A SURVEY OF FACTORS HINDERING THE GROWTH OF ICT USAGE IN THE STATE PARASTATALS IN KENYA

BY

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Declaration

This management research project is my original work and has never been presented for a degree in any other university or institution. No part of this research proposal may be reproduced without prior permission of the author and/or University of Nairobi

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

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Dedication

I dedicate this research project to my dear wife Emmy, lovely children Patricia, Godwin, Givens and Patience for their understanding and support during the entire time of my studies and this project research.

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Abstract

The focus of this research study was factors hindering the growth of ICT usage in state parastatals in Kenya. The ICT/MIS managers in the state parastatals were used as informants to the study.

The study applied a descriptive research design approach. The study targeted all the 96 state corporations in Kenya. Questionnaires were used in collection of primary data. Descriptive statistics and factor analysis techniques are the principal data analysis techniques. The findings are presented using tables and charts.

The study established that despite majority of the organizations having been in operations for more than 20 years, adequate computerization has only been attained in the management of financial operations and payroll operations. Other vital areas of operations such as human resources management, operations management, marketing management, sales management, research and operations are yet to be computerized in more than 60% of the parastatals. The factors hindering the growth of ICT usage have been categorized into seven broad categories namely the nature of management and governance structures applied by the state corporations, ICT security and implementation support, costs of ICT investments and length procurement procedures, economic performance which impacts on the ability to procure ICT related issues, lack of reliable power supply, infrastructure-related and ICT regulatory environment.

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List of Abbreviations and Acronyms

ATMs	-	Automated Teller Machines
B2C	-	Business to Commerce
CBIS	-	Computer-Based Information Systems
CCK	-	Communication Commission of Kenya
EFA	-	Exploratory Factor Analysis
ICT	-	Information Communication Technology
MIS	-	Management Information Systems
SPSS	-	Statistical Package for Social Sciences
UNCTAD	-	United Nation Conference on Trade and Development

CHAPTER ONE

INTRODUCTION

This chapter provides the background to the study, the research problem, the study objectives and significance of the study.

1.1 Background to the Study

According to Avgerou (2001), ICT is an absolute necessity for taking part in today's global economy and as such the role of ICT in the emerging global market cannot be overemphasized. ICT has also been credited with the potential to integrate world economies thus demolishing the barriers created by time and distance. In addition, ICT makes easier the trade in goods and services, encourages investment, creates new sectors for enterprise development and new revenue streams (Carayannis et al. 2005). Meng et al (2002) maintains that the role of the ICT industry in developing countries is far from clear. This might be due to the fact that developing countries are short of capital investment and knowledge. The developing countries therefore lag behind in ICT-industry development and diffusion in comparison to the industrialized nations.

Late adoption of ICT by developing countries however in a way might translate into a competitive advantage for the developing countries, as they have the opportunity to learn from the experience of the developed countries and at the same time adopt the latest generation technologies. The obvious benefit of this is that they need not incur the learning and experimentation costs that typically characterized the adoption of new technologies by the early adopters (Wong. 2002). Cohen et al. (2002) describe ICT as a collection of technologies and applications which enable electronic processing, storing and transfer of information to a wide variety of users or clients. According to

Quibria et al (2003) these technologies and applications are further broadly classified into three categories namely computing, communication and Internet.

The building blocks of ICTs are the communication processes and infrastructures. The communication processes can either be one-way or two-way. In one-way communication the information is disseminated to the receiver who does not have the opportunity to respond immediately. Examples of this include radio and television. Two-way communication allows for feedback between the sender and the receiver of information. The devices for this include telephones, telegraphs, faxes and pagers. Relatively recent communication technology like the Internet consists of a number of sub-networks that are connected to each other through which electronic communications are transmitted (Foros et al., 2005). The Internet represents the convergence of computing and communications, and forms the backbone of a knowledge-based economy and information society. The substantial improvements in computing power, speed, storage and overall capacity have boosted the development of knowledge-based economy and the information society. This has manifested in the evolution of new innovations and developments in Software applications, sophisticated hardware and communications tools. According to SAITIS (2005), technologies can be applied in e-government, e-business, entertainment and arts, science and medicine, knowledge management and dissemination amongst numerous applications.

Duncombe et al (1999) defines ICTs as electronic means of capturing, processing, storing and disseminating information. Since 1994, most development agencies, analysts and developing-country governments consider information and communication technologies (ICTs) marginal to the achievement of both national economic growth and the reduction of poverty. Today, ICTs are considered so central to development that governments have initiated national 'e-strategies' and

donor agencies have made them a mainstream item in national and international programmes (Organization for Economic Co-operation and Development OECD, 2004).

Information and communication technologies (ICTs) have the potential to make vast amounts of information available to users located in various parts of the world and to facilitate rapid communication between them (McCormick et al, 2002). ICT offers a radically new means of enabling organizations to exchange information with each other regardless of where they are located geographically (Panagariya 2000; United Nations 2000; Xie 2000). ICT in the public sector is being promoted as a means of enabling organizations in developing countries to become more integrated within the global economy on economic terms that are favourable for them. This is achieved through reductions in transaction costs accompanying ICT implementations by using the available resources and networks. The end result is attainment of more efficient information exchange systems (Benjamin et al. 1995; Leebaert. 1998; Malone et al, 1998; Malone et al, 1987). In Kenya, Parastatals are some of the organizations that have embraced ICT

1.2 Parastatals in Kenya

The establishment of Parastatals was driven by a national desire to accelerate economic social development, redress regional economic imbalances, increase Kenyan Citizen's participation in the economy, promote indigenous entrepreneurship and promote foreign investments. The desire was expressed in the Sessional Paper No. 10 of 1965 on African Socialism and its application to planning in Kenya (Sessional Paper on Privatization and Investments, 2005). In a move to stay in line with the changing technological needs, the government has invested heavily in ICTs within the state Parastatals. This is geared towards improving the productivity and efficiency of services in all sectors of the economy. New approaches in telecommunications and ICTs are also creating incentives for investment that should help to close the existing information gaps in the public sector.

Although they have embraced ICT usage, there is still low usage and utilization of technology as noted in the *Proceedings of the National Investment Conference* held between 19th and 21st November 2003, which the Government of Kenya committed itself to reviewing the legal framework to remove constraints that have discouraged adoption and use of e-commerce and to develop a master plan for e-government. This means that ICT will play an increasing role in the performance of private, public and non-governmental organizations in Kenya. This will in turn increase the dependence of the organizations on application software (Wachira, 2003).

1.3 Problem Statement

The problem of inadequate access to affordable ICTs in most African countries is due to the poor state of Africa's ICT infrastructure, the weak policy and regulatory frameworks and human resource deficiencies in these countries. African countries have in recent years made some efforts to facilitate the ICT infrastructure deployment, roll-out and exploitation process in a number of areas. However, Africa still remains the continent with the least capability in ICT and other related facilities (New Partnership for Africa's Development NEPAD, 2002). The threat posed by the digital divide to the rapid development of African countries can on the whole be attributed to African countries' inability to deploy, harness and exploit the developmental opportunities of ICTs to advance their socio-economic development within both the private and public sectoral organizations. The principal barrier to achieving the potential benefits of ICT in the public sector is often regarded as insufficient ICT infrastructure and the high costs of investment. Further to this, lack of well-defined ICT frameworks has resulted to poor access of essential services by organizations in the public sector (McCormick & Kinyanjui, 2002).

In a study on "*ICTs and Economic Growth in Developing Countries*", OECD (2004) established that the extent of diffusion, the use of ICTs, and their impact on business performance are influenced by a

number of complementary factors in the business environment. Five factors were identified. The first factor entails the nature of the business in which individual firms are engaged in. In this case, some sectors particularly those dealing with services can make much more extensive use of ICTs to change processes and their relationships with customers and suppliers (for example, through the use of software, call centers and e-commerce). Secondly is the extent of competition and the nature of the regulatory environment. In this regard, the more competitive and less regulated the business environment, the more likely are firms to take advantage of ICT innovation to improve their macro-economic performance. The third factor entails the relative costs of ICT deployment, including the costs of hardware, other inputs, labour and other indirect costs related to changes in working practices, licensing, standardization and the usage costs of networking facilities such as telecommunications networks. The fourth factor is the amount and quality of human capital available. The OECD report argued that the better skilled the workforce and the better equipped a firm is to upgrade workforce skills to take advantage of ICTs, the more likely it is to achieve higher rates of ICT-related innovation and increased productivity. Finally, the ability and willingness of organizations to restructure and reorganize their working methods to take advantage of the new opportunities made available through ICTs, the OECD study confirmed evidence reported elsewhere that adaptability and organizational capital within firms play a crucial part in maximizing the value of ICT investment (OECD, 2004).

