UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

A FRAMEWORK FOR ASSESSING SUCCESSFUL IMPLEMENTATION OF DIGITAL VILLAGES IN KENYA

BY

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SUPERVISOR

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Submitted in Partial fulfillment of the Requirements of the Master of Science Degree in Information Systems of the University of Nairobi

DECLARATION

I, **Loice Victorine Atieno**, confirm that this research project and the work presented in it is my original work and has not been presented for any other University award.

Signature: _____ **Date:** 26/04/2012

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This project has been submitted in partial fulfillment of the requirement of the Master of Science Degree in Information Systems of the University of Nairobi with my approval as the University supervisor

Signature: _____ **Date:** 26 April 2012

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DEDICATION

To

My family both nuclear and extended,
My supervisor,
My lecturers and colleagues,

For your valuable support throughout the whole process
I sincerely cherish you all
May the Almighty God bless and be with you always.

ACKNOWLEDGEMENT

First and foremost I would like to thank the Almighty God for giving me good health and energy enabling me to come this far.

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I also wish to thank my husband, my daughter Dianah and my son Rahym for their immense support, patience and sacrifice throughout the period of this project.

May you all continue with the same spirit and be blessed.

ABSTRACT

It is believed that Information and Communication Technologies (ICTs) can lead to development in developing countries hence the rush to execute ambitious ICT projects in these countries and especially in rural areas. The main focus of these initiatives has been the implementation of these projects, rather than successful implementation of these projects leading to realization of the desired impacts on the beneficiary. This has led to many failures of these projects.

Kenya not being an exception has implemented so many ICT-related projects and most of these projects are not performing to the expectations of the government. Many Digital Inclusion (DI) projects have been put up but only a fraction of them are fully serving the community's needs. A visit to the Digital Village Pilot Projects by the IBM Teams confirms this. Assessing successful implementation of these projects is very important to ascertain the value of the project from the stakeholders' point of view if the desired impact is to be realized.

This research was therefore geared towards developing a conceptual framework that can been used to assess successful implementation of Digital Villages in Kenya with more emphasis on Pasha Centres. Several ICT for Development (ICT4D) assessment frameworks were studied and important elements incorporated in the proposed framework. The elements in the framework were then tested using descriptive survey and instruments such as questionnaires, interviews and observation used to collect data. Hypotheses were formulated based on the major elements of the proposed framework.

The elements in the conceptual framework were confirmed through data analysis and testing of the hypotheses. Newer elements were discovered and incorporated in the tested framework. The framework can be used to assess successful implementation of Digital Village Projects (DVPs) in Kenya from inception period onwards to avoid undertaking projects that end up failing in the long run.

Key Words: Assessment, ICT4D, Framework, Digital Village, Digital Inclusion.

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ACRONYMS

BPO	Business Process Outsourcing
CSC	Corporate Service Corps
CSTD	Commission on Science and Technology for Development
DI	Digital Inclusion
DFID	Department for International Development
DVRF	Digital Village Revolving Fund
DVP	Digital Village Project
GoK	Government of Kenya
ICT	Information Communication and Technology
ICT4D	Information Communication Technology for Development
IDRC	International Development Research Centre
IT	Information Technology
ITU	International Telecommunication Union
KICTB	Kenya ICT Board
KTCIP	Kenya Transparency Communications Infrastructure Project
M&E	Monitoring and Evaluation
MoIC	Ministry of Information and Communication
n.d	Not dated
NGO	Non Government Organization
SL	Sustainable Livelihood
SLA	Service Level Agreement
UN	United Nations
WSIS	World Summit on the Information Society

DEFINITION OF TERMS AND CONCEPTS

Digital Inclusion: This is the promotion of digital literacy, that is, the provision of access to information and communication technologies (ICTs) for the improvement of the quality of life of the people.

Digital Village: This is an e-center that provides a suite of services to the public via computers connected to the internet, digital cameras, printers, fax machines and other communication infrastructure. The services include e-government, banking, e-learning and communication services among others.

Framework: In general, a framework is a real or conceptual structure intended to serve as a support or guide for the building of something that expands the structure into something useful (Whtais.com).

Stakeholder: Freeman (1984), in Yves (2008) defines stakeholder as any group or individual that can affect or is affected by the achievement of an organization's objectives

Telecentre: A public place where people can access computers, the Internet, and other digital technologies that enable them to gather information, create, learn, and communicate with others while they develop essential digital skills.

CHAPTER ONE

INTRODUCTION

1.0 Background

Information Communication and Technology (ICT) has become a fundamental aspect of people's lives. It is therefore important that ICT services are made available to all and at reasonable rates. This has led to a growing number of ICT initiatives in developing countries that are usually undertaken on the basis of their importance on social and economic development (Andrade et al, 2009).

The World Bank, the United Nations (UN) and other donor agencies are directly or indirectly implementing ambitious multi-million dollar ICT-supported initiatives or projects in developing countries. These projects aim to unlock the potential of ICT to improve the quality of life of poor, often rural, people. Previously, the initiatives have included a range of pilot projects, such as telecentres, multipurpose community access centres and information kiosks (Harris, 2005).

In Kenya, the government has embarked on ICT oriented projects that are geared towards bringing services closer to the people. The services provided by the projects include e-governance, e-learning, e-commerce among many. Even though this initiative is a noble course taken by the government, most of these services are not being utilized fully especially at the community level.

Barriers to the efficient utilization of ICT in developing countries, can affect the ability to manipulate and use information effectively (Andrade et al, 2009). This can lead to unsuccessful investments in ICT. Therefore it is important to develop viable projects to avoid project failures.

The IBM Team 1 Sub-Team 1 (2010) carried out a research on digital village pilot projects in Kenya. The final report shows that the utilization of the ICT-related services is affected by: low ICT literacy rate; computers are generally viewed by local constituents as tools only for the university educated; basic needs (food/water/shelter) must be met before introducing

computers; and national level programs tend to have high awareness rate, but complete communication plans reaching to all citizens are lacking.

As the government embarks on this process of creating an information society, it should ensure that, apart from establishing these projects, they are utilized fully to avoid coming up with unsuccessful projects. Therefore the major challenge is to establish if the projects are of any value to the community or the beneficiaries. This is only possible by assessing the importance of these projects on the beneficiaries.

1.1 Current Position of Digital Villages (Pasha Centres) in Kenya

The Digital Village Projects (DVPs) projects were initiated with the following objectives: provide affordable access and use of ICT resources to rural communities in a sustainable way; increase connectivity of the rural areas to other parts of the country; and create economic opportunities that will spur rural economic development.

The assessment of the pilot projects by the IBM Team 1 Sub-Team 2 (2010) gives an insight to the current situation in the Pasha Centres Pilot Projects (PCPP). The findings in the report show that:

- All Pasha Managers strive to offer additional, end-to-end services to serve their communities and drive growth.
- Services currently offered are inconsistent across Centres, and range from basic to advanced ICT initiatives.
- Services provided depend heavily on IT experience, background and community demographics for each individual owner.
- Challenges with infrastructure reliability (i.e. Internet Service Providers) and power availability result in increased costs and lengthy downtimes, impacting revenue.
- Pasha branding and communication is needed to drive awareness of offerings and generate client base across all Centres.
- There is a widespread lack of understanding of how technology can assist current and future local businesses, impacting rural enterprise advancement
- Pasha owners do not have a forum to collaborate and learn from each others' experiences

- Current categorization does not accurately articulate Pasha Centre capabilities - categorization based on complexity of services vs quantity should be considered.
- Pasha owners require KICTB support and guidance to drive expansion and revenue

Even though there are several Digital Village Projects (DVPs) up and running, the above description of most of them show that the Centres are operating below the initial expectation and hence are not meeting the needs of the community fully.

1.2 Problem Statement

To make the digital inclusion (DI) projects a success especially the digital villages, it is important to make sure that apart from focusing on their establishment, the government should ensure that they add value to the people. This can be achieved by assessing the successful implementation of these projects and ultimately their impact on the community involved hence customizing the projects to be able to serve the community fully. Since the DVPs are relatively young in Kenya it is important to assess the successful implementation if the desired impact is to be achieved.

Grunfeld (2007) argues that, effective impact assessments of ICTs on individuals and communities are required to determine whether ICT for development (ICT4D) projects are successful, scalable and replicable. Furthermore, many ICT4D project assessments often fail to answer key questions about how ICT4D initiatives can contribute to empowerment, capabilities and sustainability.

Different reports and findings released by different groups e.g. IBM Team 1 (2010) show that:

- Several DI projects have been established in several places all over the country.
- Even though these projects are up and running, the intended beneficiaries are not utilizing these projects to the maximum.
- Digital villages being privately owned and income generating activity, more emphasis has been laid on their economic benefits to the owners leaving small room to their benefits on the community.

As KICTB rolls out the funded Pasha Centres in different parts of the country, with the first phase comprising 37 Centres, there is need to account for such implementations and assess

the need, process, outcome and impact of these ICT projects on the community. According to Khene and Sewry (2012), most evaluations in ICT4D tend to focus on impact assessment and yet assessing the impact of a project relies on interdependent assessments that should be conducted throughout the life of a project. This is done especially to gauge the actual contribution of an ICT project to specified impact in a rural community. Therefore there is need for a viable framework that can be used to assess the successful implementation of Pasha Centres on the community if the desired impact is to be achieved.

1.3 Research Objectives

The overall objective of this research was to develop a framework for assessing the successful implementation of digital villages on the community.

The specific objectives included:

1. Identify the services provided by the Pasha Centres and are tailored to meet the community's needs and those that are required but are not being offered.
2. Identify constraints that affect the implementation of Pasha Centres and strategies to overcome them.
3. Establish the benefits of the Pasha Centres leading to the realization of their impact on the community.
4. Develop framework for assessing the successful implementation of Pasha Centres at the community level.
5. Validate the proposed framework.

1.4 Research Questions

The research conducted assisted in answering the following questions:

1. What services are being offered by the digital villages?
2. How relevant are the services offered or available to the intended beneficiaries?
3. What constraints hinder the implementation and success of the Centres?
4. What factors are considered when conducting assessment?
5. How is the impact of the Pasha Centres to the beneficiaries ascertained?
6. Are there frameworks that have been put in place to assess the successful implementation of ICT4D projects and of digital villages in particular?

7. If the frameworks are there, have they been able to provide a holistic approach for assessing the successful implementation of ICT related projects?
8. Is the developed framework appropriate for assessing the successful implementation of digital villages in Kenya?

1.5 Justification of the Project

The world is changing at a very high rate at the same time the population is also growing fast. In the 21st century, the pace of globalization and the growth of new information technologies, such as the Internet, are fueling both economic prosperity and human advancement. The Internet itself has started to transform the way we deliver and receive information and, in turn, how we live and do business. This phenomenon has been labeled by many as nothing short of a revolution i.e the Information Revolution (Sundaram, 2003).

The information revolution is here with us and Kenya as a country is not ready to be left behind, that is why it is spending a lot of money towards ICT related projects. For the government to achieve its objectives intended by these projects it is important that apart from developing the projects, strategies should be put in place that will help in utilizing the services provided to the maximum.

- The developed framework when properly implemented will assist the government in: Developing more viable projects and avoiding project failures
- Make sure people are utilizing the services provided to the maximum. This is because with the use of the framework, the government will be able to identify the needs of a particular community, hence tailoring the services offered by the projects to meet their needs.
- Achieve the main goal of creating the Counties that is to bring services closer to the people.
- Will assist in undertaking viable projects that will help in achieving the millennium development goals.

1.6 The Scope of the Study

Since the first Digital Village Project (DVP) was launched in August 2009, pilot projects have been used to ascertain the viability of the DVPs. The first phase of establishing Pasha

Centres was finalized in May 2011 and thirty seven (37) successful applicants were selected, funded and trained to operate the Pasha Centres. These are under KICTB though there are others organized by private organizations, for example Kenya Data Networks (KDN). The study was however restricted to digital village projects under KICTB.

1.7 Assumptions and Limitations

Several assumptions were made when carrying out the study and they included: the study required input from different groups of people and it was assumed that there will be total cooperation from them to make the research a success; the KICTB and the entrepreneurs running the centers had necessary documents and reports that could assist in the study; and all the thirty seven (37) Centres were operational.

One major limitation of the study was that the Centres were still young and therefore impact assessment could not be carried out hence the assessment of successful implementation of them. Also not all the 37 Centres were in existence therefore to have a fair representation of the population sampling could not be done hence the study was carried out on all the existing 25 Centres. Distribution of the Centres and the time allocated for this study could not allow for an in-depth study to be carried out.

1.8 Structure of the Report

Chapter One gives the background of the research problem, research objectives, research questions, justification, assumptions and limitations.

Chapter Two comprises the literature reviewed on initiation of DVPs. It also contains different frameworks studied, analysis of the frameworks, and the proposed framework.

Chapter Three gives the description of the research methodology used to validate the elements of the proposed framework. It also provides the research instruments used in the process.

Chapter Four provides the analysis and interpretation of the findings.

Chapter Five gives the conclusion of the study. It discusses the achievement, recommendations and limitations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Access to ICT is fundamental in bridging the digital divide hence an important basis for development, particularly in rural development. Creating local capacity, stimulating ingenuity and innovation and boosting human skills and performance are also critical factors in connecting rural communities to the global information and communication network.

ICT is viewed as an important means of empowering individuals and communities. Opportunities for people are rapidly increasing in many fields, such as education, entrepreneurship and community development through ICTs. Technology can be a strong medium for creativity and innovation, which can be achieved by enabling people to communicate freely and openly in many different ways. Moreover, ICTs can boost solutions to poverty and oppression, helping people to help themselves and giving greater opportunities to people to choose their own way in life and shape their future. The world is now determined to create an information society and this is achieved by creating information literacy awareness. All these have led to the digital or information revolution.

According to Yu (2002) the digital revolution has transformed the lives of many, but also has left untouched the lives of many others. As a result, a large segment of the world population misses out on the tremendous political, social, economic, educational, and career opportunities created by the digital revolution. This gap between the information haves and have-nots is commonly referred to as the digital divide.

This is because the high costs of internet access and social constraints continue to be an obstacle to innovative expression and socio-economic progress in many developing countries especially among those living in the rural areas. This has continued to widen the digital divide gap. Many countries, Kenya included have continually worked tirelessly to bridge the gap hence the initiation of the digital inclusion projects.

Kenya's continued effort on the growth and investment in ICTs has proven a point to many donors both locally and internationally. Major donors like the World Bank are pumping huge

sums of money toward the ICT- related projects. The huge chunk of the funds put aside by the Kenyan government during the 2011/ 2012 budget, collaborations done with the World Bank and other partners to leverage implementation and use of ICTs as an important factor in economic development is highly appreciated. All these are done to help bridge the digital divide that exist between the developed and developing countries, and also between the urban and rural areas.

2.1 The Information Society

Information is seen by the majority in this information age as the key to development and ultimately a solution to poverty reduction and bridging the digital gap between the rural and urban, and developed and developing countries.

According to Flor (2001) since the "information society" concept was introduced in the seventies, the correlation between access to information and poverty has been widely acknowledged. The main propositions given were as follows: information leads to resources; information leads to opportunities that generate resources; access to information leads to access to resources; and access to information leads to access to opportunities that generate resources.

Information is very essential in all that appertains to the human development both socially and economically and ICT plays an important role in the creation and dissemination of this information. Therefore, in an Information Society, the information-poor have also become the resource-poor.

The members of the World Summit on the Information Society (WSIS) in the Declaration of Principles (2003), declared their common desire and commitment to build a people-centered, inclusive and development-oriented Information Society. This is where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and people to achieve their full potential in promoting their sustainable development and improving their quality of life.

The creation of Information Society is a concern to all and creating information society is one way of achieving the millennium development goals. The committed by many if not all to

building a people-centered information society where information is available to all despite the status quo is impressing.

There are indicative targets that may serve as global references for improving connectivity and access in the use of ICTs (WSIS Plan of Action, 2003), hence promoting the objectives of the Plan of Action, to be achieved by 2015. These targets may be taken into account in the establishment of the national targets, considering the different national circumstances. They include among others: to connect villages with ICTs and establish community access points; and to ensure that more than half the world's inhabitants have access to ICTs within their reach.

2.2 Information Literacy

Information society cannot be created if the society is not information literate. To achieve the targets outlined in the WSIS action plan, the targeted communities have to be information literate. Bruce (1999) defines Information Literacy as the ability to access, evaluate, organize and use information in order to learn, problem-solve, make decisions -in formal and informal learning contexts, at work, at home and in educational settings. It is key characteristic of the lifelong learner and is strongly connected with critical and reflective thinking.

Information literacy is seen by Bundy (2004), as a prerequisite for: participative citizenship, social inclusion, the creation of new knowledge, personal empowerment and learning for life.

Information literacy plays an important role in helping people utilize the services provided by the ICT projects. Therefore apart from just developing or implementing the ICT projects it is important to make sure that the targeted population is information literate. They should be equipped with ways and means to enable them access, organize, evaluate and use the resources to the maximum.

2.3 ICT for Development Initiatives in Kenya

Newly industrialized countries have demonstrated that ICTs can play an important role in enhancing economic and social development by acting as a production sector for economic growth and an enabler for social development. ICT projects have enabled these countries make huge improvements in both productivity and quality in different areas, for example

agriculture, manufacturing, infrastructure, public administration and many others. The decisions and actions taken by a country about the use of ICT are essential in determining the path it takes towards the fight against poverty. This has set pace for the developing countries and most of them are trying to emulate the industrialized countries.

In Kenya, ICT has taken a forefront and so many projects related to it have been initiated through Government and donor funding. The vision of Kenya ICT policy is 'A prosperous ICT-driven Kenyan society' and the mission is 'To improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services' (Kenya ICT Policy, 2006).

From the mission and vision of the ICT policy, it is obvious that the government is committed towards the development of ICT projects hence contributing towards narrowing the digital divide that exists between the developed and developing countries. To achieve this, larger part of the government budget has been devoted towards the development of ICT related project.

The ICT policy is based on four guiding principles: infrastructure development, human resource development, stakeholder participation and appropriate policy and regulatory framework. To embrace the above guiding principles, there is need to increase universal access to ICT services (Kenya ICT policy, 2006), and this can be achieved by: providing ICT sectors with adequate resources; development of necessary ICT infrastructure; motivating service providers to take services to rural and under-served areas; establishing a Universal Service Fund; creating awareness of benefits of ICT to the public; and developing knowledge-sharing networks at grassroots level. Some of the objectives of the policy include: use of ICT to bridge the gap between gender, youth, people with special needs, rural and urban, and disadvantaged people; and use of ICT to eradicate poverty and improve health care.

The government together with the private sectors is striving so hard to achieve the objectives set by the ICT Policy. This is seen through the number ICT-related projects that have been developed all over the country. The rapid advancements in the field of Information Technology (IT) and the resultant explosive growth of the information services sector have

radically changed the world's economic and social landscape (Kenya ICT Policy, 2006). Through these changes a new society based on information and knowledge has been created. It has also resulted in new avenues of development, employment, productivity, efficiency, and enhanced economic growth.

