AN ANALYSIS OF INFORMATION AND COMMUNICATIONS TECHNOLOGY FOR SOCIAL INCLUSION IN KENYAN SCHOOLS

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A Management Research proposal submitted in partial fulfillment of the requirements for the award of a degree in Masters of Business Administration MBA in the School of Business at the University of Nairobi, KENYA.

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DECLARATION

I declare that this research paper for the degree of Masters of Business and Administration in the Department of Management Science of the School of Business, University of Nairobi hereby submitted, has not been submitted by me or anyone else for a degree at this or any other university. That it is my own work and that materials consulted have been properly acknowledged. Neither the project nor part of it should be reproduced without prior authority of the author.

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27th October 2010

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

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DEDICATION

This paper is dedicated to Mama, Monica Adeya Masinde. You are the foundation of all this; you know how far we have come. This far the Lord has brought us and we give praise. You are, and forever will be Mama.

ABSTRACT

ICT is now at the center of operations in all sectors of the economy. Key to the proper utilization and hence realization of maximum benefits in ICT is in education. ICT has to be entrenched in our education system right from the formative years, so that we raise a population with the necessary skills to utilize ICT for economic growth and development. This paper focuses on ICT in public schools in Kenya. It seeks to establish the current status of ICT in public schools in areas of infrastructure, application and management of ICT resources. The objective of this test is to determine why, despite efforts by different stakeholders in bridging the digital divide, the problem is still far from being solved. Comparisons are made between four public schools with minimal or no ICT infrastructure to three private international schools with well established ICT infrastructure and systems. Variables compared are Access, governance, economic challenges, human capital, social capital, project sustainability and inadequacies in the theoretical definition of the digital divide.

Data has been collected from all seven schools using the interview method as well as observation and personal experiences at the schools by the researcher. Further information has been gathered from school reports, websites and records from the ministry of education

The findings show that for social inclusion to be achieved in ICT in the education sector, the variables mentioned above have to be put into consideration in order to achieve a holistic approach to the issue. The private international schools have been able to achieve this; public schools need to direct their efforts in the same direction so as to effectively

compete with the private schools in the area of quality education and job market preparedness.

The findings of this research bring out issues hindering achievement of digital equity hence guiding policy makers in the policy formulation process. It creates an understanding of what needs to be done in order to achieve the goals of ICT in education, hence formulate the relevant policies. To academia, the study helps identify theoretical deficiencies or inadequacies in the definition of the digital divide and which need to be addressed accordingly. It points out that the definition of digital divide as is currently available is limiting. The findings also aid in better project planning for implementation of ICT projects in schools. Issues of training and skill upgrade have been brought out as well as the need for better governance.

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List of Abbreviations

ABC – Access, Basic Training and Content

OECD – Organization for Economic Cooperation and Development

ICT – Information and Communication Technologies

VSAT – Very Small Aperture Terminal

LAN – Local Access Network

CFSK – Computer for Schools Kenya

CHAPTER 1
INTRODUCTION

1.1 Background

It has become increasingly recognized that information is the most important strategic resource that any organization has to manage. Key to the collection, analysis, production and distribution of information within an organization is the quality of the IT Services provided to the business. It is essential that we recognize that ICT services are crucial strategic organizational assets and therefore organizations and governments must invest appropriate levels of resource into the support, delivery and management of these critical ICT Services and the ICT systems that underpin them. However, these aspects of IT are often overlooked or only superficially addressed within many organizations. (Cartlidge et al, 2007)

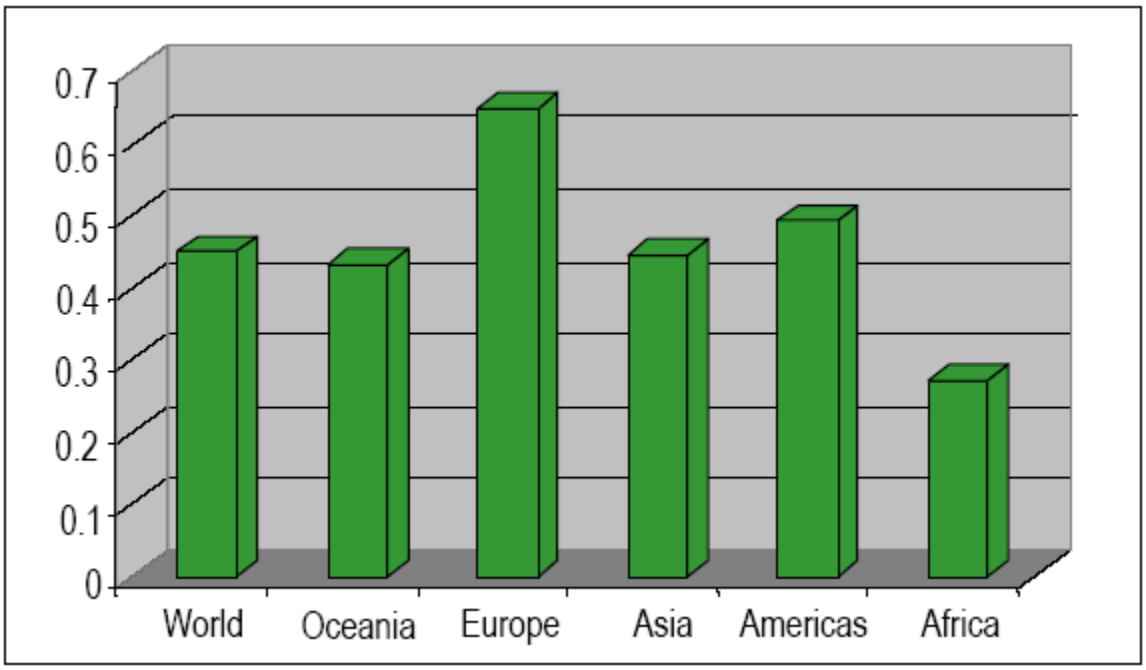
The difference in the level of access and utilization of Information and Communications Technologies otherwise termed ICTs by various sections and populations in society has resulted in the Digital Divide. Digital divide refers to 'the gap between those who are able to harness the power of the Internet and those who are not; the gap between the Information *haves* and *have-nots', (*Dozci, 2000*).* The OECD defines it as the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities; (OECD, 2001). Berdichevsky refers to it as the discrepancy between people who have access to new information and communication tools, such as the internet, and those who do not, (Berdichevsky, n.d). The term also describes the

discrepancy between those who have the skills, knowledge and abilities to use the technologies and those who lack them. The digital divide can exist between those living in rural areas and urban areas, between the educated and uneducated, between economic classes and, on a global scale, between more and less industrially developed nations. The digital divide can thus wholly be defined in terms of the ABCs, thus the gap that exists in Access to ICTs, Basic Skills training in ICT and the use of content available online.

Many researches have been done to determine the digital divide problem. The United Nations report gives its report in terms of e-readiness which is defined generally as the extent of readiness in access to network infrastructures and technologies. (UNDP, 2003).

The United Nations e-readiness report of 2008 gives the following results:

Figure 1 - Regional average of e-government readiness



Source: United Nations E-readiness report, 2008

From this figure, Asia and Oceania are slightly below the world average (0.4514), while Africa lags far behind. This means that ICT adoption has been slow as compared to developed countries hence the digital divide.

"The reality of the Digital Divide means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities". (Tinio, 2003).

1.1.1 ICT and the Digital Divide in Education

The term Information and Communication Technology (ICT) refers to technologies that enable the generation, processing and conveyance of information in electronic form between two or more locations (Senaji, 2005). It also refers to the amalgamation of computing and telecommunication technologies within which information and digital media is created, distributed and accessed (Taneja, 2006).

As the need for ICT access increases globally, so does the need to improve and incorporate ICT into educational frameworks. Increasingly, schools, communities, governments, teachers, students, vocational training centers and rural communities are realizing the need to invest heavily in education which implements ICT and new technologies. Education holds the key to tackling poverty and extending opportunity in the developing world. The new technologies have great potential to aid the effort to spread education. However, there is a real danger of a digital divide opening between rich and poor countries.

The digital divide problem also manifests itself in schools. There are a number of challenges concerning access to and use of ICT in Kenya schools, including high levels of poverty, limited rural electrification, and frequent power disruptions. Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1. Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-Schools program, (NEPAD, 2005-6). Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated phone lines and high-speed connectivity for e-mail and the Internet. Even where access to high-speed connectivity is possible, high costs remain a barrier to access. As well, very few schools can afford to use VSAT technology. Roughly 10% of secondary schools with computers are able to share teaching resources via a LAN. As a solution to these access problems, the ministry hopes to leverage the e-government initiative of networking public institutions countrywide to facilitate connectivity for the educational sector. (Farrell, 2007)

1.1.2 **Bridging the Digital Divide and the challenges**

"The current information and communication technology (ICT) situation in Kenya is characterized by inadequate infrastructure, lack of awareness amongst the majority of the population, high cost of ownership, and lack of requisite ICT skills" (Senaji, 2005). At the same time, ICT is more developed in the major cities as compared to the smaller towns and rural areas. There has been a lot of concentration in developing major cities economically. This has led to rural-urban migration of skilled workforce hence leaving the rural areas with little or no development. This is the same scenario for ICT; there is a more developed ICT infrastructure in the urban areas where the major percentage of the population who can afford ICT resources, for example computers, is concentrated. Service providers of this infrastructure have also been slow to invest in the rural areas for fear of being unable to get a proper return on their investment. This slow pace of development of the rural areas has enhanced the divide. (Farrell, 2007)

There are a number of initiatives from both private and public sector, geared towards enabling Kenya adopt ICT in all areas of the economy. These efforts and initiatives have been observed both from the private sector and the government.

A National ICT policy and Strategy was promulgated in January 2006 as a blue print for actively participating in the network society (GOK-NICT 2006). The National ICT Policy aims to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. A National ICT policy framework and implementation strategy exists, complete with measurable outcomes and time frames. However, universal implementation is challenging given the lack of

resources, national ICT infrastructure, and even electrical supply, particularly in the rural areas. (Farrell, 2007).

