DETERMINANTS OF INFORMATION AND COMMUNICATION TECHNOLOGY APPLICATION AMONG SMALL AND MEDIUM ENTERPRISES IN NAIROBI

By:

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DECLARATION

This research project is my original work and has not been submitted for a degree in any other university.

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This management project has been submitted for examination with my approval as the university supervisor.

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Date: 8/11/2006

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DEDICATION

I would like to dedicate this study to my late mother, Miss Elizabeth Wangu, together with my brothers and sisters.

ABSTRACT

Rapid development of Information and Communications Technologies (ICTs) accompanied by the convergence of telecommunications, broadcasting and computer technologies is creating new products and services, as well as new ways of learning, entertainment and doing business. At the same time, more commercial, social and professional opportunities are being created through the unique opportunity provided by ICTs. As a result, the world is undergoing a fundamental transformation as the industrial society that marked the 20th century rapidly gives way to the information society of the 21st century. In Kenya alone, we had about 2 million users by the year 2004. As a developing country. Kenya is considered as one of the active nation among its neighbour countries.

However, one of the greatest challenges for Kenya is to convince small and medium enterprise (SME) that both their survival and prosperity depends on applying ICT. SME today still do not understand the process in setting up ICT. This research found out that all SME appreciate the implication of the major changes taking place around them with regard to communication and its implications to the business. However, it is evident in this research that there is resistance to ICT application with only 3% of SME in Nairobi using the Internet. This research also figures out the influencing factors and experiences of SME using the ICT. Therefore the transition to use of ICT by SME is hoped to open up a vast array of business opportunities for those who are willing to take advantage of the new technology.

LIST OF ABBREVIATION

SME	Small and Medium Enterprises
ICT	Information and Communication Technology
ME	Medium Enterprises
LE	Large Enterprises
ERP	Resource Planning Systems
GOK	Government of Kenya
USD	United States Dollar
UNIDO	United Nations Industrial Development Organization
KIE	Kenya Industrial Estates

LIST OF TABLES

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

1.1 Background

1.1.1 Small and medium Enterprises

Small and Medium-sized Enterprises or SME are companies whose headcount or turnover falls below certain limits. SME is a convenient term for segmenting businesses and other organizations that are somewhere between the "small office-home office" (SOHO) size and the larger enterprise. The abbreviation SME occurs commonly in the EU and in international organizations, such as the World Bank, the United Nations and the WTO.

Small and Medium Enterprises (SME) form significant sectors in most world economies and therefore their development is regarded as an important issue for most governments. The significance of the sector is due to the contribution made to job and wealth creation in the world economies (Hodgetts & Kuratko 1995). According to the International Labour Organization (1986) the sector accounts for over 40 percent of private sector employment.

Kenya's development plans for the 1989 - 1993, 1994 - 1996 and 1997 - 2001 periods put special emphasis on the contribution of micro, small and medium size enterprises in the creation of employment in the country (Republic of Kenya, 1989; 1994; 1997). The focus on these enterprises as loci for employment generation reinforced the themes of Sessional Paper No.I of 1986 on Economic Management for Renewed Growth (Republic of Kenya, 1986), and Sessional Paper No.2 of 1992 on

Small Enterprise and Jua Kali Development in Kenya (Republic of Kenya, 1992). Data from various studies confirm the basis of the thrust of those development plans and Sessional Papers. The results of the 1993 National Baseline Survey of the Micro and Small Enterprises in Kenya (GEMINI PROJECT) estimated that there were 910,455 micro and small size enterprises in Kenya offering employment to 2,050,855 people (Parker and Torres, 1994). Six years later, another survey, the National Micro and Small Enterprise Baseline Survey of 1999 found that there were 1,289,012 micro and small enterprises in the country, employing 2,381,250 people in 1999 in Kenya.

The classification of the enterprises for this study was based on the Government of Kenya's Sessional Paper No.I of 1986 (Kenya, Government of Republic, 1986) and the 1989-1993 Development Plan (Kenya, Government of Republic, 1989). According to the documents, firms are classified by the number of full-time employees that they engage. Firms, which employ less than five full-time workers, are referred to as micro-enterprises. Those which employ between five and 49 fulltime workers are called small-scale enterprises (SEs) and those with 50 to 99 full-time employees are classified as medium-scale enterprises (MEs). Those firms with 100 and above full-time workers are large enterprises (LEs).

1.1.2 Information and Communications Technology

Information and Communications Technology or ICT refers to technology used to handle information and aid communication. It also refers to the amalgamation of computing and telecommunications technologies, including the Internet, which are the matrix within which information and digital media are created, distributed and accessed.

Information and Communications Technology features basically comprise of information access and dissemination over the Internet and wireless computing that include communication features such as landlines and mobile telephones, wireless communication, voice over Internet communication or voice mail and facsimile. It also includes computer hardware such as computers, printers, scanners, faxes, modems, networks and software, which includes programs for accounting, spreadsheets, data processing enterprise resource-planning systems (ERP) etc.

Less than ten years ago, information and communication technology belonged to the information technology industry; IT managers, systems engineers, and support staff. Today, information and communication technology is part of the mainstream of business strategy. Everyone and every department in the organization are taking it up. ICT is no longer just another cog in the enterprise. It is one of the major components of the organization (Otieno, 1999).

For many organizations, both business and non-business, information and communication technology has certainly brought some benefits. The high and increasing level of demand for information and communication technology products in the country indicate this, and further demonstrates the extent to which information

and communication technology has infiltrated the Kenyan market (Otieno, 1999). The business benefits of using information and communication technology include maintenance of the systems, access to new technology and attainment of competitive advantage (McFarlane, 1984). Malone and Laubacher (1998) add that information and communication technology systems and networks allow small businesses to tap into the global reservoir of information, expertise and financing that used to be available only to large firms. According to Mwaniki (2001), new companies are entering the market with systems that are already computerized and they are therefore able to take advantage of the high speed of the information and communication technology systems. The new companies are taking advantage of gaps that the older companies have not been able to spot.