The digital divide between the countries that are ahead in the field of information technology and those that are still developing is increasing. In Kenya, there is also a gap between rural and urban areas terms of ICT development. It is therefore, the objective of the Government to initiate steps to reduce this divide by using information technology to rapidly develop all sectors of the economy. Among the broad-objectives of the Information Technology (IT) policy are: ensuring that IT plays a key role as an empowerment tool, addressing gaps relating to gender, youth, people with special needs, rural and urban and disadvantaged groups and as a literacy tool for the population and potential users; and using IT to achieve the objectives of alleviating poverty, improving healthcare, and general welfare of the population.

2.4 The Kenya ICT Board

The Kenya ICT Board is a state corporation within the Ministry of Information and Communication established under the State Corporation Act 446. The vision of the board which is set against vision 2030 plan for wealth and employment creation is "Kenya becomes a top ten global ICT hub". The mission is to rapidly and innovatively transform Kenya through the promotion of ICT for social-economic enrichment of our society. The mandate of the board includes: advising the government, marketing, capacity building, project management and investment facilitation.

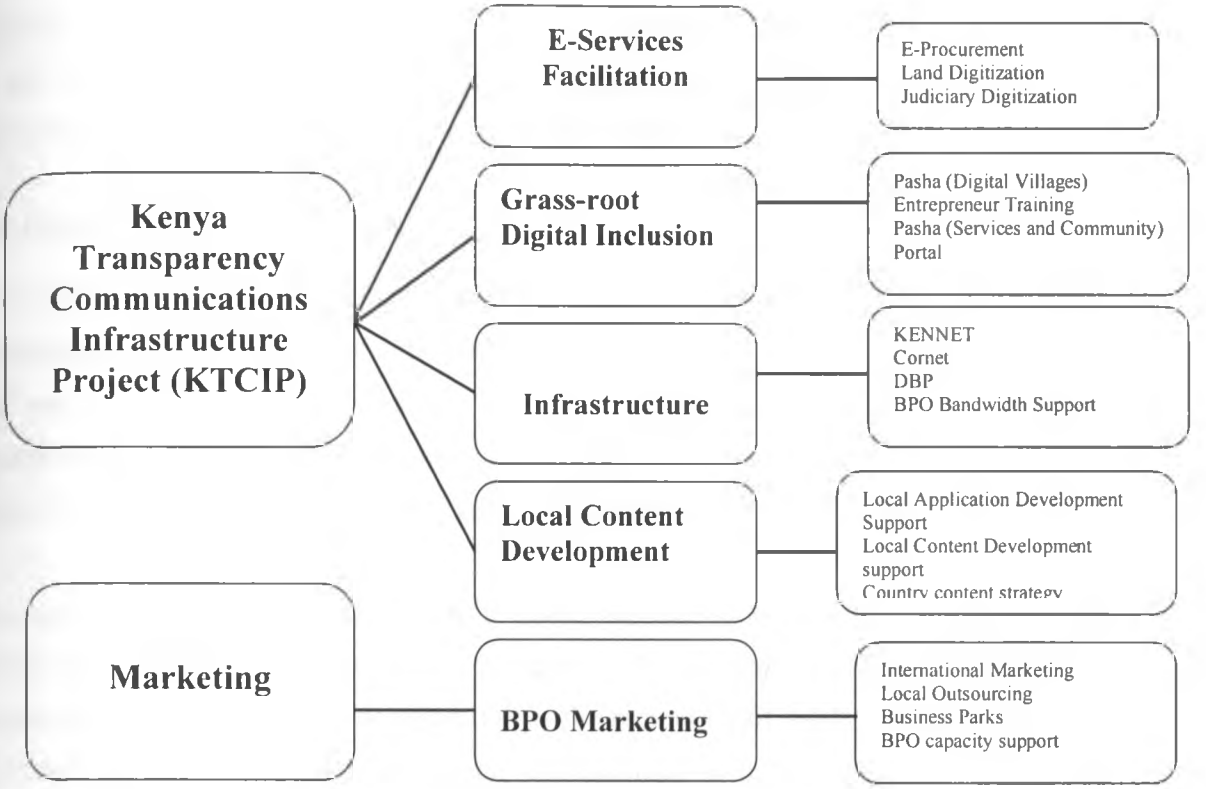

Fig 2.1: KICTB Projects and Services (Kukubo, n.d.)

2.5 The Initiation of the Digital Village

One of the main objectives of the first phase of WSIS meeting held by the UN in Geneva (2003) was to provide connectivity and services for development to all poor communities of the world by 2015. An ICT Village Model was therefore created based on the principle that only sustainable development can guarantee poverty eradication (ICT Village Model). Three important sectors in the ICT Village Model were identified as bearing high priority in the fight against poverty through the ICTs and they include: telemedicine, e-learning and e-governance. To develop the sectors identified above, the following activities were identified:

- **Broadband platform** to be used as support for the poor communities, for appropriate services provision
- **Reliable e-services** adapted to the needs of the communities and constantly improved on the basis of the feedback of all the actors engaged in the projects.
- **Research and development** of new products, services and procedures, expressly created for new markets
- Identification of the **Needs** of communities and end-users in developing countries

The ICT Village model was concluded in Tunis in November 2005 during the second phase of the WSIS meeting where the validity of the model was certified and implementation in other developing countries was suggested hence the conception of the Digital (ICT) Villages.

2.6 Digital Villages in Kenya

The Government of Kenya, through the Ministry of Information and Communication (MoIC), recognizes that the provision of Information and Communication Technology (ICT) goods and services is important for enabling economic and social development by improving communication and facilitating information flow. However, the ICT sector is currently more active in urban areas, resulting in wide regional disparities in the distribution of ICT facilities.

The government, through the Kenya ICT board, has started several ICT projects to help redress the disparities that exist between the urban and rural areas and Digital inclusion (DI) is one of the Projects. Digital Inclusion (DI) is the promotion of digital literacy, that is, the provision of access to information and communication technologies (ICTs) for the improvement of the quality of life of a people (Kenya ICT Board, 2008). DI is a deliberate attempt at bringing information services closer to those who are disadvantaged economically, geographically etc by providing the necessary ICTs and training. Several DI initiatives have been established and Digital Villages Project (DVP) is one of them. The project was initiated to help attain the following objectives:

- Provide affordable access and use of ICT resources to rural communities in a sustainable way
- Increase connectivity of the rural areas to other parts of the country
- Create economic opportunities that will spur rural economic development.

The Digital Village which has been dubbed ***Pasha***, a Swahili word meaning to inform provide services to all despite the demographic disparities. A digital village in Kenya has a similar role as a telecentre in many other countries, i.e. to provide services with regard to Internet and telecommunication (Hallberg, 2011). In addition, digital villages are also meant to provide certain training, education, and governmental services (e-Government).

A core requirement for this project is to set up and manage a Digital Village Revolving Fund (DVRF) that will advance loans to entrepreneurs to enable them establish the Pasha Centres. In addition, the Kenya ICT Board will also provide technical support to the successful Pasha entrepreneurs. Other components of this initiative include training and bandwidth capacity support.

The role of the Pasha Centre according to the Kenya ICT Board (2008) is to provide Kenyans in rural areas with access to a world of information in a community-focused format that is self-sufficient: This will serve in:

- Enhancing both their business skills and knowledge as well as expose them to world news and trends that may positively enhance their lives
- Providing employment for Kenyans both directly through economic activity that the centre will generate and secondarily through the opportunities that the information will provide
- Enhancing provision of government services. Kenyans will be able to access government services such as NSSF statements, driving license application forms, police extracts among others, from the Pasha Centre. These services will all be online.

Pasha Projects will ultimately open up cost-effective access to government and private services for remote farmers and entrepreneurs who would otherwise have to travel extensively to achieve this. The Pasha project has three maturity models:

- ***Basic model***: Constitutes basic office services, internet surfing and emailing
- ***Standard model***: Contains all of basic model, IT basic skills courses, IT face to face support and access to government services
- ***Advanced model:*** Has all of standard model, remote technical support, wireless access to satellite "places", education and vocational course training room, and health advice room.

According to Deloitte & Touche (2011), the government made a call on the application for the round one DVP revolving funds in January 2011and close of application in February 2011. 731 applications were received and 37 of the applicants qualified. Disbursement of funds was done in May 2011and as per M&E site visit in October operational Centres were 21.

The Pasha Centres are run by private entrepreneurs. Prospective entrepreneurs who apply for the Digital Villages Revolving Fund and are successful will be eligible to set up Pasha Centres. The entrepreneurs are concerned with the day to day running of the project. MoIC through KICTB are concerned with: provision of revolving funds for the project, training, provision of affordable bandwidth and monitoring and evaluation of the projects

The KICTB and the entrepreneurs have a Service Level Agreement that provides a basis for written, agreed and guided co-operation between the two parties for support services to be provided by KICTB to the Centres. This ensures that a timely and efficient service support is available to the end users (KICTB-SLA, n.d).

The KICTB has established General Transparency Infrastructure Projects department that deals with the initiation of different projects and DI projects are under the department. Figure 2.2 below shows the structure of KICTB.

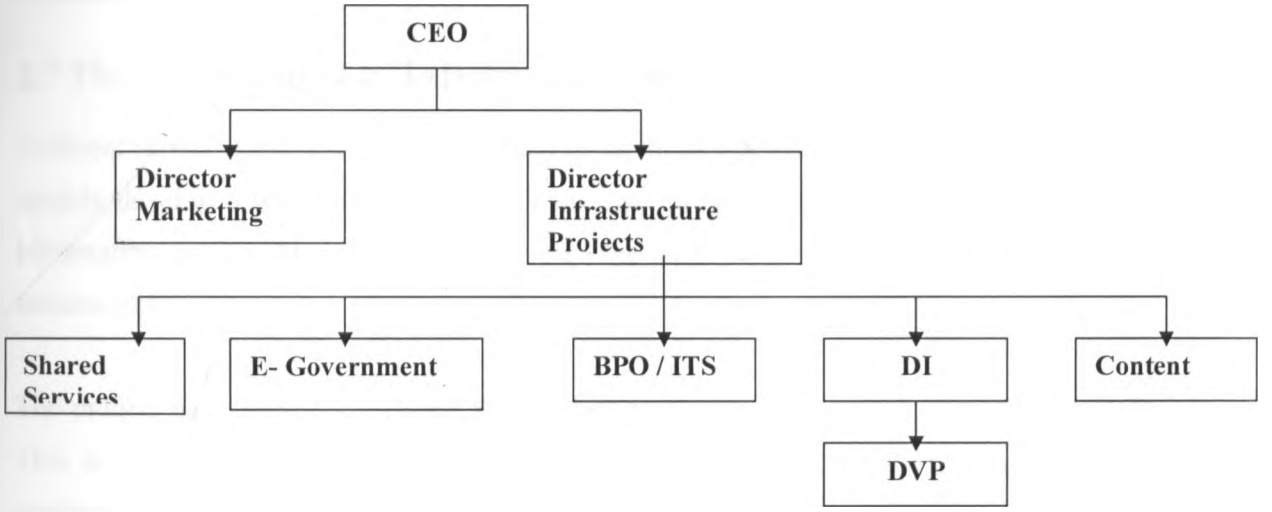

Fig 2.2: Management Structure of DVPs

The digital Village concept is a good idea but it can only be viable if the projects can fully be beneficial to the people in the rural areas hence helping eradicate poverty at the same time bridging the digital divide between the urban and rural areas in Kenya. The key is to achieve Information Literacy at all level which is paramount in achieving the above desired goals. According to the IBM Team 1 Sub-Team 1 report (2010): Pasha Centres are not currently operating as a true extension of government services; Existing Pasha Centre owners have a strong desire to offer e-government services, but require the means to deliver these services; and Communication plan is required to inform citizens particularly in rural areas about e-

government services and the direct benefits consumers will gain by utilizing these types of services.

The government should not continue pumping in funds into these projects while the projects are not benefiting the community fully. A visit to the migration, registrar of persons and even the Kenya Revenue Authority offices just but a few examples are clear indications that the services offered by the digital villages are not being utilized by many people.

It is important to carry out an assessment on successful implementation of these projects in order to come up with viable projects. According to Bundy (2004), a thriving national and global culture, economy and democracy will be advanced best by people able to recognize their need for information, and identify, locate, access, evaluate and apply the needed information. This can be achieved through the use of a holistic digital village successful implementation assessment framework.

2.7 The Assessment of ICT4D Projects at the Community Level

Different models have also been developed to facilitate the assessment process. Among the models developed are the ICT Value Chain, the Information Chain and the Three-stage Information Society Models that have formed the basis for most of the impact assessment frameworks.

The models have played significant roles when it comes to assessment of ICT4D projects. This is because they form strategy in which the assessment is based. Without proper strategies in place, so many projects fail to have a significant impact. This happens because mostly they address only the technology component of economic resources which only affects one part of the access function. Better projects also try to develop local data content and local ICT skills. But this, too, is nowhere near enough. It still addresses only the access function, and does nothing to ensure that the full model can be completed. Hence the limited value and limited uptake of some recent local data content development projects. To be effective, research has proved that e-development projects must be designed around the models and until this happens, ICTs will not deliver to their developmental potential.

2.7.1 The ICT Value Chain

Heeks and Molla's ICT4D value chain gives the basis for understanding the assessment of ICT4D projects and it is build on a standard input—process—output model to create a sequence of linked ICT4D resources and processes. The value chain is divided into four main targets for assessment as shown in Figure 2.3 below.

- ***Readiness***: Measures the systemic prerequisites for any ICT4D initiative, strategy that turns these precursors into project specific inputs, and the presence/absence of those inputs.
- ***Availability***: Implementation of the ICT4D project turns the inputs into a set of tangible ICT deliverables; one can assess the presence and availability of these intermediate resources.
- ***Uptake***: Assessment typically measures the extent to which the project's ICT deliverables are being used by its target population. Broader assessment could look at the sustainability of this use over time, and at the potential or actuality of scaling-up.
- ***Impact***: as the name suggests, only this focus actually assesses the impact of the project and we can divide it into three sub-elements: ***Outputs***: the micro-level b ehavioral changes associated with the ICT4D project; ***Outcomes***: the specific costs and benefits associated with the ICT4D project; and ***Development Impacts***: the contribution of the ICT4D project to broader development goals.

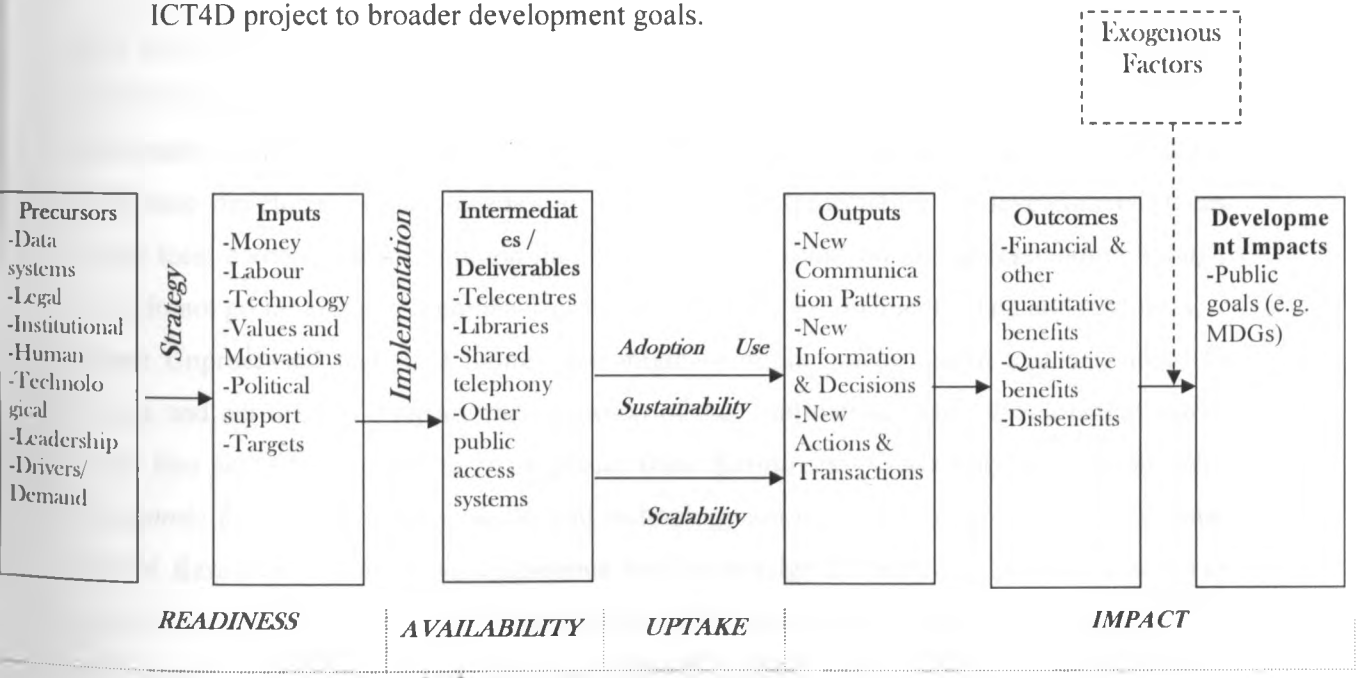

Fig 2.3: The ICT4D Value Chain (Heeks and Molla, 2009)

When looking at the impact of information, one needs to analyze how information has brought about behavioral change to the people. How has it impacted on the way they live economically, socially and even politically?

2.7.2 The Information Chain Model

Information chain model is a useful technique to understand ICT led developmental impact (Heeks, 2005). This is because it demonstrates how data is processed into information which can be acted upon to achieve desired outcomes. In the model, the input (data) is processed through assessment i.e. assessing its relevance and then applying the assessed data to a specific decision and the output is information. The information chain model must be understood in its surrounding context of economic, social, data and action resources which assists human beings to transfer data to information.

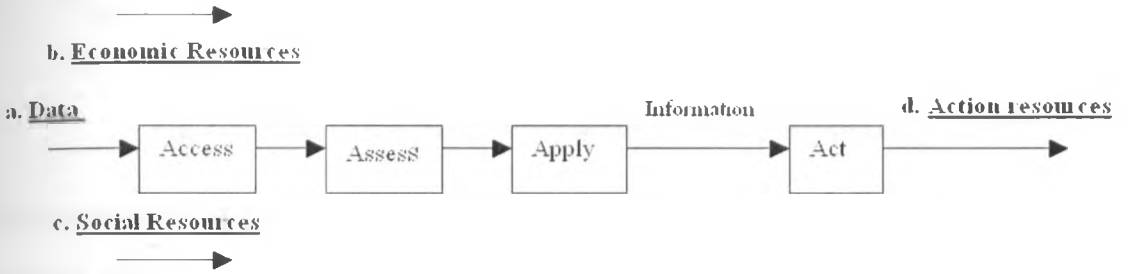

Fig 2.4: Information Chain Model (Heeks, 2005)

The information chain must be understood well in order to understand the full range of activities and resources necessary for information to contribute to development. ICTs handles information and understanding "e-development" i.e. the contribution of ICTs to socio-economic development then needs one to understand information in development. Ideas about local content and information literacy have made a start on this understanding, though they do not go far enough. It emphasizes on the following key elements: data and resources.