The Ministry of Education developed a Kenya Education Sector Support Program (KESSP) in 2005 that featured ICT as one of the priority areas with the aim of mainstreaming ICTs into the teaching and learning process. In June 2006, the ministry introduced the National ICT Strategy for Education and Training. This document is referred to as the ICT policy for the education. (Farrell, 2007). Another key part of the implementation strategy is the Kenya ICT Trust Fund, formed in 2004, with the aim of spearheading ICT initiatives in education. In general, the objective is to facilitate public-private partnerships (PPPs) that will mobilize and provide ICT resources to Kenyan public schools and community resource and learning centers, (Farrell, 2007)

The Kenya ICT Board under the State corporations Act 446 was established with the aim of marketing Kenya as an ICT destination. The board is charged with the mandate of attracting investors to invest in the ICT sector in Kenya. The board offers advisory services to the government towards their design of initiatives for the development and deployment of ICTs in the economy, Marketing services to position and promote Kenya as an ICT destination internationally, capacity building, project management services and investment facilitation. The Kenya e-government policy recognizes the ICT infrastructure as antecedent to achieving e-government maturity (GoK-EGS, 2004). The e-government project is an initiative to embrace ICT in service delivery to the public. Under the e-government project, the idea of digital villages has been embraced; this is a step towards closing the digital divide between the urban centers

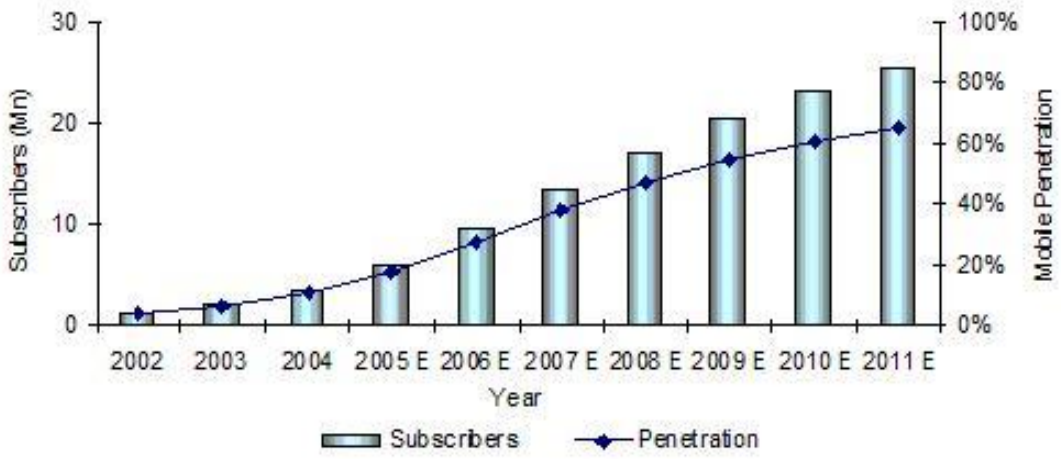
and rural areas. The digital villages provide internet access to people in remote places, besides creating jobs.

The Kenya Communications (Amendment) Act of 2008 addresses a number of issues in ICT for which there was no legislation. For example, the act legalizes electronic transactions which make the use of electronic signatures acceptable, electronic communication is regarded as valid and is attributed to the originator. The exemption of computer equipment and software from taxation has led to a drop in prices of computers and other accessories, increasing the percentage of the population which is able to afford these resources. (Kenya Government Communication, 2010)

The establishment of the Kenya Education Network, KENET, is a step towards interconnecting all institutions of higher learning hence enables knowledge sharing and collaboration between students and lecturers from different institutions.

Within the private sector, the emergence of mobile telephony has made communication easier and faster as compared to the pre-mobile period. The government has supported this technology by licensing various service providers to ensure efficient, effective and affordable services to consumers. The money transfer service offered over this system has brought financial transactions closer home, where one does not need to go and find a bank to send or withdraw money.

Figure 2: Kenya Mobile Subscribers and Penetration (2002-2011)



Source: Africa and Middle-east Telecomm well (n.d)

The Computer for Schools Kenya is a charitable non-governmental organization working with various partners to help boost ICT access and utilization in Kenya. The vision of CFSK is "the establishment of an information-rich Kenyan Society actively participating in sustainable development. We hope to help achieve this by facilitating the development of information and communication technology infrastructure and capacity in educational and training institutions as well as community information access and resource access centers", (Computer for Schools Kenya, 2010)

Indeed, various positive initiatives have been made towards bridging the digital divide in the country. However, the problem of digital divide still exists in Kenya as demonstrated by the highlighted statistics. It therefore appears that either these initiatives are geared towards the wrong direction, or, that there are other factors that are working against all these initiatives.

1.1.3 Lang’ata District

The research will be conducted in the Lang’ata District of Nairobi province. Lang’ata district has common boundaries with Lang’ata Constituency. The district has an estimated population of 355,188 people, as per the Kenya National Bureau of Statistics 2010 census results. It has an area of 223 km². Kibera, Kenya's largest slum is located in Langata constituency, as are Karen and Langata, some of the most affluent suburbs in Nairobi. (Answers, 2010).

Langata constituency is an area with glaring contrast in living standards, ranging from the plush homes of Karen and Lang’ata, middle-income areas like Nairobi West to the sprawling Kibera slums, which are characterized by poor living standards. Langata constituency is basically a residential region although a number of businesses including offices and institutions are located in the area. The constituency is multi-ethnic and multi racial. (CKRC, 2003).

1.2 Statement of the Research Problem

The government and the private sector have made a lot of advancement towards resolving the digital divide problem as has already been seen. Most of the above efforts are geared towards providing access and a policy framework for ICT. However, as per statistics, the problem of digital divide still manifests itself, particularly in the education sector in Kenya. It therefore appears that either these initiatives are geared towards the wrong direction, or, that there are other factors that are working against all these initiatives. It needs further exploration to understand why the digital divide problem still

persists. These undermining factors must be unearthed with a view of having them addressed if the goal of eliminating the digital divide is ever to be achieved.

This research will help to answer the following question:

How are social capital, human capital, economic challenges, theoretical frameworks, and sustainability and governance factors influencing ICT for social inclusion in the education sector in Kenya?

- To what extend are these factors critical in addressing the social inclusion problem in the education sector in Kenya?
- How do these factors influence the implementation and sustainability of projects aimed at addressing the social inclusion?
- Can digital inclusion be attained in Kenyan schools? How?

1.3 The Research Objective

a) To examine the status of ICT implementation and utilization in public schools in Kenya

b) To identify the undermining factors to the achievement of digital equity in schools in Kenya

c) To find out reasons why, despite a lot of efforts by the government and other stake holders, the social exclusion problem is still existent.

1.4 Importance of the Study

To policy makers, this study will help bring out issues hindering achievement of digital equity hence guide policy makers in the policy formulation process. It will create an understanding of what needs to be done in order to achieve the goals of ICT in education, hence formulate the relevant policies. To academia, the study will help identify any theoretical deficiencies or inadequacies in the definition of the digital divide and which need to be addressed accordingly. The findings will also aid in better project planning for implementation of ICT projects in schools. Issues of training and skill upgrade will be brought out and addressed by addressing the findings of this study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Information and Communication Technology for Development

Development is defined as ‘a purposeful change in a society that contributes to social and economic well being and advancement of its people without creating any disharmony’, UNESCO. ICT for Development is a general term referring to the application of Information and Communication Technologies (ICTs) within the field of socioeconomic development or international development. ICT4D concerns itself with directly applying information technology approaches to poverty reduction. Studies have been conducted which have shown a link between ICT and economic development. According to Piatkowski (2002), ICT contributes significantly to macro-economic development in developed countries. During the Interactive Thematic Session of the workshop on ICT as an Enabler for Growth, Development and Competitiveness: Implications for national and International policies and actions organized by the UNCTAD in June 2004, it was concluded that ICT is an enabler for growth and development could benefit both developed and developing countries, provided the right policy measures and enabling environment were in place. However, on the other hand, the diffusion of ICTs has not produced any significant impact on transitional economies also known as ‘emerging markets’ (Garten, 1996, p.7).

In the Kenyan scenario, the emergence of mobile telephony has made communication easier and faster. Similarly, the M-PESA money transfer system has brought financial transactions closer home, where one does not need to go and find a bank to send or withdraw money. Technologies such as VSAT, copper, fiber and

broadband have opened up most parts of the country thus making them accessible via e-mail and internet. As a result, banks have opened up branches in remote areas to serve the rural population, availability of digital TV and FM radio stations has been made possible, organizations have opened up branches in rural areas leading to availability of employment opportunities hence fostering development.

Education is an essential tool for achieving sustainability. Two of the major issues in the international dialog on sustainability are population and resource consumption. Increases in population and resource use are thought to jeopardize a sustainable future, and education is linked both to fertility rate and resource consumption. Educating females reduces fertility rates and therefore population growth. By reducing fertility rates and the threat of overpopulation a country also facilitates progress toward sustainability. The opposite is true for the relationship between education and resource use. Generally, more highly educated people, who have higher incomes, consume more resources than poorly educated people, who tend to have lower incomes. In this case, more education increases the threat to sustainability. The challenge is to raise the education levels without creating an ever-growing demand for resources and consumer goods and the accompanying production of pollutants. Meeting this challenge depends on reorienting curriculums to address the need for more-sustainable production and consumption patterns, (Education for Sustainable Development, 2002).

2.2 The Concept of Social Inclusion

Despite numerous initiatives by both the private and public sector in ICT, the problem of digital divide remains rampant. From available statistics and literature, most researchers measure the digital divide based on the ABCs, and mainly on Access. For example, in the statistics highlighted in this research paper, access to internet hosts, telephone lines, radio and TV has been used as a measure of technology use. This is however limiting and misleading.

The UN ICT Task Force (2003) argues that one relevant way of measuring the gap in access to ICTs is to look at the differences between developed and developing countries in the level of penetration of different ICT services (telephone, mobile phone, Internet) and of personal computers, over the course of the past decade. The gap has narrowed markedly, with particularly rapid progress in the field of mobile phone and Internet use." UN ICT Task Force (2003). This measurement only focuses on level of penetration of ICT services. Warschauer (2002) argues that the term digital divide 'provides a poor framework for either analysis or policy'. He advocates moving away from the physical ownership of and access to, technology and encourages the use of ICT as a means of social development, suggesting that the term 'digital divide' be replaced by 'technology for social inclusion'. In the article "From Digital Divide to Social Inclusion" by Kristy Muir, 2004, the term digital divide has been replaced with 'technology for social inclusion', redefining the focus from technology as an end to technology as a means to the end. Social Inclusion goes beyond education to include factors such as social interaction, civic engagement and the all encompassing social capital.

The OECD (2001) defines the digital divide as differences between individuals, households, companies, or regions related to the access to and usage of ICT. The divide may appear due to historical, socioeconomic, geographic, educational, behavioral, or generation factors, or due to the physical incapability of individuals (Cullen, 2001, p. 311). Such an understanding of the digital divide is generally unproblematic. Difficulties arise from the lack of a more standardized and elaborated operationalization. As a consequence, the measurement process may lead to the development of incomplete and misleading indicators. Another issue that arises due to the inadequacy of the conceptualization of the digital divide is sustainability of ICT projects. A lot of efforts and resources are being expended on ICT projects. The ICT status in terms of infrastructure is being addressed by various stakeholders. However, challenges due to governance, economic, human capital and social capital still exist and need to be addressed, failure to which the sustainability of the projects is in question.

Due to the lack of a wholesome definition and approach to the digital divide issue, stakeholders are focusing on only a few areas. This as has been seen, has not resolved the digital divide problem, and is not certain to do so in the long run.

In summary, the concept of ‘digital divide’ seems to be incomplete; it leaves out aspects that are vital in the achievement of digital equity.

2.3 Social Exclusion

“Social exclusion “is a multi-dimensional concept, involving economic, social, political, cultural, and special aspects of disadvantage and deprivation (Lenoir, 1974; Room, 1995; Magrab, 1998; Klasen, 1998). It is often described as the process by which individuals

and groups are wholly or partly closed out from participation in their society, as a consequence of low income and constricted access to employment, social benefits and services, and to various aspects of cultural and community life. (Kamerman, n.d)

This definition may be extended to ICT to mean that a population that is not able to harness the power of ICT will remain socially excluded.