O'Brien (2000) emphasizes the inevitability of using computer-based information systems in organizations. O'Brien argues that information systems give an organization competitive advantage in the market place. ICT, a component of computer based information systems (CBIS), enhances the development of products, services, processes and capabilities that give business strategic advantages over the competitive forces it faces in its industry. These forces include not only a firm's competitors but also its customers and suppliers, potential new entrants into its industry, and companies offering

substitutes for its products and services. Computer based information systems are also playing a greater role in the management of organizations (O'Brien, 2000). Organizations requiring ICTs to enhance their performance are therefore exposed to performance-related risk. In Kenya, this is so especially for organizations in the public domain where poor ICT usage has been evident over the years. It is in this view that this study sought to establish the factors hindering the growth of ICT usage in the Kenyan public sector organizations.

1.4 Objectives of the study

The objective of the study was to establish the factors hindering the growth of ICT usage in the state parastatals in Kenya.

1.5 Significance of the study

The findings of the study seek to inform the top management of state parastatals in assessing their own practices in ICT development. The study will be of help to ICT vendors as it would help them in the future when preparing proposals for implementing ICT solutions. The ministry of Information and Communications could also benefit from the findings especially in regard to policy and regulations formulation. The study is of importance to MIS managers in preparing them to articulate the need for organizations to keep abreast with the technology. Finally, scholars would use the results of the study to further research on factors that hinder the growth of ICT usage.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The review covered the past research studies carried out in Kenya and elsewhere on ICT development. It addressed the issues of possible factors that hinder the growth of ICT usage in the Kenyan public sector. The past studies and relevant literature in the area were analyzed critically, highlighting the key areas in the reviews.

2.1 Historical background and rationale for establishing Public Enterprises

From 1963 when Kenya achieved political independence up to 1979 when a comprehensive review of the State Corporations sub-sector was carried out, the Government's participation in commercial activities grew rapidly and broadly resulting in state dominance in various forms (including monopolies) in many commercial activities. The establishment of the parastatals was driven by a national desire to accelerate economic social development. redress regional economic imbalances. increase Kenyan citizen's participation in the economy, promote indigenous entrepreneurship and promote foreign investments. This desire was expressed in the Sessional Paper No. 10 of 1965 on African Socialism and its application to planning in Kenya (Sessional Paper on Privatization and Investments, 2005).

A comprehensive review of the public enterprises performance was carried out in 1979 (the Report on the Review of Statutory Boards) and 1982 (the Report of the Working Party on Government Expenditures). The Report on Review of Statutory Boards pointed out that growth in the parastatal sector had not been accompanied by development of efficient systems to ensure that the sector plays its role in an efficient manner. there was clear evidence of prolonged inefficiency, financial

mismanagement, waste and malpractices in many parastatals. The report also noted that government investments had largely been at the initiative of private promoters with government being brought in either as an indispensable partner or to undertake rescue measures. Many of the parastatals had moved away from their primary functions, especially the translation by regulatory boards from their regulatory role into executive role resulting in waste and confusion and there was danger of over-politicizing production and distribution through establishment of too many parastatals (Sessional Paper on Privatization and Investments, 2005).

Following the two reviews, a number of measures were put in place, one of them being the enactment of the State Corporations Act. However, although this was a major attempt to streamline the management of the state corporations, the performance of most of the corporations continued to deteriorate. One of the reasons is the continued reliance on limited public financing. The state corporations continued relying on public sector financing which was insufficient to meet all the sector's needs. They continued to be financed from loans borrowed by the government and on-lent or channeled to them as government equity, loans borrowed by the enterprises on government guarantees which in most cases ended up being repaid by the Treasury when the corporations defaulted; funds provided directly by the Treasury as grants or equity; or through internally generated funds. The internally generated funds were, however, inadequate due to huge debt burdens, tariffs that were below cost recovery levels, over employment, which caused most of the revenue to be used in payment of salaries, non-viable ventures that siphoned away resources from the enterprises, corruption and mismanagement in general. In addition most of the Parastatals were under capitalization from the time of incorporation as they were mainly financed from loans without due regard to the establishment of a strong financial base. Most of them also continued to spread their resources thinly due to multiplicity of objectives and poor accountability (Sessional Paper on Privatization and Investments, 2005).

The corporations were unable to reinvest to rehabilitate or modernize their operations due to inadequacy of resources (Sessional Paper on Privatization and Investments, 2005). This led to poor service delivery and inability to extend services to new consumers including industries. The continued poor service delivery and lack of access in turn resulted in a vicious circle, which increased the country's cost of production, thereby affecting adversely Kenya's external competitiveness and leading to loss of jobs and of economic opportunities. One of the steps towards the recovery of loss-making state parastatals by the government was modernization of major operations through installation of ICT tools and related infrastructure. However, with globalization and rapid changes in technology, most organizations in the public sector are not able to adopt new ICT tools as they would like their private sector organizations.

2.2 Information Communication Technology (ICT)

According to Cole (2000) the advent of computerization has revolutionized the nature and scale of human communications and information/data management. Combined with the computing and manipulation ability of computers and global reach of telecommunications facilities, ICT has transformed people's ability to acquire, store, use and disseminate information. The information may be numeric, textual, pictorial or sound form and can be applied in a wide range of texts. In workplaces the impact of IT can be seen from the number of computers and servers that are numerical to the amount of information available at a touch of key board and the speed of availability of such information. Other gadgets that have come through the advent of IT include mobile phones, satellite communication, laptops, palmtops, electronic organizers and ATMs (Automated teller machines).

According to Mahathir (1996), the "Internet-worked" electronic global village offers opportunities for national and local problem resolution, although equity and universal access will continue to remain key issues in multiracial and multi-religious societies. According to Hudson (1997), the four

major technological trends - capacity, digitization, ubiquity, and convergence - are driving the current telecommunications revolution, which parallels the emergence of a global economy. Investment in telecommunications could in itself contribute to economic, social, and political development. Reliable telecommunications networks could improve the productivity and efficiency of agriculture, industry, and social services. New approaches to financing telecommunications in the developing countries are also creating incentives for investment that should help to close the information gaps between the advanced and the developing regions.

Knight (1996), asserted that countries that fail to embrace the revolution are bound to become further marginalized and lack in technological development that is vital for economic growth. The new technologies are lowering the cost of storing, processing, and transmitting information and knowledge. Therefore, Knight contends that the less developed countries must build new learning systems, and mobilize international resources to create massive programs, community information and learning centers. These countries should solve the organizational, political, and regulatory obstacles so they could attract the resources they need.

According to Hamelink (1994), the four major trends in today's world communication are digitization, consolidation, deregulation and globalization. He argues that the accumulation of these trends have disempowered the people in important ways. He further adds that they make people powerless vis-à-vis the control of their own lives. They create a culture of silence in which people enslave others. Disempowerment matters because it represents a basic violation of human rights.

The proliferation of digital technologies, for instance, dis-empowers people through new forms of dependence and vulnerability. The solution would be a people's self-empowerment on a global scale - a global public sphere in which people can freely express themselves, share information, opinions,

ideas, and cultural experiences, challenge the accountability of power holders and take responsibility for the quality of the secondary environment. According to Marmaduke (1997), the Internet will bring not enlightenment, but a new dark age of exploitation of Third World peoples through downsizing and automation of the resource extraction network, both in raw materials and human labor. The present technological advances will serve only the clerical and burgher classes, excluding 95 percent of the world's people. According to Kuo (1993), computerization is an indicator that is commonly believed to be most closely associated with the level of informatization. Similar to telecommunications, computerization also has a mutually causal relationship with economic development and the level of per capita income.

2.3 Effect of ICT on Performance

In some countries, such as Finland and the United States, the technological innovation and high volumes of demand generated by an ICT-productive sector played an important role in achieving beneficial impact to the national economies. Countries with strong ICT service sectors are at an advantage over those countries where the ICT sector as a whole is weak. ICT investment has contributed to capital-deepening by increasing capital input per worker in addition to increasing labour productivity. The pervasive use of ICTs throughout the value chain has contributed to improved performance in firms, enabling them in particular to increase efficiency in combining capital and labour (OECD, 2004).

Information and communications technology (ICT) has permeated many activities in Kenya. Industries and different business environments such as supermarkets, banks, airlines and hospitals have institutionalized the technology. In addition, the *Report of the Sector working Group on Information Technology* (2001) recognized the need to leverage information and communications technology in its national priorities of growth and poverty reduction, and has mainstreamed ICT in the national planning process. In the *Proceedings of the National Investment Conference* held

between 19th and 21st November 2003, the Government of Kenya committed itself to reviewing the legal framework to remove constraints that have discouraged adoption and use of e-commerce and to develop a master plan for e-government. This means that ICT will play an increasing role in the performance of private, public and non-governmental organizations in Kenya. This will in turn increase the dependence of the organizations on application software (Wachira, 2003).

Developments in computer technology have drastically influenced the competitive business environment as proved by the emergence and strengthening of the global economy, and the transformation of industrial economies to knowledge-and-information-based service economies (Laudon and Laudon, 2001). This has in turn encouraged most organizations to use computer-based information systems in order to remain competitive.