Data: Unprocessed facts and figures that might or might not be useful that one needs to assess and act upon. To ensure the operation of the information chain, development actors need four sets of resources to be in place: ***Data Resources***: Availability of relevant data; ***Economic Resources***: Money, skills, and technology are needed in order to access the data; ***Social Resources***: Motivation, confidence and knowledge is needed to access, assess and apply the data, and the source must be trusted; and ***Action Resources***: Acting on the information made with the resource which will require hard resources such as money, technology and raw materials plus soft resources like skills and empowerment. Heeks (2005)

argues further that, the information chain can be used to evaluate the effectiveness of e-development projects to ensure the project have a significant impact.

2.7.3 The Three-Stage Information Society Model

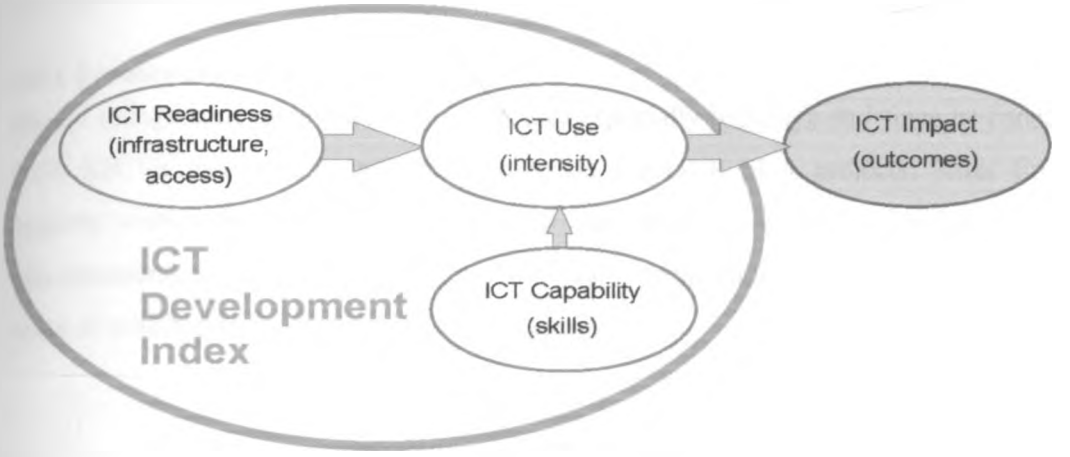

Fig 2.5: The Three-Stage Information Society Model (ITU, 2009)

The three-stage model describes the process countries are going through in their evolution towards information societies. The stages include:

- ***Stage 1: ICT readiness***, reflecting the level of networked infrastructure and access to ICT
- ***Stage 2: ICT intensity***, reflecting the level of use of ICTs in the society
- ***Stage 3: ICT impact***, reflecting the result of efficient and effective ICT use

In addition to the two components (access and use), the evolution towards an information society and the reaching of the final stage (ICT impact) will depend on a third component, capturing ICT capability or skills and this is an indicator on ICT in education. The three components can be considered apart, while at the same time they are closely linked. Without ICT infrastructure and access there is no ICT use. Having access to ICT infrastructure is thus always a prerequisite for subsequent use.

2.8 Assessment Frameworks

From different findings we see that there is no particular way of conducting assessment on successful implementation of ICT4D projects. Instead, KirKpatrick and Lee (2000) through Singh et al (2008) states that, there is a continuum from more quantitative economic approaches to sociological and anthropological approaches.

For an assessment framework to be robust, it must be founded upon a holistic understanding of the benefits of ICT to communities (Ashraf et al (b), n.d). Most assessment frameworks focus on the effectiveness and accessibility of computer hardware and software. Little attention if any is given to the human and social systems that must also change for technology to make a difference.

2.8.1 Frameworks used by KICTB

Digital village concept is relatively a new idea especially in Kenya and since its conception in 2009 KICTB has only been concentrating on the DVP pilot projects. After finding the projects viable, the board has decided to start funding the projects. Even though the entrepreneurs are being given loans, no collateral is required therefore the board has to device ways of monitoring the progress of these Centres.

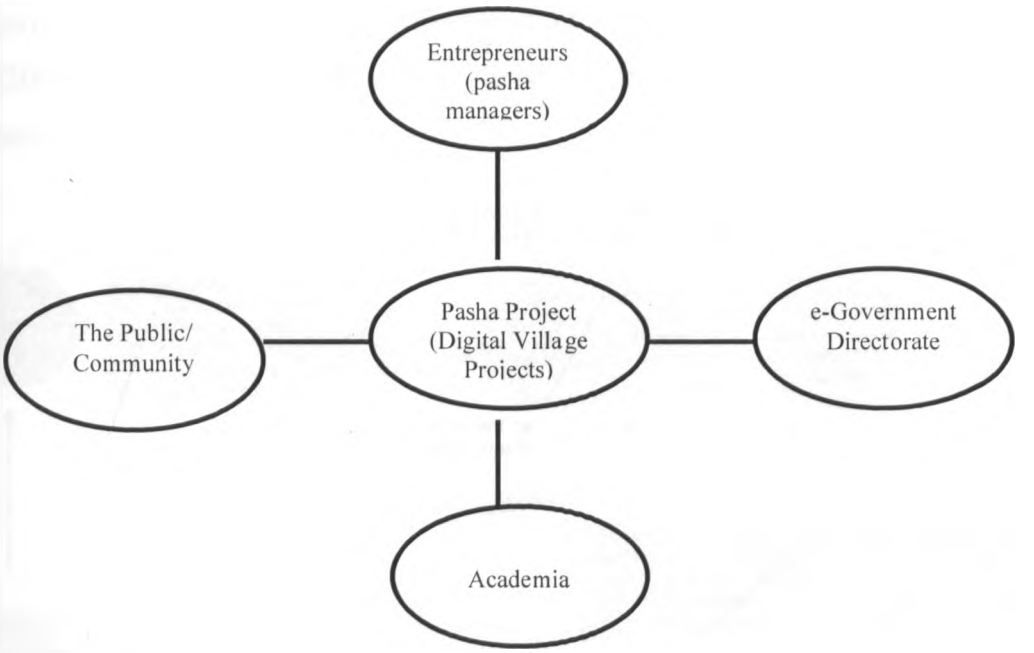

Fig 2.6: The Key Boundary Partners Framework (KICTB, 2009)

For Monitoring and Evaluation (M&E) the Key Boundary Partners framework is used. The framework considers the key players in the project who are known as the key boundary partners. The Pasha Project (DVP) is at the centre and the partners form the boundary. Each partner forms a vision and mission for the project and during M&E the outcome is assessed based on the vision and mission for each partner.

2.8.2 Framework to Investigate ICT led Development at Community Level

In Ashraf et al (n.d) framework, Heeks' (2005) model has been placed within a contextual framework, taking into account the understanding of ICT-led economic and social development at micro level from the participants' points of view. The framework is divided into two segments: ***ICT*** which acts as input providing technology and support in rural/village areas conducive to an improved standard of living; and ***Development*** acts as the output, which is perceived and experienced by the participants due to the presence of ICT in their localities.

The social constraints that hinder the ultimate process of development are also considered and the broad right-left arrow represents this inter-connection. Addressing social barriers remains a challenge which, if successfully resolved, can then be linked with development. This interconnection is represented by the broad left-right arrow. Ashraf et al (n.d) also used Sen's (2000) notion of 'development as freedom' to connect the two segments of the framework.

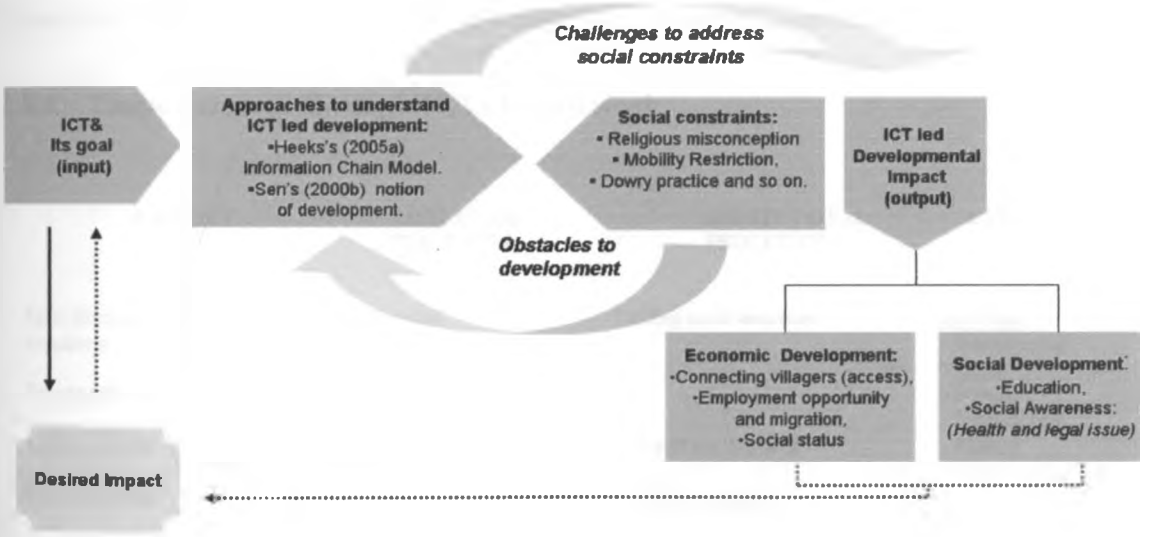

Fig 2.7: Framework to Investigate ICT Led Development at Community Level (Ashraf et al, n.d)

2.8.3 Sustainable Livelihood Framework

The Department for International Development (DFID) (2001) framework, just like other SL frameworks, focus on the intended beneficiaries of development as actors who make choices and strategies based on the resources available to them and the environment in which they exist. The choices are hence based on perceived opportunities and risks.

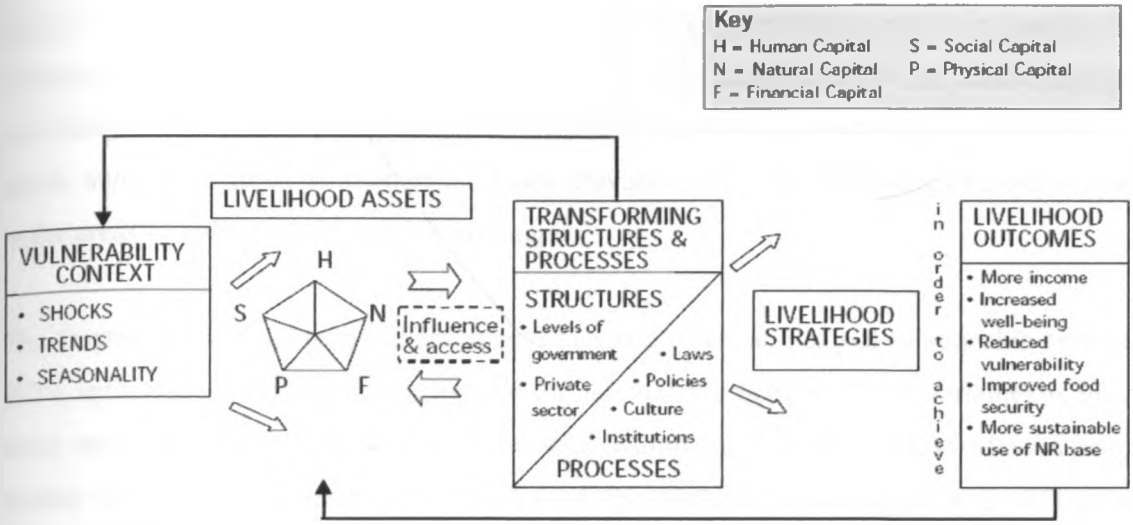

Fig 2.8: Sustainable Livelihood Framework (DFID, 2001)

The framework contains five types of assets which include human, social, physical, natural and financial and they can also be referred to as human capital, social capital, and so on. As such, the SL framework is not expected to be used in a fixed prescriptive way: The framework is people centered. It does not work in a linear manner and does not try to present a model of reality. It embraces multiple dimensions that are interrelated in a dynamic manner.

2.8.4 Empowerment through ICTs Framework

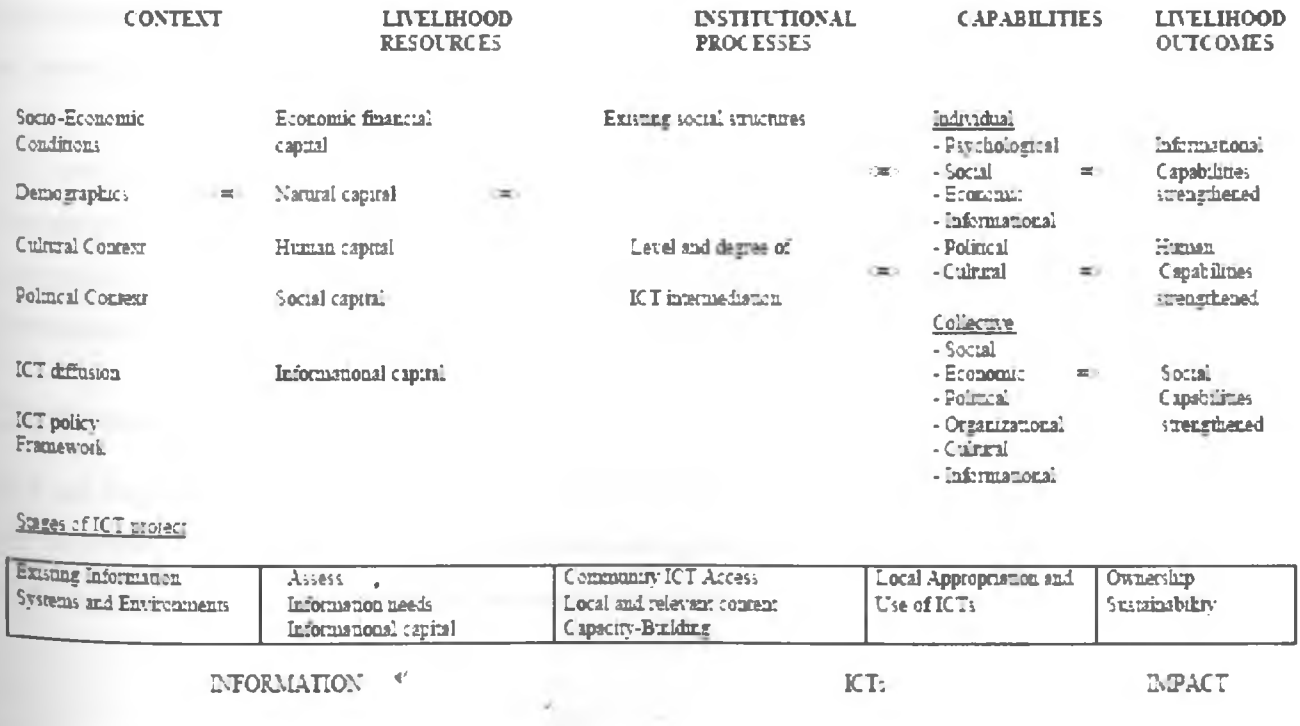

Fig 2.9: Empowerment through ICTs Framework (Gigler, 2004)

The framework emphasizes that a successful mediation process by an effective and local intermediary is required before ICTs can have a positive contribution towards expanding the livelihoods of the poor. In addition, intermediaries play a decisive role in: identifying and providing access to ICT products and services that suit the local communities' information needs, supporting the generation of local and relevant content and providing ongoing support in the areas of training and capacity-building.

The framework highlights that there does not exist a direct and causal relationship between ICTs, information and empowerment, but the relationship between these variables is much more multi-dimensional and needs to be seen within the broader context of sustainable human development. It is therefore based on the contextualized approach to ICTs thus stresses the importance of the local socio-economic and cultural context in the analysis of the effects of ICTs on empowerment. Gigler distinguishes between: Individual capabilities with six dimensions which include: informational, psychological, social, economic, political and cultural; and Group/community capabilities with six dimensions including: informational, organizational, social, economic, political and cultural. Each of these is linked to a set of outcome indicators that could be measured according to ICT impact.

The framework highlights the need to assess at the beginning of ICT programs, existing traditional information systems and environments. This solves a common reason for the ICT programs failure brought about by key community members perceiving the new technologies as a mechanism to undermine existing information systems.

By carrying out information needs assessment prior to introducing ICTs and use the framework to identify the key stakeholders and their interests in the information system, an assessment will make explicit the role that information plays for the community and which information and communications channels are traditionally being used in the communities

2.9 Review of the Frameworks

ICT has become part and parcel of our lives and it is evident from the way it has taken over the way most of things are being done. DVPs are among the projects that have been initiated to bring services closer to the people at the community level.

Literature reviewed has shown that for ICT related projects to be successful, they must be able to impact on the beneficiaries. Most ICT projects have failed because they do not have an impact on the beneficiaries. Successful implementation of these projects leads to the realization of the desired impact. Therefore it is important to carryout assessment to ascertain the successful implementation of the projects. A holistic framework for assessing the successful implementation of the DVPs is therefore required to facilitate the assessment process.

The Key Boundary Partners Framework used for monitoring and evaluating the DVPs has put so much emphasis on the stakeholders (partners). The assessment is lumped fully to the key partners. The assessment can be more effective if key elements in the projects can be identified and their role in the project established.

Digital Village Projects were initiated with one major goal in mind and that is to bridge the digital gap that existed between the rural and urban areas. The assessments carried out tend to address only the technology component of economic resources which only affects one part of the access function. In coming up with the desirable framework, the ICT4D Value Chain Model (Heeks & Molla, 2009) has been adopted as the preferred model for this research. With the objectives of DVPs in mind, other frameworks have also been used and important elements have been extracted from them to come up with a holistic assessment framework for DVPs. Table 2.2 shows the summary of the models and frameworks reviewed.