The Digital Impact Group (2010) summarizes the economic impact of digital exclusion as follows: "The economic impacts associated with digital exclusion are large enough, and the public policy implications complex enough, to warrant significant additional study. Digital exclusion imposes a number of categories of costs on a number of affected groups in a number of ways, and remedying it is resonant with broader national purposes articulated in the Federal Communications Commission's National Broadband Plan proceeding. It is a topic that intersects directly with fully one-third of the US population and with the very industries within the US economy that are currently large, anticipated to continue to grow in size, and most ripe for gains from technological innovation." In education, social exclusion exists in the areas of access to global information and information sharing, modes of delivery of the content, ICT Content in the syllabus – imparting of skills to students and skill level of teachers to utilize ICT in their work.

2.4 Conceptual Framework for analysis of ICT for Social Inclusion

E-readiness is described as "…a measure of its e-business environment, a collection of factors that indicate how amenable a market is to Internet-based opportunities. E-readiness is not simply a matter of the number of computer servers, websites and mobile phones in the country, but also things such as its citizen's ability to

utilize technology skillfully, the transparency of its business and legal systems, and the extent to which governments encourage the use of digital technologies", (Economic Intelligence Unit, 2005). This readiness or lack of it is what results into the digital divide. The Economist's Intelligence Unit (EIU) uses a combination of variables to measure/assess e-readiness. Below are the scoring criteria and associated weights:

Table 1: EIU e-readiness scoring criteria

Category	**Weight**
Connectivity and technology infrastructure	20%
Business environment	15%
Social and Cultural environment	15%
Legal environment	10%
Government policy and vision	15%
Consumer and business adoption	25%

Source: Economist Intelligence Unit, 2010

These variables are more than just ABCs. We thus need to explore these and others as factors that influence the digital divide, and which need to be addressed. Hearn, et.al. (2004) observe that ICT initiatives have often stalled for a number of reasons. These are that the initiatives are largely ICT supply-driven and fail to specify and address the local cultural impediments and opportunities. In particular, they mis-specify and under resource the human infrastructure required. Secondly, they do not take account of the dynamics of the global ICT industry; they have a narrow perspective and only look at the specific case in question. Thirdly, these initiatives are overoptimistic about the productivity improvement ICTs can bring in traditional industries. Finally, they often overlook the importance of content per se. In short, the question of how community-based ICT initiatives 'can survive financially, that is be "sustainable" in the longer term' has grown in significance, (Gurstein, 2001).

Hearn et al, 2004 propose that more realistic models of the role of ICTs in regional development must achieve clarity in specifying sustainability goals, leverage micro-business enterprise development off government funded technical and human infrastructure provision, build on local industry strengths; to learn from global experiences whilst building on local assets, find innovative business models to capitalize on new opportunities for content and applications, ensure community involvement in deciding, planning and evaluating projects and, adopt a learning approach through cycles of evaluation based on action research.

According to ITU (2002), Gillis and Mitchell (2000) and Piatkowski (2002), policy, infrastructure, level of ICT knowledge and skills, availability of capital investment and affordability are some of the factors which influence the implementation/ diffusion of ICT in a country. The Washington University, WSU model identifies three stakeholders: 'Community members', ICT investment and Public policy as being key in implementation of ICT and hence the attribution of ICT to economic and human development. (Gillis and Mitchell, 2002).

2.4.1 Theoretical Model

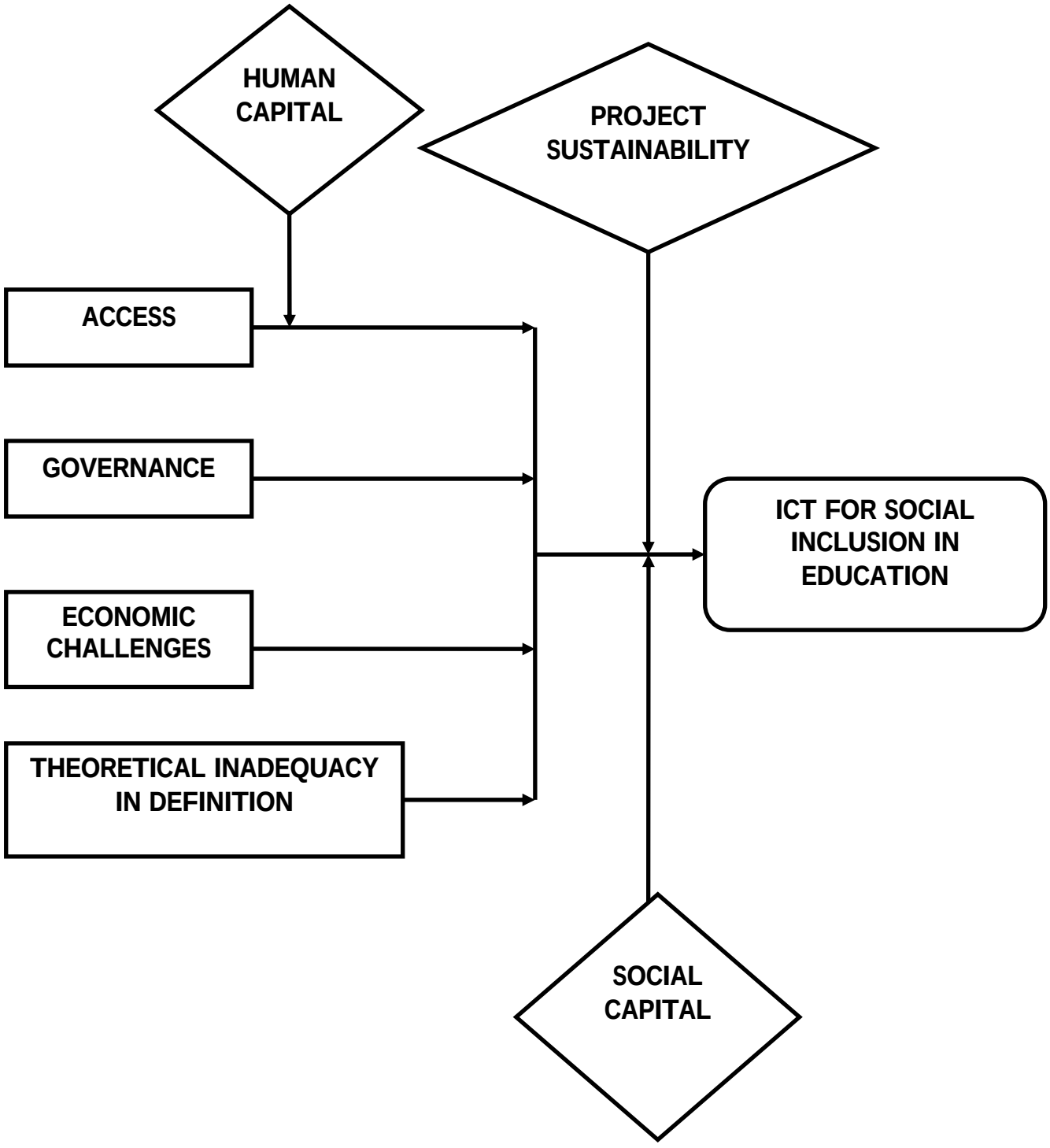


Figure 3: Relationship of variables

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The figure 3 above shows the relationships between the various variables to be considered in this study. These relationships and how the Independent and moderating variables affect the dependent variable are discussed below.

Access: This is the ability, right, or permission to approach, enter, speak with, or use; admittance, (Dictionary.com, 2010). In ICT, access refers to the ability to obtain and make use of an ICT resource, either software, hardware or other ICT service. In Kenya, access to ICT resources is hindered by a number of factors. One of the factors is the lack of electrical power supply in the rural areas. This has led to many people being unable to access technology. The cost of alternative energy sources such as solar and generator is prohibitive. A second factor hindering access is the lack of a reliable network infrastructure. Most efforts on network infrastructure are concentrated in the urban areas with a population that is able to buy and use the infrastructure. This ensures a good return to the infrastructure owners. This tendency has led to exclusion of the rural population in the use of ICTs.

Governance: The Asian Development Bank Institute describes governance as the ability of government to create and to implement public policy, and, the mechanisms by which citizens and groups define their interests and interact with institutions of authority and with each other. It consists either of a separate process or of a specific part of management or leadership processes, (Asian Development Bank Institute, 2005). The Kenya government has put in place policies for ICT in education as well as strategies for its implementation. However, other failures due to governance have hindered the development of ICT in the education sector. Firstly, there lacks a government push and

incentives for schools for implementation of ICTs – there are no timelines set for schools to achieve any goals in the implementation of ICT. This has led to laxity in the same. Secondly, in the planning phase, the Ministry of Education has taken a broad approach in the development of ICT in education. The problems faced in ICT implementation vary from one school to the next. There is thus a need to address these issues on a case by case basis. Thirdly, in the development of ICT plans, there hasn't been adequate involvement of all stakeholders; there is lack of buy-in from them thus they have not owned the plans and are thus not supporting them, some resist these efforts. Fourthly, the ministry of education is currently conducting basic ICT skills training for both senior and junior officers. This means that even within the ministry, there lacks capacity to formulate proper ICT policies, and even if the formulation is outsourced, the skills to implement them are lacking. Finally, most school administrators, committees and local leaders do not have the skills and knowledge necessary to appreciate and utilize, and push for the implementation of ICTs for the benefit of the schools. ICT projects are thus not prioritized.

Economic Challenges: Despite an economic growth rate of 5.8 percent, 50 percent of Kenyans are living below the poverty line. (UNDP, 2007). The high cost of technology in terms of the cost of software and costs of networking such as installation and running a VSAT in areas with no other infrastructure is high. The cost of having a continuous internet connection on GPRS modem is also still quite high in Kenya as compared to most of the develop countries. While every average household in the United States is able to afford a high speed internet link, not many middle class Kenyans can afford to pay for a normal internet connection on a monthly basis. In areas where there is no electric

connectivity, the costs of investing in alternative power sources e.g. generators, solar or wind are very high. With a general population classified as living under the poverty line, such investments are not prioritized. Another economic challenge facing the application of ICT in education is inadequate government funding to schools. The money provided to public schools for free schooling comes with specific instructions on areas where it can be spent. ICT is not one of those areas.

Theoretical inadequacy in definition: The definition and conceptualization of the concept of Digital Divide as is available in existing literature is inadequate and thus limiting how the problem is being addressed. It restricts itself to certain aspects of the problem viz. Access, Basic Training and Content, also known as the ABCs, (Warschauer, 2002) argues that the term digital divide 'provides a poor framework for either analysis or policy'. He advocates moving away from the physical ownership of and access to, technology and encourages the use of ICT as a means of social development, suggesting that the term 'digital divide' be replaced by 'technology for social inclusion'. The inadequacy in definition has narrowed the perspective of policy makers and implementers in their formulation of policies and projects to ensure sufficient access and use of ICTs. Focus has thus been mainly on access issues. The bulk of projects in Kenya are focused on provision of computers, internet access, and computer laboratories. We thus need to explore further and find out what other issues have led to the slow or even lack of adoption of ICT in our education sector.