2.4 Challenges to ICT development in Kenya

2.4.1 Lack of Skilled Manpower

Armstrong (2000) defines manpower skills as intellectual capital, which consists of stocks and flows of knowledge available to an organization. These can be regarded as intangible resources which together with tangible resources (money and physical assets), comprise the market or total value of business. Armstrong (2000) further conceptualizes workers as embodying a set of skills, which can be rented out to employers. For an employer the decision to invest on human capital are expected improvements on performance, productivity, flexibility and capacity to innovate which should result from enlarging the existing manpower base hence increasing the level of knowledge. Organizations in the public sector in Kenya usually fail to venture into new ICTs due to lack of qualified personnel to manage, plan and maintain such technologies. According to Parker (2004), the technology is relatively complex and requires skilled manpower that is unlikely to be available locally.

Bowey (1977) defined manpower planning as a strategy for matching future manpower numbers and skills with organizational activities. Gregory (1983) presented a manpower-planning model based on the idea of career development and job assignment according to skills attained. The parastatals in Kenya are still using traditional models of manpower planning and utilization hence the need for manpower for ICT development has been greatly ignored since some of the organizations are yet to adapt the new ICTs. Thomson (1979) introduced a transportation linear programming model to be used for studying the design of a manpower system. Thomson's (1979) work was notable for its application of linear programming to manpower planning problems. Golver (1979) introduced a model whereby jobs are assigned to individuals based on the costs associated with each individual doing a particular job. Although these models are useful for manpower planning, they are more concerned with matching employee's skills with different jobs.

According to human capital theory, workers rationally choose investments in their own human capital (For example, the amount and type of education to acquire, whether to change employers) based on their expectations about the returns on these investments in the form of future earnings. Becker (1975); Hotchkiss et al (1996). Thus, decisions about investments that are driven by predictions of future wages affect job and occupational choices and ultimately career paths. The theory has been used to explain gender differences in earnings and occupational attainment. Specifically, this theory suggests that because the market-work life of a woman has historically been shorter than that of a man, women have been less likely to invest in education and training Ehrenberg & Smith (1991). The net effect of these investment choices, according to human capital theory, is that women will differ significantly from men in not only the level of educational attainment and tenure, but also in the rewards they receive.

According to OECD (2004), the most important long-term constraint on ICT investment and ICT-led growth in developing countries is likely to be the shortage of human capital. Most developing countries suffer from a shortfall of ICT-related skills, which acts as a substantial constraint throughout the economy. The result of inadequate human capital is too little understanding of ICTs in government; too little awareness of ICT opportunities amongst entrepreneurs, too little relevant content and too few relevant applications, too few trainers able to pass on ICT skills to employees, too little computer literacy, too few trained computer programmers and maintenance personnel. ICT-skilled personnel in low-income countries can also usually earn much higher wages in other countries and so many leave.

The shortage of ICT-related skills is one outcome of a general low standard of basic education in Kenya. Poor general literacy and numeracy reduce the number of people who can make effective use of ICTs, not simply in the workforce but also as individual consumers. It will take much investment and a considerable length of time before developing countries can compete with the skill resources available to firms in industrial countries. In Kenya, the challenge to growth of human capital in ICT-related disciplines has been due to slow upgrading of educational attainment and poor government's commitment in ensuring that ICT capability is incorporated in various educational strategies at all levels.

2.4.2 Level of Organizational Performance

Cole (2000) defines Organizational performance as the degree of accomplishment of the set goals. He further refers organizations as open systems whose performance can be determined either quantitatively or qualitatively by considering the input-conversion-output model. In this model the choice of resources, the way they are recombined and the efficiency of transformation will determine the cost and or quality/quantity as well as timeliness of outputs/services and hence the competitiveness. The selection of ICTs for organizations is also influenced by such factors. In

management, organizational effectiveness is only realized by guaranteeing the full utilization of the resources available through ensuring proper mix of resources under its guidance while balancing influences both from internal and external to the firm. Pearson & Robinson (2004) states that no organization operates in a vacuum. The external and internal environment of the organization will affect its operations. The adoption of modern ICTs will greatly help to improve both the internal and external environments. Ansoff (1990) emphasizes that no organization will achieve success if it does not align its strategy to the dictates of the external environment and its internal capabilities. For example, the recent success of Kenya Airways was attributed to its modernization efforts for both its internal and external operations.

The Audit Commission UK Government (1998) developed five principles of a performance measurement system. These are clarity of purpose, focus, alignment, balance and regular refinement. What the public sector organizations in Kenya are lacking is regular refinement in relation to their ICT development policies and strategies. Under clarity of purpose, the organization should make users to understand its importance and purpose. The information should help them make better decisions or answer the stakeholders' questions. The information on organizational performance should focus on the core objectives of the organization or areas that need improvement. This should be complemented by information on day-to-day operations.

As regards alignment, the performance measurement system should be aligned with the objectives-setting and performance review process of the organization. There should be a link between the performance indicators used by managers for operation purposes and the indicators used to monitor corporate performance. The level of modernization in terms of ICT development can be used by state-owned enterprises in Kenya to measure their level of corporate performance. As regards the balance, the overall set of performance indicators should give a balanced picture of the

organization's performance, reflecting the main aspects, including outcomes and the user perspective. Finally regarding regular refinement, the performance indicators should be kept up to date to meet changing circumstances. A balance should be struck between having consistent information to meet changing circumstances. There should be a balance between having consistent information to monitor changes in performance over time, taking advantage of new or improved data and reflecting current priorities, Audit Commission UK Government (1998).

2.4.3 High Cost of investment in ICT

The speed with which skepticism has given way to enthusiasm has stimulated a good deal of innovative thought, but it also carries substantial risks. Investment in ICTs is expensive and its impact largely un-researched and easily exaggerated (OECD, 2004). Many of the assumptions underpinning current thinking on ICTs in development are based on intuition rather than analysis and on limited evidence from a narrow range of pilot projects rather than large-scale impact assessments. The danger is that, without better understanding of the real impact of ICTs on both national economies and community development, the pursuit of over-ambitious, unrealistic goals may mean that resources are misapplied and worthwhile objectives missed. Past disappointments, for example the failure of import substitution with industrialization strategies to transform economic growth, have not destroyed the yearning for a magic bullet for development and the real capabilities and limitations of ICTs must be properly understood if they are to be exploited effectively in both small- and large-scale industrial activity and in their contributions to national economic expansion.

When compared to developing economies, ICT investment costs are generally much higher in Less Developing countries (LDCs) where almost all ICT equipment must be imported (often subject to high rates of taxation and non-tariff barriers) and where telecommunications usage charges are generally much higher (especially for international and Internet connectivity). Regulatory factors such as license fees often also add to the cost of ICT investment. The net result is that every dollar of

ICT investment in an LDC buys significantly less ICT equipment and usage than in the developing economies. This is therefore likely to have a significantly lower rate of return (OECD, 2004).

2.4.4 Nature of the Regulatory Environment

Historically, most ICT sectors have been heavily regulated, particularly broadcasting and telecommunications. The last twenty years, however, have seen extensive liberalization and deregulation of communications markets in industrial countries and increasingly, also in the developing world. Most telecommunications markets in developing countries have now been at least partially liberalized and opened up to private-sector investment, including that from foreign companies. The impact of liberalization and privatization in telecommunications is generally agreed to have been beneficial, stimulating new investment, extended access, diversity of services and lower prices. Certainly, telecoms markets which have been liberalized to offer both private and business consumers cheaper and better connectivity, enabling them to make more effective use of ICT investments (OECD, 2004).

OECD (2004) further argued that ICT investment and innovation could also be constrained by regulatory factors outside the telecommunications sector, which increase the monetary or opportunity costs of ICT investment. Heavy customs duties on ICT hardware, for example, can put otherwise attractive ICT investments beyond the reach of smaller businesses and reduce the likely rate of return. Complex or bureaucratic licensing and standardization requirements also constrain investment. Governments which lack modern legislation on intellectual property rights or e-commerce may be tempted to restrict and control markets rather than allow them to develop freely. In these areas, too, more openness is likely to stimulate entrepreneurship, lower prices and encourage dynamic ICT-led businesses to contribute to economic growth. In Kenya for example, the licensing of communication and major ICT investment is bestowed to the Communication Commission of

Kenya. All new entrants that need to roll out their services are required to sign up with Telkom Kenya for connection and ICT infrastructural support.

2.4.5 Technological Changes

Creativity and innovation have for a long time been recognized as necessary for bringing the required change to sustain competitive advantage (Dean, 1998). Carr and Johansson (1995) defined creativity as the generation of ideas and alternatives, and innovation as the transformation of those ideas and alternatives into useful applications that lead to change and improvement. They have found that, in today's business environment, an essential element to an organization's success is adaptability. You must be able to manage at the speed of change, and that takes creativity and innovation.