MODEL / FRAMEWORK	KEY DIMENSIONS / ELEMENTS	AUTHOR (S)
The ICT Value Chain	Readiness, Availability, Uptake, Impact	Heeks and Molla, 2009
The Information Chain Model	Data, Economic Resources, Social Resources, Action Resources	Heeks, 2005
The Three – Stage Information Society Model	ICT Readiness, ICT Intensity, ICT Impact	ITU, 2009
The Key Boundary Partners Framework	Pasha Project, Partners	KICTB, n.d
Framework to Investigate ICT Led Development at the Community Level	Input, Approaches, Social Constraints, Output, Desired Impact	Ashraf et al, n.d
Sustainable Livelihood Framework	Vulnerability Context, Livelihood Assets, Transforming Structure & Processes, Livelihood Strategies, Livelihood Outcome	DFID, 2001
Empowerment Through ICTs Framework	Context, Livelihood Resources, Institutional Processes, Capabilities, Livelihood Outcome	Gigler, 2004

Table 2.1: Summary of the Reviewed Models and Frameworks

2.10 The Proposed Framework

WSIS Plan of Action paragraph 28 emphasizes that, a realistic international performance evaluation and benchmarking (both qualitative and quantitative), through comparable statistical indicators and research results, should be developed. This is done to follow up the implementation of the objectives, goals and targets in the Plan of Action, taking into account different national circumstances.

It is therefore important that assessment of different ICT led project be carried out to ascertain if the objectives set by the WSIS and those set for the project have been met. One major factor that needs to be considered is the context under which the assessment is being carried out.

According to Menou and Potvin (n.d), changes have positive and negative aspects for each individual and group. The way for this heterogeneity of perceptions to be taken into account in any appraisal is to ensure that all categories of stakeholders are involved in conducting assessments, that they are represented in the results, and that they have an opportunity to validate the results.

Organizations have been inventing all sorts of new ICT applications to transform these processes. We still need to understand ends of the transformations, so that we can assess both the positive and negative consequences of our efforts. Therefore there is need to develop a viable way that implementation of ICT4D projects in general and DVPs in particular can be measured hence determining the success of these projects.

The general aims of any effort to assess the success of ICT on development are to see, for instance, how far a project has reached its intended audience, and to identify its effects or changes. This enables the project stakeholders to understand the extent to which related activities or services have reached the community and the magnitude of their effects on their well-being. Digital Village Projects are not an exception to this.

Heeks and Molla's ICT4D value chain model constitutes the main part of the proposed model. It is built on a standard input-process-output model to create a sequence of linked ICT4D resources and processes. In the proposed model, the components; input, process and output have been substituted by inception, implementation and post-implementation which are the key stages in the project development. The Pasha Projects are projects that are just beginning and have therefore not developed enough to have four assessment targets. The intensity and uptake targets have been combined in the proposed framework and renamed implementation. The projects are still young and not much can be assessed on their intensity of use but one can assess how they are being implemented.

Other important elements that also appear in the discussed frameworks and models have been co-opted to form the framework that is suitable for impact assessment of Pasha Centres on the community. These elements include stakeholders, resources, context, challenges and constraints, strategies to overcome the constraints, outcome and impact.

The conceptual framework was based on the objectives of Pasha Centres which included:

- Provide affordable access and use of ICT resources to rural communities in a sustainable way.
- Increase connectivity of the rural areas to other parts of the country
- Create economic opportunities that will spur economic development

With the above objectives in mind, the proposed framework was developed using a hybrid of three frameworks i.e. Heeks and Molla's ICT Value Chain Model and Ashraf et al's Framework to Investigate ICT Led Development at the Community Level.

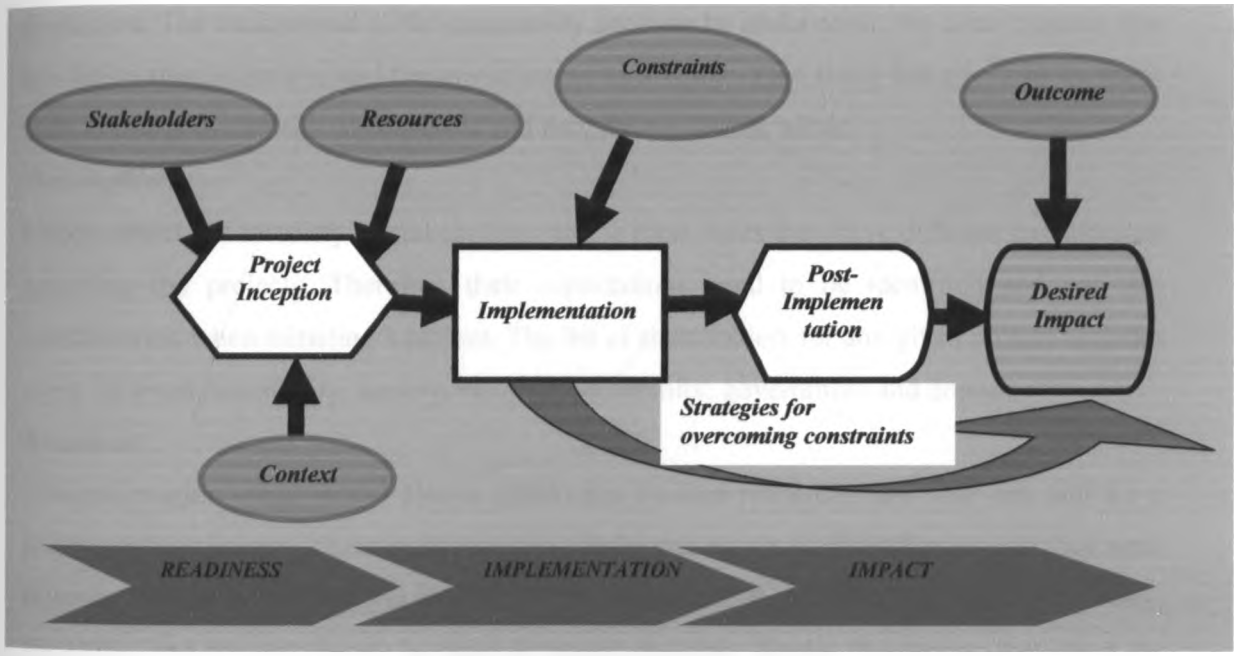

Fig 2.10: The Proposed Framework

The Elements of the Proposed Framework

The ICT value chain model divided the assessment targets into four – readiness, availability, uptake and impact. The proposed framework adopted the assessment targets but merged availability and uptake to come up with implementation hence the three targets for assessment. This was done in the view that the Pasha Centres were still young and very little could be achieved if the assessment targets were many.

The ICT value chain used the standard input – process – out model to create a sequence of linked resources and processes. The proposed framework is to be used on the Pasha Projects and these projects need to go through the normal stages of project development like any other project. Therefore the standard input – process – out model was modified to suite the key stages in project development i.e. inception – implementation – post-implementation.

a) Readiness Stage

This reflects the level of the networked infrastructure and access to ICT. In the readiness stage the position of ICT in the community is determined. According to Heeks and Molla(2009), "e-readiness" assessment typically measures the systemic prerequisites for any ICT4D initiative e.g. presence of ICT infrastructure, ICT skills, ICT policies, and so on. One could also assess the strategy that turns these precursors into project specific inputs, and the presence/absence of those inputs. The following are considered in this stage.

Context

When initiating a project, one needs to understand the context under which it is to be developed. The background of the community needs to be understood, the circumstances that has led to that initiatives and the environment as a whole. One thing that needs to be made clear is that communities are different and they have different needs.

Stakeholders

Every project has a variety of stakeholders and in most cases they have different expectations regarding the projects. Therefore their expectations need to be identified and put into consideration when initiating a project. The list of stakeholders for any given project includes users, targeted community, society, business community, government and donors.

Resources

The information chain model Heeks (2005) has divided resources into four sets and for a project to be a success these resources need to be put in place: ***Data Resources***: they need relevant data to be available in the first place; ***Economic Resources***: they need the money, the skills, and the technology in order to access the data; ***Social Resources***: they need the motivation, confidence and knowledge to access, assess and apply the data, and they must trust the source; and ***Action Resources***: they must be able to act on the decisions made with the information. This will require hard resources such as money, technology and raw materials plus soft resources like skills and empowerment.

b) Implementation Stage

This is the stage where the services provided by the digital village projects are being utilized. The implementation and utilization of the services depend on service availability, cost and skills needed to implement and utilize it. Implementation of the Pasha Centres turns the inputs into a set of tangible ICT deliverables; one can assess the presence and availability of these intermediate resources. The assessment at the same time measures the extent to which the project's ICT deliverables are being used by its target population. This helps establish the sustainability of this use over time, and the potential of scaling-up.

Constraints and Strategies

Different constraints hindering project development and implementation in the community must be looked into and strategies to overcome them considered and they include social, religious, financial, literacy level among others. These constraints affect the initiation of projects and even their development and they end up affecting the output hence impacting on the development negatively. With proper strategies to tackle the constraints, the level of desired impact will increase adding to the success of the project. This is shown by the bold arrow from the process to the desired impact.

c) Impact Stage

In this stage the changes brought about by the DVP are looked at.

Outcome

These are the unexpected occurrences that will impact on the project output positively or negatively.

Impact

This is the achievement of the broad development goals that are associated with the ICT4D project and Pasha Projects in particular, and they can include the Millennium Development Goals. The strategies on how to deal with the constraints are to be considered seriously because they add significantly on to the desired impact.

ELEMENT	DESCRIPTION	SOURCE
Readiness	Stage where the position of ICT in the society is determines	Heeks and Molla, 2009
Implementation	Stage where the services provided are being utilized depending on cost, availability and skills	
Impact	Stage where the development goals associated with the project are ascertained	
Project Inception	Key stages in project development modified from the standard input – process - output	
Implementation		
Post-Implementation		
Stakeholders	Those that are interested in the project: - entrepreneur, community, government, donors, researchers	KICTB, 2009
Resources	Include: -funds, skills, availability of information, technology, availability of affordable bandwidth, infrastructure, equipment	Heeks, 2005, Ashraf et al, n.d
Constraints	Religion, politics, customs, gender, environmental factors, security, funding, reliable supply of electricity, reliable and affordable bandwidth	Ashraf et al, n.d
Context	Background of the community, the surrounding environment, economic/ social activities, infrastructure, security, literacy level	
Outcome	Unexpected occurrences that are either positive or negative	Heeks and Molla, 2009
Strategies	Ways of overcoming the constraints	Ashraf et al, n.d
Desired Impact	Development/ social changes associated with the project	Ashraf et al, n.d, Heeks and Molla, 2009

Table 2.2: Summary of the Elements in the Proposed Framework

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The goal of this research was to evaluate the availability and access of information through the Pasha Centres at the community level and to develop a viable framework that can be used to assess the successful implementation of these projects. To come up with reliable and accurate solutions, research methodology and tools described below were used.

3.1 Research Design

Kothari (2008) defines research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It therefore gives the structure in which the research is conducted and it contains the collection, measurement and analysis of data.

General survey was used in carrying out the study. Because only a few Centres have been rolled out so far, the research covered all the operational Pasha Centres.

3.2 Sampling Technique and the Targeted Population

The target population for this study were the Pasha Centre managers and their clients. The research covered all the Centres that are operational all over the country. This is because only a few Centres have been rolled out and therefore taking a sample would not have given a fair representation of the total population.

The population targeted by the study was divided in to two: the Digital Village Service Providers and the Clients.

3.3 Research Instruments

The following research instruments assisted in the collection of data while carrying out the study.

Questionnaires

The main data collection method used was questionnaires. This is because they could be used to reach a large number of respondents. They were cost effective and could be used to curb

biasness. Questionnaires did not require respondents to provide their identity thus encouraging them to give more reliable information. Two sets of questionnaires were used for this research: questionnaires targeting Service Providers and others targeting Clients

The questionnaires largely used closed-ended questions. Being more of a qualitative research, open-ended questions were also included to allow the respondents to give their opinion. A pilot test of the questionnaires was conducted on two Centres around Nairobi. The data was then analyzed and the questionnaires modified accordingly. The modified questionnaires were then circulated to the intended respondents. The questionnaires used for both sets of respondents are contained in Appendix I.

Interviews

To gain more insight into the project, interviews were carried out with the KICTB staff directly connected with project and where possible with service providers. Interviews were used because they provide an opportunity to collect more information through probing that could not be collected by using questionnaires alone. The sample of the interview guide used is contained in Appendix II.

Observation

Where possible, visits to the projects locations were carried out to collect data on: users' turn-out at the centers, the set-up of the Pasha Centres and the environment in which the Centre is established

Secondary Research Methods

To understand the problem domain, literatures related to the search problem were reviewed to understand how relevant frameworks have been developed and the benefits accrued from the developments. Also reviewed, were records, reports and documents from the KICTB in order to get more information about the project.

Testing the Research Instruments

The quality of a research study depends to a large extent on the accuracy of the data collection procedures (Mugenda and Mugenda, 2003). Therefore it is important to test the quality of the research instruments used. This is done to increase the reliability and validity of the data collected. Reliability can be described as the consistency of the results yielded from a

certain measure even after several tests or trials. Validity can be described as the accuracy of the research results.

a) Reliability Testing

The reliability of the instruments to be used was measured to determine the consistency of the results. For examples, using the questionnaires, answers to the same questions were analyzed to establish the consistency. The reliability was also tested using SPSS.

b) Validity Testing

The following validity test was carried out: face, construct and content validity tests.

Face Validity

This tested whether the instrument viewed from the face value was able to give the results it was intended to give. This required intuitive judgment and was carried out by grouping the questions into sections, each targeting an area in the objectives stated.

Construct Validity

The instruments were tested to find out if the data obtained through them could accurately reflect a theoretical concept. This included statistical analysis of the structure of the instrument and the relationship between responses to different items in the instrument studied.

Content Validity

The instruments were tested to find out the extent the data collected using them represent the content of the study. This validity is non-statistical and systematic examination of the items in the instrument was carried out to determine whether the items are a representative of the domain. This was done by a group of experts who reviewed the responses from the pilot instruments to determine the representation.

3.4 Hypotheses Formulation

The success of the ICT projects depends on their impact on the intended beneficiaries and Pasha Centres are not exceptions. The achievement of the desired impact depends on the contribution of different elements that are essential in the implementation of these projects. These elements include: stakeholders, resources, context and constraints

The KICTB's M&E Framework has looked at the Key Boundary Partners, who are also considered as the stakeholders, as the main components of the M & E Framework. They are comprised of those who have interest in the project and their positive contributions towards

the project results to successful projects. The stakeholders include: community members, entrepreneur, sponsor/ donor, researchers etc. To implement viable projects, Gigler (2004) states that it is important to identify the key stakeholders and their interest in the information systems prior to introducing ICTs. The research therefore strived to test the hypothesis below.

H1 ***Contribution of the stakeholders is important towards the success of the Pasha Centres***

Resources add significantly to the success of the Centres and they include both tangible and non tangible resources such as availability of information, funds, skills, technology, availability of affordable bandwidth, infrastructure, equipment etc. Heeks (2005) in the Information Chain Model identifies four sets of resources: economic, social, data and action resources that assist the human beings to transfer data into information. To establish the importance of resources, the hypothesis stated below was used.

H2 ***Resources play an important role in the success of the Pasha Centres***

The context contributes significantly in the location and service offered and they include: security, background of the community, the surrounding environment, economic/ social activities, literacy level etc. Gigler (2004) has looked at the importance of the local socio-economic and cultural context in the analysis of the effects of ICTs on empowerment. Context is linked to a set of outcome indicators that could be measured according to ICT impact. The importance of Context was tested using the hypothesis below.

H3 ***Context influences the location and the services offered by the Centres***

The Pasha Centres were implemented with three objectives in mind as stated in 2.6. The achievement of the objectives confirmed the success of the Centres. The impact of the Centres was established using the project stated objectives, roles and the benefits of the Centres to the community. The hypothesis below was used to test the success of the Centres.

H4 ***The Pasha Centres are beneficial to the Community.***

3.5 Testing the Hypothesis

The stated hypotheses were tested using One-Sample Kolmogorov-Smirnov and One-Sample T Tests. Value of Alpha used in the test was 0.05. One-Sample Kolmogorov-Smirnov and One-Sample T Tests were used to determine the p-value for each factor considered in testing the elements. The hypothesis was not considered if p-value was less than 0.05and considered if p-value was greater than 0.05.

3.6 Data Analysis

Raw data from the field is not easy to interpret. It needs to be processed and analyzed for it to make sense. After collecting the data, the raw data was arranged first in a manner that enabled analysis to take place. The following processes took place: editing of data to detect errors, omissions and corrections done where possible; coding of close-ended questions for efficient analysis; classification of data in order to come up with meaning relationship; and tabulate the data to facilitate the analysis. Both qualitative and quantitative methods of data analysis were used to analyze the data. Data analysis tools such as SPSS was used to make the analysis process easier and more accurate.

Qualitative Analysis

Qualitative analysis was used to analyze data that could not be quantified, which includes data collected using open-ended questions and interviews. This assisted in analyzing data collected from different respondents in a systematic way in order to arrive at useful conclusions and recommendations. Phrases or words from different respondents were studied to identify similarities and differences and establish a pattern.

Quantitative Analysis

Quantitative analysis was used to analyze close-ended questions that had predefined responses and could be assigned numerical values. This made it easier to come up with statistics that would assist in describing distribution of scores or measurements using a few indices.

3.7 Mapping the Research Objectives on to Methodology

No.	Research Objectives	How the Objectives were Achieved
1	Identify the services provided by the Pasha Centres and are tailored to meet the community's needs and those that are required but are not being offered.	Literature review of telecentres and of digital villages in particular. Use of interviews and questionnaires, to identify services provided.
2	Identify constraints that affect the implementation of Pasha Centres and strategies to overcome them.	Review of KICTB monitoring and evaluation reports on Pasha Centres. Use of interviews and questionnaires, to identify the constraints and challenges and ways to overcome them.
3	Establish the benefits of the Pasha Centres leading to the realization of their impact on the community.	Literature review on the benefits and impact of ICT projects and digital villages in particular. Interviews and questionnaires were used to identify benefits of the Centres on the community.
4	Develop framework for assessing the successful implementation of digital villages at the community level.	Important elements extracted from the reviewed framework were used to develop the framework.
5	Validate the proposed framework.	Data collected through interviews, questionnaires and even observations were analyzed and used to validate the proposed framework.

Table 3.1: Mapping the Research Objectives on to the Research Methodology

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

The main reason of carrying out data collection was to test the validity of the proposed framework for assessing the successful implementation of Digital Village Projects at the community level. The collected data was edited, coded, classified and tabulated. During analysis, measures from the coded and classified data were computed to establish patterns and relationships among the data groups. To enable analysis using SPSS, the two sets of questionnaires were coded accordingly. The close-ended questions were coded using numerals and the open-ended questions evaluated to establish a pattern or common relationship among them.

4.1 Reliability and Validity Testing

During data analysis, the first step to be carried out was to test the reliability and validity of the instruments used to collect data.

Reliability Testing

The reliability of the instruments to be used was measured to determine the consistency of the results. For examples, using the questionnaires, answers to the same questions were analyzed to establish the consistency. SPSS was used to test the reliability of the questionnaires to determine if they met the recommended minimum Alpha coefficient which is 0.7. T he Cronbach's Alpha coefficient for service provider questionnaire was .903 which is above 0.7 therefore the questionnaire was reliable.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.903	.959	49

Table 4.1: Reliability Statistics

Validity Testing

The following validity tests were carried out: face, construct and content validity.

