E-commerce comes with security issues hence company must first be assured of its information security		.646		
Rapid technological changes have increased E-commerce costs hence reducing its usage.		.563		

Scarce business resources are not enough to invest in E-commerce.	.522
Implementation of E-commerce requires a lot of time which is a challenge	.494
Kenyan laws governing use of Internet social networks in business are not clearly stipulated.	.733
Internet social networks require training and change which are costly	.742
High infrastructure maintenance cost of Internet social networks reduces its usage.	.722
Lack of internal technical expertise in Internet social network reduces its usage.	.677
Investment in Internet social networks does not represent value for money.	.674
Internet l networks come with security issues hence company must be assured of its information security	.659
High cost of Internet social networks software leads to reduced usage.	.638
Rapid technological changes have increased Internet social networks costs hence reducing its usage.	.615
Implementation of Internet social network requires a lot of time which is a challenge	.601
Scarce business resources are not enough to invest in Internet social networks.	.560
High Internet social networks consultancy fee reduces its usage.	.535
Kenyan laws governing use of computerized systems in business are not clearly stipulated.	.788
Computerization of operations comes with security issues hence company must be assured of its security	.769
High cost of business operation computerization software leads to reduced usage.	.725
Investment in computerized business operations does not represent value for money.	.657
Lack of internal technical expertise in business computerization reduces its usage.	.652
Computerization of business operations requires training and change which are costly to the company	.651
High infrastructure maintenance cost of computerized system reduces its usage.	.632
Implementation of computerized business operation requires a lot of time which is a challenge	.610
Rapid technological changes has increased computerization costs of business operations reducing its usage	.599

High computerization consultancy fee reduces its usage.	.558
Scarce business resources are not enough to invest in computerization of business operations.	.550

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 12 iterations.

Appendix 7: Stage Model of ICT Adoption and Readiness Issues in SMEs

READINESS ISSUES		
Individual/person	Organization	Business environment
<i>Pre-stage. Uninvolved: naïve, indifferent, hostile</i>		
Cultural/lifestyle concerns	Lack of resources; unemployment; sole trader	Low ICT contact; no market demand
<i>Stage 1. Threshold: Keen to try ICT: unsure how</i>		
Low technical knowledge: ICT business potential curiosity	Communication important; customer, staff demand	Customer/peers online; supplier, government pressure; local ISP, ADSL
<i>Stage 2. Beginner: Recently online but unsure of where to go next</i>		
Confident with e-mail, internet; ready for website	Internet e-mail; sales-customer activities; skills-productivity issues	Market/network push ICT use; sources of advice not obvious
<i>Stage 3. intermediate: Internet e-mail, website, no ICT strategy</i>		
Owner grows ICT knowledge; sees benefits of Web, ready to use ICT in administration and operations	ICT skills and efficiency issues; network benefits	Use of advice and support networks; stronger competition push on costs, access/delivery issues
<i>Stage 4. advance: ICT an integral part of business strategy</i>		
ICT capabilities developed; ready for new approaches to business	Knowledge issues; outsourcing; ICT integrated in systems	Strong competitor and customer ICT skills; clear regulatory and legal frameworks
<i>Stage 5. innovative: Capability to exploit ICT strategically in process/product innovations</i>		
Entrepreneurial; high ICT literacy; manager/workers in effective autonomous working conditions	Shared corporate culture and vision; knowledge management/sharing; networked	Strong value-chain; strategic partnership and support networks; global competition

(Source: Zappala & Gray 2006: p.12)