Changes in technologies and market structures have shifted competition between organizations to a global level. This has resulted in the need for new organizational structures. Traditional organizational structures are not appropriate for the new business trends because they evolved in response to different and older competitive eras. In the information era, a responsive IT infrastructure is crucial to the flexibility and constantly changing needs of a business organization. It seems that in this very difficult and competitive environment the only change is constants and uncertainty. This turbulent business environment is forcing organizations to re-evaluate totally their processes and structures, indicating an increasing need for networking and cooperative arrangements (Athanasios, 2003).

2.4.6 Security and Privacy Concerns

The costs and benefits of security should be carefully examined in both monetary and non-monetary terms to ensure that the cost of controls does not exceed expected benefits. Security should be appropriate and proportionate to the value of and degree of reliance on the IT systems and to the

severity, probability and extent of potential harm. Requirements for security vary, depending upon the particular IT system. In general, security is a smart business practice. By investing in security measures, an organization can reduce the frequency and severity of computer security-related losses. For example, an organization may estimate that it is experiencing significant losses per year in inventory through fraudulent manipulation of its IT system. Security measures, such as an improved access control system, may significantly reduce the loss.

According to Marianne and Barbara (1996), security benefits do have both direct and indirect costs to the organization. Direct costs include purchasing, installing and administering security measures, such as access control software or fire suppression systems. Additionally, security measures can sometimes affect system performance, employee morale or retraining requirements. All of these have to be considered in addition to the basic cost of the control itself. In many cases, these additional costs may well exceed the initial cost of the control (as is often seen, for example, in the costs of administering an access control package). Solutions to security problems should not be chosen if they cost more, in monetary or non-monetary terms, directly or indirectly than simply tolerating the problem.

The ability of security to support the mission of an organization may be limited by various factors, such as social issues. For example, security and workplace privacy can conflict. Commonly, security is implemented on an IT system by identifying users and tracking their actions. However, expectations of privacy vary and can be violated by some security measures. (In some cases, privacy may be mandated by law.) Although privacy is an extremely important societal issue, it is not the only one. The flow of information, especially between a government and its citizens, is another situation where security may need to be modified to support a societal goal. In addition, some authentication measures may be considered invasive in some environments and cultures. Security

measures should be selected and implemented with recognition of the rights and legitimate interests of others. This may involve balancing the security needs of information owners and users with societal goals. However, rules and expectations change with regard to the appropriate use of security controls. These changes may either increase or decrease security (Marianne and Barbara, 1996).

2.4.7 Resistance to Change

According to Cairns (2003) there is strong evidence of staff resistance to accepting new computer systems on the grounds that they are likely to standardize ways of working, centralize systems and reduce their freedom of operation. In Kenya, employees in the public sector organizations consider ICT development as a threat to their jobs since computerization will lead to automation of major tasks that they usually undertake manually. In addition, technology can be seen to challenge the traditional management hierarchy and change both the location and the nature of decision making. The effectiveness and success of a technological system seems to depend not only on the technology itself. but also on the ways in which users are introduced to the concept. The possibility of job loss raises resistance toward ICT change so it is especially interesting that the groups most prone to layoffs are those holding highly routine and middle management positions, according to the findings of Landry, Mahesh and Hartman (Landry et al., 2005). In the case of highly routine jobs, the automation of work poses the threat.

The support of employees is highly dependent on the type of new development the company tries to introduce (Zwick, 2002). In their studies, Daniel (1987) and (Daniel & Hogarth, 1990) showed that changes in the organization of work alone (independent of technological investment) trigger higher resistance than the introduction of technological innovation alone. Based on survey responses from a large pool of firms introducing innovations, Zwick proved the validity of the following three main hypotheses employee resistance is higher in firms that face negative business prospects, the impact of expected employment reduction on internal resistance against innovation is stronger for lower

qualified employees than for higher qualified employees and employee resistance is higher in firms that plan to introduce other innovations or organizational changes. This study will seek to establish the factors hindering the growth ICT usage in the public sector organizations in Kenya.

Another important factor in terms of reaction to changes in a technology environment is the level of education. The correlation between education level and resistance is not surprising as it is usually easier for higher qualified personnel to find a new job if the introduction of new technologies finally result in headcount reduction; higher-qualified employees are better at accommodating to such changing environments. (Acemoglu & Pischke, 1999). Workers also experience great loss of value when their knowledge becomes obsolete. There are five main types of skill obsolescence (Loo et al., 2001): wear, atrophy, job-specific, obsolescence by market and company specific. In the case of workplace ICT environment changes, job-specific obsolescence is the most significant as radical changes occur in the individual work processes. Atrophy might also show up in the telecommunications industry since in the event of a technology change the old environment does not get discarded in its entirety, but might operate parallel with the new one for a period of time. In these cases, atrophy-type obsolescence can show up when knowledge of the previous-generation ICT environment may still be required in rare instances, but without practice those skills erode or in extreme cases even become extinct.

2.4.8 Organizational Culture

Hofstede (1991) defined organizational culture as the collective programming of the mind, which characterizes the members of one organization from others. Public sector organizations in developing countries are increasingly facing the difficulty of managing and using the multiplicity of new ICTs, such as e-mail, voice mail, worldwide web, cell phones, and videoconferencing. In addition, the sheer speed and ease of use of modern ICTs only serves to amplify these challenges. Hence, ICTs have become ubiquitous in organizations and most practices are now related to them. Because

organizations progressively expand into global markets, it is critical for them to know how ICTs facilitate communication (Ross, 2001). Embedding ICTs in organizations requires careful consideration of the implementing organization's culture and the cultures of other organizations and countries they communicate with (Ross, 2001; Westrup et al, 2003).

El Shinnaway & Vinze (1997) examined the impact of technology and culture in the process and outcomes of group decision-making in the United States of America (U.S.A) and Singapore. They found that ICTs do indeed have an impact on group decision outcomes such as polarization. However, the impact of ICTs is quite different on the culture that dictates the norms under which a group operates. Straub (1994) studied the effect of organizational culture on IT diffusion of e-mail and fax in Japan and the U.S.A. His findings suggest that culture plays an important role in the predisposition towards selection of ICTs. However, findings on the use of face-to-face and telephone were similar between the two countries. Leidner, Carlsson, Elam, & Corrales (1999) drew on survey responses from managers using Executive Information Systems (EIS) across organizations in Mexico, Sweden, and the United States. Their study examined whether cultural differences influence perceptions of the relationship between EIS use and decision-making outcomes. The study found significant differences, predicted by cultural factors, in the impact of EIS use on senior management decision-making. Hofstede (2000) investigated the specific attributes of organizations that influence ICT adoption speed. The findings established that cultural variables (individualism and uncertainty avoidance) might be used to predict the ease and speed of changes. Cultures of high uncertainty avoidance are slow in adopting new technologies.

The social context of ICT development and use plays a significant role in influencing the way in which people use and develop information technologies (Cairns, 2003). A study by Cairns (2003) in local governments found that configurations of local computing packages (including support

resources and information structures, as well as hardware and software) were influenced by the distribution of power within the department in question and often reinforce existing power relations. Technology acquisition therefore needs to be seen within the context of the inequalities, complexities and uncertainties of organizational life.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter focuses on the research design to be used in the study. The issues described in this chapter includes the target population, the sampling techniques, the research design, a description of instruments or tools to be used to collect data, sample size and the techniques to be used in data analysis.

3.1 Research design

The research adopted a descriptive design. The major purpose of descriptive research design is to establish the state of affairs as it exists at present (Kothari, 1999). This research design was used to investigate the factors hindering the growth of ICT usage in state parastatals in Kenya.

3.2 The target population

The target population of this study was made up of 72 non-commercial and 24 commercial state parastatals in Kenya as at 31st December,2005 (Republic of Kenya, 2005). The Management Information Systems (MIS) managers or their equivalents were the respondents.

3.3. Scope of the Study

A census was conducted to all the 96 state parastatals across the two broad categories shown in Table 3.1.

Table 3.1: A presentation of the study's population and scope.

Category of parastatal		Number of Parastatals
Broad	**Specific**	
Non-Commercial	Regulatory	25
	Research institutes	10
	Educational/Professional	14
	Development/Promotional agencies	11
	Culture/Social service	10
	Revenue collection	2
Commercial	Various	24
Total		**96**

Source: Draft Sessional Paper on Privatization (2005)

3.4 Data collection

Primary data was collected by use of questionnaires that were administered to the ICT/MIS managers or their equivalents in all the Parastatals. The questionnaire consisted of both open-ended and closed questions covering issues on factors hindering ICT usage in state parastatals. The researcher self-administered some of the questionnaires while others were mailed electronically to the target respondents. The respondents were assured that strict confidentiality was to be maintained when dealing with their responses.