4.2 Interpretation of Results

Both sets of questionnaires were analyzed individually and each section in the questionnaire looked at separately. The service provider questionnaire was used to test most of the elements in the framework while the clients' questionnaire was used mainly to test information literacy level, the services required and the impact of the Pasha Centres on the community. The targeted population was constituted as shown in table 4.2.

RESPONDENTS	TARGET	%	RECEIVED	%
No. of Respondents to be interviewed	3	3%	1	33 %
No. of respondents to be reached through questionnaire	100	97%	88	88 %

Table 4.2: The Targeted Population

Out of the 3 targeted respondents for interview, only 1 was interviewed. Questionnaires were distributed to 25 Centres, 4 respondents from each centre making a total of 100. 21 Centres were operational and therefore had clients but 4 Centres were still being set up therefore was able to get feedback from the service providers only.

4.2.1 Demographic Analysis of the Respondents

Gender

GENDER	FREQUENCY	%
Male	64	73%
Female	24	27%
TOTAL	88	100%

Table 4.3: Gender of the Respondents

Age

AGE	FREQUENCY	%
Below 18	3	3.5%
18-35	58	66%
35-60	24	27%
Above 60	3	3.5%
TOTAL	**88**	**100%**

Table 4.4: Age of the Clients

Most of the respondents in the study were youths between age 18 and 35. This can be attributed to the fact that ICT is still a developing field in Kenya and has been mostly embraced by the youths.

Education Level

LEVEL	NO. OF SERVICE PROVIDERS	NO. OF CLIENTS	TOTAL	%
Secondary	3	8	11	13%
College	17	30	47	53%
University	5	25	30	34%
TOTAL	**25**	**63**	**88**	**100%**

Table 4.5: Education Level

Most of the respondents in the study had college and above level of education, accounting for 87% of the population. Hence we can assume that due to technicality of ICT, more education is required to fully understand and utilize it.

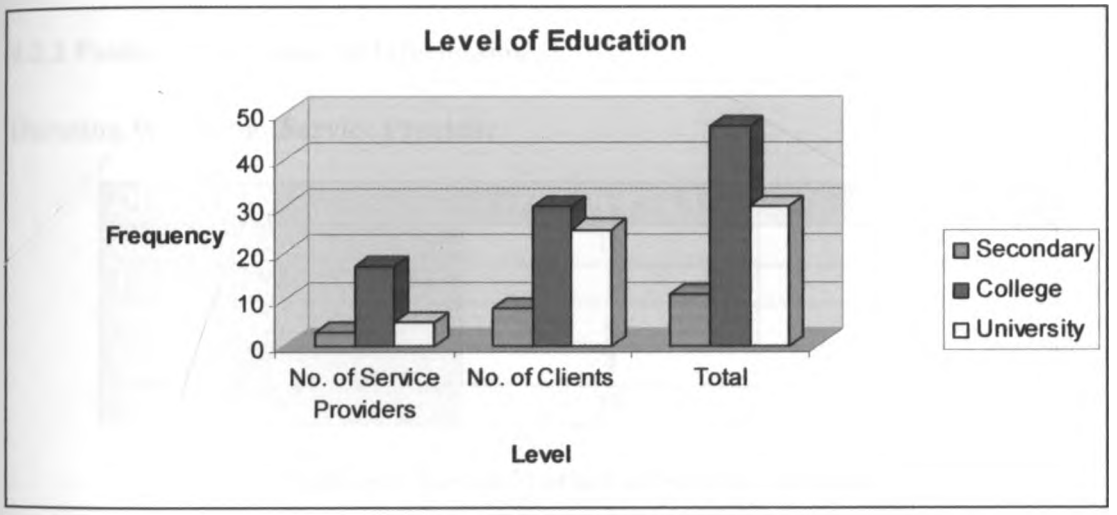

Fig 4.1: Level of Education

Occupation

DESCRIPTION	FREQUENCY	%
Student	8	13%
Employed	28	44%
Self employed	22	35%
Not applicable	5	8%
TOTAL	**63**	**100%**

Table 4.6: Occupation of the Respondents

The respondents who used the services represented all levels of occupation although those employed and self employed were the majority with 44% and 35% respectively. This can be

attributed to economic factors and the services offered are being charged. Therefore one needs to be able to pay for the services in order to use them.

Income

INCOME (Ksh.)	FREQUENCY	%
<10,000	6	10%
10,000-20,000	10	16%
20,001-30,000	9	14%
30,001-40,000	10	16%
40,001-50,000	7	11%
>50,000	8	13%
N/A	13	21%
TOTAL	**63**	**100%**

Table 4.7: Monthly Income of the Respondents

The monthly income level of the respondent was not a determining factor as represented in table 4.7 above.

4.2.2 Pasha Centre General Information

Duration Worked as Service Provider

DURATION	FREQUENCY	%
Less than 1 year	16	64%
1-2 years	1	4%
Above 2 years	4	16%
N/A	4	16%
TOTAL	**25**	**100%**

Table 4.8: Period Worked as Service Provider

Duration the Centre has been Operational

DURATION	FREQUENCY	%
Less than 1 year	17	68%
1-2 years	4	16%
Not started	4	16%
TOTAL	**25**	**100%**

Table 4.9: Period the Centre has been Operational as Pasha Centre

The findings showed that Pasha Centres are relatively young projects and 68% of them have been operational for less than one year. We can also assume, judging from the tallies, that the

majority of the service providers have only worked as service providers in the Pasha Centres. This confirmed the Digital Village Report (Deloitte & Touche, 2011), that gave the snapshot of activities carried out on the round one of the DVPs which shows date of first disbursement of the DVP revolving funds as May 2011. This confirms why most Centres have been operational for less than a year.

Physical Location of the Centres

COUNTY	FREQUENCY	%
Kajiado	1	4%
Busia	1	4%
Nyandarua	1	4%
Kisumu	3	12%
Bomet	1	4%
Meru	3	12%
Nithi	1	4%
Kilifi	2	8%
Makueni	1	4%
Kiambu	4	16%
Baringo	1	4%
Homa- Bay	1	4%
Mombasa	1	4%
Kakamega	1	4%
Garissa	1	4%
Kericho	1	4%
Murang'a	1	4%
TOTAL	**25**	**100%**

Table 4.10: Physical Location of the Pasha Centres

Location of the Centres within the county

LOCATION	FREQUENCY	%
County Headquarter	4	16%
Other towns	12	48%
Shopping center	9	36%
TOTAL	**25**	**100%**

Table 4.11: Location within the County

According to KICTB (2010), the DVPs are being implemented to redress the glaring disparities between urban and rural areas in the distribution of ICT facilities. This is as a result of most ICT facilities in the Kenya being located in urban areas.The findings confirmed this move and it showed that the 25 Centres are located in 17 out of the 47

counties in the country. Most of these Centres are located in other towns and not county headquarters which is a way of bringing services closer to the people in the rural areas.

Maturity Level

MODEL	FREQUENCY	%
Basic service model	8	32%
Standard service model	14	56%
Advanced model	3	12%
TOTAL	**25**	**100%**

Table 4.12: Maturity Level of the Pasha Centre

Most of the Centres belonged to the standard service model with 56% of the target population.

Services

RESPONSE	FREQUENCY	%
YES	12	48%
NO	9	36%
N/A	4	16%
TOTAL	**25**	**100%**

Table 4.13: Centres Offering Extra Services

The findings showed that most Centres, represented by 48% of the operational Centres, are offering extra services out of their maturity level that were tailored to meet the community needs.

SERVICES	FREQUENCY	%
Awareness creation program for the youth	1	7%
Certified training	1	7%
KRA PIN, POLICE ABSTRACT	3	20%
Mobile money transfer services	5	32%
Photography	3	20%
Post office box services	1	7%
Sale of safe drinks	1	7%
TOTAL	**15**	**100%**

Table 4.14: Other Services offered to suit the needs of the Community

Among the extra services offered are money transfer services with 32%. This confirmed the findings from other teams Deloitte and Touche (2011) being an example. Being that the

Centres are situated in the rural areas where banking services are mostly not there, they are therefore substituting for the banks.

SERVICES	FREQUENCY	%
Sending/receiving messages	54	17%
Sending/receiving email	57	17%
Sending/receiving money	32	10%
Creating documents	55	17%
Searching for info over the internet	55	17%
Training/Education	39	12%
Research	34	10%
TOTAL	**326**	**100%**

Table 4.15: Services Accessed

Various types of information can be generated using the computers and mobile phones with 17% of those sampled being able to sending/receive messages using mobile phones, and an equivalent proportion being able to send/receive messages using email, create documents, and search for other information on the internet. This accounts for 68% of the population fully informed. However, only 10% are able to carry out research using the gadgets with an equivalent proportion being able to send or receive money.

RESPONSE	SERVICE PROVIDERS		CLIENTS	
	FREQUENCY	%	FREQUENCY	%
YES	13	52%	48	76%
NO	8	32%	15	24%
N/A	4	16%	0	0
TOTAL	**25**	**100%**	**63**	**100%**

Table 4.16: Frequency of Services required but not offered

It was also evident that even though the Centres were offering extra services, there were services that were required by the community and were not being offered. This was evident by the high percentage of the respondents that stood at 52% of service providers and 76% of the clients. Certified training and money transfer service were the services required most with 50% and 40% respectively confirming the service providers' concern.

SERVICES	SERVICE PROVIDERS		CLIENTS	
	FREQUENCY	%	FREQUENCY	%
Agency banking services	3	17%	0	0
Certified training	4	22%	15	50%
Video Conferencing	0	0	2	7%
Event organization	1	6%	0	0
Fax services	1	6%	0	0
Mobile money transfer services	7	39%	12	40%
Processing of documents online	1	6%	0	0
Video Games	0	0	1	3%
Forex services	1	6%	0	0
TOTAL	**18**	**100%**	**30**	**100%**

Table 4.17: Services required but not offered

Money transfer services are still leading by 39% among the services that are required but are not offered by the Centres.

4.2.3 Stakeholders

FACTORS	MOST		AVERAGE		LEAST	
	N	%	N	%	N	%
Community members	12	39%	5	14%	4	16%
Entrepreneurs	14	45%	7	19%	0	0%
Researchers	1	3%	6	17%	13	52%
Donors/sponsors	3	10%	13	36%	5	20%
Other factors	1	3%	5	14%	3	12%
TOTAL	**31**	**100%**	**36**	**100%**	**25**	**100%**

Table 4.18: Contribution of Stakeholders towards Success of the Centres

Among the stakeholders, the Pasha Centre managers and the community members have played the major role, with 45% and 39% respectively, in making the Centres a success

4.2.4 Resources

FACTORS	MOST		AVERAGE		LEAST	
	N	%	N	%	N	%
Information availability	12	14%	8	13%	1	14%
Funds	11	13%	10	17%	0	0%
Skills	12	14%	8	13%	1	14%
Technology	12	14%	8	13%	1	14%
Affordable bandwidth	7	8%	11	18%	3	43%
Infrastructure	13	15%	7	12%	1	14%
Equipment	16	19%	5	8%	0	0%
Other factors	2	2%	3	5%	0	0%
TOTAL	**85**	**100%**	**60**	**100%**	7	**100%**

Table 4.19: Contribution of Resources towards Success of the Centres

The availability of the resources mentioned above also facilitated the success of Centres.

4.2.5 Context

FACTORS	MOST		AVERAGE		LEAST	
	N	%	N	%	N	%
Community background	7	11%	9	14%	5	71%
Surrounding environment	7	11%	14	22%	0	0%
Economic/social activities	7	11%	14	22%	0	0%
Infrastructure	12	20%	8	13%	1	14%
Security	15	25%	6	10%	0	0%
Literacy level	11	18%	9	14%	1	14%
Other factors	2	3%	3	5%	0	0%
TOTAL	**61**	**100%**	**63**	**100%**	7	**100%**

Table 4.20: Factors to Consider when Choosing the Location of the Centres

The findings also showed that several factors should be considered when choosing the location of the centre and security was considered by majority as most important taking 25% of the tallies while the community background was the least considered.

4.2.6 Constraints

FACTORS	SERVICE PROVIDERS						CLIENTS					
	Not at all		Just a little		Much/So much		Not at all		Just a little		Much/So much	
	N	%	N	%	N	%	N	%	N	%	N	%
Religion	7	15%	13	19%	1	1%	45	17%	12	16%	5	7%
Politics	7	15%	13	19%	1	1%	48	18%	12	16%	2	3%
Customs/cultural beliefs	10	21%	10	15%	1	1%	53	20%	1	1%	6	8%
Gender	15	32%	5	7%	1	1%	51	19%	9	12%	1	1%
Environmental factors	4	9%	12	18%	1	1%	25	9%	30	41%	4	6%
Security	1	2%	5	7%	10	13%	0	0%	0	0%	0	0%
Information Literacy	0	0%	0	0%	0	0%	8	3%	6	8%	22	31%
Funding	2	4%	2	3%	15	19%	0	0%	0	0%	0	0%
cost of Services	0	0%	0	0%	0	0%	8	3%	4	5%	26	37%
Reliable electricity supply	1	2%	4	6%	15	19%	0	0%	0	0%	0	0%
Adequate bandwidth	0	0%	3	4%	17	22%	0	0%	0	0%	0	0%
Other factors	0	0%	1	1%	17	22%	31	11%	0	0%	5	7%
TOTAL	47	100%	68	100%	79	100%	269	100%	74	100%	71	100%

Table 4.21: Factors affecting the Daily Operations of the Centres

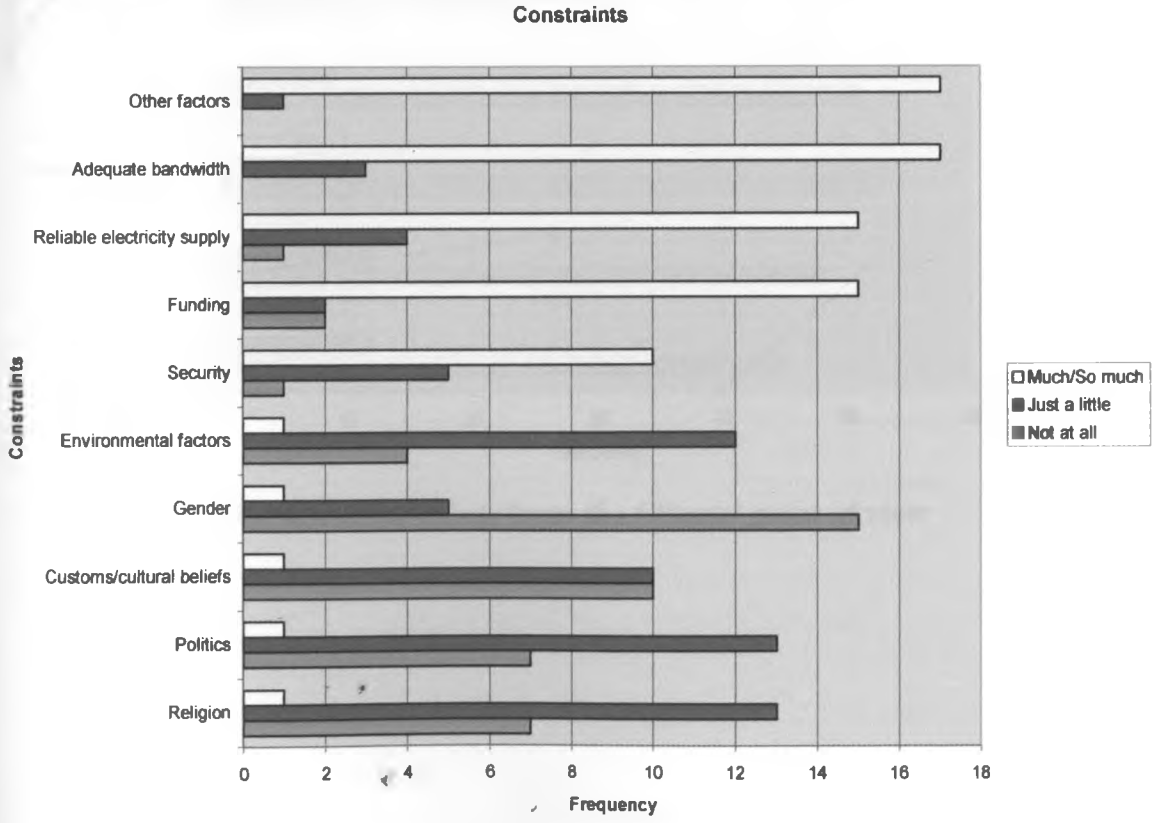

Fig 4.2: Constraints from the Service Providers' point of view

Several factors were seen to affect the daily operations of the Centres and availability of the affordable bandwidth was rated as the major challenge with 22%. On the other hand, from the clients' point of view, costs of services posed the greatest challenge with 37% compared to other factors and was closely followed by information literacy at 31%. The high cost of services was attributed, by the service provider, to the lack of affordable bandwidth and channel through which the funds are received. Hallberg, et al (2011) findings showed that having private contractors run the digital villages has significance costs to the users and digital villages therefore will not necessarily be cheaper. One reason for this is that a digital village must be sustainable hence the high cost of services.