Human Capital: Human capital refers to the stock of competences, knowledge and personality attributes embodied in the ability to perform labor so as to produce economic value. It is the attributes gained by a worker through education and experience. In the

implementation of ICT projects in schools, the human capital factor acts as a moderating factor to the issue of access in two ways: there is lack of adequately skilled workforce to teach and utilize ICT in place. The curriculum for teacher training colleges does not have in depth knowledge on ICT. For this reason, teachers are incapacitated to teach ICT in schools effectively. Secondly, lack of necessary project management skills hence projects fail along the way or are wrongly implemented and no not meet the desired outcomes.

Social Capital: Social capital is defined by the OECD as "…networks, together with shared norms, values and understandings which facilitate cooperation within or among groups", (Organization for Economic co-operation and development, n.d). The lack of proper and adequate information sharing on ICT applications in Education and the benefits has led to the low level of embracing ICT in education. Even in cases where there is a possibility of implementing ICT, the teachers or education heads may not know what to do with it once implemented. Secondly, there is a lack of knowledge and information on the different technological options available to counter existing challenges e.g. financial constraints. A proper research and advice on cheaper technologies needs to be conducted so as to counter some of the existing constraints. Thirdly, there is a lack of understanding and appreciation by local leaders and the general population from which school parents and committees are drawn, on importance of ICT. This has resulted in the unwillingness to prioritize and invest in ICT by schools. Students are also not aware of what they could possibly gain from ICTs hence do not pressure their school administrators to implement it. Kenya is rated amongst the bottom fifteen countries in the world as pertains to corruption. Corruption has infiltrated every part of our society;

schools are no exception. Misappropriation of allocated funds either by members of parliament, CDF committee members or school heads has resulted in planned projects not taking off or if in progress, stalling along the way. Another aspect is the resistance to change and lack of willingness to learn and change from old ways of doing things, especially by school administrators and teachers. The old people are too comfortable in their comfort zones and do not want to be bothered with learning new things. There is also the misconception that ICT will take away jobs especially with automation. This has increased the resistance to ICT initiatives. Finally, most existing problems are not adequately exposed. This may be due to the fear of being seen as failures. As a result, the country is unable to get development partners to assist, e.g. UNDP, World Bank, and other NGOs.

Project Sustainability: According to Hearn et al (2004), from a community perspective, sustainable ICT projects are those that can pay their own way, without reliance on government funding. They serve individual and community needs, are easily accessible and promote the social, cultural and/or economic development of the community (e.g. build social capital and assist local business). Those who adopt a business perspective view sustainability in terms of whether the project is commercially viable and profitable. Proponents of the government perspective focus on service provision. They recognize that governments have Community Service Obligations (of which a Universal Service Obligation in relation to telecommunications is one example), and that market failure occurs, especially in rural, regional and remote areas where the costs of setting up and maintaining ICT services can be very high. These factors make government support of

ICT initiatives necessary. Yet these advocates acknowledge that, in the current policy context, government funds are limited.

‘Arguments about the effects of introducing ICTs to African Education rest on fundamental moral questions. Undoubtedly the introduction of ICTs is expensive and there are countless other needs in Africa for school buildings with roofs, for paper and chalk, for desks, for clean water, and for decent salaries for teachers. However, it is not simply a question of either buildings and text books, or ICT. The crucial issue is to find ways in which ICT can be incorporated appropriately and sustainably into African education strategies’, (Unwin, 2004).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

The research design adopted for this study is a case study. A case study describes an actual administrative situation involving a decision to be made or a problem to be solved. It is an in-depth investigation of an individual, group, institution or phenomenon, (Mugenda and Mugenda, 2003). The primary purpose is to determine factors and relationships among the factors that have resulted in the behavior under study. Case study research has the capability of uncovering casual paths and mechanisms and through richness of detail, identifying casual influences and interaction effects which might not be treated as operationalized variables in other studies like statistical studies.

Case studies are however not representative of entire populations, nor do they claim to be. The case study will enable the researcher gain an deep understanding of the dynamics of ICT implementation and utilization in Kenyan public schools.

This research takes a few schools from within Lang'ata district and tries to establish the status of ICT, and, factors promoting or hindering the adoption of ICT in various areas of the school education system. Conclusions will be made based on the findings from these schools.

3.2 **The Research Population**

The population of study is comprised of public primary and high schools in Kenya. These are schools that are under direct control of the government and to whom government education policies apply. Three private international schools have also been studied for comparison; the identified variables play themselves out differently in public and private schools.

3.3 **Sample Design**

This study focuses on three public schools and three private international schools, all within the Lang'ata district. These are: Ayany Primary School, Karen C Primary school and Lang'ata High School.

Ayany Primary school is located in Kibera slum in Nairobi. Most of its people live in extreme poverty, and most people living in the shanties here make less than $1.00 per day. Unemployment rates are high. There are few schools, and most people cannot afford an education for their children. The suburb of Karen which is home to Karen C Primary school. There is thus a major disparity in the socio-economic characteristics of the localities of the schools under study. The study will thus bring out the effects of socio-economic status in the application and utilization of ICT in education by comparing the low, middle and high earning populations of the three areas. Other factors that will be compared include levels of education and the leadership on the schools.

For comparison purposes, a study was done for Lang'ata West Primary School, which is in the same locality as Lang'ata High School. This is because the dynamics and

requirements of primary education are different from those of secondary education hence the need to study a primary school in this locality.

After studying the four public schools, it was found necessary to compare the findings for public schools to the case in private schools. This is because, of the four public schools studied, ICT infrastructure was virtually inexistent in all of them hence there was really nothing to compare. Three international schools were then selected, also located within the Lang'ata and Karen areas. These are Hillcrest Secondary School, The Nairobi Academy and The Brookhouse International School.

Hillcrest Secondary is located within the Karen area of Lang'ata district. It has a 'A truly multi-cultural environment, mixing students from over 55 countries, and maintaining an important balance in representing the three major cultural groups in Kenya: African, European and Asian'. It also has a State-of-the-art science, IT computing, design and technology and food science laboratories. The IT facilities extend from two fully networked computer laboratories with individual work stations for a full class, to computers in the library for student research. A lease line ensures our e-mail and Internet access is available throughout the school day. (Hillcrest, 2010).

The Nairobi Academy is located within the Lang'ata-Karen area, commonly referred to as Karengata. It caters for children aged from 2 years to 18 years (Pre-Prep, Prep & Secondary), taught in small classes. Students in the Secondary School are prepared and entered for IGCSE and A Level Examinations'. (The Nairobi Academy, 2010)

Brookhouse International School is a co-educational day and boarding school for students aged 2-19, offering an adapted form of the British National Curriculum to Kenyan and International students. (Brookhouse international school, 2010).

3.4 Data Collection

Data was collected mainly from school heads, teachers and other school administrative staff. The interview method was used to collect data from the above population. This method ensured that qualitative data is gathered as the issues surrounding the area of digital inclusion are varied. Secondary sources such as National ICT policy for education, School Financial reports and school websites were also used. Results of observation and personal experiences at the school by the researcher were also used to come up with some of the conclusions.

CHAPTER 4
DATA ANALYSIS, RESULTS AND DISCUSSION

4.0 **Overview**

What follows is a discussion on the findings from the research. Respondents were interviewed and their responses summarized, and conclusions made. The research looked at the current status of ICT in schools, and the factors promoting or undermining the implementation and utilization of ICTs in schools.

4.1 **Data Analysis**

A content analysis was conducted on the data and views collected from the interviews. Content analysis is regarded as a qualitative method for identifying, analyzing and describing the data set in rich detail. It is similar to the observational method but what is studied is not direct behaviour but a representation of that behaviour in speech or texts that are analyzed (Muganda, 2010). Results of observations by the researcher were considered as they contributed to the overall study.

4.2 **Results**

Below are the objectives of the study and how the research worked towards meeting them:

a) To examine the status of ICT implementation and utilization in public schools in Kenya – to achieve this, the status of ICT in the schools studied was done. This included evaluating the present of computers, computer laboratories, websites, and internet connectivity.

b) To identify the undermining factors to the achievement of digital equity in schools in Kenya – to achieve this objective, the impact and status of the variables

identified in this study was done. This was based on the responses received from the interviewees, as well as school documents and the researcher's own observation.

c) To find out reasons why, despite a lot of efforts by the government and other stake holders, the social exclusion problem is still existent – this was achieved by linking efforts in bridging the divide to the actual situation in the schools, and trying to identify deficiencies. The respondents were also asked questions regarding the efforts by the ministry; these are tabulated in the results.

4.2.0 **School general characteristics**

The schools studied have various differences in their setup, the school community, how they are funded and even size in terms of number of students.

School code	**Funding**	**Approx. number of students**	**Governance**	**Demographic characteristics**
P1	GoK under the free primary education	1,400	School head mistress School Committee (parents, teachers and ministry representative) Director of City Education	This is a day school with pupils and parents are mainly from the larger Kibera slum.
P2	GoK under the free primary education. Parents supplement in a few areas e.g. school furniture and books	1,000	School head mistress School Committee (parents, teachers and ministry representative) Director of City Education	This is a day school. Parents are mainly from Lang'ata estate, Ongata Rongai and the nearby Kibera slum.
P3	GoK under the free primary education	1,000	School head mistress School Committee (parents, teachers and ministry	The pupils and parents are mainly from the nearby Kuwinda slum. The parents

			representative) Director of City Education	are mainly domestic workers in the posh homes around Karen.
P4	GoK under the free secondary education	900	School principal, deputy principal, deputy and a Board of governors.	This is a day school with a population drawn from various parts of Nairobi. The teachers consist mainly of university graduates.
PR1	Parents	Details not provided	School committee	International community. Mainly expatriates working in Kenya and living in up-market areas of Nairobi
PR2	Parents	Details not provided	School	Mostly well-off Kenyan families plus International community.
PR3	Parents	Details not provided. The school combines the preparatory and secondary schools.	School committee	International community. Mainly expatriates working in Kenya and living in up-market areas of Nairobi

Table 2: Characteristics of schools studied

The differences observed contribute in different ways to the adoption and utilization of ICTs is schools. This can be seen in the findings tabulated in the following sections.