According to Davenport (1998), the need to focus on the future has been the driving force for the application of information and communication technology systems in many companies. Efficiency and effectiveness, customer service, easier and convenient accounting data storage and retrieval have also been cited as reasons for ICT application. Abwao V, (2002) is of the view that in Kenya, the main reasons for application of information and communication technology systems by locally owned small and medium companies are centered on the need to handle higher volumes and more complicated transactions faster and more efficiently, while improving customer service in order to meet and exceed increasing customer expectations. There are also demands by the financing institutions, mainly banks, donors, and micro finance institutions to apply technology in operations

For many small and large firms in Kenya, information and communication technology is viewed as potentially capable of bringing in some benefits. The high rate at which

organizations are buying mobile phones, computer hardware and software as well as using the internet for information and communication is evidence of the increasing awareness of information and communication technology in the Kenyan market. The business benefits of using information and communication technology include access to new technology and attainment of competitive advantage (McFarlane, 1984).

1.2 Statement of the Problem

Information and Communication Technologies (ICT) are regarded to be a powerful tool for socio-economic development as well as for fostering growth in businesses. Effective ICT-utilization, appropriate applications, and individually tailored solutions can create cross-sectoral opportunities and, thus, ICT can play a substantial role to address a number of goals on the development agenda Information and Communication Technologies (ICT) also offer enterprises a wide range of possibilities for improving their competitiveness: they provide mechanisms for getting access to new market opportunities and specialized information services such as distance consulting, continuous training, new advisory modes, etc.; organizations can exchange real-time information and build closer relationships with their customers, suppliers and business partners; immediate customer feedback allows companies to react fast to changing customer demands and recognizing new market niches. This means that organizations that are able to exploit the potentials offered by ICT can handle innovative processes, such as Supply Chain Management, Customer Relationship Management, Knowledge Management, more effectively. Current trends

has shown that large enterprises in Kenya, and in deed all over the world, have embraced ICT as a major business tool and have ripped the benefits that go with ICT adoption.

However, if we analyze the present situation of the introduction and use of information and communication technologies in Small and Medium sized Enterprises in Kenya, it appears as if most SME do not appreciate the implication of the major changes taking place around them, do not understand the process in setting up ICT, or there is resistance to ICT use. This has been shown by the slow rate at which SME are adopting information and communication technology.

Studies indicate that the adoption of new technology and e-commerce relies on the particular features according to the respective SME's organization and structure, rather than the industry sector in which it operates (Mohd A, 2002; Dr Peter N Kiriri, 2003; and Susanna Wolf, 2001

Unfortunately very few, if any, empirical studies have been done in Kenya relating to the question of application of ICT among SME.

This therefore posed a problem whose solution could be used to unravel why SME cannot compete effectively, develop or strive to see competitive advantage within their respective markets despite wide acclaim of their potential, ability to play key roles in economic growth and be factored as a significant parameter to the re-energized 5% growth in the Kenyan economy.

This study therefore sought to find out the determinants of Information and Communication Technologies application among small and medium enterprises.

1.3 Objective of the Study

The objectives of the study were:

i. To establish the determinants of application of Information, Communication and Technology by the small and medium enterprises in Nairobi

ii. To establish the extent of ICT application among SME in Nairobi.

1.4 Importance of the Research

i. The research will be of use especially to the small and medium enterprises; to understand the importance of adopting the information and Communication Technology (ICT)

ii. It will be of use to the government especially the ministry of Information and Communication, in understanding how it's policies have affected the SME's in Kenya.

iii. To the policymakers, the study will act as guide for establishing the best policies to effect on ICT so as to enable the growth of SME's in Kenya.

iv. Will help to highlight and enlighten the readers on matters concerning the ICT industry and SME, therefore develop ideas on how both can help each other.

v. To the managers of the small and medium enterprises; the approach to the internal operations and the competitive market can both offer two types of strategic opportunity, either by significantly improving the traditional ways of

operating or by making significant changes to the ways of doing business. Information and communication technology can be used for strategic purpose either in internal operations or in the competitive market arena.

vi. To the manufacturers of information and communication technology hardware and software; it would help them to identify the different types of hardware and software that the small and medium enterprises really need at the right price. Their innovation is needed urgently and it is necessary that IT firms focus their attention to creation and marketing of innovative solutions for small and medium enterprises.

vii. To the academicians; the study will shed some light into the field of strategic information and communication technology systems. It will also give an appreciation of the level of infiltration of information and communication technology systems into the management of small and medium enterprises. It will highlight changes that have taken place in the management of the small and medium enterprises over the years due to the influence of information and communication technology systems and assist in evaluating the pace of application of information and communication technology systems. It will also help the academicians to develop appropriate syllabus for students of strategy, management and entrepreneurship.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In most African countries, and particularly in Kenya, small and medium enterprises (SME) account for a significant share of production and employment and are therefore directly connected to poverty alleviation. For the poor population in the rural areas SME are also very relevant for employment and as an income source. In developing countries SME are challenged by the globalization of production and the shift in the importance of the various determinants of competitiveness. Small and medium enterprises are accountable for above 50 percent of manufacturing gross domestic product. It is estimated that in Kenya small enterprises generate 12 % to 14 % of the national income (Daniels and Mead 1998).

Past research (Biggs and Srivastava 1996) confirms the often-made assumption that SME with less than 50 employees are an important source of employment growth. For example in Kenya, employment growth for enterprises with 10-49 employees is 41 %. for 50 –99 employees 24 % and for more than 100 employees only 12.5 %. However the share of total job creation for small enterprises (10-49) is only 23.0 % compared to 15.2 % for middle size enterprises (50-99) and 55.5 % for large enterprises (100+). As determinants of firm growth similar variables as in developed countries are found to be important, namely initial firm size, firm age, human capital, sector and in some cases form of ownership and ethnicity. It is worth noting that SME in developing countries usually show high rates of start-ups as well as high closing rates due to the difficulties they face in a highly risky environment.

A strong SME sector is critical in terms of the goods and services it provides to large enterprises and to informal, micro-enterprises. In developed countries informal micro-enterprises have been largely supplanted, and it is suggested that this pattern will also occur in more advanced developing countries. On the other hand, in the developed countries large scale enterprises increasingly are down-sizing and depending on networks of SMEs. It is suggested that a technologically strong SME system in developing countries will also be necessary to develop, attract and work with large enterprises.

It was estimated that in 1999 there were about 1.3 million micro and small size enterprises in Kenya offering employment to 2.36 million people (Central Bureau of Statistics, 1999). This quantitative growth of the sector has engendered sustained research, resulting in a wealth of literature, particularly with regard to size, employment generation capacity, financial support and business regulations. Some key areas of the sector, however, have not been studied as much. This study focuses on ICT application among the small and medium size enterprises, which is one of the areas that have received scanty attention.