3.5 Data analysis

The returned questionnaires were coded and checked for completeness. The data on the characteristics of the respondents was analyzed through the use of descriptive statistics such as mean, median and mode. Analysis of the data on the extent to which different factors influence the growth of ICT usage in the Kenyan state parastatals was performed through factor analysis (principal component analysis) techniques. The results are presented through the use of tables and graphs. SPSS was used to analyze the data.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

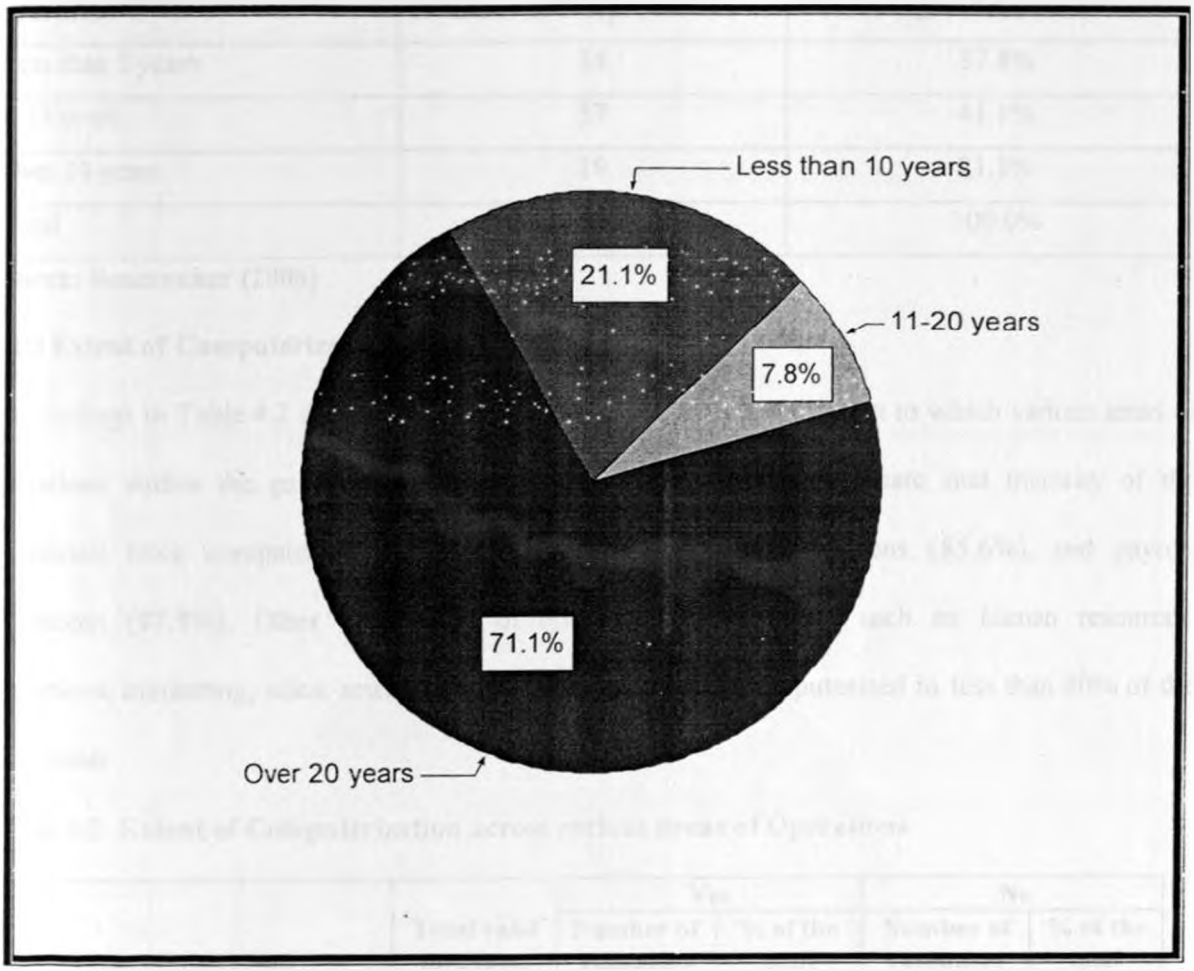
This chapter presents the analysis of findings. The findings are presented using tables and charts. The study achieved a response rate of 94% (representing 90 out of the targeted 96 parastatals). The chapter is organized by first analyzing the general information about the respondents and their organizations.

4.2 Analysis of the General Information

4.2.1 Duration of Operations since Incorporation

The findings presented in Figure 4.1 indicate the duration between when the organizations were incorporated in Kenya and the date of interviews (year 2006). The findings indicate that majority of the organizations (71.1%) have been in operations for more than 20 years. This shows that, majority of these organizations were in operations before the advent of the concept of computerization within the public sector.

Figure 4.1: Number of years since incorporation



Source: Researcher (2006)

4.2.2 Respondents' Experience in ICT Management in the Public Sector

The findings from the study indicates that, majority of the respondents (62.2%, cumulative) had worked in the ICT departments for durations exceeding five years. This indicates that, they are adequately informed on issues of ICT usage in the public sector, evidenced by the level of experience they possess.

Table 4.1: Experience of the respondents within ICT departments

Duration	Number of Responses	Percentage of the total
Less than 5 years	34	37.8%
6-10 years	37	41.1%
Over 10 years	19	21.1%
Total	90	100.0%

Source: Researcher (2006)

4.2.3 Extent of Computerization with the Parastatals

The findings in Table 4.2 shows the split of responses regarding the extent to which various areas of operations within the parastatals are computerized. The findings indicate that majority of the parastatals have computerized the management of financial operations (85.6%), and payroll operations (97.8%). Other vital areas of operations management such as human resources, operations, marketing, sales, research and operations are only computerized in less than 40% of the parastatals.

Table 4.2: Extent of Computerization across various areas of Operations

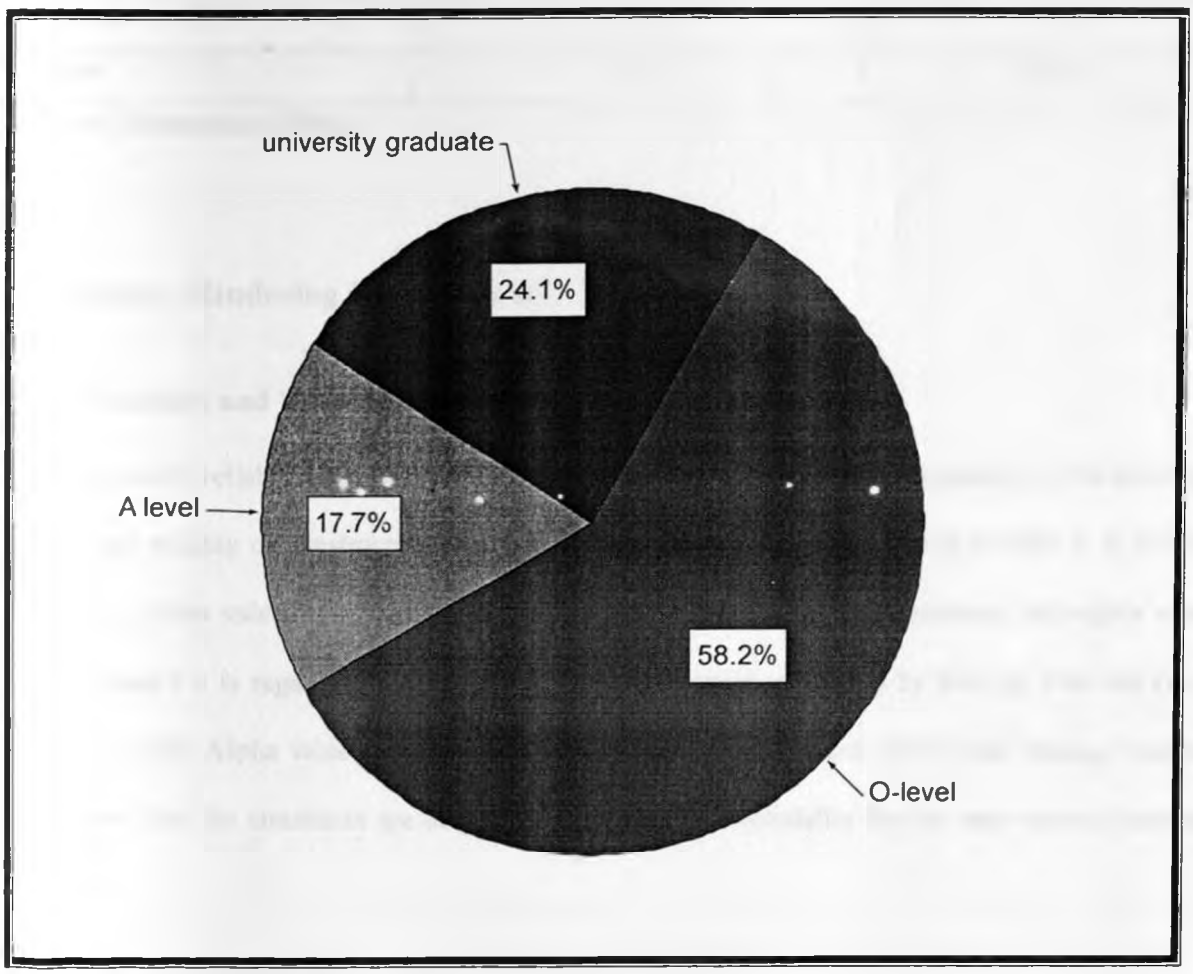
Areas of operations	Total valid responses	Yes		No	
		Number of responses	% of the total	Number of responses	% of the total
Finance management	90	77	85.6%	13	14.4%
Payroll operations	90	88	97.8%	2	2.2%
Human resources management	87	31	35.6%	56	64.4%
Operations management	81	31	38.3%	50	61.7%
Marketing management	68	11	16.2%	57	83.8%
Sales management	68	24	35.3%	44	64.7%
Research operations	72	16	22.2%	56	77.8%