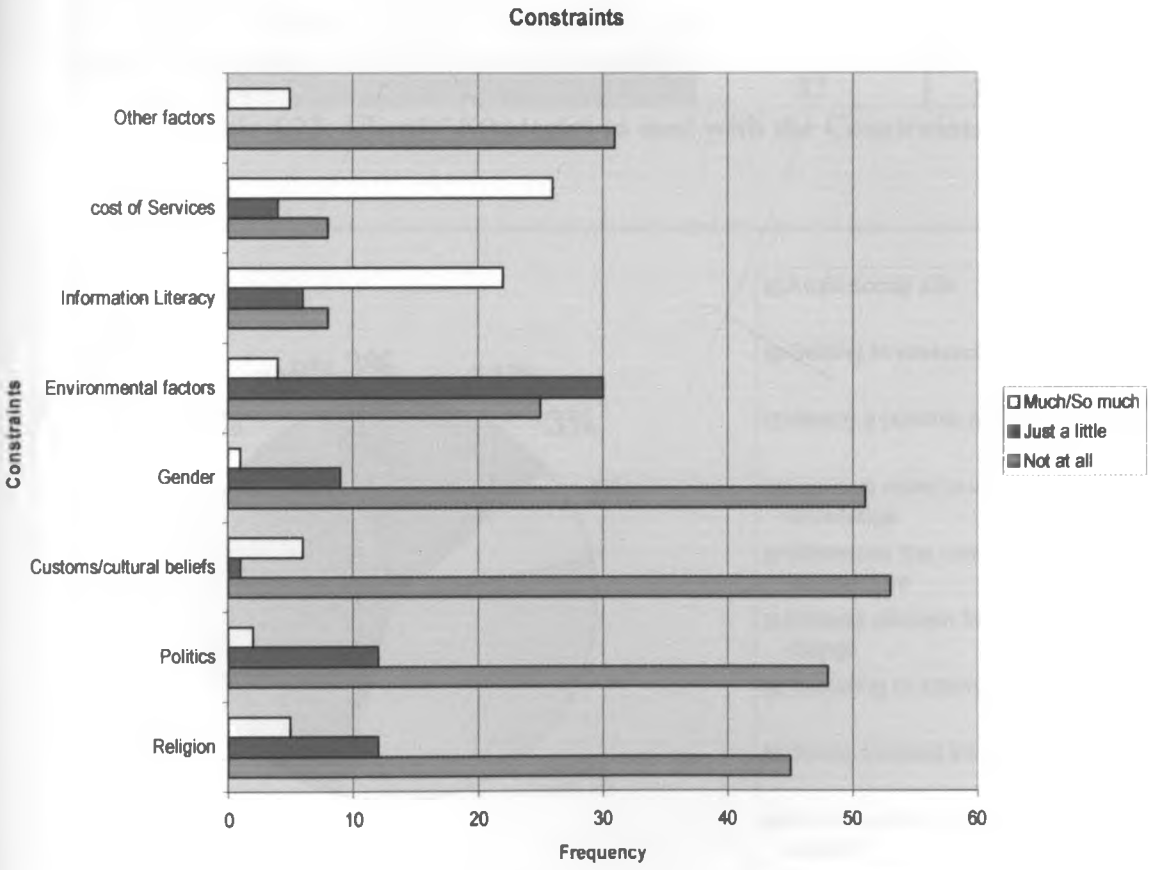

Fig 4.3: Constraints from the Clients' point of view

4.2.7 Strategies to Deal with the Constraints

Clients' Strategies to deal with the Constraints

STRATEGIES	FREQUENCY	%
By not joining any social site in the internet	4	11%
Getting to research	1	3%
Having a positive attitude	3	8%
Learning more to improve IT knowledge	12	32%
Minimizes the costs related to internet use	8	22%
Raising concern to the in charge	3	8%
Resorting to alternatives	3	8%
Saving to avoid information loss	1	3%
Seek assistance from pasha owners	1	3%
Set priorities on urgent services	1	3%
TOTAL	37	100%

Table 4.22: Clients' Strategies to deal with the Constraints

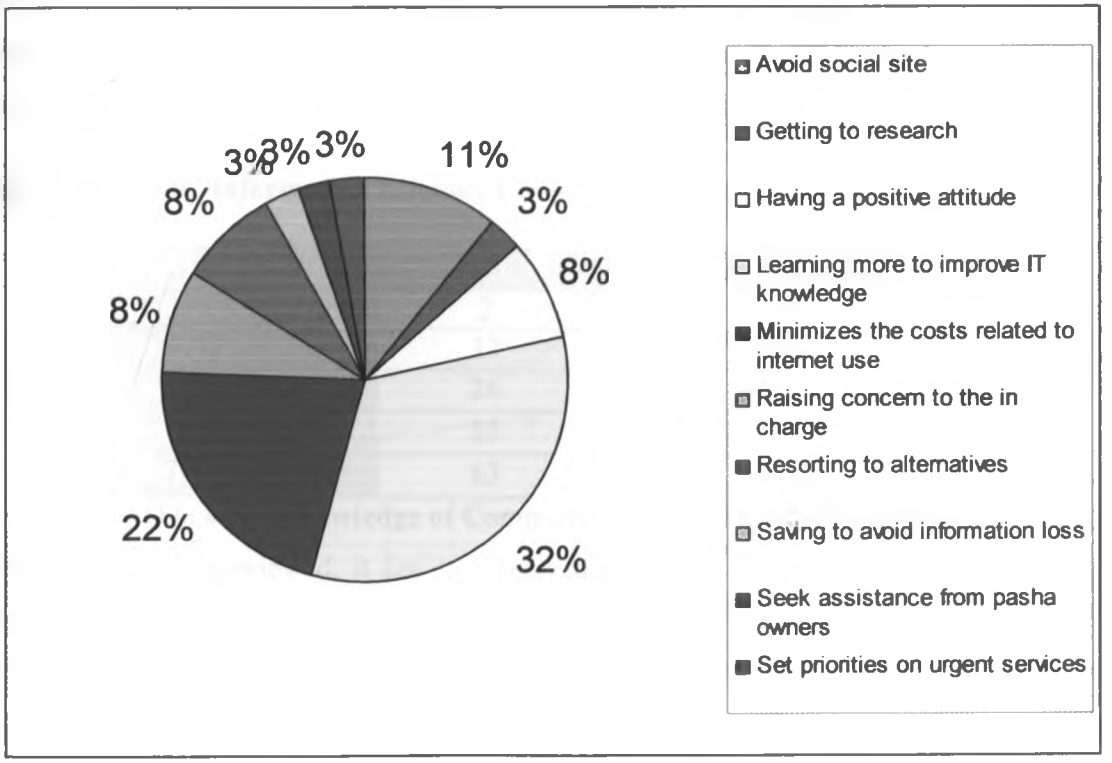

Fig 4.4: Strategies to deal with Constraints

When asked on how to deal with the constraints in accessing services at the Pasha Centers, the majority representing 32% of the target population suggested learning more to improve IT knowledge/skills as the best way to deal them. For those with finance related constraints, the best strategy was to minimize the costs related to internet use and this accounted for 22%.

Service Providers' Strategies to deal with the Constraints

STRATEGIES	FREQUENCY	%
Additional funding	3	7.5%
Create awareness	7	17.5%
Electricity supply backup	9	22.5%
Employment security	1	2.5%
Insuring the business	1	2.5%
Linking with the local churches	1	2.5%
Outsource for ISP	15	37.5%
Acquired modems	1	2.5%
Community mapping	1	2.5%
Variation of products and service	1	2.5%
TOTAL	**40**	**100%**

Table 4.23: Service Providers' Strategies to deal with Constraints

The service providers also had several ways of dealing with constraints with outsourcing for ISPs being the strategy employed by the majority; taking 37.5% of the target population. This was followed by electricity supply backup and creating awareness gunning 22.5% and 17.5% respectively. This echoes ashraf et al (n.d) that addressing social barriers remains a challenge which, if successfully resolved, can then be linked with development.

4.2.8 Respondents' Information Literacy Level

KNOWLEDGE	FREQUENCY	%
Below Average	2	3%
Average	12	19%
Good	26	41%
Excellent	23	37%
TOTAL	**63**	**100%**

Table 4.24: Knowledge of Computer / Mobile Phone Operation

From the sample interviewed, it can be observed that 78% of the sample population has above average knowledge on the operation of either phones or computers with only 3% having insufficient knowledge of operation of the two.

CAPABILITY	FREQUENCY	%
Average	12	19%
Good	27	43%
Excellent	24	38%
TOTAL	**63**	**100%**

Table 4.25: Capability to generate Information Using Computer / Mobile Phone

However, of the proportion with knowledge on the operation of the two gadgets, 81% can generate information using them with ease. The ability of the other 19% to generate the same information is however considered average.

4.2.9 Successful Implementation

Assessment of the Centres

RESPONSE	FREQUENCY	%
YES	13	52%
NO	8	32%
N/A	4	16%
TOTAL	**25**	**100%**

Table 4.26: Assessment of the Centres

Even though the Centres are still young, the findings showed that majority of the service providers, representing 52% of the target population, were carrying out assessment to check on the progress of their Centres.

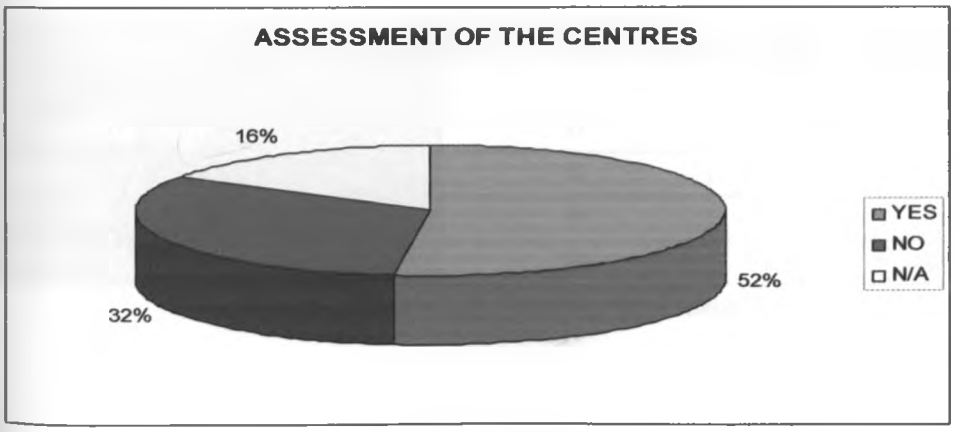

Fig 4.5: Assessment of the Centres

Frequency of the Assessment

FREQUENCY	FREQUENCY	%
Every 3 months	11	44%
Every 6 months	2	8%
N/A	12	48%
TOTAL	**25**	**100%**

Table 4.27: Frequency of the Assessment

Among the Service Providers who carried out assessment, the majority did it after every three months.

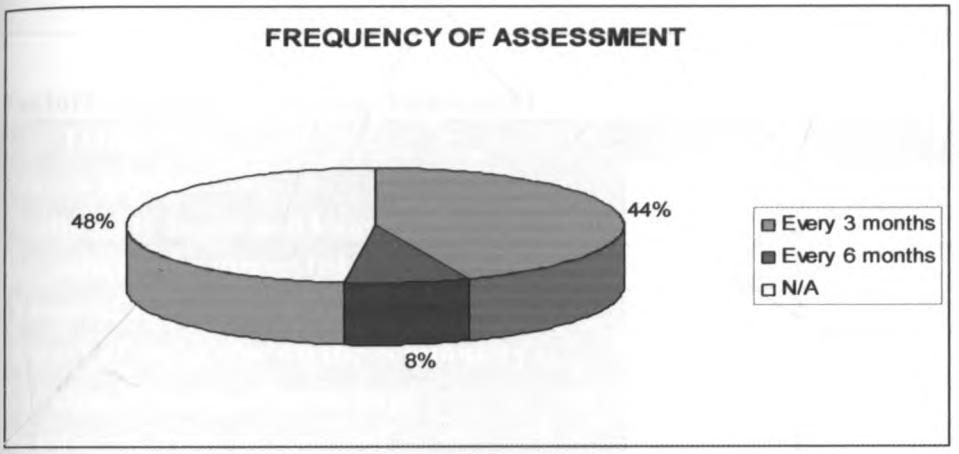

Fig 4.6: Frequency of Assessment

Number of Times Assessed

PERIOD	FREQUENCY	%
Once	7	28%
More than once	6	24%
Never	8	32%
N/A	4	16%
TOTAL	**25**	**100%**

Table 4.28: Number of Times Assessed

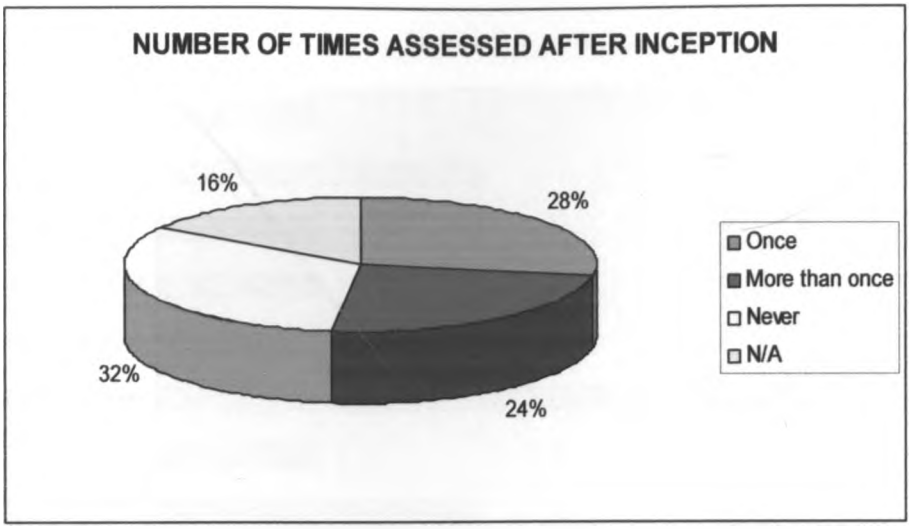

Fig 4.7: Number of times Assessed since Inception

Factors Considered During Assessment

FACTORS	FREQUENCY	%
Clients satisfaction	3	16%
Community needs and knowledge	2	11%
Enquiries from interested people	1	5%
Financial requirement and profit margin	2	11%
Impact of the center on the community	1	5%
Looking at the cash flows-daily	4	21%
Number of students received	1	5%
Challenges involved	1	5%
Looking at the services which bring outcome	1	5%
Performance evaluation and appraisal	2	11%
Traffic	1	5%
TOTAL	**19**	**100%**

Table 4.29: Factors Considered during Assessment

Looking at the factors considered during assessment, the findings showed that, the majority represented by 21% considered daily cash flow as one of the factors.

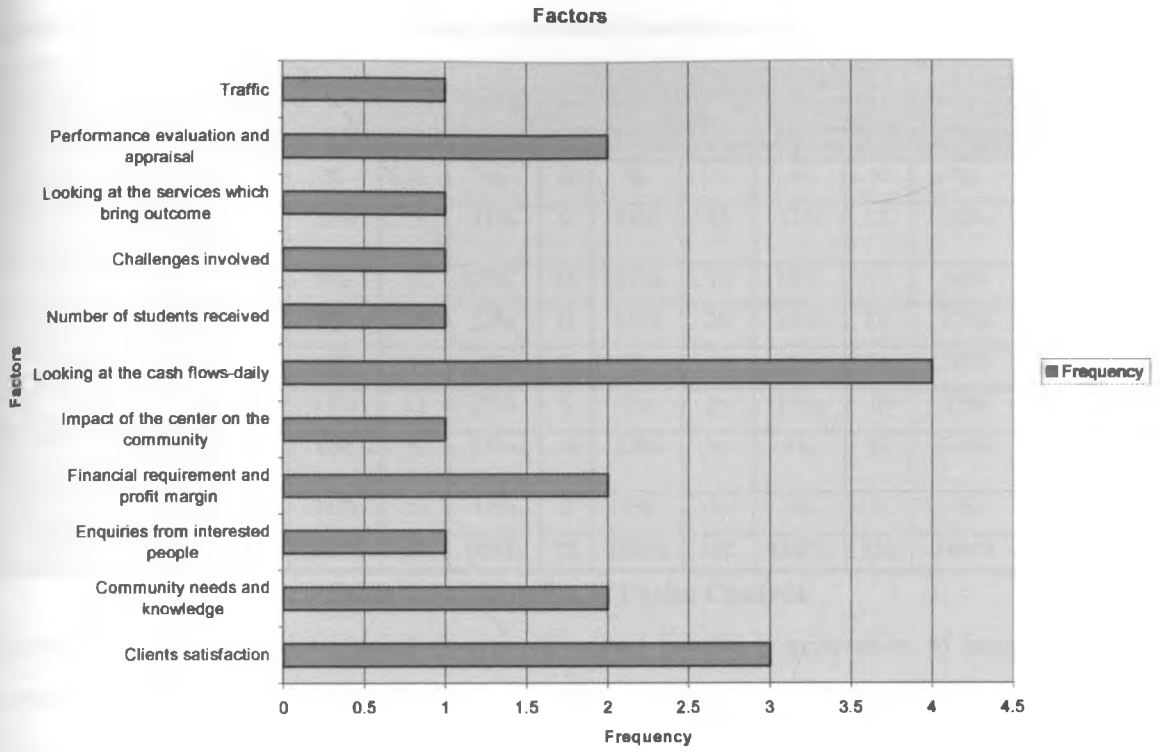

Fig 4.8: Factors Considered During Assessment

Benefits of the Pasha Centres

RESPONSE	SERVICE PROVIDERS		CLIENTS	
	Frequency	%	Frequency	%
YES	21	84%	63	100%
NO	4	16%	0	0%
TOTAL	**25**	**100%**	**63**	**100%**

Table 4.30: Frequency of Benefits of the Pasha Centres

Pasha Managers of the Centres that were operational representing 84% conquered that the Centres had been beneficial to them. The remaining 16% had not started operating therefore could not talk of benefits. All the clients had benefited from the Centres in one way or another.

Benefits of Pasha Centres According to Services Providers and Clients

BENEFITS	SERVICE PROVIDERS						CLIENTS					
	Not at all		Just a little		Much/ so Much		Not at all		Just a little		Much/ so Much	
	N	%	N	%	N	%	N	%	N	%	N	%
E-government services	7	23%	5	11%	9	13%	45	32%	12	10%	5	4%
Generation of Income	0	0%	0	0%	21	29%	40	28%	17	14%	6	5%
Employment	0	0%	10	23%	11	15%	20	14%	20	17%	23	20%
Training	9	30%	7	17%	5	7%	6	4%	24	20%	33	29%
Affordable Services	4	13%	12	27%	5	7%	25	18%	30	25%	8	7%
Location of the Centres	0	0%	5	11%	16	22%	6	4%	17	14%	40	35%
Other Benefits	10	34%	5	11%	5	7%	0	0%	0	0%	0	0%
TOTAL	**30**	**100%**	**44**	**100%**	**72**	**100%**	**142**	**100%**	**120**	**100%**	**115**	**100%**

Table 4.31: Benefits of Pasha Centres

From the service providers' point of view, the most benefit is generation of income which constitutes 29%. This is because Pasha Centres are income generating activity. This is followed by location of the Centres representing 22% which the clients also conquer with taking 35% of the total target population. The Centres are situated near the people at the community level hence bringing services closer to the people. This is evident in the location of the Centres within the Counties. Out of the targeted population, 84% are located in other towns and small centres as shown in table 4.11.

4.3 Discussion of Results

Successful Implementation of the Pasha Centres

According to KICTB (2008), the achievement of an information-based society is one of the main priorities of GoK towards the realization of national development goals and objectives for wealth and employment creation. ICT is one of the fastest growing sectors in the country. Harnessing of ICT will therefore help the Government to realize a number of its key public policy objectives.

The KICTB argues further that, most ICT facilities in the Kenya have traditionally been located in urban areas. This has resulted in glaring disparities between urban and rural areas in the distribution of ICT facilities. To redress the disparities, the KICTB is implementing the DVPs. The success of these Centres depends on the achievement of the objectives set and how well they are executing the roles as stipulated in Section 2.6.

The success of the Pasha Centres can therefore be seen in the achievement of the objectives and also how the Centres have changed the lives of the community members as discussed below.