The literature cited in this review is a combination of data and ideas from local research, government reports and external work. The first section of the review addresses the general concepts in small enterprise and medium enterprises. The second section focuses on the concepts of Information and Communication Technology diffusion and application among SME.

2.2 Information and Communication Technology Application among Small and Medium Enterprises

Information and communication technology (ICT) connectivity (PCs and Internet) is very widespread in businesses of all sizes. As is the case with all technologies, small businesses are slower than large ones to apply new ICTs. Commercial considerations and potential returns are the principal drivers of small business application of ICT and profitable use. Principal reasons for non-application are lack of applicability and little incentive to change business models when returns are unclear. SMEs also face generic barriers to application including trust and transaction security, challenges in areas of management skills, technological capabilities, productivity and competitiveness. The issues for governments are to foster appropriate business environments for e-business and ICT uptake (e.g. to diffuse broadband, enhance competition), and target programs to overcome market failures to the extent that they are needed in particular areas (e.g. skill formation, specialized information).

The technological performance of small and medium enterprises is emphasized to focus on what enterprises actually do technologically. An enterprise must bring together at each productive point people with the right technological knowledge, equipment with the right technological capabilities, and materials suitable for the purposes and the techniques to be applied. If anywhere in the process failures occur, they will be measured in loss of relevance of industry to the needs of the country, loss of productivity, loss of quality in the products produced, or some external cost such as pollution of the environment. Difficult as achieving this level of performance may be, the task facing the enterprise is still greater. Technology performance is not just

performance at the moment; it must be sustained, and the sustenance is through creative destruction. Thus the people, equipment, facilities, and processes in the enterprise must embody sufficient technological knowledge and flexibility to select wisely among alternative techniques available for each step in the process, to adapt technology to meet local circumstances and changes in local circumstances, and ideally to develop new technology when appropriate and necessary.

Due to the externalities among enterprises, it is also important to recognize that technological performance is often best seen as the performance of synergistic networks of enterprises. Moreover, to achieve good technological performance in the SME sector, the institutions that provide technologically skilled managers and workers, technology embodying capital and intermediate goods, technology services (and so on) must all function.

In a survey of the African Internet status Jensen (2000) reports that the average usage of Internet is still very low due to high connection fees. Communications are mostly done with people outside the continent. Most users are NGOs, universities or private companies and users are mainly male and well educated. E-mail is used for correspondence, document exchange, technical advice, managing projects, arranging meetings, and exchanging research ideas, but it is still limited for accessing formal information resources. 25 % of e-mail is replacing faxes, 10 % e-mails replacing phone calls and 65 % of the e-mails standing for communication that would not have been made without an e-mail-system. Users report that Internet has increased efficiency and reduced information costs, although it is still an under-utilized resource.

In Kenya, Jambonet, Telkom's Internet backbone subsidiary faces tough times ahead following the liberalization of Internet gateway backbone services.

With this development, Kenya's Information and Communications technology sector will operate in same lines with other East African countries that have a more competitive private sector driven ICT environment.

A competitive environment for the ICT sector will translate into cheaper costs for both providers and users; it will also ease and spread accessibility to areas that are not covered at the moment creating jobs.

Through the rapid spread of information and communication technologies (ICT) and ever decreasing prices for communication, markets in different parts of the world become more integrated. The spread of ICT has led several commentators to argue that these technologies are creating a new economy – an information economy – in which information is the critical resource and basis for competition in all sectors – manufacturing and probably even more in services.

Generally, from the performance perspective, the competitiveness effect of ICTs derives from the impact that ICTs have upon the productivity of the factor inputs. In this regard, ICTs can improve efficiency and increase productivity by different ways including, improving efficiency in resource allocation, reducing transaction costs, and technical improvement, leading to the outward shifting of the production function. It is argued that in remote regions, the disadvantages that arise with isolation can be significantly lessened through access to rapid and inexpensive communication. However, there are also more pessimistic views that assume that the digital divide will increase and therefore producers in developing countries and especially in rural

areas will face even greater disadvantages relative to their competitors in developed countries.

Information and communication technology has rewritten business rules; it has transformed stand alone environments into connected entities and created networks that dramatically optimize operations and step up the pace of business.

Hence, in this dynamic environment, information and communication technology becomes a key business enabler (Robson, 1997). It allows businesses to address and accommodate global customers, vendors, suppliers and customers on a common ground. It is this evolving information and communication technology that has forced enterprises to be proactive and seek solutions that evolve too. Anticipating shifts, managing them, and turning them into effective business solutions that change, scale and deliver at all times is the only way to maintain a competitive advantage in the market place.

Oesterle (1991) argues that there is the implicit assumption that business needs drive information and communication technology and information strategy. There is evidence however, that in some organizations, information and communication technology strategy is driving corporate planning, and that information and communication technology can actively assist in the creation of business opportunities, rather than just support them.

Over the past decade, we have witnessed amazing business change through reengineering. optimizing supply chains and building total quality programs. Bursts of technological change, component based development and the Internet has responded to realize the business vision. Previously, business strategy created a vision and technologists crafted systems to realize this vision. Today is however

different: business and technology are fusing into a single, simultaneous revolutionary thrust. The application and the business are intertwined and hence the application is the business (Robson, 1997).

2.3 Determinants of Information and Communication Technology Application

As SME are often disadvantaged due to economies of scale in production and marketing, lack of access to capital and inputs etc. it is especially interesting whether the use of ICT can help them to overcome some of these disadvantages. Therefore first the general effects of ICT on enterprise performance are discussed followed by specific SME and entrepreneur's circumstances.

2.3.1 Information and Communication Technology and Small and Medium Enterprises' Competitiveness

According to Davenport (1990), the need to focus on the future has been the driving force for the application of information and communication technology systems in many companies. Efficiency and effectiveness, customer service, easier and convenient accounting data storage and retrieval have also been cited as reasons for application.