Source: Researcher (2006)

4.2.4 Level of education/professionalism recommended for staff in ICT/MIS departments

The study sought to establish the lowest level of education and professional qualifications recommended for staff in the ICT/MIS departments of the parastatals as set by the human resource departments or the corporations' recruitment policies. Figure 4.2 shows that majority of the parastatals have recruited staff with at least 'O-Level' (58.2%), 17.7% employed those with an 'A-Level' certificate, while 24.1% employed those with a university degree.

Figure 4.2: Lowest recommended level of education for ICT/MIS staff



Source: Researcher (2006)

Table 4.3 shows that majority of the parastatals have recruited staff with at least a diploma qualification in ICT (62.2%), 32.2% employed staff with a certificate in ICT, while 3.3% recruited graduates in ICT. The variations established in the levels of education and professional

qualifications are due to the disparities in the nature of operations from one parastatal to another. Parastatals with complex ICT systems will require staff with higher qualifications than parastatals with less complex ICT systems.

Table 4.3: Lowest recommended level of qualification for ICT/MIS Staff

Qualification	Number of responses	% of the total
Certificate (in IT)	29	32.2%
Diploma (in IT)	56	62.2%
Graduate (in IT)	3	3.3%
Others	2	2.2%

Source: Researcher (2006)

4.3 Factors Hindering Growth of ICT Usage

4.3.1 Reliability and Validity Assessment

The purpose of reliability and validity assessment is to assess the internal consistency of the resulting scales and validity of constructs within the research questionnaire. According to Hair et al (1995), Cronbach Alpha values of 0.7 are acceptable as cut-offs for reliability assessment, although a value greater than 0.6 is regarded as a satisfactory level as earlier suggested by Van de Ven and Ferry (1980). A joint Alpha value of 0.8888 was obtained based on 24 items. From this finding it can be concluded that the constructs are deemed to have adequate reliability for the next stage of validity analysis.

4.3.2 Principal Component Analysis

According to Kline (2000), factor analysis is a statistical procedure, which enables the underlying dimensions of a questionnaire to be determined. An exploratory factor analysis (EFA) based on the

principal component method with varimax rotation was conducted using SPSS package to detect the factor structure in the observed variables. First of all, to examine whether the data set was appropriate for a factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Barlett's Test of Sphericity were utilized. Findings in Table 4.4 showed that, the KMO statistic of 0.628 with a p-value less than the critical level of significance of the test, which was set at 1%. Field (2000) recommends that, the value of KMO should be greater than 0.5. In comparison with these cut-off levels, the KMO result was 0.628, which was sufficiently high. Barlett's Test of Sphericity was also highly significant (Chi-square = 1486.095 with 276 degree of freedom, at $p < 0.01$), indicating that the correlation matrix was not an identity matrix. These results provide an excellent justification for the factor analysis (Kline, 1998). This led to the conclusion that a factor analysis of the scale items would be appropriate.

Table 4.4: KMO and Bartlett's Test

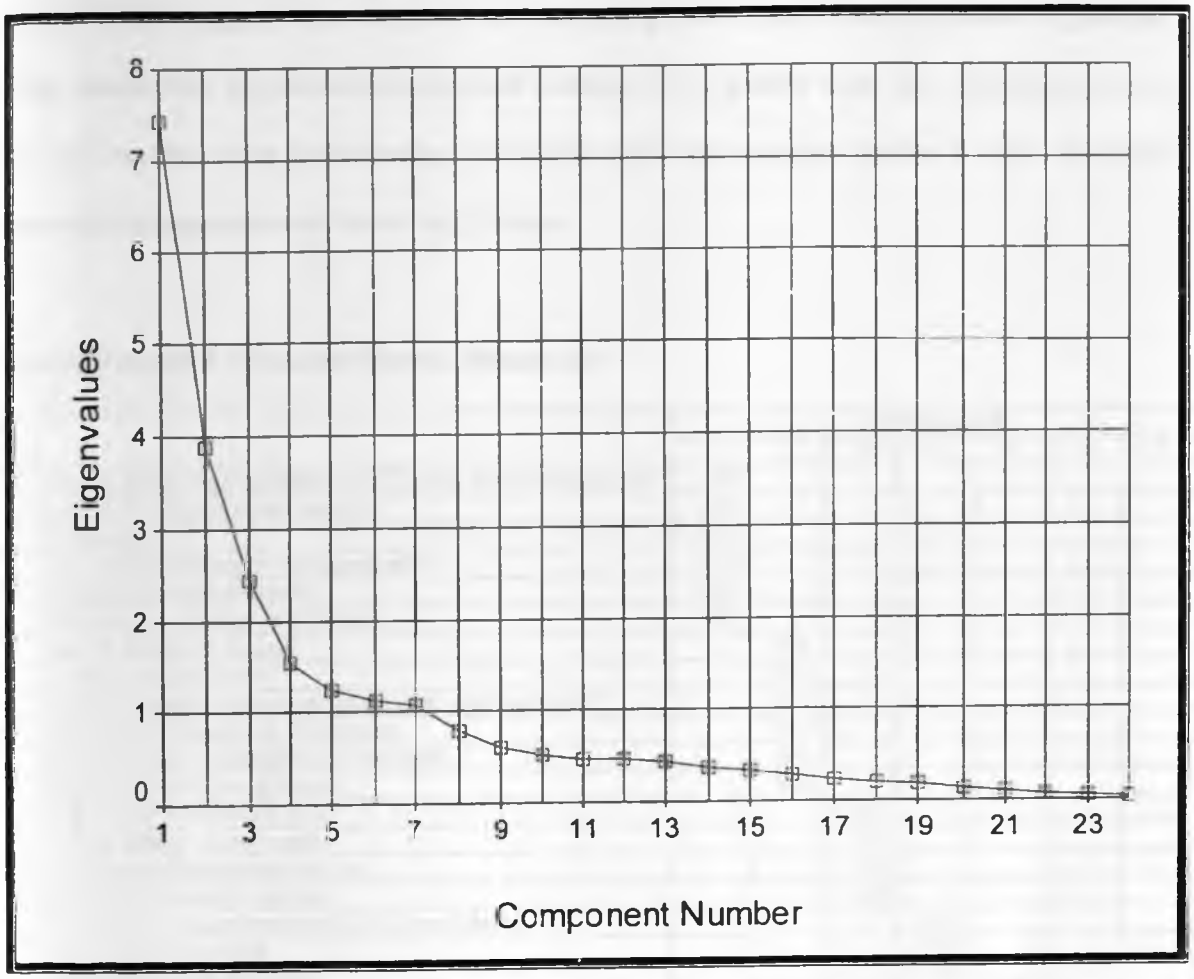
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.628
Bartlett's Test of Sphericity	Approx. Chi-Square	1486.095**
	d.f	276

****P-value < 0.01 (the critical level of significance for the test)**

Source: Researcher (2006)

Initial statistics from a principal components analysis were used to draw a scree plot. This indicated a clear change in the steepness of the curve at seven components as shown in Figure 4.3. The scree test method (as proposed by Cattell, 1978) for the selection of an appropriate number of factors for extraction is generally considered to be the most suitable technique (Kline, 2000). From the EFA, seven factors comprised of 24 items were extracted with eigen values greater than 1.00, accounting for 78.08% of the total item variance as shown in Table 4.5.