4.2.1 **Access**

As defined earlier, access refers to the ability to obtain and make use of an ICT resource, either software, hardware or other ICT service. To determine the levels of access, the researcher determined the available ICT infrastructure and accessibility to this infrastructure by the school communities. The findings are as follows:

School Code	**Text: Excerpts of Transcripts**	**Description (Text Analysis)**	**Interpretation**
P1	We don't have any computer in the school. Most pupils come from Kibera and most do not have access to computers at home. We have a radio that we use for radio lessons. The school corresponds with Norton Primary School of Stockton, UK in the 'Connecting Classrooms' scheme. However this correspondence is mainly by post. (Senior teacher and school notice board)	ICT access for the school community is inexistent.	No access to ICTs hence no utilization of the same at school. This means the school is lagging behind in ICT
P2	There is only one working computer used in the head teacher's office. The pupils do not have access to computers at school; there are no computer lessons offered in the school. However, some pupils have this access at home. The school received a donation of old Pentium 1 computers. This PCs are slow, although may be used to tech the pupils the basics of computers. The head teacher said that, even with the donation of computers, the school does not have any free room to use and a computer room and as a result the computers have been kept in a store. A member of the committee has sponsored the development of the school's website, this is underway. The school has bought a radio, TV and DVD player which are used as aids in learning. The school's head hopes that the Constituency Development Fund will help the school put up a resource centre that will have a computer laboratory. (Head mistress)	Some pupils have access to computers at home but there are no statistics to prove this.	No access to ICTs hence no utilization of the same at school. This means the school is lagging behind in ICT. Some students have access to computers at home but since there is no evidence, this cannot be used to make any conclusions.
P3	The school has no computer and thus no computer lab The pupils do not have access to computers; there are no computer lessons offered in the school. (School administrator)	ICT access for the school community is inexistent.	No access to ICTs hence no utilization of the same at school. This means the school is lagging behind in ICT
P4	The school has three computers: one in the principal's office, one in the records office and the third used to key in marks. The students do not have access to these computers; there are no computer lessons	Some pupils have access to computers at home but there are no statistics to prove this.	No access to ICTs hence no utilization of the same at school. This means the school is lagging behind in ICT. Some students have access to

	offered in the school A few students have mobile phones; however, these are not allowed for use within the school premises hence only accessed outside the school. (Deputy principal)		computers at home but since there is no evidence, this cannot be used to make any conclusions.
PR1	We have two fully networked computer laboratories with individual work stations for a full class, to computers in the library for student research. A leased line is available and used for e-mail and Internet access; this is available throughout the school day The pupils have access to these resources at all times. ICT is taught as a subject in the school and at the secondary level, some students specialize in it. The school has a website. (ICT administrator and the school website)	All students have access to computers and the internet, ICT is taught as a subject.	There are no access problems in this school. All students have access to ICT resources at school and are able to enjoy the benefits of ICT in education.
PR2	The school's ICT facilities comprise of four computer laboratories as well as computers in the staff offices. A lease line is available and used for e-mail and Internet access; this is available throughout the school day. Internet is accessible by students, teachers and administrative and support staff. The school has projectors which are used for content delivery in the class rooms. The pupils have access to these resources at all times. ICT is taught as a subject in the school and at the secondary level, some students specialize in it. The school has a website. (School Administrator and the school's website)	All students have access to computers and the internet, ICT is taught as a subject.	There are no access problems in this school. All students have access to ICT resources at school and are able to enjoy the benefits of ICT in education.
PR3	The schools ICT facilities extend from two fully networked computer laboratories with individual work stations for a full class, to computers in the library for student research. A lease line is available and used for e-mail and Internet access; this is available throughout the school day The pupils have access to these resources at all times. ICT is taught as a subject in the school and at the secondary level, some students specialize in it. The school has a website, (ICT Manager and the school website).	All students have access to computers and the internet, ICT is taught as a subject.	There are no access problems in this school. All students have access to ICT resources at school and are able to enjoy the benefits of ICT in education.

For the public primary schools studied, inadequate funding by the government seems to be the greatest hindrance to provision of ICT facilities at the schools. The schools'

priority list does not include ICT infrastructure hence the lack. This is both from the ministry of education as well as the school committee. The available funds are channeled towards providing basic facilities such as desks, chairs and uniforms for needy children. Although Lang'ata High School is a secondary school, it does not have ICT facilities for use by the students and teachers. This is a great problem that needs to be addressed because this means that after the students leave school, they will have to start learning about computers in order to fit into the job market. The private schools, on the other hand, have well established ICT infrastructure. The schools have computer laboratories; have computers for use in their libraries and offer ICT courses to the students. Projectors and laptops are also available for use in delivery of class lessons. Leased lines are available and this ensures that e-mail and internet access is possible for both teachers, students and other members of staff at all times. On the issue of access we thus see that private schools which have adequate funding are advantaged and thus the students have access to and use of computers early in life. This gives them an edge over their counterparts in the public schools.

4.2.2 Human Capital

In the assessment of human capital, the researcher sought to find out the ICT skills level of the teachers and also the present of specialist ICT staff to handle ICTs for the school. The findings are as follows:

School Code	**Text: Excerpts of Transcripts**	**Description (Text Analysis)**	**Interpretation**
P1	The teachers are mainly P1 teachers with no training in ICT. The head teacher has no knowledge of ICT The school does not employ any ICT specialists. (Senior teacher and school notice board)	Inadequate human capital at the school	There are no skills and resources to teach and manage ICT
P2	The teachers are mainly P1 teachers with no training in	Inadequate human	There are no skills and

	ICT. I have no formal knowledge of ICT (head mistress)	capital at the school	resources to teach and manage ICT
P3	The teachers are mainly P1 teachers with no training in ICT. The head teacher has no knowledge of ICT (School administrator)	Inadequate human capital at the school	There are no skills and resources to teach and manage ICT
P4	The teachers have no specific training in ICT although some through their own initiative have acquired some ICT knowledge outside the school. (Deputy principal)	Inadequate human capital at the school	There are no skills and resources to teach and manage ICT
PR1	The school has dedicated ICT staff to manage the ICT infrastructure, as well as trained ICT teachers. The principal understands the benefits of ICT in education and is fully in support of ICT initiatives in the school. (ICT administrator and the school website)	The school has invested in ICT teachers as well as System administrators to manage ICT systems.	Adequate resources have been provided to manage ICT
PR2	The school has three dedicated ICT staff to manage the ICT infrastructure, as well as trained four ICT teachers. The principal understands the benefits of ICT in education and is fully in support of ICT initiatives in the school.	The school has invested in ICT teachers as well as System administrators to manage ICT systems.	Adequate resources have been provided to manage ICT
PR3	The school has dedicated ICT staff to manage the ICT infrastructure, as well as trained ICT teachers. The principal understands the benefits of ICT in education and is fully in support of ICT initiatives in the school.	The school has invested in ICT teachers as well as System administrators to manage ICT systems.	Adequate resources have been provided to manage ICT

Private schools have invested heavily in ICT personnel both teachers and ICT administrators. The Nairobi academy, for example, has three full time ICT staff and four ICT teachers. This ensures that the systems are well managed and maintained, and that the students have adequate teachers to deliver ICT content to the. The private schools on the other hand have no ICT human capital. Most of the teachers have only undergone the normal teacher training course which does not include ICT training. P2 has received some donation of computers but had to get an external person to come and examine them and advise the head teacher on their status. The school does not have an allocation for an ICT person. The head teacher is willing to have the facilities put in place despite having minimal knowledge of ICT. A website is under development under the initiative of a committee member who is an alumnus of the school.

4.2.3 Governance

In governance the researcher considered the knowledge levels of the school heads, committees and ministry officials who make decisions regarding school projects.

School Code	Text: Excerpts of Transcripts	Description (Text Analysis)	Interpretation
P1	The school is governed by a committee comprising of members of PTA, the school head and a representative from the Nairobi City Council. Decisions made at the school are subject to approval by the Director of Education and the Nairobi City Council The school head has no ICT knowledge; she has not attended any formal ICT training or training in Project management The school head has no knowledge of the National ICT policy for education. Funds are released from the ministry with guidelines on what the money should be used for – books, desks and chairs, and school uniforms for pupils classified and most vulnerable children. This then does not provide the school committee with the flexibility needed in decision making on the use of the funds. (Senior teacher and school notice board)	A lot of control on finances is done by the ministry. The ministry and the city council make major decisions on how finances will be used. There is no publicity and education of school heads on the National ICT policy for education. School committees need to be educated on benefits and need for ICT.	Education of decision makers on the National ICT Policy for education is essential. ICT also needs to be prioritized and adequate funds provided.
P2	The school is governed by a committee comprising of members of PTA, the school head and a representative from the Nairobi City Council. Decisions made at the school are subject to approval by the Director of Education and the Nairobi City Council The school head has no ICT knowledge; she has not attended any formal ICT training or training in Project management. However, she appreciates the need for ICT in the school and appeals to well wishers to help her put up ICT infrastructure. The school head has no knowledge of the National ICT policy for education. Funds are released from the ministry with guidelines on what the money should be used for – books, desks and chairs, and school uniforms for pupils classified and most vulnerable children. This then does not provide the school committee with the flexibility needed in decision making on the use of the funds. (Head mistress)	A lot of control on finances is done by the ministry. The ministry and the city council make major decisions on how finances will be used. There is no publicity and education of school heads on the National ICT policy for education. School committees need to be educated on benefits and need for ICT.	Education of decision makers on the National ICT Policy for education is essential. ICT also needs to be prioritized and adequate funds provided.
P3	The school is governed by a committee comprising of members of PTA, the school	A lot of control on finances is done by the ministry. The	Education of decision makers on the National ICT

	head and a representative from the Nairobi City Council. Decisions made at the school are subject to approval by the Director of Education and the Nairobi City Council The school head has no ICT knowledge; she has not attended any formal ICT training or training in Project management The school head has no knowledge of the National ICT policy for education. Funds are released from the ministry with guidelines on what the money should be used for – books, desks and chairs, and school uniforms for pupils classified as most vulnerable children. This then does not provide the school committee with the flexibility needed in decision making on the use of the funds. (School Administrator)	ministry and the city council make major decisions on how finances will be used. There is no publicity and education of school heads on the National ICT policy for education. School committees need to be educated on benefits and need for ICT.	Policy for education is essential. ICT also needs to be prioritized and adequate funds provided.
P4	The school is governed by a committee comprising of members of PTA, the school head and a representative from the Ministry of Education. Decisions made at the school are subject to approval by the Director of Education. The school head has no ICT knowledge; she has not attended any formal ICT training or training in Project management The school head has no knowledge of the National ICT policy for education. Funds are released from the ministry with guidelines on what the money should be used for – books, desks and chairs, and school uniforms for pupils classified and most vulnerable children. This then does not provide the school committee with the flexibility needed in decision making on the use of the funds. (Deputy Principal)	A lot of control on finances is done by the ministry. The ministry and the city council make major decisions on how finances will be used. There is no publicity and education of school heads on the National ICT policy for education. School committees need to be educated on benefits and need for ICT.	Education of decision makers on the National ICT Policy for education is essential. ICT also needs to be prioritized and adequate funds provided.
PR1	The school is governed by a committee comprising of members of PTA and the school head. It is managed by a team of Senior Management staff. The school head has good ICT knowledge; she has not attended any formal ICT training or training in Project management (ICT administrator and the school website)	Decision making is done at school level thus making the process faster. The school head has good ICT knowledge thus appreciates and prioritizes ICT	Good governance hence growth of ICT in the school
PR2	The school is governed by a committee comprising of members of PTA and the school head for the Pre-prep school, the Preparatory School and secondary School. The heads of the three sections have good ICT knowledge (School Administrator and website)	Decision making is done at school level thus making the process faster. The school head has good ICT knowledge thus appreciates and prioritizes ICT	Good governance hence growth of ICT in the school
PR3	The school is governed by a committee comprising of members of PTA and the school head. It is managed by a team of Senior Management staff.	Decision making is done at school level thus making the process faster. The school head has good ICT	Good governance hence growth of ICT in the school

	The school head has good ICT knowledge; she has not attended any formal ICT training or training in Project management (ICT Manager and school website)	knowledge thus appreciates and prioritizes ICT	

The governance of public schools is posing a challenge in the attainment of a proper ICT environment. The ministry of education funds which are disbursed to schools under the free primary education come with guidelines on how they shall be used. As much as the ministry has come up with an ICT policy for education, it does not list ICT as one of the areas where these funds should be used. Secondly, the funds are few for the requirements of the schools hence they are not even enough for the areas proposed. Therefore, there is no surplus to invest in ICT. For private schools on the other hand, the fees paid include funds for investment in ICT. The school management is comprised of an international team that has exposure in the application of ICT in education. They are therefore able to plan and champion ICT initiatives better as compared to committees in say Ayany primary who do not have the same exposure. Committees such as the Constituency Development Fund (CDF) committees have not prioritized ICT hence no funding to ICT initiatives.