Flexibility is considered to be a major source of competitiveness for SME compared to larger enterprises. The use of ICT could now on the one hand increase the competitiveness of SME as they enable the creation of more flexible links with trading

partners because of faster and more reliable communication channels. On the other hand ICTs could help bigger enterprises to increase their flexibility through a restructuring of the organization, which will enable them to adapt quicker to changing conditions. Therefore the competitive advantage of SME could also decline. In general SME rely much more on informal information systems than larger enterprises. To get the relevant information that is needed for a rational decision is not costless especially as in SMEs usually there is only one decision maker – the owner/manager – whose personal resources (time, knowledge, and capabilities) are restricted.

However SME have the advantage of smaller internal coordination costs, as all decisions are made by one or few people (Blili and Raymond 1993, Müller-Falcke 2001). External transaction costs are associated with the initiation, negotiation and enforcement of contracts. Especially the Internet helps to screen the enterprises' environment for relevant information and thereby get information about sellers and customers that were previously out of reach. However for the actual delivery of goods and the transmission of payments also other infrastructure like transport and a reliable banking system has to be in place. With the use of ICT transaction costs could be lowered and therefore the economies of scale in exporting can be reduced. This will enable SME not only to stick to local markets but to expand regionally and internationally.

On the other hand many SME that are located in rural areas serve the local niche market and are protected against competition from bigger enterprises because of high transport and communication costs. Therefore ICT might also increase

competition for these enterprises, so they either have to become more productive or to close down.

Müller-Falke (2001) finds for Indian manufacturing SME that enterprises that use more advanced forms of ICT have on average a higher labour productivity and a higher growth rate. In a survey of 59 electric and electronic manufacturing Indian SME mainly employing less than 50 people, Lal (1996) observed higher profit margins, skill intensity and export and import intensities for firms using IT. There is also some evidence that export performance of SME is related to ICT application (Lal 1999, Nassimbeni 2001).

However it is not the investment in the technology alone but the combination with other technologies and especially relevant skills that make ICT work. A more qualitative study by Duncombe and Heeks (2001) stresses the different information and ICT needs for different types of SME. They conclude that smaller SME with little working capital (which they characterize as survivalists and trundlers) rely mainly on informal information from known sources where personal relations and trust plays a major role. For these enterprises ICTs are of minor relevance and only telephone can help to increase access to this kind of information.

As phones can help to extend social and business networks and in some cases substitute for journeys and business intermediaries access to telephone services should be given priority. However, for bigger SME that are growth oriented, belong to the formal sector, and are export oriented etc, information becomes more important

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and therefore more advanced ICTs can be helpful for building business linkages. Information is also lacking about external finance and sources of skills and training. This lack of information was found to raise costs and reduce income. "ICTs can reduce time and money costs of business processes and can improve the certainty and quality of those processes." These benefits occur mainly in enterprises with bigger size and specific sector of operation such as manufacturing exporters and the tourist industry, where the Internet can be used as a marketing tool. However for 90 % of the survey, enterprises lack of finance and skills are the main constraints and they cannot afford to buy a computer or make efficient use of it in the short or even medium term (Duncombe and Heeks 2001).

Information and Communication Technology (ICT) plays a major role for a knowledge-based economy, opening the window of opportunity for accelerated economic and social development. The most common identifiable constraints facing the development and expansion of the SME in Kenya is lack of markets, lack of access to information on new production technology and lack of finance and credit facilities. A faster and sustainable SME development could be achieved through linkages between small and large marketing firms, formal production companies and micro financing organizations. With the diminishing cost of acquiring new ICT tools, poor women can now be introduced to computers and the various ways of harnessing information for development. (AWCIN, 2004)

2.3.2 Information and Communication Technology and Enterprise Performance

The increased use of ICT in enterprises that can be observed leads to a substitution of ICT equipment for other forms of capital and labour and may generate substantial returns for enterprises that invest in ICT and restructure their organisation. However this does not necessarily imply that total factor productivity in the whole economy will increase. In fact in the industrial country the growth of total factor productivity (TFP) that is associated with technical change has even declined in parallel to the increased use of ICT in the past 10 to 20 years (Jorgenson and Stiroh 1999)

Only in the 1990's empirical evidence found that computers had a substantial effect on a firm's productivity levels. In their studies on the effect of IT on productivity (Brynjolfson and Hitt (1995) observed that alongside firm effects, ICT capital contributes positively and significantly to output and productivity for large US firms. Similar results are also found when examining the effects the use of various ICTs has on productivity. These results were consolidated even further in a more recent study (Brynjolfson and Hitt (2000) which underscores the importance of complementary factors such as restructuring the enterprise and improving the skills level of the personnel to get the productivity growth as a result of investment in ICT. They also take into account the reverse causality that successful firms might spend their windfall on ICT equipment.

Information also has become in recent years an important feature in promoting and facilitating the conduction of trade. Contact or exchange of information between producers, exporters and consumers helps to improve trade performance by creating

mutual awareness of products, quality and market conditions. Therefore access to information is an important determinant in creating competitiveness by effectively reducing the transaction cost. The application of the new information and communication technologies and especially in the Internet, offer increased effectiveness, for they encourage and facilitate direct contact between trade partners.

There is a growing acceptance that ICTs can play an important role in international development efforts by providing new and more efficient methods of production, bringing previously unattainable markets within the reach of local producers, improving the delivery of government services, and increasing access to basic social goods and services.

These new technologies, it is now clear, are not an end in themselves. Nor will a one-size-fits-all approach prove effective. The challenges faced by developing countries vary greatly by geography, culture, and level of economic achievement.
Evidence is growing that ICTs is a powerful tool when used in the right way as part of an overall development strategy.
They contribute through three different channels:

2.3.3 Social empowerment

ICT should not only be treated as a sector on its own, but also, and mainly, as a lens to re-think development. People should be aware of the possibilities that ICT offers in the traditional development sectors such as education, good governance, health, livelihood opportunities, and environment. ICT applications in those sectors have

already proved their value in addressing various challenges and in contributing to improving the efficiency in delivering the Millennium Development Goals.

2.3.4 Economic empowerment

The key to poverty reduction, in the end, is sustained economic growth. By using ICTs, nations can make a significant contribution to economic growth through increasing labour productivity, increase in the real ICT capital stock per work, and through the overall productivity growth across the entire economy arising from re-organization of production around ICT goods and services. At the micro-economic level, ICTs provide farmers, workers, and entrepreneurs with opportunities to reduce transaction costs, overcome inefficiencies, increase market coverage, and improve competitiveness, even across borders.