- Connectivity of the rural areas to other parts of the country has been increased. The findings show that 84% of the Centres are located in areas other than the County headquarters. The location of the Centres has facilitated the process of bringing services closer to the people. This is evident in the findings which show that location of the Centres is one of the major benefits achieved with 22% and 35% of the service providers and the clients respectively. This has made the community members to be able to access the services provided without having to travel far hence saving on fare and time. This came out clearly in Centres that are established far from the district headquarters for example Garisa and Homa-Bay Counties.
- DVPs are one way of creating economic opportunities. The Centres are income generating activities for the Service Providers and all the services offered at a fee. This has helped in empowering the Service Providers, who are also members of the community, economically.
- Each Centre has created employment opportunity to at least one member of the community. This is evident in the findings which give employment opportunity as one of the major benefits with 15% and 20% of Service Providers and Clients respectively.
- Trainings offered by the Centres also beneficial to the community members. In the findings, training takes 29% in the benefits. This can be attributed to the fact that training has helped in increasing the literacy level of the community members.
- The Centres are also enhancing provision of e-government services. This is evident in 20% of the Centres that are offering provision of police abstracts, submission of KRA returns online and other e-government services. At the same time provision of money transfer and banking services
- Enhancing both their business skills and knowledge as well as expose them to world news and trends that may positively enhance their lives. This has been made possible though the provision of the internet services and trainings.

From the discussion above it is evident that even though the Centres are still relatively young, they have had a considerable impact on the community hence making their implementation a success. This can be concluded from the benefits achieved and how these benefits have changed their lives. The impact can be summarized as shown in Table 4.32 below.

ACHIEVEMENTS	HOW IT HAS BEEN REALIZED
Economic Empowerment	1. Giving Service Providers an income generating activity 2. Providing the community members with employment 3. facilitating availability of information in different areas through the internet
Increase in Information Literacy	Through trainings offered by the Centres
Trust	Clients trusting the Service Providers to assist them
Provision of e-government and other ICT related services	Services were now available nearer and faster

Table 4.32: Summary of Achievements

Constraints and Strategies

Even though the Centres have had a considerable impact on the community, several constraints are still hindering the achievement of the desired impact from the projects. Ashraf et al (n.d), in their framework, considered constraints as hindrance to ultimate process of development and addressing these constraints successfully leads to development. This is evident in the research findings with availability of affordable bandwidth being the major constraint with 22% from the Service Providers' view and cost of services with 37% from the Clients' view. Other factors also took the same percentage as the bandwidth. Five factors came out so strongly as being among the major constraints and they included: Channeling of the funds, Branding of the Pasha Centres, Awareness creation, Cost of services and Level of information literacy.

Channeling of the Funds

There was a major concern on how the funds were being channeled. Process of accessing the funds was taking long. Being a loan that needs to be paid back, the service providers were left

with little or no grace period to be able to prepare and start paying. This has led to the services being charged higher than the expected prices as was expressed by the clients as their major constraint with 37%.

Branding of the Pasha Centres

A visit to most of the Centres confirmed that they were not branded and each provider had their own way of setting up the centre. The service providers felt that the Centres are being seen by community as any other cyber café despite the special services they are offering.

Awareness Creation

The findings confirmed the results in the IBM Team 1 Sub-Team 1 report, which shows that there is awareness of ICT initiatives at the national level but the same is lacking at the community level. The Service Providers believe that lack of awareness is one of the major factors that is hindering the success of the Centres

Cost of Services

The major constraint the Clients were facing is cost of services which stood at 37%. The cost of the services prohibited the Clients from utilizing the services fully. This constraint according to the Service Providers was attributed to the cost of adequate bandwidth and inadequate way of channeling funds.

Level of Information Literacy

Other major constraint the clients were facing apart from cost of services was lack of information literacy to be able to utilize the services to the fullest which was rated at 31%. Majority of the clients' knowledge on the use of computer / mobile phone and capability to use them to generate information was rated at good with 41% and 43% respectively. When probed further, most of the clients expressed their desire to know more in order to be able to use the more advanced services.

How the Stakeholders can boost the Success Level of the Centres

The opinion of the service providers who were not satisfied with success level of their Centres was requested. The contribution of the donor came out prominently. Further probing showed that the donor had not kept its part of the bargain as was signed in the Service Level Agreement. The donor's functions included: timely disbursement of the revolving funds, provision of technical support, provision of quality and affordable bandwidth and training of the service provider

The donor had only performed one out of the four functions i.e. training the service providers. With all the other three still pending, the Centres cannot operate to the expectation.

4.4 Framework Testing

The proposed framework consisted of the following elements that the research had set out to validate: stakeholders, context, resources, constraints, strategies to overcome the constraints, outcome and desired impact which were used to add value to the project. The proposed framework was also divided into three assessment targets which tallied with the key stages of project development. To validate the framework, data was collected from different sources including: KICTB staff, Pasha Centres and the managers and users of the services offered by the Centres

The data collected was then analyzed and the new elements that emerged were incorporated in the framework.

Testing the Hypotheses

The hypotheses formulated in chapter three were used to test the elements of the proposed framework. The detailed analyses of the tests are contained in Appendix IV but the summary of the findings are contained in Table 4.33 below. The summary shows that one hypothesis is fully supported while the rest are partially supported.

HYPOTHESES	FACTORS	SUPPORTED
H1	Community Members & Entrepreneur	Yes
	Sponsors/Donors & Researchers	No
H2	Information Availability, Funds Availability, Skills, Technology, Infrastructure, Equipment	Yes
	Affordable Bandwidth	No
H3	Community Background, Surrounding Environment	No
	Economic/ Social Activities, Infrastructure, Security, Literacy Level	Yes
H4	Provision of e-government Services, Generation of income, Employment, Training, Provision of affordable services, Bringing services closer to the people	Yes

Table 4.33: Summary of Hypotheses Results

The Refined Framework

The research findings tested the framework. However, new elements emerged from the findings that were found to be important hence were used to refine the framework. The findings showed that apart from the elements that were contained in the proposed framework, the following elements added value to the success of the Pasha Centres hence were incorporated in the framework as shown in Fig 4.9 below:

- Pasha Centres awareness
- Service Level Agreement implementation (Channeling of funds and availability of affordable bandwidth)
- Pasha Centres branding
- Level of information literacy

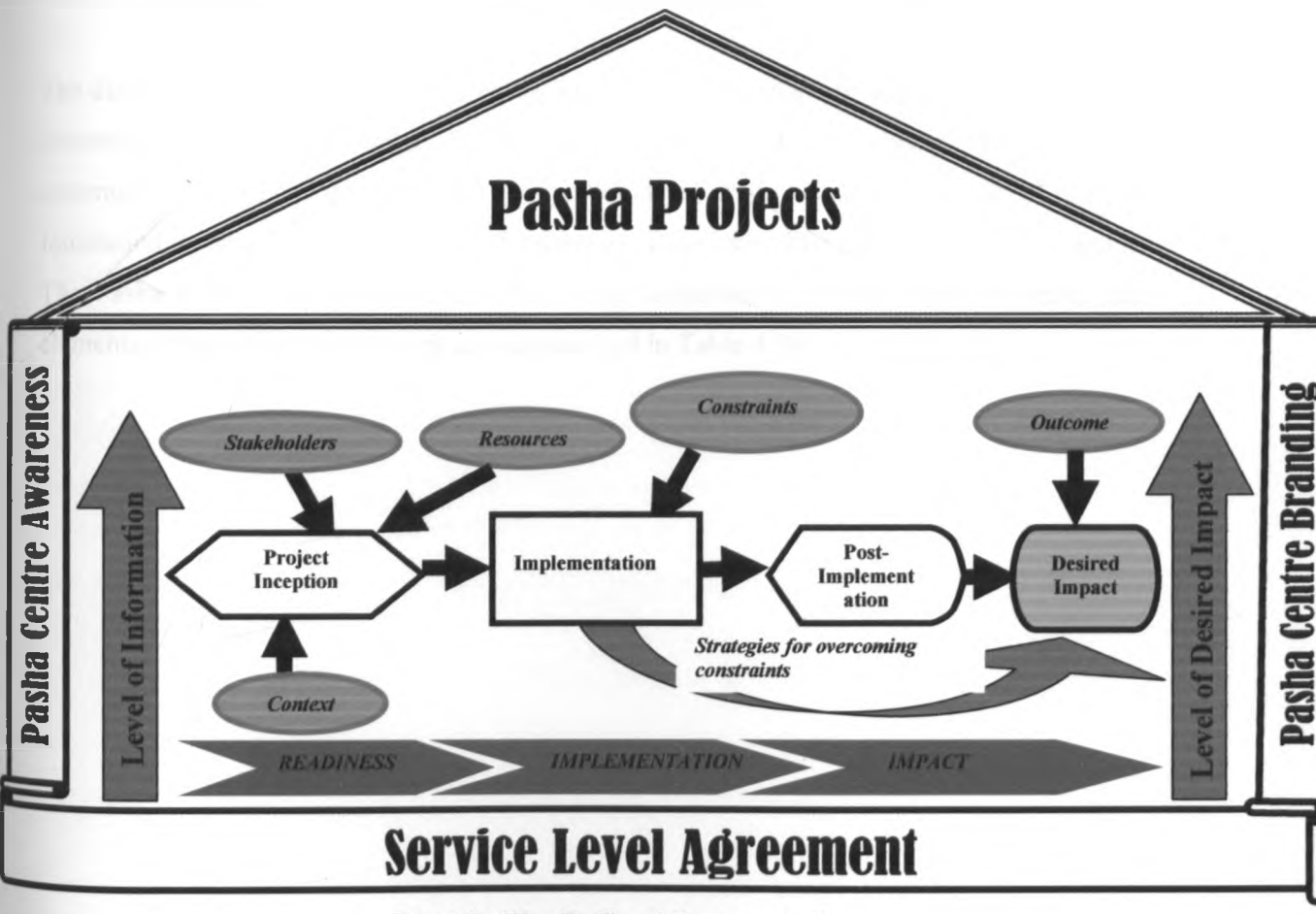

Fig 4.9: The Refined Framework

Pasha Centres Awareness Creation

The community needs to be made aware of the existence of these centres and the services that are offered there. Most people are not aware of the Centres and this is evident on the way

overnment offices are still being crowded for services that can easily be accessed through he centres.

Service Level Agreement Implementation

There should be a proper way of funds channeling to avoid delays which is impacting negatively on the success of the Centres. Also affordable bandwidth should be made available. Both of these are contained in SLA which needs to be implemented fully for them to be achieved.

Pasha Centre Branding

The Centres need to be branded so that they can be unique hence easily differentiated from the normal businesses providing ICT services.

Level of Information Literacy

For the community members to be able to utilize the services provided by the Centres fully, their information literacy level needs to be increased. This can be achieved through training.

The diagrammatic depiction of the framework has taken the shape of a hut which symbolizes community or grass-root level. The Pasha Projects are meant to benefit people at the community level hence the use of the hut symbol. The hut has been formed using SLA at the foundation or base, while branding and awareness forms the pillars on which the hut stands. The Pasha Projects are on top of the hut being supported by all the other elements. The elements of the refined framework are summarized in Table 4.34.

ELEMENT	DESCRIPTION
Readiness	Stage where the position of ICT in the society is determines
Implementation	Stage where the services provided are being utilized depending on cost, availability and skills
Impact	Stage where the development goals associated with the project are ascertained
Project Inception	Key stages in project development modified from the standard input – process – output
Implementation	
Post-Implementation	
Stakeholders	Those that are interested in the project: - entrepreneur, community, government, donors, researchers
Resources	Include: funds, skills, availability of information, technology, availability of affordable bandwidth, infrastructure, equipment
Constraints	Religion, politics, customs, gender, environmental factors, security, funding, reliable supply of electricity, reliable and affordable bandwidth
Context	Background of the community, the surrounding environment, economic/ social activities, infrastructure, security, literacy level
Outcome	Unexpected occurrences that are either positive or negative
Strategies	Ways of overcoming the constraints
Desired Impact	Development/ social changes associated with the project
Service Level Agreement	SLA should be implemented fully
Pasha Project Awareness	Creating awareness of the project among the community members
Pasha Project Branding	Branding of the project for recognition purpose

Table 4.34: Summary of Elements in the Refined Framework

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Achievements

So many ICT for development projects have been initiated in the country and others are still being initiated. Even though these projects have been started with a noble cause, most if not all, have not been successfully implemented. The overall objective of this research was to develop a framework for assessing the successful implementation of digital villages in Kenya. This would help in undertaking viable project and avoid project failure. Several specific research objectives were also stated and research questions for each objective formulated to assist in achieving each objective exhaustively.

Objective 1: Identify the services provided by the Pasha Centres and are tailored to meet the community's needs and those that are required but are not being offered.

The following research questions assisted in achieving the above objective: a) What services are being offered by the digital villages? b) How relevant are the services offered or available to the intended beneficiaries?

According to KICTB (2008), the Pasha Centres have three maturity levels i.e. basic, standard and advance levels. Each level has standard services. From the research findings, the Centres were offering services outside their maturity level that are tailored to meet the community needs. The main services are mobile money transfer, photography, PIN and police abstracts. The results also showed that there were other services that were required but not offered. These include mobile money transfer, certified training and agency banking.

Objective 2: Identify constraints that affect the implementation of Pasha Centres and strategies to overcome them.

The following research question was used in achieving the above objective: What constraints hinder the implementation and success of the Centres?

Ashraf, et al. (n.d) looked at several social constraints and ways in which to deal with them. The research did not look at social constraints in specific, but constraints in general. The findings identified several constraints from the Service Providers' and Clients' point of view.

The major constraints included: cost of services, awareness creation, channeling of funds, availability of affordable bandwidth and lack of information literacy. The research also revealed strategies the Service Providers and the Clients were using to deal with the constraints in order to make the projects a success. This included sourcing for an alternative internet service provider, gaining more knowledge on IT, limiting time taken on the internet etc.

Objective 3: Establish the benefits of the Pasha Centres leading to the realization of their impact on the community.

The following research questions were used as a guide to achieve the objective: a) What factors are considered when conducting assessment? b) How is the impact of the Pasha Centres to the beneficiaries ascertained?

The Service Providers considered several factors when carrying out assessment on the Centres and the major ones included examination of cash flow and client's satisfaction among others. Being that the Centres were relatively young a comprehensive impact assessment could not be carried out on them. Assessment on the successful implementation of the Centres was instead carried out. The assessment revealed that even though the Centres were still young, two out of the stated three objectives for starting these projects had been met so far. There were also several accrued benefits from the project which included income generation, employment, provision of e-government services among others.

Objective 4: Develop framework for assessing the successful implementation of DVPs at the community level.

The following questions facilitated the achievement of the above objective: a) Are there frameworks that have been put in place to assess the successful implementation of ICT4D projects and of digital villages in particular? b) If the frameworks are there, have they been able to provide a holistic approach for assessing the successful implementation of ICT related projects in general and DVPs in Kenya in particular?

Several assessment frameworks were reviewed and important elements extracted to develop the conceptual framework. The main framework used was Heeks and Molla's Value Chain (Fig.2.3). Other important elements were extracted from KICTB's M & E framework (Fig.

2.6) and Ashraf et al's Framework to Investigate ICT Led Development at Community Level (Fig 2.7).

Objective 5: Validate the proposed framework.

The research question that assisted in achieving this objective was: Is the developed framework appropriate for assessing the successful implementation of digital villages in Kenya?

This was achieved through analysis of the collected data and testing of the stated hypothesis. The findings confirmed the elements of the conceptual framework and newer elements were also revealed which were incorporated in the framework.

The specific research objectives and how they were achieved are summarized in Table 5.1.

NO.	RESEARCH OBJECTIVES	HOW THEY WERE ACHIEVED
1	To identify the services provided by the Pasha Centres and are tailored to meet the community's needs and those that are required but are not being offered.	Questionnaires were used to collect data on services from the service providers and the clients. The findings are contained in: 1. Table 4.14 - Services offered by the Centres that are tailored to meet the community needs. 2. Table 4.16 and 4.17 - Those that are required but are not offered.
2	To identify constraints that affects the implementation of Pasha Centres and strategies to overcome them.	The constraints were identified through literature review and confirmed through collection of data from the service providers and the clients. The findings from the data collected also showed the strategies used to overcome the constraints. These are contained in: 1. Table 4.21 - The constraints 2. Tables 4.22 and 4.23 - The strategies
3	To establish the benefits of the Pasha Centres leading to the realization of their impact on the community	Through literature review to establish the objectives of the Pasha Centre and reasons why the Centres were started. The findings identified the benefits of the Centres which confirmed that the stated objectives had been met to a certain extent. The benefits are contained in Table 4.31
4	To develop framework for assessing the impact of digital villages at the community level.	Various existing impact assessment frameworks were reviewed and important elements extracted to develop the conceptual framework. The conceptual framework is contained in figure 2.11
5	To test the proposed framework	This was achieved through analysis of the collected data and testing of the stated hypothesis. The findings confirmed the elements of the conceptual framework and newer elements were also revealed. The refined framework is contained in figure 4.9

Table 5.1: Mapping the Objectives on to the Research findings

5.1 Limitations of the Study

The projects are still young not so much can be established in terms of impact and therefore the need to assess the successful implementation of the DVPs at the community level instead of their impact. It was also very hard and time consuming to convince KICTB and the service providers that the research was purely academic and the data being collected was for academic purposes only. This may have affected the results because some respondents were not willing to open up fully.

1.2 Recommendations

The research findings evidently show that there is need for an assessment framework for successful implementation of DVPs if the projects being initiated are to be successful. The research findings show that there is need for ICT related services at the community level which are provided by these Centres. Even though there are several benefits achieved from these Centres, several constraints are hindering the successful implementation of these projects. Lastly proper strategies need to be put in place in order for the project to be implemented successfully in order to achieve the desired impact on the community.

For the projects to be a success, we therefore recommend the adoption of the framework to be used as a guide when developing the DVPs.

5.3 Research Contributions

The research therefore has contributed to: the development of a framework for assessing the successful implementation of DVPs in Kenya; a basis for further study in that the framework can be enhanced with more research in order to be used to assess the impact of the DVPs on the community; and the research also has established strategies incorporated in the framework that needs to be included in the ICT Policy if the ICT4D projects are to be successful.

5.4 Further Research

Being that the projects are still relatively young, there is still room for more development. Also human needs keep on changing as well as ICT innovations. The framework needs to be refined further as the projects grow to incorporate new developments. Therefore we

recommend further research to explore emerging issues and new ICT innovations as the projects grow. This study was initially set to establish the impact of DVPs on the community. With further research, the framework can be enhanced further to be used to assess the impact of DVPs on the community

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APPENDIX I: QUESTIONNAIRES

SURVEY ON PASHA CENTRES

QUESTIONNAIRE FOR SERVICE PROVIDERS

Date: Serial No.

Introduction

I **Loice victorine Atieno** is a student of University of Nairobi doing Msc in Information Systems. As part of the programme requirement, am undertaking project entitled: **Framework for Assessing Impact of Digital Villages.** This study aims at coming up with strategies that will enable the success of the Digital Village Projects hence making the project beneficial to the Pasha Centre owners and the community.