4.2.4 Economic Challenges

School Code	Text: Excerpts of Transcripts	Description (Text Analysis)	Interpretation
P1	The school is under funding from the Ministry of Education Priorities include buying of school stationery and desks for the pupils Most parents are from the Kibera slum hence not able to fully finance school projects (Senior teacher and school notice board)	Inadequate funding to the school. Money provided is channeled to other critical needs such as books and furniture. Parents do not have the financial ability to fund ICT projects	Lack of funds is hindering ICT development in the school.

P2	The school is under funding from the Ministry of Education although the funds are not sufficient. As such, parents have contributed towards the procurement of the TV, radio and DVD player. Priorities in the school include buying of school stationery, utility bills, paying of administrative staff and procurement of uniforms for children from very poor backgrounds.	Inadequate funding to the school. Money provided is channeled to other critical needs such as books and furniture. Parents do not have the financial ability to fund ICT projects	Lack of funds is hindering ICT development in the school.
P3	The school is under funding from the Ministry of Education under the Free Primary Education program. Priorities include buying of school stationery and desks for the pupils The interviewee noted that the parent's do not have the financial capability required to finance ICT projects in the school.	Inadequate funding to the school. Money provided is channeled to other critical needs such as books and furniture. Parents do not have the financial ability to fund ICT projects	Lack of funds is hindering ICT development in the school.
P4	The school is under funding from the Ministry of Education under the Free Secondary Education program. Parents are however called upon from time to time to supplement the ministry's funds. Priorities include buying of school stationery and desks for the pupils Most parents are from the Kibera slum hence not able to fully finance school projects	Inadequate funding to the school. Money provided is channeled to other critical needs such as books and furniture. Parents do not have the financial ability to fund ICT projects	Lack of funds is hindering ICT development in the school.
PR1	A high-cost school funded by the parents who may be classified as well-off financially. (ICT administrator and the school website)	Parents' are able to fund major ICT projects at the school.	Availability of funds has enhanced ICT growth in the school
PR2	A high-cost school funded by the parents who may be classified as well-off financially.	Parents' are able to fund major ICT projects at the school.	Availability of funds has enhanced ICT growth in the school
PR3	A high-cost school funded by the parents who may be classified as well-off financially.	Parents' are able to fund major ICT projects at the school.	Availability of funds has enhanced ICT growth in the school

Economic difficulties amongst the communities of Karen 'C' and Ayany has led to the schools having no computer or other ICT infrastructure at all. A look at the financial statements revealed that funds received from the ministry were channeled towards procurement of books, desks and uniforms for needy children. This therefore leaves no surplus for ICT investment. This coupled with the low incomes of the parents of the schools results the prevailing situation. The private schools receive adequate funding from the members of their communities classified in the high-income bracket.

4.2.5 Social Capital

School Code	Text: Excerpts of Transcripts	Description (Text Analysis)	Interpretation
P1	The education levels of the general population of the school's locality are low. This then translates to the kind of decisions made by the committee. (Senior teacher and school notice board)	The general community of the school is not well informed and educated on the benefits of ICT and how it can be implemented in the school.	Lack of knowledge is hindering the school community from supporting or pushing ICT projects. This has hindered its growth.
P2	The majority of parents at this school are from within the Lang'ata estate. A few students are drawn from the nearby Kibera slum as well as Ongata Rongai. The average education and economic station of the school's community may be classified as average.	The parents may be able to fund ICT projects but lack of knowledge and information on ICT is slowing down progress.	Lack of knowledge is hindering the school community from supporting or pushing ICT projects. This has hindered its growth.
P3	The parents of this school are mainly domestic workers of the nearby posh homes on Karen, and mainly reside in the nearby Kuwinda slum. Some of the pupils also come from Ongata Rongai. The average education and economic levels of this community may be classified as low.	The general community of the rmed and educated on the benefits of implemented in the school.	Lack of knowledge is hindering the school community from supporting or pushing ICT projects. This has hindered its growth.
P4	Over half of the students attending this school are from the nearby Kibera slum. A few students come from within Lang'ata estate, while the rest commute from as far as Jogoo road and Ongata Rongai to attend school here. The parents' level of education and economic wellbeing may be classified as middle to low income.	The parents may be able to fund ICT projects but lack of knowledge and information on ICT is slowing down progress.	Lack of knowledge is hindering the school community from supporting or pushing ICT projects. This has hindered its growth.
PR1	The school has an international community with good exposure to ICT and its benefits. ICT projects are well supported and funded. (ICT administrator and the school website)	The school's community is well exposed thus well informed on ICT and thus able to steer ICT projects and provide funding as required	Lack of knowledge and exposure is important in getting support for ICT projects
PR2	The school has an international community with good exposure to ICT and its benefits. ICT projects are well supported and funded.	The school's community is well exposed thus well informed on ICT and thus able to steer ICT projects and provide funding as required	Lack of knowledge and exposure is important in getting support for ICT projects
PR3	The school has an international community with good exposure to ICT and its benefits. They include expatriates working for non-governmental organizations and charitable organizations. ICT projects are well supported and funded.	The school's community is well exposed thus well informed on ICT and thus able to steer ICT projects and provide funding as required	Lack of knowledge and exposure is important in getting support for ICT projects

The international exposure of the communities of Hillcrest, Brookhouse and Nairobi Academy has enabled them to appreciate the benefits of ICT in education. The parents' population is well educated and informed hence able to make solid decisions as regards ICT in education. The students are also well aware of ICT either from their homes or their social circles. For this reason they know what to expect from the ICT systems in place at their school thus the school's management has to ensure that their expectations are met. The communities of some of the public schools, on the other hand, do not have as much exposure to ICT. This means that ICT projects are not prioritized, or the communities are not willing to pay more so as to invest in ICT. At the same time, most parents in these schools argue that the government is funding the schools thus are unwilling to pay any more money to the school for other projects.

4.2.6 Project Sustainability

Here the researcher looked at the ability of staff at the school to maintain and ensure continuous running of ICT projects, financial ability and support by the school community towards ICT projects.

School Code	Text: Excerpts of Transcripts	Description (Text Analysis)	Interpretation
P1	The school committee has minimal or no understanding of the value of ICT in education. We have other needs considered to be more pressing e.g. procurement of desks and books thus funds are channeled in that direction. (Senior teacher and school notice board)	There is not enough funding for investment in ICT. This will affect the projects in the long run. There is also no education and thus lack of the will to support ICT projects.	Due to lack of funds, the school is not able to run and ensure sustainability of ICT projects. The school community also needs to appreciate ICT so as to support the projects in the long run.
P2	The government gives us roughly 1,200 per pupil per year. We have other needs that are more pressing so we focus on those e.g. books. (Headmistress)	There is not enough funding for investment in ICT. This will affect the projects in the long run. There is also no education and thus lack of the will to support ICT projects.	Due to lack of funds, the school is not able to run and ensure sustainability of ICT projects. The school community also needs to appreciate ICT so as to support the projects in the long run.

P3	The school's head and the committee have minimal or no understanding of the value of ICT in education. For this reason, the priorities of the school are different. This is also due to the fact that there are other needs considered to be more pressing e.g. procurement of desks and books thus funds are channeled in that direction. (School administrator)	There is not enough funding for investment in ICT. This will affect the projects in the long run. There is also no education and thus lack of the will to support ICT projects.	Due to lack of funds, the school is not able to run and ensure sustainability of ICT projects. The school community also needs to appreciate ICT so as to support the projects in the long run.
P4	The school's head and the committee have minimal or no understanding of the value of ICT in education. For this reason, the priorities of the school are different. This is also due to the fact that there are other needs considered to be more pressing e.g. procurement of desks and books thus funds are channeled in that direction. (Deputy principal)	There is not enough funding for investment in ICT. This will affect the projects in the long run. There is also no education and thus lack of the will to support ICT projects.	Due to lack of funds, the school is not able to run and ensure sustainability of ICT projects. The school community also needs to appreciate ICT so as to support the projects in the long run.
PR1	The ICT projects in place have all the requirements for sustainability – there is continuous funding to keep the projects running, there are trained personnel employed to manage the ICT resources and the school's management is educated on the need for ICT in the school. (ICT administrator and the school website)	There is proper funding for ICT projects, as well as the will to see ICT projects succeed. This has ensured their success and continuous availability.	Knowledge and funding are essential for sustainability of ICT projects. Project Management skills are also essential to ensure success of these projects.
PR2	The ICT projects in place have all the requirements for sustainability – there is continuous funding to keep the projects running, there are trained personnel employed to manage the ICT resources and the school's management is educated on the need for ICT in the school. (School administrator and school website).	There is proper funding for ICT projects, as well as the will to see ICT projects succeed. This has ensured their success and continuous availability.	Knowledge and funding are essential for sustainability of ICT projects. Project Management skills are also essential to ensure success of these projects.
PR3	The ICT projects in place have all the requirements for sustainability – there is continuous funding to keep the projects running, there are trained personnel employed to manage the ICT resources and the school's management is educated on the need for ICT in the school. (ICT Manager and School website)	There is proper funding for ICT projects, as well as the will to see ICT projects succeed. This has ensured their success and continuous availability.	Knowledge and funding are essential for sustainability of ICT projects. Project Management skills are also essential to ensure success of these projects.

The issue of project sustainability arises in schools where there is ICT systems in place. The private schools have the necessary funds and will to continue driving their ICT projects and investments. A school like Lang'ata west, on the other hand, received a donation of computers. With these, some value should be seen to be drawn from them however old. Due to lack of will and the necessary resources to harness these facilities, the computers have been kept in a store hence no value added to the students.

On the definition of social inclusion, private schools were observed to have the necessary ingredients for achievement of ICT for social inclusion. These include ICT facilities, financial muscle to invest and maintain ICT systems, the will and knowledge required to support ICT initiatives, the personnel to manage ICT resources and teach ICT to the students and strong, well informed management teams championing the adoption and use of ICTs. Private schools on the other hand lack most of these; most do not have any ICT infrastructure in place. Lang'ata west primary school, on their side, has some computers and are putting up a website. The school head and school committee are supporting ICT initiatives. The challenge is funding and human capital in terms of teachers and ICT staff required to manage ICT systems. Focus is now on acquisition of a computer room; the management needs to also look at educating the parents on the benefits of ICT in the school, and provision of manpower to teach and manage ICTs. Once the parents appreciate this, they will be able to support ICT initiatives financially, given that they are classified as average economically. Governance is another area that has made public schools to lag behind in ICT. The ministry of education has not educated teachers and school heads on ICT. It has also not communicated the National ICT Policy for Education to school heads and administrators.