As the poor population and small firms usually have less access to information, this effect might help to reduce disadvantages and inequality. A reduction of information asymmetry will also create new opportunities and therefore enhance the efficiency of resource allocation (Akerlof 1970). On a macro level this will then lead to faster growth and diversification of the economy. ICTs can serve as information channels because they are able to support the decoupling of information from its physical repository, which can be argued to be the truly revolutionary aspect of these technologies (Evans and Wurster 1997; Pohjola 1999).

This property allows the immediate transmission of large volumes of information and permits communication independent of the physical movement of individuals. This

decoupling effect allows users access to a body of information and ideas, which are non-rival in use and potentially generate large content-related externalities, which will improve the innovation capacity and diffusion. One effect of the diffusion of ICT is the disruption of established economic relations as new possibilities are in the reach. Changes in how the economy works will also have effects on employment. Creation of new jobs and a loss of jobs that become redundant, new contents and quality of work, relocation of firms and maybe most important the skills required are all affected by the spread of ICT (ILO 2001).

In general it is difficult to separate the factors that drive diffusion of ICT from the effects of ICT. For example education is a precondition to use advanced computer based ICTs but at the same time ICT might help to improve

2.3.5 Entrepreneur's Knowledge

SME usually face a comparatively uncertain environment and entrepreneurs often have a short-term time horizon. Therefore the decision to implement ICT depends on the intuition of the entrepreneur, which is subject to his training and experience as well as his optimism or pessimism with respect to policy changes and economic conditions in the future. Past studies on diffusion of the Internet have shown that the number of Internet hosts per capita depend on the level of education. Especially university education seems to matter for Internet access as universities are among the first institutions with Internet access in many countries.

2.3.6 Cost

The cost and availability of telecommunications determines the extent to which the new ICTs are used and these access costs are often higher in poorer countries. The price of telecommunication services has a negative impact on the spread of Internet technologies as the transmission of data depends on the use of this infrastructure which means that telephones and Internet are complementary (Pohjola 2001). Where the perceived cost of setting up ICT systems is high compared to expected benefits, then the rate of application of ICT remains low. This is especially true for SME located in rural areas

Therefore, the application decision is determined not only by the enterprise characteristics but also by characteristics of the entrepreneurs and the environment the enterprise operates in. This explains why not all-potential users introduce the different ICT technologies at the same time despite its advantages.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research design

The world today is undergoing a fundamental transformation as the industrial society that marked the 20th century rapidly gives way to the information society of the 21st century. This has resulted to most businesses turning to ICT as a very important resource in conducting business. This study used descriptive approach to identify and analyze the determinants of application of information and communication technologies among the small and medium enterprises in Nairobi.

3.2 Population

The population of interest in this study consisted of proprietors and managers of all Small and Medium Enterprises in Nairobi. It is estimated that there are over 1.3 million SMEs in Kenya with approximately half of them based in Nairobi. (National Micro and Small Enterprise Baseline Survey, 1999) According to the study, SMEs in Kenya fall under three broad categories based on the nature of business an enterprise is involved in. These are;

i. Manufacturing
ii. Retailing
iii. Service provision

3.3 Sample of the study

Since a study of the whole population was not practical, a random sample of 30 firms from each category forming a total of 90 respondents was taken to constitute the sample for this study.

3.4 Data Collection

In Kenya, a number of entrepreneurs of SME have modest education and it would be difficult for them to interpret some of the requirements of the questionnaire. For that reason, trained research staff visited selected small and medium enterprises in Nairobi, and having attained necessary consent, they contacted the managers or owners of the selected SME in order to familiarize them with the questionnaires and also get an opportunity to probe and ask further questions, besides leaving the questionnaire for collection later where necessary. The questions asked served to provide complementary information to that on the questionnaire.

The questionnaire consisted of two parts. The first part solicited information on the profile of the enterprise and the entrepreneur and the nature of business is involved in. The second part was to elicit information on the respondents' understanding of ICT, level and determinants of ICT application by the enterprise, benefits and/or problems experienced by the enterprise as a result of ICT adoption and future prospects of the enterprise as regards ICT application.

3.5 Data Analysis

Descriptive statistics were used to analyze the data collected. The data collected was quantitative in nature. Levels of ICT application were evaluated by the nature ICT system a firm has and amount of the firm's involvement in it. A narrative summary of the open-ended questions was made. In the analysis, a database was tabulated to give the different levels of ICT adoption by the SMEs. The collected data was then analyzed for factors influencing application of ICT systems by SME. From the summary and analyzed data presented, conclusions were drawn.

CHAPTER FOUR: STUDY FINDINGS AND ANALYSIS

4.1 Introduction

This chapter presents findings and discussions of the study. A total of 90 questionnaires were distributed to various small and medium enterprises in Nairobi, out of whom 50 companies responded by completing and returning the questionnaires, representing 55.5% of the response rate. The data analyzed is based on these statistics. The questionnaire used had four main sections. The first two sought information on the profiles of both the entrepreneur and the enterprise. The third section sought to find out the extent of application of ICT by the enterprise and the motivating factors for ICT application. General information, entrepreneur profile, ICT application in the enterprise and general comments ware analyzed using frequency distribution and percentages,

4.2 4.2 Profile of Enterprise

The respondents were requested to give information on the location of business, ownership, decision making in the business, number of branches, number of employees and ICT awareness in the enterprise. The following tables depict the findings as follows:

4.2.1 Business Ownership.

This section was to find out the nature of ownership of the business. Nature of business ownership is important in making decisions on investing on technologies as personal knowledge and experiences come into play. The respondents were requested to indicate whether the business was a sole proprietor, partnership, family business etc.

Table 4-1: The Data Findings of the ownership of the businesses

Ownership	Number	Percentage
Sole Proprietor	25	50
Partnership	19	38
Family Business	5	10
Others	1	2
Total	50	100

Source: Research Data

In the table above, of the 50 respondents, 50% indicated that the business ownership was a sole proprietor, 38% was a partnership 10 % was family business while the rest 2% had other types of ownership. This shows that most of the respondent had setup their own business and hence the decision to apply ICT greatly depended on their characteristics.

4.2.2 Age of Enterprise

The purpose of this section was to establish how long the SME had been in existence. The respondent was required to indicate the period within which the enterprise had been in business.