Figure 4.3: Scree plot based on twenty-four components



Source: Researcher (2006)

Table 4.5: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.435	30.978	30.978	7.435	30.978	30.978	4.898	20.408	20.408
2	3.887	16.197	47.175	3.887	16.197	47.175	3.219	13.411	33.819
3	2.446	10.192	57.367	2.446	10.192	57.367	3.099	12.911	46.730
4	1.540	6.415	63.782	1.540	6.415	63.782	2.389	9.954	56.684
5	1.230	5.127	68.908	1.230	5.127	68.908	1.881	7.836	64.520
6	1.126	4.694	73.602	1.126	4.694	73.602	1.708	7.117	71.637
7	1.075	4.478	78.080	1.075	4.478	78.080	1.546	6.443	78.080

Source: Researcher (2006); Extraction Method: Principal Component Analysis

However, to determine the minimum loading necessary to include an item in its respective construct, Hair et al. (1995) suggests that variables with loadings greater than 0.3 are considered significant, loadings greater than 0.4, more important and loadings 0.5 or greater were very significant. In this study, only variables with factor loadings of 0.40 or higher are reported. Table 4.6 shows the seven components that were extracted based on 24 items.

Table 4.6: Rotated Component Matrix, Round one

No.		Component						
		1	2	3	4	5	6	7
1.	Lack of proper representation of ICT at top level management	.876						
2.	Lack of top management support	.872						
3.	Bureaucracy	.819						
4.	Lack of ICT strategy in the organization	.819						
5.	Lack of organizational policy	.803						
6.	Resistance to change by the users	.686						
7.	Fear of breach of security		.753					
8.	Lack of innovativeness		.747					
9.	Lack of support by the government in developing the ICT		.702					
10.	Lack of data security by the vendors		.675					
11.	Security threat as perceived by the users		.616					
12.	Poor implementation methods		532					
13.	High cost of investment in ICT			807				
14.	Lack of skilled human capital			785				
15.	Lengthy procurement procedure			710				
16.	High cost of support services			.700				
17.	Poor economic performance by the organization				.854			
18.	Slow economic growth				.804			
19.	Lack of adequate resources				.739			
20.	State of ICT in other trading organizations					.865		
21.	Lack of adequate power supply					.738		
22.	Lack of shared database						.884	
23.	Lack of proper ICT infrastructure						.453	
24.	Nature of regulatory environment							.814

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

By examining the results in Table 4.6, it is evident that all components loaded significantly. This led to the extraction of 7 principal components. The results in Table 4.7 shows that the 7 components explained total of 78.08% of the variance. It also shows that component 1 represents 20.408% importance, whereas components 2, 3, 4, 5, 6 and 7 represent 13.411%, 12.911%, 9.954%, 7.836%, 7.117%, and 6.443% of variance across all items respectively.

Table 4.7: Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	4.898	20.408	20.408
2	3.219	13.411	33.819
3	3.099	12.911	46.730
4	2.389	9.954	56.684
5	1.881	7.836	64.520
6	1.708	7.117	71.637
7	1.546	6.443	78.080

Extraction Method: Principal Component Analysis.
Source: Researcher (2006)

The composition of the seven factors as shown in Table 4.6 is presented as follows:

Factor 1: consists of six items. The items were all significant with loadings greater than 0.5. These are items numbered 1, 2, 3, 4, 5 and 6. These are related to the nature of management and governance structures applied by the state corporations.

Factor 2: consists of six items. The items were all significant with loadings greater than 0.5. These are represented by items numbered 7 through to 12. These are ICT security related issues and level of support during implementation.

Factor 3: consists of four items. The items were all significant with loadings greater than 0.5. These are represented by items numbered 13 through to 16. These items are related to the costs of ICT investments and length procurement procedures.

Factor 4: consists of three items. The items were all significant with loadings greater than 0.5. These are represented by items numbered 17, 18 and 19. These are related to performance of the country's economic performance which impacts on the ability to procure ICT related solutions.

Factor 5: consists of two items. They both loaded significantly with loadings greater than 0.5. These comprised of items numbered 20 and 21. The two items describe the challenges relating to usage of ICT in public sector organizations and lack of reliable power supply.

Factor 6: consists of two items. The factors were both significant with loadings greater than 0.5. These comprised of items numbered 22 and 23. The two items describe the challenges relating to the nature of ICT infrastructure in public sector organizations.

Factor 7: consists of item numbered 24, which loaded significantly at 0.814. The item relates to the nature of regulatory environment. From the analysis it can be concluded that the nature of regulation environment has affected the growth of ICT usage in the state parastatals.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary and description of findings derived from the study. The chapter also provides a discussion of findings, conclusions, and recommendations.

5.2 Discussion of findings

The broad objective of the study was to establish the factors hindering the growth of ICT usage in the Kenyan public sector organizations. The findings established that despite majority of the organizations being in operations for more than 20 years, adequate computerization has only been attained in the management of financial operations and payroll operations. Other vital areas of operations such as human resources management, operations management, marketing management, sales management and operations are yet to be fully computerized in more than 60% of the parastatals.

The factors hindering the growth of ICT usage have been categorized into seven broad categories namely the nature of management and governance structures applied by the state corporations, ICT security and implementation support, costs of ICT investments and length procurement procedures, economic performance which impacts on the ability to procure ICT solutions, lack of reliable power supply, infrastructure-related and ICT regulatory environment. Some of the factors identified are closely linked to the introduction of the computer technology and the effects of globalization. These include low computer literacy among staff, securing and installation of information and communication technology (ICT) resources, hiring and training of technical personnel, managing, controlling and maintaining ICTs within a rapidly changing environment. The effects of

globalization means that, organizations in Kenya have to deal with more problems than their western counterparts in their effort to catch up with the developed world.

The low usage rate of ICTs in state parastatals in Kenya raise important management issues for top management and the technical staff. ICTs are employed in organizations to gain an advantage and improve performance by doing things differently from earlier methods (Lucas, 1997). Slow rate of economic performance and high costs of investments in ICTs have hindered growth in usage. This is in agreements with other empirical studies (Aiyepeku et al, 1994; Lucas, 1997). The limited knowledge of ICT found at the level of top management compounds the situation even more, especially on technical issues and investments in ICT. Many senior and influential parastatal officials with positions of responsibility requiring decision-making, received their education and early work experiences well before the advent and wide-scale introduction of the computer technology. They also did so in environments where the capabilities of the available ICTs were very limited as compared to the situation today. It is therefore noted that these officials lack sufficient grasp of the issues related to ICT resources and its management and struggle to provide adequate and effective managerial direction and support that is so much needed. Lack of trained and experienced technical personnel to manage, control and maintain the increasingly large numbers of these resources means that their utility values, effectiveness and efficiency, cannot be ascertained.

The development and management of information and communication technology in state parastatals is also constrained by poor budgetary allocations from the government. In addition, very little had been done in policy development until recently in 2006 when the government developed a National ICT Strategy Policy paper to guide ICT development at the national level. The policies are meant to guide the adoption of ICT to realize its full potential and benefits.

5.3 Conclusions

ICTs play special roles in the development of a country. However, in the view of this study a wide gap has been noted amongst the Kenyan state corporations. This brings about an urgent need to bridge this gap so as to enhance adoption and application of ICTs in productive activities. In order to address the needs of these corporations, there is need to develop and implement strategies that enhance linkage between technology developers, producers and end-users. In addition, development of strategies for capacity building will empower employees to enhance usage thus making the usage of ICTs to be demand driven.

The government has a significant role to play in the information sector to lower the barriers to ICT development. Its role would be to create an appropriate policy and legislative framework, promote ICT adoption, skill development and significantly expand the use and applications of ICT within the government. A well-developed ICT infrastructure could lead to a more rapid rollout of ICTs and ensure higher growth of the sector. While the growth in service provision and the ICT sector has been striking in recent years, certain levels of basic infrastructure as well as organizational activities are required for the direct benefits of the information society to be realized. Perhaps, lack of adequate ICT infrastructure is the key problem constraining developing information services in Kenyan state corporations.

5.4 Recommendations

5.4.1 To the Management of State Parastatals

In order to enhance the usage of ICTs within the state corporations, the study recommends appropriate intervention measures namely commitment in the training of employees on ICTs,

improvement of the existing infrastructure, reduction of taxes by the government in ICT investments in order to enhance the same, drafting of appropriate policies on ICT usage by the Communication Commission of Kenya, sourcing of advise on the most appropriate implementation methods from the ICT vendors and entrenching of ICT departments within the organizational structures.

The management should also consider running change management programmes, adopt modern technologies, limit bureaucracy on issues related to ICT usage and persuade the government through the Ministry of Finance to simplify public procurement procedures. The Universities and other bodies offering ICT training could liaise with the end users in order to come up with IT professionals ready to support employers implement effective ICT solutions without the need of such employers to spend large amount of money on training. The government needs to invest more in ICT and prioritize on issues of ICT.

5.4.2 Recommendations for Further Research

Continued monitoring of national circumstances and outcomes is vital. Good policy formation requires a clear understanding of the circumstances addressed. Little research has been done to date on the relationship between ICTs and corporate performance of organizations in the Kenyan public sector and there are similar deficiencies in analysis of the aggregate relationship between ICTs and mainstream development goals. Therefore, the government and other agencies could do much of value by focusing research resources on understanding in more detail how ICTs are interacting in practice through enhancement of service delivery and strategic management of the corporate organizations especially in the public domain.