4.2.7 Theoretical Inadequacies in definition

From available theory, the definition of the term 'Digital divide' is seen to be inadequate as it does not provide a proper framework for the resolution of the existing problem. It focuses mainly on the ABCs i.e. Access, Basic training and content. This argument has been supported by various scholars. Warschauer (2002) argues that the

term digital divide ‘provides a poor framework for either analysis or policy’. He advocates moving away from the physical ownership of and access to, technology and encourages the use of ICT as a means of social development, suggesting that the term ‘digital divide’ be replaced by ‘technology for social inclusion’. The term digital divide has been replaced with ‘technology for social inclusion’, redefining the focus from technology as an end to technology as a means to the end. Social Inclusion goes beyond education to include factors such as social interaction, civic engagement and the all encompassing social capital. (Muir, 2004).

The OECD (2001) defines the digital divide as differences between individuals, households, companies, or regions related to the access to and usage of ICT. The divide may appear due to historical, socioeconomic, geographic, educational, behavioral, or generation factors, or due to the physical incapability of individuals (Cullen, 2001, p. 311).

The Economist’s Intelligence Unit (EIU) uses a combination of variables to measure/assess e-readiness. These variables include connectivity and technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision, and, consumer and business adoption. (Economist Intelligence Unit, 2010). These variables are more than just ABCs. We thus need to explore these and others as factors that influence the digital divide, and which need to be addressed. Hearn, et.al. (2004) observe that ICT initiatives have often stalled for a number of reasons. These are that the initiatives are largely ICT supply-driven and fail to specify and address the local cultural impediments and opportunities. In particular, they mis-specify and under resource the human infrastructure required. Secondly, they do not

take account of the dynamics of the global ICT industry; they have a narrow perspective and only look at the specific case in question. Thirdly, these initiatives are overoptimistic about the productivity improvement ICTs can bring in traditional industries. Finally, they often overlook the importance of content per se. In short, the question of how community-based ICT initiatives 'can survive financially, that is be "sustainable" in the longer term' has grown in significance, (Gurstein, 2001).

Hearn, et al, 2004 propose that more realistic models of the role of ICTs in regional development must achieve clarity in specifying sustainability goals, leverage micro-business enterprise development off government funded technical and human infrastructure provision, build on local industry strengths; to learn from global experiences whilst building on local assets, find innovative business models to capitalize on new opportunities for content and applications, ensure community involvement in deciding, planning and evaluating projects and, adopt a learning approach through cycles of evaluation based on action research.

According to, policy, infrastructure, level of ICT knowledge and skills, availability of capital investment and affordability are some of the factors which influence the implementation/ diffusion of ICT in a country.(ITU, 2002), (Gillis. et. al, 2000), (Piatkowski, 2002). The Washington University, WSU model identifies three stakeholders: 'Community members', ICT investment and Public policy as being key in implementation of ICT and hence the attribution of ICT to economic and human development. (Gillis. et. al, 2002).

In summary, the concept of 'digital divide' seems to be incomplete and needs a theoretical review.

CHAPTER 5
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 **Summary**

This study's broad objective was to find out why, despite efforts by various stakeholders in ensuring the penetration and utilization of ICTs, Kenyan public schools still lag behind. It focused on ICT adoption in schools not only as a taught subject but also as a tool to aid in better learning through delivery of content.

The specific objectives of the study were:

a) To examine the status of ICT implementation and utilization in public schools in Kenya
b) To identify the undermining factors to the achievement of digital equity in schools in Kenya
c) To find out reasons why, despite a lot of efforts by the government and other stake holders, the social exclusion problem is still existent.

The approach to this study was to confirm the research framework highlighted in chapter three of this thesis, as well as to highlight other issues that were not captured in the research framework. The framework adopted for this study proposed seven variables as necessary for the achievement of ICT for social inclusion in the Kenyan education sector.

The literature review focused mainly on an understanding of the issues surrounding ICT for social inclusion, and how various scholars have approached the issue. Issues of the

definition of the term ‘digital divide’ were also discussed and the deficiencies brought out.

This study is not a replica of another study but is based on the conceptual framework as outlined in other earlier sections of this study. It set out to test variables that have been used to come up with the theoretical framework.

5.1.2 Discussions

From the research findings as presented in chapter four of the study, several conclusions can be drawn in support of the adopted framework. These are discussed in light of the objectives of the study.

Objective 1: ICT STATUS IN SCHOOLS

This objective has been met. The factors used to meet this objective included assessment of the ICT infrastructure, ICT staff and plans for ICT projects. These factors are discussed here below.

Factor 1: ICT Infrastructure:

In general, it has been observed that private schools have better ICT infrastructure and employ ICT staff to teach and manage ICTs as compared to public schools. This research sought to find out the determinants of the ICT status in any given school. The identified variables were examined and the findings are discussed below.

ICT infrastructure is critical for the attainment of digital equity. Private schools have invested considerably in ICT infrastructure as compared to public schools. This is partly

due to the financial muscle that private schools have, and also the social class of the school community. As has been seen, the general population of this schools is well exposed hence they understand the need for ICT and have prioritized it in these schools.

Factor 2: Human capital

This has been measured in terms of teachers and staffs to manage the resources are critical. We also observe that private schools have invested in ICT managers, system administrators and ICT teachers. Public schools, on the contrary have none. This is due to the lack of infrastructure as well as the finances to invest in this area.

Factor 3: Governance

Governance gives direction and even funding for the projects especially in areas where the local community does not have the financial ability to do so. For public schools, the money allocated comes with specific instructions on where to use it, and ICT is not part of these areas, or, the money is not enough to cover the needs of the school. Secondly, National ICT policy for education has not been communicated to school heads and school committees; they thus do not have direction on which was to go as concerns ICT.

Factor 4: Project sustainability

It is not enough to put up ICT infrastructure. There is need to ensure that the infrastructure continues to be useful and meets the needs of the users. Some infrastructure such as internet links attracts a recurrent expenditure; there has to be a budgetary allocation to cater for this in order to be sustainable.

From the findings above it has been observed that access only is not sufficient as a factor to be put into consideration in the attainment of social inclusion in ICT in schools. All variables discussed in this thesis are necessary. We also see that they are all interrelated; none can work and achieve the desired goals without the other, they all have to be present.

Objective 2: UNDERMINING FACTORS

This objective has been met by this study. By comparing private schools which have ICT facilities and utilize ICT in their education and public schools which have nothing existent, the following have been identified as undermining factors:

Factor 1: Economic challenges

Lack of financial ability is key to the attainment of ICT for social inclusion. Private schools which have a good financial base have been able to invest considerably in ICT and hence fully enjoy the benefits of ICT in their institutions. Public schools, on the other hand, rely on government funding for most of their activities. The funds provided by the government are not sufficient for the investment required by ICT.

Factor 2: Governance

The ministry of education, under which public schools fall, has failed in the area of governance. First, as was found on the ministry's website, senior officials who are meant to give direction on ICT in education are undergoing basic ICT user training in Microsoft applications. This shows that they are yet to acquire advanced ICT training. With this

limited knowledge, they cannot formulate the necessary policies to steer the education system in the area of ICT. This is an area that needs to be looked at.

Factor 3: Social Capital

Education of the general public on the benefits of ICT is critical. As has been observed, most of the population that makes up the communities of public schools do not have the necessary knowledge and exposure for them to appreciate ICTs. As a result, ICT is not prioritized in the plans of schools, or, there is no push to the government and school administrators to work towards provision of ICT resources. If the general public is educated and gets to appreciate ICT, they will push to have it implemented and be ready to use it.

Factor 4: Project Sustainability

For sustainability of ICT projects to be achieved, it necessary that the project owners have the knowledge and the will to continue running those projects. Financial capacity is also necessary. Private schools have websites and internet links and are able to continue paying and maintaining these resources in working order. Lang'ata West primary school, on the other hand, received a donation of computers. They do not have a computer room, nor the knowledge and capacity to set up these computers for use. This has made the donation lie idle while the pupils miss out on the benefits of this resource.

Factor 5: Human Capital

Teacher education needs to be enhanced to include ICT skills. From the findings, teachers at public schools and even head teachers do not have any ICT education. For them to steer and utilize ICT in delivery of educational content, they need to be equipped with the necessary skills.

Objective 3: To find out reasons why, despite a lot of efforts by the government and other stake holders, the social exclusion problem is still existent.

This objective has been achieved and factors undermining the attainment of the set ICT goals identified. The following are the factors that have led to the failure in achievement of goals:

Factor 1: Governance

One of the issues noted from the findings is that the National ICT policy for Education has not been communicated to school heads and other stake holders. Most of the respondents did not have any information on the existence and content of this policy document.

The ministry of education has also not given proper direction in the implementation of the National ICT policy for education. Once the ministry gives guidelines on what is expected of every public school and provides the necessary funding, school heads will have no option but to oblige.

Factor 2: Funding

There is inadequate funding to public schools. Minimal funds are sent to schools at an approximate rate of 1,200 per pupil per year. This can only cater for writing materials and not any major investment as is required for ICT. This has therefore led to lack of ICT infrastructure.

Factor 3: Social Capital

The majority of the general public has no knowledge of ICT or its benefits. ICT talk is mainly amongst industry players as opposed to involvement of the general public thus nothing much is being achieved. As observed by Hearn, et.al. (2004), ICT initiatives have often stalled for a number of reasons. These are that the initiatives are largely ICT supply-driven and fail to specify and address the local cultural impediments and opportunities. In particular, they mis-specify and under resource the human infrastructure required.

Factor 4: Generalization of the approach to the planning and implementation of ICT projects

Projects started do not take account of the dynamics of the global ICT industry; they have a narrow perspective and only look at the specific case in question.(Hearn et. al.,2004). In formulation of policies and implementation of projects, it is necessary that the dynamics of the different schools are taken into account, in terms of the school community, location of the school, school management and existing infrastructure. A broad approach will not address the specific issues that impact the success of ICT projects.

Factor 5: Theoretical inadequacy in the definition of the Digital divide

Finally, the current theoretical definition of the term ‘digital divide’ has undermined the way in which the problem is being approached. From the efforts discussed earlier, most are focusing on provision of infrastructure and formulation of policies. From the findings of this research, the attainment of ICT for social inclusion calls for more than infrastructure and policies.

5.2 **Conclusion**

The objectives of this study have been fully achieved. For social inclusion in ICT to be attained in Kenyan public schools, focus has to be made to issues of access, governance, economic challenges, human capital, and sustainability of projects and the definition of the term digital divide. Focus on any of these variables without considering the others will not solve the problem being experienced in public schools in Kenya; they have to be looked at as a whole.

5.3 **Recommendations**

The government needs to boost funding to public schools for them to reap maximum benefits from ICT. The sums of money given to schools are not adequate to cater for all their needs. It is also important to highlight the issues and get partners to help put up ICT infrastructure in schools for faster achievement of the required levels of infrastructure. Secondly, the ministry needs to empower school committees in the planning and prioritization in the use of funds given to them. Limiting the committees on what the money should be used for is hindering schools that may be able to, from investing in ICT.