4.2.3 Table 4-2: Years of existence of the Enterprise

Years of existence	Number	Percent
0 – 5 years	15	30
6 – 10	21	42
11 – 15	7	14
15 – 20	1	2
Over 20 years	6	12
Total	50	100

Source: Research Data

Findings indicate that 72% of SME in Nairobi are less than ten years old. Only 20% of them are more than twenty years old. This could indicate that most of the SME got into business within the ICT era and hence are more predisposed to apply ICT in their operations.

4.2.4 Business Size

The purpose of this section was to find out the size of the SME. The size was measured by the number of employees an enterprise had or the number of branches of the business.

This was to enable categorize the business as small, medium or large enterprise. Respondents were requested to indicate the category of their business with respect to its number of employees and branches within given ranges. The tabulation of these data is shown in table 4-3 and table 4-4

Table 4-3: Number of employees

Number of employees	Frequency	Percent
1-10	26	52.0
11-20	8	16.0
21-50	9	18.0
51-100	7	14.0
Total	50	100.0

Source: Research data

The results from the table 4-3 show that 86 % of the enterprises can be classified as small enterprises as they employ less than 50 employees. The rest 14 % are medium enterprises while none qualified as a large enterprise.

Table 4-4: Existence of branches

Existence of branch	Number	Percent
Yes	14	28
No	36	72
Total	50	100

Source: Research data

The results from table 4-4 show that most of the SME are single entities as only 28% have branches. It is expected that as an enterprise becomes bigger and its operations become more complex, the need to apply ICT systems increase to facilitate communication and data storage. This was actually found to be the case as the bigger enterprises had more elaborate ICT systems in place.

4.2.5 Decision Making in the Enterprise

The purpose of this section was to find out who was responsible for making decisions in the running of the SME. It was an open-ended question and the respondents were requested to identify the people who made decision in their enterprises. It was expected that the decision to apply ICT systems in the business to a large extent depends on the decision maker in the business. The tabulation of this data is shown in table 4-5 below.

Table 4-5: Decision makers in the Enterprise

Decision Maker	Number	Percentage
Board of Directors	14	28
CEO	2	4
One Partner	22	44
All Partners	12	24
Total	50	100

Source: Research Data

The results from table 4-5 show that decisions in majority of the businesses are made by the owners (68%), directors coming second at 28 %. It was also noted that most CEOs were actually the owners of the businesses. The fact that most owners made all the decisions means that the decision to apply ICT in the business is largely influenced by the entrepreneur's knowledge on ICT.

4.3 Entrepreneur's Profile

The data on entrepreneur's profile considered in the study was the age of respondents, level of education, history of employment, and knowledge on computers. The following tables depict the findings as follows:

4.3.1 Entrepreneur's age

Most modern technologies have been associated with younger people and the study was trying to establish whether this was true with ICT application among small and medium enterprises. The respondents were requested to indicate the bracket within which their age was.

-6: Entrepreneur's age

ars)	Number	Percent
	23	46
	10	20
	15	30
	1	2
ears	1	2

Research Data

s show that majority of small business owners are young people below the 40 years forming 66% the respondents. Most of them therefore had been in during the 'information age' and are therefore more likely to apply ICT in their ss operations. The study confirmed that this was the case on the ground.

Level of Education

rpose of this section was to find out the highest level of education attained by repreneur and determine whether the education level influenced the decision y ICT in the business.

spondents were requested to indicate their highest level of education as either sity, college, secondary or primary.

4-7: Level of Education of Entrepreneur

st Level of Education	Number	Percent
sity	16	32
je	30	60
idary	4	8
ry	0	0
	50	100

e: Research Data

The findings in the table above show 32% of the respondents are university graduates, 60% of them have undergone college studies while 8% of them have reached secondary level. The data from table shows that most of the respondent are holders of diploma and have undergone several forms of education. The implication was that most of the entrepreneurs had sufficient education to enable them understand and apply ICT systems.

4.3.3 Previous Formal Employment

The purpose of this section was to find out whether the entrepreneurs had previously been formally employed. Previous employment would possibly expose an individual to ICT thereby influencing the decision to apply the same in their enterprises. The tabulated results are shown in the table below.

Table 4-8: Employment History of Entrepreneur

Previously Employed	Number	Percent
Yes	37	74
No	13	26
Total	50	100

Source: Research Data

The results from the table 4-8 show that the majority of the respondents (74%) had at one time been employed. Most of those who had been employed previously indicted that they had had the opportunity to use ICT with their former employers.

4.3.4 Entrepreneur's Knowledge on Information and Communication Technology

This section had the purpose of finding out the level of knowledge on ICT the entrepreneur had. The level of ICT knowledge by an entrepreneur would largely influence the decision of applying ICT systems in their business as setup labour costs would be reduced. Respondents were asked to indicate what they thought was their level of knowledge on ICT as very high, high, medium and low.

Table 4-9: Level of Knowledge of Information and Communication Technology of the Entrepreneur

Level of Knowledge of ICT	Number	Percent
Very High	10	20
High	20	40
Medium	18	36
Low	2	4
Total	50	100

Source: Research Data

Findings as shown in table 4-9 show that 10% of SME owners have very high knowledge on ICT. Only 2% of the entrepreneurs have low knowledge of ICT. It also came out that the 10% who indicated their level of ICT knowledge to be very high deal in ICT products. None of the entrepreneurs admitted to having no knowledge on ICT.

4.4 Level of Information and Communication Technology Awareness by Employees

The purpose of this section was to find out the level of ICT awareness of the employees. It was expected that where an enterprise's employees had high level knowledge on ICT, then there was likelihood of the management being influenced to apply ICT systems. The respondents were requested to indicate on a level of low, medium, high or very high. The tabulation of this data is shown in table 4-10.

Table 4-10: Level of Information and Communication Technology awareness by employees.

Level of ICT awareness	Number	Percent
Low	3	6.1
Medium	32	65.3
High	10	20.4
Very High	4	8.2
Total	49	100

Source: Research Data

The result from the table 4-10 shows that most of the respondents (64%) had a medium level of awareness of ICT. 6% had low level of awareness, while 4% had very high level of knowledge in ICT i.e. experts in ICT. The implication was tthat in most SME information and communication systems are run by the owners of the business. Most of the employees deal with the physical work.