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Appendix I: Letter of introduction

KIPKEMOI WILLIAM KISANG
P O BOX 15317-00509
NAIROBI

.....August 2006

To: ICT/MIS Manager,

Dear sir/madam,

REF: LETTER OF INTRODUCTION

I am a Master of Business Administration student at the University of Nairobi, Faculty of Commerce. I am carrying out a research study to establish the factors affecting the growth of ICT in the Kenyan public sector organizations. Your institution is among the institutions selected for this study. Please fill for me the attached questionnaire and feel free to add more information you deem necessary and useful to the study.

I would like to assure you that all the information collected will be treated with utmost confidentiality and will only be used for purposes of this study. If wish to have a copy of the results fro this study, kindly indicate your e-mail address at the bottom of this letter.

Your co-operation and contribution will be highly appreciated.

Thank you in advance.

Yours faithfully,

_____

Kipkemoi William Kisang

Appendix II: Questionnaire for MIS Managers

This questionnaire is meant to collect information on factors hindering the growth of ICT in the Kenyan public sector organizations. Kindly answer the following questions by writing a brief answer statement or ticking in the boxes provided as will be applicable.

1. Please indicate your gender
   a. Male ☐
   b. Female ☐
2. Which year did your organization come into operation? _____
3. What is the main line of operation of your organization? (Tick the appropriate box)
   a. Commercial ☐
   b. Non-commercial (Regulatory) ☐
   c. Non-Commercial (Research institute) ☐
   d. Non-commercial (Educational/Professional) ☐
   e. Non-commercial (Development/promotional agency) ☐
   f. Non-commercial (Culture/social service) ☐
   g. Non-commercial (Revenue Collection) ☐
4. For how long have you worked within your ICT department of the organization? (State in years)

   _____

5. Are the following areas computerized in your organization?, (Tick the appropriate box)

	Yes	No
a. Finance	☐	☐
b. Payroll	☐	☐
c. Human Resources	☐	☐
d. Operations	☐	☐
e. Marketing	☐	☐
f. Sales	☐	☐
g. Research	☐	☐

h. Others (please specify) _____

6. What is the lowest level of education recommended for staff in your ICT/ MIS department as set out by your human resources department or company recruitment policy? (Tick the appropriate box)

a. O- level ☐

b. A- Level ☐

c. University graduate ☐

d. University Postgraduate ☐

e. Others (please specify) _____

7. What is the lowest level of professional qualification set by your organization's recruitmen policy or guidelines for staff in the ICT/ MIS department? (Tick the appropriate box)

   a. Certificate (in IT) ☐

   b. Diploma (in IT,) ☐

   c. Graduate (in IT/MIS) ☐

   d. Others (Please specify) _____

8. Please indicate the extent to which the following factors have hindered the growth of ICT usage in your organization.

Factor	Very High	High	Medium	Low	No Effect
a) Lack of skilled human capital					
b) High Cost of investment in ICT					
c) Nature of regulatory environment					
d) Lengthy Procurement Procedures					
e) Lack of proper ICT infrastructure – communication					
f) Lack of adequate Power Supply					
g) The State of ICT in other trading organizations					
h) Lack of central database to shared access resources					
i) Lack of adequate resources in the Organization					
j) Lack of Top management support					
k) Lack of ICT strategy in the organization					
l) Lack of organizational policy on the use of ICT					

m) Lack of proper representation of ICT at Top level management					
n) Poor Economic level within the country					
o) Security Threat as perceived by the users					
p) Resistance to Change by Employees					
q) Lack of guarantee on data security by vendors as perceived by the organization					
r) Fear of breach of confidentiality of information by suppliers of ICT solutions as perceived by the organization					
s) Lack of government's commitment towards development of an ICT policy to guide public sector organizations in developing their ICT infrastructure					
t) Slow economic growth has led to low prioritization of ICT development in your organizations					
u) Poor implementation methods by ICT Vendors have hindered the growth of ICT usage.					
v) Lack of innovativeness has hindered ICT development in the public sector organizations					
w) Bureaucracy within the organization has hindered growth of ICT usage					
x) High cost of support services by ICT vendors has hampered the growth of ICT in your organization					

Any other factor (Please Specify):

_____

_____

_____

_____

_____

_____

_____

_____

9. Please indicate your level of agreement to the following statements as regards to suggested recommendations to speed up growth of ICT usage in your organization.

Proposed Recommendation	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a) Require Top Management to be committed to training of employees to improve their skills on ICT					
b) ICT infrastructure requires improvement to be in line with organization's strategy					
c) The government need to reduce taxes to speed up the growth of ICT in the country					
d) Security policy need to be put in place by the ICT regulators					
e) Top management support is required to enhance growth of ICT in your organization					
f) Better implementation methods need to be in place					
g) Employees need training on change management to reduce resistance to change as a result of ICT implementation					
h) ICT department need a proper representation in the Organizational Structure to articulate ICT issues at the top management level					

Any other recommendation (Please specify):

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR RESPONSES

Appendix III: List of Non-Commercial State Corporations

A. Regulatory Corporations

1. Betting Control and Licensing Board
2. Capital Markets Authority
3. Central Agricultural Board
4. Coffee Board of Kenya
5. Electricity Regulatory Board
6. Export Processing Zones Authority
7. Cotton Board of Kenya
8. Film Censorship Board
9. Horticultural Crops Development Authority
10. Hotels and Restaurants Authority
11. Kenya Bureau of Standards
12. Kenya Dairy Board
13. Kenya Plant Health Inspectorate Services
14. NGO Coordination Bureau
15. Pests Products Control Board
16. Pharmacy and Poisons Board
17. Pyrethrum Board of Kenya (has some financial functions)
18. Radiation Protection Board
19. Sisal Board of Board (has some financial functions)
20. Tea Board of Kenya
21. Kenya Tea Development Authority
22. Communications Commission of Kenya
23. Presidential Commission on Soil Conservation
24. Kenya Sugar Authority
25. National Environment Management Authority

B. Research Institutes

1. Coffee Research Foundation
2. Kenya Agricultural Research Institute
3. Kenya Forestry Research Institute
4. Kenya Industrial & Research Development Institute
5. Kenya Institute for Public Policy Research & Analysis
6. Kenya Marine and Fisheries Research Institute
7. Kenya Medical Research Institute
8. Kenya Trypasonomiasis Research Institute
9. Tea Research foundation
10. Kenya Veterinary vaccines Production Institute

C. Educational/Professional

1. Cooperative College of Kenya
2. Council of Legal Education
3. Egerton University
4. Higher Education Loans Board
5. Jomo Kenyatta University of Agriculture and Technology
6. Kenya Institute of Administration
7. Kenya Medical Training Center
8. Kenya National Examinations Council
9. Kenya Utalii College
10. Kenyatta University
11. Moi University
12. University of Nairobi
13. National Council for Science and Technology
14. Maseno University

D. Development/Promotional agencies

1. Coast Development Authority
2. Ewaso Ny'iro North River Basin Development Authority
3. Ewaso Ny'iro South River Basin Development Authority
4. Kerio Valley Development Authority
5. Lake Basin Development Authority
6. National Irrigation Board
7. Tana Athi Rivers Development Authority
8. Export Promotion Council
9. Investment Promotion Center
10. Kenya Tourism Board
11. Kenya Wildlife Service

E. Culture/Social service

1. Kenya National Library Services
2. Kenyatta National Hospital
3. Local Authorities Provident Fund
4. Moi Referral and Teaching Hospital
5. National Health Insurance Fund
6. National Social Security Fund
7. Presidential Music Commission
8. Bomas of Kenya Ltd.
9. National Museums of Kenya
10. National Aids Control Council

F. Revenue Collection

1. Catering and Tourism Development Levy Trustees
2. Kenya Revenue Authority

Appendix IV: List of Commercial State Corporations

1. Agricultural Finance Corporation (AFC)
2. Industrial and Commercial Development Corporation
3. Kenya Tourist Development Corporation (KTDC)
4. Kenya Industrial Estate Limited
5. East African Development Bank
6. National Housing Corporation
7. Agricultural Development Corporation
8. Kenya Post Office Savings Bank
9. Kenya Broadcasting Corporation (KBC)
10. Jomo Kenyatta Foundation
11. Kenya Literature Bureau
12. Kenya Veterinary Vaccine Production Institute (KEVEVAPI)
13. School Equipment Production Unit (SEPU)
14. National Cereals & Produce Board.
15. Pyrethrum Board of Kenya (commercial function)
16. Kenya Reinsurance Corporation
17. Kenya National Trading Corporation
18. Kenya Electricity Generating Company
19. Kenya Railways Corporation
20. Kenya Pipeline Company
21. National Oil Corporation:
22. Telkom Kenya

23. Kenya National Assurance

24. Kenya Airports Authority