The third area that needs to be looked at is ICT training for teachers. All teachers need to have some basic ICT training in their curriculum. Specialist teachers also need to be trained and posted to schools so as to give students the option to take up ICT as a subject hence prepare them adequately for the job market where ICT is a key requirement. ICT also needs to be introduced in the school curriculum; every student should have the basic knowledge of ICT necessary to utilize ICT resources that will be availed to them.

Education of policy makers, school heads and the general public on the benefits of ICT in education must be done. This will ensure that ICT projects are prioritized right from the ministry down to the students. A check on the ministry of education's website revealed that senior ministry officials going through basic ICT training. It is necessary that the ministry gets officials with excellent ICT knowledge to head some of the departments so that they can prioritize ICT. The National ICT policy for education also needs to be communicated widely to school administrators, school committees and even ministry official.

School heads and committees need to be trained on management of projects. This will ensure success of ICT projects, as well as their sustainability.

Finally, the definition of digital divide is limiting to addressing of the problem being experienced. There is need to increase its scope to include issues if Access, governance, economic factors, human capital, social capital, and project sustainability.

5.4 Limitations to the Study

The limitations of the study have been identified as follows:

a) Limitations in research population

The generalization of this study required collecting data from schools within Lang'ata district only. This cannot be considered representative of the Kenyan situation since the dynamics of the different populations and localities differ. Foe example, in some areas lack of electric power is a hindrance to ICT development, which is not the case in Lang'ata district.

b) The mode of responses

The conclusions are based on the responses given by the interviewees. A physical evaluation by the researcher would be necessary so that there is a fast hand experience on the ground. This was not granted by the schools.

c) Financial and time Constraints

Limited finances and time constraints were also a factor in this study. Only a few schools could be studied.

d) Lack of Local Research in this area

There isn't much research done locally on ICT in education. Much of the reference by the researcher is based on online sources and studies done in other parts of the world. The

dynamics of the different places are different thus some of the issues affecting the Kenyan situation may not have been captured by the international researchers.

e. Difficulty accessing Ministry documents

There was a lot of difficulty in accessing documents held by the ministry; the same are not posted on their website. The conclusions were thus mainly based on information received from the respondents.

5.5 Suggestions for Further Research

In order to know the exact issues hindering ICT growth in Kenya, a research needs to be done covering each specific institution. This will bring out the issues which are specific to those institutions hence aid in planning.

A research also needs to be done to evaluate the teacher education curricula in Kenya and if it equips teachers with the necessary skills to teach and utilize ICT in their work. This is critical for the success of ICT in schools.

However, despite the limitations, this study forms a basis for further research and an input into planning for ICT by policy makers. It brings out issues that have not been addressed before hence gives guidance on what the focus should be on.

Reference List

1. Farrel, G. (April, 2007). *ICT in Education in Kenya* Retrieved Jan 19th 2010 from http://www.infodev.org/en/Document.409.pdf
2. Cartlidge, A., Hanna A., Rudd C. Macfarlane, I. Windebank, J., Rance, S., 2007. *An introductory overview of ITIL V3*
3. Berdichevsky, K. (n.d). *Young people's access to technology*. Retrieved July 5th 2010 from http://www.tigweb.org/images/resources/tool/docs/1279.pdf\
4. Dozci, M. (2000). The Digital Divide retrieved August 5th 2010 from http://www.govis.org.nz/conference2000/presentations/marianne-dozci.ppt
5. The United Nations e-government survey (2008) Retrieved January 16th 2010 from www.ict.go.ke
6. *The Kenya Communications (Amendment) Act 2008* (2008) Retrieved August 6th 2010 from www.kenyalaw.org
7. Organization for Economic Cooperation and Development, OECD ('Understanding the digital divide' by. Accessed from www.oecd.org on 5th July 2010,
8. Tinio, V. L. (2003). *ICT in Education.* Retrieved April 4th 2010 from www.apdip.net/publications/iespprimers/ICTinEducation.pdf
9. www.number-10.gov.uk/output/page2793.asp accessed on 2nd July 2010 at 5.30pm
10. E-Africa Commission (2006) *NEPAD e-Schools Demonstration Project. 2005-2006*. Retrieved March 5 from www.eafricacommission.org/nepad_eschool_initiative.html
11. www.e-government.go.ke
12. Computer Society of Kenya Mission. Retrieved April 19th 2010 from www.cfsk.org
13. Lang'ata Constituency (n.d). Retrieved April 26 2010 from http://www.constitutionnet.org/files/LANGATA%20CONSTITUENCY%20complete.pdf

14. Education in Lang'ata, (n.d). Retrieved April 26 2010, from http://www.cdfproject.org/index.php?option=com_content&view=article&id=220&Itemid=168
15. UNESCO, (n.d). *Relationship between Literacy, Education and Development,* Retrieved August 20 2010 from http://www2.unescobkk.org/elib/publications/TrainingManual/MODULE1.PDF
16. Education for Sustainable Development discussion, (n.d). Retrieved July 5th 2010 from http://www.esdtoolkit.org/discussion/default.htm
17. Economist Intelligence Unit (2010) *Digital economy rankings 2010; Beyond e-readiness*, Retrieved July 5th 2010 from http://graphics.eiu.com/upload/EIU_Digital_economy_rankings_2010_FINAL_WEB.pdf
18. Warschauer, M. (2002). *Reconceptualizing the Digital Divide*. Retrieved July 5th 2010 from http://rfrost.people.si.umich.edu/courses/SI110/readings/DigiDivide/Rethinking_Digital_Divide.pdf
19. Digital Impact Group, (2010). 'The Economic Impact of Digital Exclusion' Retrieved July 6th 2010 from http://www.digitalimpactgroup.org/costofexclusion.pdf
20. Hearn, Greg N. and Simpson, Lynette E. and Lennie, June and Kimber, Megan P. (2004) ICTS and Regional stability: a critique and a way forward.
21. Unwin, T. (2004) ICT & education in Africa: Partnership, practice and knowledge sharing', Retrieved from 28th June 2010 from www.JStor.org
22. UNDP, (June, 2003). '*BHUTAN E-READINESS ASSESSEMENT* Final Report', retrieved September 27th 2010 from *www.unapcict.org.*
23. Asian Development Bank Institute, (2005). http://www.adbi.org/

24. Constitution of Kenya Review Commission (n.d). *Report of the Constitution of Kenya Review Commission, Volume four: Constituency Constitutional Forum Report: Constituency no 4 Langata*. Retrieved April 15 2010 from www.constituionnet.org

25. The Scottish Parliament Information Centre, (1999). 'Measuring Social Exclusion', retrieved April 16th 2010 from www.scottish.parliament.uk

26. Africa and Middle East Telecomm Week, (n.d). Retrieved September 28, 2010from http://www.ametw.com/resources/AfricaOpp_Kenya.shtml.

27. Kamerman, S. B. (n.d). Social Exclusion and Children: Background and Context, Retrieved October 1st 2010 from ww.childpolicyintl.org/publications/Kamerman.pdf

28. Muganda, N. (2010). Applied business and research management research, Nicorp Publications.

APPENDIX I – INTRODUCTION LETTER TO THE RESPONDENTS

TO
THE HEAD TEACHER,
AYANY PRIMARY SCHOOL,
P.O. BOX
NAIROBI, KENYA

Dear Sir/Madam,

Re: ACADEMIC RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGY, ICT, IN EDUCATION

The research above is part of the MBA program requirement of the University of Nairobi. This specific research focuses on the application and utilization of ICT in education. It seeks to find out why, despite the various efforts made by the government and other stakeholders, Kenya still lags far behind the developed world in the use of ICT in our education sector.

Your contribution and response shall without doubt go a long way in ensuring the success of this project, and contribute towards tackling of the problem at hand.

Yours sincerely,

SIGNED:

STUDENT

Kubasu Dorothy Masinde
Reg. No.: D61/9072/2005

AND

PROJECT SUPERVISOR:

DR. Nixon Muganda Ochara
UNIVERSITY OF NAIROBI.

APPENDIX II – INTERVIEW SCHEDULE

	Interviewee	Interview Date	Interview Time	Remarks
1	Head Teacher, Ayany Primary school	28th September 2010	4.25pm	
2	School Administrator, Karen C. Primary School	29th September 2010	12.00pm	
3	Deputy Head Teacher, Lang'ata High School	29th September 2010	11.00am	
4	Head Teacher, Lang'ata West Primary School	29th September 2010	10.00am	
5	Head of Computer Studies, Hillcrest Secondary School	29th September 2010	12.30pm	
6	School Administrator, Nairobi Academy	29th September 2010	2.00pm	
7	ICT Manager, Brookhouse International School	30th September 2010	11.30am	

APPENDIX III – INTERVIEW GUIDE

Researcher's Name: **KUBASU DOROTHY MASINDE**
Registration Number: **D61/9072/2005.**

RESPONDENT:

Biodata

Name: ……..……

Age: ……..

Position: ……..

Level of education:…….

Access:

1. Do you have any ICT projects in the school?

☐ YES

☐ NO

If yes, list the projects and briefly describe them.……

……

.

……

.

……

.

2. Do you have a computer laboratory in the school?

☐ YES

☐ NO

If yes, what is the ratio of computers to pupils? ……

……

.

3. What forms of technology are applied in the school as teaching aids?

……..……

……..……

……..……

……..

……..

4. What is the approximate percentage of pupils that have access to computers (in General)? ……..……..

5. What is the approximate percentage of teachers that have access to computers?

……..

6. Do you correspond with other schools any where in the world? …….……

If yes, how? .....

……

……

……

Human Capital

1. What is your understanding of the term Information and Communication Technology?

…..…….……

……..

……..

……..

2. Have you had any formal training in any area of ICT?

☐ YES

☐ NO

If yes, was it as part of your teacher training? …….....

……..

……..

3. Do you think that the current teacher education curriculum enables teachers to gain skills to use and teach ICT?

☐ YES

☐ NO

Briefly explain what areas should be included into the curriculum……...……

……..……...……

……

……..……...……

……..…….

4. Have you attended any formal training on the management of projects?

☐ YES

☐ NO

If yes, briefly describe the skills you acquired…….……

Governance

1. Are you aware of the National ICT policy for education?

☐ YES

☐ NO

If yes, in your opinion how will it affect your work and the school? ……..….

……...…..

……

……..

2. Is there any plan for ICT in your school?

☐ YES

☐ NO

If yes, briefly describe it …….....

……

……

……

3. Who is the main decision maker on the strategic direction of the school? ……...

……

……

4. How would you describe the level of ICT knowledge of the decision maker(s) mentioned in 11 above? ……

……

……

Economic Challenges

1. How would you describe the economic status of parents of the school? …….

…….

…….

Social Capital

1. On a scale of 1 to 5 with 1being very low and 5 being very high, how would you classify the education levels of parents of the schools? ……

……

……

2. What is your opinion on how funds allocated by the government for development projects are utilized? ……..……

……..

……..

……..…….

3. What should be done to ensure that the funds above are better utilized? ……..

……

……

……

……

Thank you for supporting this research.