4.5 Level of Information and Communication Technology Application in the Enterprise

The ICT application considered in the study is the existence of ICT systems in the enterprise, level of ICT application, factors influencing the enterprise to apply ICT,

expansion of ICT in the enterprise and areas of expansion, and financial turnover of the enterprise in relation to the introduction of ICT.

4.5.1 Existence of Information and Communication Technology in Small and Medium Enterprises

The aim of this section was to find out if the enterprise had ICT systems in its operations. Findings showed that 94% of the respondents had ICT systems in their enterprises. The existence of ICT in the enterprise indicates that most SME are embracing ICT in their operations and willing to spend a lot on the same.

4.5.2 Level of Information and Communication Technology Application

The analysis was done to find out the level of application of ICT by the businesses. The respondents were requested to indicate the level by ticking against a list. i.e. Level I (mobile phone and landline), Level II (fax and computer) and Level III (computer network and internet.)

Table 4-11: Level of Information and Communication Technology Application

Level of ICT application	Number	Percent
Level I	38	84
Level II	4	9
Level III	3	7
Total	45	100

Source: Research Data

The findings show that majority of the small business use ICT largely for communication only as only 16% had computers.

4.5.3 Factors that Influence Information and Communication Technology Application in Business

The purpose of this section was to establish the strength of various factors in influencing the enterprise to apply ICT in its operations. Respondents were required to rate given factors on a scale of 1 to 5, with 5 being the strongest and 1 the least, on their strength as having influenced the business to use ICT. The tabulated results are given in the table 4-12 below.

Table 4-12: Factors that influenced the enterprise to apply Information and Communication Technology

Factors that influenced the enterprise to use ICT	Strength of the factor as an influencing agent on a scale of 1 to 5 with 5 being the strongest
Data storage	2
Improve customer service	3
Reduction of time spent on transactions	4
Make accounting easier	4
Improve efficiency and effectiveness	4
As a substitution of labor	3
Increase competitiveness	3
Other business were already using it	2
Requirement by suppliers	2
Owner's previous experience with ICT systems	3

Source: Research Data

The findings indicate that reduction of time spent on each transaction, making accounting easier and improving efficiency were cited as the highest influencing

factors for small businesses on use of ICT. Contrary to expectation, competitiveness was not cited as a very strong influencing factor in ICT application among SME. Most SME owners thought that ICT was readily available it had ceased being a competitive tool but rather a necessity to run a business.

The following were also cited as reasons for use of ICT on the section where the respondents were required to highlight other reasons.

i. Earlier payments by debtors
ii. Public image
iii. Faster decision making

4.5.4 Contribution of Information and Communication Technology to Increment in Turnover in the Enterprise.

The purpose of this question was to find out if ICT had contributed to turnover increment in the business.

Table 4-13: Turnover Increment as a result of application of Information and Communication Technology

Percentage increment	Number	Percent
Below 20%	4	8.7%
Between 20% - 50%	27	58.7%
Between 51% - 80%	8	17.4%
Over 80%	7	15.2%
Total	46	100

Source: Research Data

All the respondents agreed that ICT had contributed to increment in turnover in their businesses.

4.6 Other Findings on Information and Communication Technology Application in Small and Medium Enterprises

In this section of the questionnaire, the respondents were requested to give general comments concerning ICT in small and medium enterprises and the country at large. This included benefits achieved by the SME, any negative effects brought by ICT, constrains that the business faced in its application of ICT and ways ICT could be improved in the business and the country.

4.6.1 Gains after Application of Information and Communication Technology Systems

The findings show that after a business has introduced ICT, the gains are numerous which include: profit and efficiency, reduction in costs, effective service and employee satisfaction. Further gains include faster data storage and retrieval from machines that connected through networks. Reduction of staff was also given as another gain that was achieved. Those that deal with manufacturing gave a view that they experienced reduced cost of production in their firms.

This information is very important to other small-scale enterprises as evidence that there is an impact of introduction of ICT in SME.

4.6.2 Negative Effects of Information and Communication Technology

Despite the acclaimed advantages occasioned by application of ICT in a business, some respondents thought that ICT has some disadvantages or negative effects. Findings showed that 38 % of the respondents thought that use of ICT had brought some negative effects to the enterprise, 52% thought there were no bad effects while 10 % were not sure. The bad effects mentioned include:

i. Reduction of mental activities. Some respondents indicated that constant use of machines to solve most of the problems had reduced their mental activities making them dull and un-innovative.

ii. Frequent system breakdown leading to customer dissatisfaction. For most businesses who used internet as a business tool, breakdown in communication was cited as a major problem since it usually resulted with delays and dissatisfied customers.

iii. Information insecurity. Some respondents felt that security of their data had become compromised since ICT systems are prone to interference by other parties.

iv. Loss of jobs. Application of communication systems was cited to be a source of job loss especially for messengers and secretaries.

v. High installation costs affecting business finances

vi. Reduced personal interaction. It was felt by some respondents that use of machines had taken away the traditional personal interaction and made people operate like machines.

4.6.3 Constrains Faced by Small and Medium Enterprises in Setting Up Information and Communication Technology

The purpose of this question was to find out what constrains the business faced as it applied ICT.

Table 4-14: Constrains Faced in Application of ICT

Constrain	Number	Percent
Capital constraints	3	50
lack of professional staff	5	10
Delay of connection of internet	5	10
Government regulation	5	10
Training of staff	5	10
Programmes crashing	5	10
total	**50**	**100%**

The results above show that capital constraint is the major constraint. Others like lack of professional staff, delay of connection of internet, government regulation, training of staff and unreliable software all score 10%.with an indication that they are not major constraints. The implication was that most enterprises are willing to apply ICT systems but are held back by the high investments involved.

4.6.4 Suggested ways to Improve Information and Communication Technology in the Business

Respondents made the following suggestions for improving ICT use among SME in Kenya.

i. Reduction of cost of internet facilities
ii. Boosting technology in the grassroots
iii. Eliminating substandard products

iv. Government regulations and Liberalization of waves

v. Reducing tax on the ICT equipment

vi. Educating people

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The research study was carried out to investigate determinants of application of information and communication technology among the small and medium enterprises in Nairobi. It also aimed at determining whether ICT application in a business is influenced by various independent variables like age, academic qualification, job experience, academic qualification etc.

To carry out the study, the research instrument used was a questionnaire, which was presented to businesses within Nairobi area. Fifty small and medium enterprises responded out of 90 targeted in this area.

The research study made the following revelations:

It found out that 20% and medium enterprises had a very high knowledge of ICT making it is easy for them to understand the benefits and importance of ICT in their enterprises and enabling them to plan appropriately in future.

In was found out that most SME interviewed had at least an aspect of ICT in use as defined in the three levels of ICT application. This is an indication that they appreciate ICT and are able to work with it. The study also found out that 92% of the small and medium enterprises staff had knowledge of ICT

According to the findings, younger respondents had higher Knowledge of ICT especially within the age of 20-30 and 30-40 years as compared to the older

respondents in their 40s and 50s. Majority of the businesses that had applied ICT extensively were owned by individuals within these age brackets.

The study found out that all the businesses that applied ICT in their transactions had experienced increase in turnover as a result of applying ICT systems. However, initial capital investment for ICT is so high that very small enterprises are unable to finance it.

5.2 Conclusions

The need to do business more easily was seen to be the biggest drive for application of ICT among SME in Nairobi. Most businesses want to conclude transactions faster and more efficiently. Surprisingly, most businesses did not view competitiveness and data storage as a big driver to ICT application. This could be attributed to the fact that ICT applications are globally available to everyone and the fact that most SME handle relatively smaller volumes of business

Age and level of education were seen to be major factors in influencing SME in applying ICT systems in their daily use especially where the businesses were solely owned.

Capital constrains is a big hindrance to adoption of ICT among small and medium enterprises. This means that SME should clearly plan before they embark on installation of ICT systems.

According to the findings of the study, it can be seen that small and medium enterprises have understood the benefits of ICT and are ready to utilize it appropriately.

5.3 Suggestion for Further Studies

The following are suggestions for further studies that can be carried out.

This study was limited to finding out the determinants for application of ICT by SME in Nairobi. The study also found out that while most SME are willing to apply ICT in their operations, they are normally faced with numerous hindrances. A study to establish in detail the problems faced by small and medium enterprises while applying ICT, with a view to proposing solutions, would go a long way in helping SME in Kenya.

While the study was limited to small and medium enterprises, it was noted that some of the factors motivating SME to apply ICT in their operations are generic and could also apply to the large enterprises. The study should therefore be extended to major companies in Kenya since they operate in the same environment as the Small and medium enterprises.

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DETERMINANTS OF APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY AMONG THE SMALL AND MEDIUM ENTERPRISES IN NAIROBI

SECTION A: ENTERPRISE PROFILE

1. Name of the enterprise .....(Optional)
2. Current location.....
3. Please give details of what your business is involved in .....
   .....
4. When was the business established.....
5. How is the ownership of the business
   i. Sole proprietor ( )
   ii. Partnership ( )
   iii. Family business ( )
   iv. Other .....
6. Who makes decisions in the business.....
7. Does the business have branches..... If yes, where are they located .....
8. How many employees does your business have.....
9. What would you say is the ICT awareness level of your employees
   i. Low ( )
   ii. Medium ( )
   iii. High ( )
   iv. Very high ( )

SECTION B: ENTREPRENEUR'S PROFILE

10. Please mark against your age bracket
    Below 20 years ( )
    20 – 30 ( )
    30 – 40 ( )
    40 – 50 ( )

50 - 55 ( )

Above 55 years ( )

11. Please mark against highest level of education attained.

University ( )

College ( )

Secondary ( )

Primary ( )

12. Have you ever been in formal employment before

Yes ( ) No ( )

13. If yes above, what type of industry was it .....

14. Have you ever used a computer

Yes ( ) No ( )

15. How would you rate your Knowledge on ICT

Very high ( )

High ( )

Medium ( )

Low ( )

SECTION C: ICT APPLICATION IN THE ORGANISATION

16. Does your enterprise have ICT system(s) in its operations?

( ) Yes ( ) No

17. When did your enterprise first adopt ICT system(s)

.....

18. If Yes above, what would you say is the level of ICT application as defined below.

Level I ( ) – Mobile phone, Landline

Level II ( ) – Fax, computer

Level III ( ) – Computer network, Internet

19. In a scale of 1 to 5, with 5 being the strongest reason and 1 the least, how would you rate the following factors as having influenced

your enterprise to use ICT

Factors	1	2	3	4	5
Data storage					
Increase productivity					
Improve customer service					
Reduction of time spent on a transaction					
Make accounting easier					
Improve efficiency and effectiveness					
As a substitution of labour					
Increase competitiveness					
Other businesses were already using it					
Requirement by suppliers					
Owner's previous experience with ICT systems					

What other factors, not mentioned above, motivated your enterprise to apply ICT?

.....

.....

.....

20. Have you experienced any expansion in ICT since the first application of ICT in your enterprise?
21. If Yes above, please state the areas of expansion.

    .....

    .....

    .....
22. Approximately how much has the enterprise spent in setting up the ICT system(s)? .....
23. What was your enterprises' approximate turnover before setting up ICT systems? Ksh .....
24. What is your enterprises' approximate turnover after setting up ICT systems? Ksh .....

25. If there's an increment in your turnover, do you think ICT has contributed to the increment?

( ) Yes ( ) No

26. If Yes above, what percentage increment has been contributed by ICT

- Below 20%
- Between 20% - 50%
- Between 51% - 80%
- Over 80%

27. In a scale of 1 to 5, with 5 being highest contribution and 1 being least contribution, how would you rate the contribution ICT systems to the following areas in your enterprise

Areas	1	2	3	4	5
Improved efficiency					
Improved productivity and job Satisfaction					
Cost reduction					
Improved customer service					
Increased speed of transaction processes					
Increased competitiveness					
Increased profitability					

SECTION D: General Comments

28. What benefits have you gained after applying ICT systems?

i. .....

ii. .....

iii. .....

iv. .....

29. Has ICT application brought any negative effects?

( ) Yes ( ) No

30. If yes which are they

i. .....

ii. .....

iii. .....

iv. .....

31. What constraints has your enterprise faced in its application of ICT?

i. .....

ii. .....

iii. .....

iv. .....

32. How do you think ICT in your enterprise can be improved?

i. .....

ii. .....

iii. .....

33. How do you think ICT in the country can be improved?

i. .....

ii. .....

iii. .....

34. What are the future ICT prospects in your enterprise?

i. .....

ii. .....

.....