Currently I am collecting data to develop and validate the framework.

This research is purely academic, and any information given will solely be used for that purpose. The details and data provided will be treated as confidential and will not be passed on to any third party without your permission.

Your response will be highly appreciated and the analysis of this research will be availed to interested respondents. Thank you

Instructions

1. Answers all the Questions in the questionnaire provided
2. You are not required to give you name
3. Scaled questions will be rated between 1 and 5 with 1 being the lowest and five the highest.
4. Use *tick*, *X* or *shade* the box to choose your answer
5. Where only one answer is required choose only one. Selecting more than one answer makes the answer invalid and will not be considered.
6. For questions where there is no options to choose, please write your answer in the space provided.
7. Feel free to use additional pages if necessary.

1 Pasha Centre General Information

1.1 Physical location

County

1.1.1 Actual location within the County

☐ County Head Quarter ☐ Other Towns ☐ Small Centre

1.2 The Pasha Centre falls / will fall under which maturity model

☐ Basic Service Model ☐ Standard Service Model ☐ Advanced Model

1.3 Duration the business has been operational as a Pasha Centre

☐ Less than 1 year ☐ 1 - 2 years ☐ More than 2 years ☐ Not Started

If the centre is not yet started go to section 7

1.4 Are there any other services offered by the center that are tailored to suite the community needs?

☐ Yes ☐ No

1.4.1 If the answer above is yes, please list them

1.5 Are there other services that the community require but are not offered by the center?

☐ Yes ☐ No

1.5.1 If the answer above is yes, please list them

2 Stakeholders

In a scale of 1 to 5, with 1 being the least and 5 the most, please rate the contribution of the following people towards the success of the centre.

a) Community members ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

b) Entrepreneur ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

c) Sponsors / donors ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

d) Researchers ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

e) Others (name & rate)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

3 Resources

In a scale of 1 to 5, with 1 being the least and 5 the most, how would you rate the contribution of the following resources towards the success of the centre?

a) Availability of Information ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

b) Funds ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

c) Skills ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

d) Technology ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

e) Availability of affordable Bandwidth ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

f) Infrastructure ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

g) Equipment ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

h) Others (name & rate)

☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

4 Context

In a scale of 1 to 5, with 1 being the least and 5 the most, how important are the following when choosing the location of the centre and services to be offered there

a) Background of the community ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

b) The surrounding environment ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

c) Economic / Social Activities ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

d) Infrastructure ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

e) Security ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

f) Literacy Level ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

g) Others (name & rate) _____ ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

5 Constraints

5.1To what extend do the following influence the day to day running of the centre and the choice of services offered

a) Religion ☐ Not at all ☐ Just a little ☐ Much ☐ So much

b) Politics ☐ Not at all ☐ Just a little ☐ Much ☐ So much

c) Customs / Cultural Believes ☐ Not at all ☐ Just a little ☐ Much ☐ So much

d) Gender ☐ Not at all ☐ Just a little ☐ Much ☐ So much

e) Environment factors ☐ Not at all ☐ Just a little ☐ Much ☐ So much

f) Security ☐ Not at all ☐ Just a little ☐ Much ☐ So much

g) Funding ☐ Not at all ☐ Just a little ☐ Much ☐ So much

h) Reliable supply of Electricity ☐ Not at all ☐ Just a little ☐ Much ☐ So much

i) Reliable /adequate Bandwidth ☐ Not at all ☐ Just a little ☐ Much ☐ So much

j) Others (name & rate) _____ ☐ Not at all ☐ Just a little ☐ Much ☐ So much

5.2 What strategies have you put in place to deal with the above constraints and challenges?

6 Assessment of the Centres

6.1 Do you carry out assessment of your centre?

☐ Yes ☐ No

If the answer is no please go to question 6.6

6.2 If the answer above is yes, how often do you carryout assessment

- ☐ After every 3 months
- ☐ After every 6 months
- ☐ After every 9 months
- ☐ After 1 year

6.3 How many times have you carried out assessment since the inception of the Centre?

- ☐ Once
- ☐ More than once
- ☐ It has never been done

6.4 What factors do you consider when carrying out assessment?

6.5 Are you satisfied with the success level of your centre?

☐ Yes ☐ No

If the answer is yes, move on to question 7

6.6 If the answer above is no, please suggest ways in which the success level can be boosted by:

6.6.1 The entrepreneur

6.6.2 The community

6.6.3 The government

6.6.4 Sponsors

6.6.5 Others (name and suggest ways)

7 Successful Implementation of the Pasha Centres

7.1 Have you benefited from the Centre?

☐ Yes ☐ No

7.2 If the answer above is yes, how would you rate the following benefits to you and the community as a whole, with 1 being the least benefit and 5 the most benefit?

a) Provision of e-government services	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
b) Generation of income	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
c) Employment	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
d) Training	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
e) Provision of affordable services	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
f) Bringing services closer to the people	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
g) Others (name & rate)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

8 Demographic Details (Important - This is for analysis only)

8.1 Gender:

☐ Male ☐ Female

8.2 Age:

☐ 18 - 35 years ☐ 35 - 60 years ☐ 60 years and above

8.3 Education:

☐ Secondary School Level ☐ College Level ☐ University Level

8.4 Period worked a service provider:

☐ Less than 1 year ☐ 1 - 2 years ☐ More than 2 years ☐ Not Applicable

9 would you like to receive a copy of the research analysis

☐ Yes ☐ No

Thank you for your valuable response!!!!!!

SURVEY ON PASHA CENTRES

QUESTIONNAIRE FOR CLIENTS

Date: Serial No.

Introduction

I Loice victorine Atieno is a student of University of Nairobi doing Msc in Information Systems. As part of the programme requirement, am undertaking project entitled: **Framework for Assessing Impact of Digital Villages**. This study aims at coming up with strategies that will enable the success of the Digital Village Projects hence making the project beneficial to the Pasha owners and the community.

Currently I am collecting data to develop and validate the framework.

This research is purely academic, and any information given will solely be used for that purpose. The details and data provided will be treated as confidential and will not be passed on to any third party without your permission.

Your response will be highly appreciated. Thank you

Instructions

1. Answers all the Questions in the questionnaire provided
2. You are not required to give you name
3. Scaled questions will be rated between 1 and 5 with 1 being the lowest and five the highest.
4. Use *tick*, *X* or *shade* the box to choose your answer
5. Where only one answer is required choose only one. Selecting more than one answer makes the answer invalid and will not be considered.
6. For questions where there is no options to choose, please write your answer in the space provided.
7. Feel free to use additional pages if necessary.

1 Information Literacy Level

1.1 How would you rate your basic computer / mobile phone knowledge?

☐ None ☐ Below Average ☐ Average ☐ Good ☐ Excellent

1.2 How do you rate your capability to use computer / mobile phone to generate information?

☐ None ☐ Low ☐ Average ☐ Good ☐ Excellent

2 Services

2.1 From the list below select computer / mobile phone services that you frequently access from the Centre (you may choose more than one)

☐ Sending / receiving messages

☐ Sending / receiving e-mail

☐ Sending / receiving money

☐ Creating documents

☐ Searching for information in the internet

☐ Training / Education

☐ Research

☐ Others (name) _____

2.2 Are there services that you require and are not being offered by the Centre?

☐ Yes ☐ No

If the answer above is No please go to question 5

3.3 If the answer above is yes, please name them

_____

4 Constraints

4.1 How do the following affect how you use the services mentioned above?

a) Religion ☐ Not at all ☐ Just a little ☐ Much ☐ So much

b) Politics ☐ Not at all ☐ Just a little ☐ Much ☐ So much

c) Customs ☐ Not at all ☐ Just a little ☐ Much ☐ So much

d) Gender ☐ Not at all ☐ Just a little ☐ Much ☐ So much

e) Environmental factors ☐ Not at all ☐ Just a little ☐ Much ☐ So much

f) Information literacy level ☐ Not at all ☐ Just a little ☐ Much ☐ So much

g) Cost of the services ☐ Not at all ☐ Just a little ☐ Much ☐ So much

h) Others (name & rate) ☐ Not at all ☐ Just a little ☐ Much ☐ So much

4.2 How do you overcome the constraints above?

5 Successful of Implementation of the Pasha Centres

5.1 Have you benefited from the Centre?

☐ Yes ☐ No

5.2 If the answer above is yes, how would you rate the following benefits to you and the community as a whole, with 1 being the least benefit and 5 the most benefit?

a) Provision of e-government services ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

b) Generation of income ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

c) Employment ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

d) Training ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

e) Provision of affordable services ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

f) Bringing services closer to the people ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

g) Others (name & rate) _____ ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1

6 Demographic Details (Important - This is for analysis only)

6.1 Gender:

☐ Male ☐ Female

6.2 Age (years):

☐ Below 18 years ☐ 18 - 35 years ☐ 35 - 60 years ☐ 60 years and above

6.3 Education:

☐ Primary School Level ☐ Secondary School Level ☐ College Level

☐ University Level

6.4 Occupation:

☐ Student ☐ Employed ☐ Self - employed ☐ Not Applicable

6.5 Income (Kshs.) per month:

☐ Less than 10,000 ☐ 10,000 - 20,000 ☐ 20,001 - 30,000 ☐ 30,001 - 40,000

☐ 40,001 - 50,000 ☐ Above 50,000 ☐ Not Applicable

Thank you for your valuable response!!!!!!

APPENDIX II: INTERVIEW GUIDE

Important Elements	Elaboration
Introduction Key Components:	
• ***Opening statement***	• I want to thank you for taking the time to meet with me today.
• ***Name***	• My names are Loice Victorine Atieno
• ***Purpose of study***	• I would like to talk to you generally about the Digital Village Project and in particular how impact assessment of the project is done. The data collected will facilitate development of a framework that can be used to assess the impact of the project on the community. The study is done to fulfill the requirements of Masters of Science in Information Systems.
• ***Duration***	• The interview will not take more than 20 minutes.
• ***How interview will be conducted***	• I will be taking some notes during the session and will be probing for more clarifications on points that are not clear. At the end of interview main points will be read out for your confirmation.
• ***Confidentiality***	• Being an academic research, the final report will be used for academic purpose only and any information included in this report will not identify you as the respondent. You don't have to talk about anything you don't want to and you may end the interview at any time.
• ***Opportunity for questions***	• Are there any questions about what I have just explained?
• ***Signature of consent***	• Are you willing to participate in this interview?

	_____ _____ ***Interviewee signature*** ***Date***
Questions ***Not more than ten (10) open-ended questions***	• What factors do you consider when carrying out assessment? Please list. • Which of these factors would you consider to be key project elements? Please explain. • To what extent do the above named factors advance or hinder the success of the Pasha Centres? Please elaborate • What constraints have you encountered in connections with the development of the DVPs • How did you overcome the constraints? • What are the benefits of the DVPs on the intended beneficiaries • In your own opinion what do you think needs to be done to increase the benefits of these projects on the community? • What recommendations do you have for future efforts such as these?
Closing Key Components: • ***Additional comments*** • ***Next steps*** • ***Closing remarks***	• Is there anything more you would like to add? • I'll be analyzing the information you and others gave me and submitting the progress there after. I'll be happy to send you a copy to review at that time, if you are interested. • That's the end of the interview and I'll be grateful if you will grant me another opportunity like this one if need be. Thank you for your time.

Adopted from **Boyce and Neale (2006)**

APPENDIX III: SAMPLE OF ITEMS IN THE QUESTIONNAIRE

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PCGI 1.1	191.92	1875.493	-.222	.919
PCGI 1.1.1	198.16	1809.223	.003	.904
PCGI 1.2	198.56	1801.090	.153	.904
PCGI 1.3	198.72	1731.293	.835	.899
PCGI 1.4	198.68	1760.977	.770	.901
PCGI 1.5	198.72	1766.293	.676	.901
S 1.1	195.96	1753.540	.470	.901
S 1.2	195.52	1776.760	.518	.902
S 1.3	196.76	1739.357	.507	.901
S 1.4	197.56	1712.257	.559	.900
S 1.5	194.92	1787.910	.110	.905
R 1.1	195.76	1751.440	.659	.901
R 1.2	195.76	1753.940	.686	.901
R 1.3	195.72	1754.793	.649	.901
R 1.4	195.68	1764.310	.563	.901
R 1.5	196.40	1737.000	.595	.900
R 1.6	195.84	1753.390	.535	.901
R 1.7	195.48	1759.927	.753	.901
R 1.8	194.32	1799.393	.088	.904
C 1.1	196.32	1746.393	.504	.901
C 1.2	196.00	1763.583	.520	.901
C 1.3	195.88	1767.027	.544	.902
C 1.4	195.76	1750.607	.668	.901
C 1.5	195.48	1768.677	.667	.901
C 1.6	195.88	1749.443	.591	.901
C 1 7	194.08	1820.660	-.121	.905
CC 1.1	197.96	1686.040	.876	.897
CC 1.2	197.96	1694.623	.811	.898
CC 1.3	198.08	1692.660	.796	.898
CC 1.4	198.28	1680.543	.843	.897
CC 1.5	197.60	1701.417	.769	.898
CC1.6	196.80	1711.000	.845	.898
CC 1.7	196.80	1718.083	.782	.899
CC 1.8	196.60	1725.417	.748	.899
CC 1.9	196.44	1734.590	.771	.900
CC 1.10	195.64	1761.907	.548	.901
I 1.1	198.72	1751.210	.917	.900
I 1.2	197.36	1696.157	.674	.898
I 1.3	197.92	1740.077	.789	.900
I1.4	198.52	1777.093	.513	.902
DD 1.1	199.24	1804.357	.193	.904
DD1.2	197.84	1807.140	.058	.904
DD1.3	197.28	1809.293	.006	.904
DD1.4	198.64	1734.573	.782	.900

APPENDIX IV: HYPOTHESES TESTING

RESULTS OF THE ONE-SAMPLE KOLMOGOROV-SMIRNOV TEST

Stakeholders

One-Sample Kolmogorov-Smirnov Test						
		Community members	Entrepreneur	Sponsors/donors	Researchers	Others
N		25	25	25	25	25
Normal Parameters	Mean	4.40	4.84	3.60	2.80	5.44
	Std. Deviation	1.384	.746	1.607	2.021	1.960
Most Extreme Differences	Absolute	.308	.305	.154	.221	.267
	Positive	.172	.255	.126	.221	.213
	Negative	-.308	-.305	-.154	-.187	-.267
Kolmogorov-Smirnov Z		1.538	1.525	.772	1.103	1.335
Asymp. Sig. (2-tailed)		.018	.019	.590	.175	.057

Resources

One-Sample Kolmogorov-Smirnov Test									
		Information availability	Funds availability	Skills	Technology	Affordable bandwidth	Infrastructure	Equipment	Others
N		25	25	25	25	25	25	25	25
Normal Parameters	Mean	4.60	4.60	4.64	4.68	3.96	4.52	4.88	6.04
	Std. Deviation	1.041	.957	.995	.945	1.428	1.229	.781	1.207
Most Extreme Differences	Absolute	.290	.262	.281	.273	.229	.332	.361	.307
	Positive	.190	.178	.199	.207	.229	.188	.279	.213
	Negative	-.290	-.262	-.281	-.273	-.207	-.332	-.361	-.307
Kolmogorov-Smirnov Z		1.448	1.310	1.406	1.363	1.146	1.660	1.805	1.534
Asymp. Sig. (2-tailed)		.030	.065	.038	.049	.144	.008	.003	.018

Context

One-Sample Kolmogorov-Smirnov Test								
		Community Background	Surrounding Environment	Economic / Social Activities	Infrastructure	Security	Literacy level	Other

N		25	25	25	25	25	25	25
Normal Parameters	Mean	4.04	4.36	4.48	4.60	4.88	4.48	6.28
	Std. Deviation	1.457	1.036	.918	1.041	.726	1.194	1.173
Most Extreme Differences	Absolute	.185	.196	.259	.290	.326	.268	.370
	Positive	.119	.196	.259	.190	.274	.172	.270
	Negative	-.185	-.172	-.181	-.290	-.326	-.268	-.370
Kolmogorov-Smirnov Z		.925	.979	1.297	1.448	1.628	1.342	1.851
Asymp. Sig. (2-tailed)		.359	.293	.069	.030	.010	.055	.002

Constraints

One-Sample Kolmogorov-Smirnov Test											
		Religion	Politics	Customs	Gender	Environmental Factors	Security	Funding	Reliable Electricity Supply	Reliable Bandwidth	Other Factors
N		25	25	25	25	25	25	25	25	25	25
Normal Parameters	Mean	2.40	2.40	2.28	2.08	2.76	3.56	3.56	3.76	3.92	4.72
	Std. Deviation	1.683	1.683	1.745	1.824	1.665	1.387	1.387	1.332	1.152	1.021
Most Extreme Differences	Absolute	.394	.394	.364	.323	.316	.216	.216	.268	.312	.368
	Positive	.394	.394	.364	.323	.316	.216	.216	.268	.312	.232
	Negative	-.203	-.203	-.232	-.277	-.164	-.144	-.183	-.252	-.248	-.368
Kolmogorov-Smirnov Z		1.970	1.970	1.819	1.616	1.580	1.078	1.078	1.342	1.562	1.840
Asymp. Sig. (2-tailed)		.001	.001	.003	.011	.014	.196	.196	.054	.015	.002

Successful Implementation of DVPs

One-Sample Kolmogorov-Smirnov Test							
		Provision of e-government services	Generation of income	Employment	Training	Provision of affordable services	Bringing services closer to the people
N		38	38	38	38	38	38
Normal Parameters	Mean	2.68	2.84	3.50	4.18	3.03	3.97
	Std. Deviation	1.016	1.128	1.289	1.111	1.052	1.262
Most Extreme Differences	Absolute	.329	.299	.272	.400	.326	.371
	Positive	.329	.299	.256	.231	.326	.208
	Negative	-.250	-.228	-.272	-.400	-.165	-.371
Kolmogorov-Smirnov Z		2.025	1.841	1.679	2.466	2.008	2.286
Asymp. Sig. (2-tailed)		.001	.002	.007	.000	.001	.000

RESULTS OF THE ONE-SAMPLE KOLMOGOROV-SMIRNOV TEST

		One-Sample Test					
		Test Value = 0.05					
						95% Confidence Interval of the Difference	
ELEMENTS	**FACTORS**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Lower**	**Upper**
Stakeholders	Community Members	15.710	24	.000	4.350	3.78	4.92
	Entrepreneur	32.100	24	.000	4.790	4.48	5.10
	Sponsors/donors	11.044	24	.000	3.550	2.89	4.21
	Researchers	6.804	24	.000	2.750	1.92	3.58
	Others	13.753	24	.000	5.390	4.58	6.20
Resources	Information Availability	21.857	24	.000	4.550	4.12	4.98
	Funds Availability	23.762	24	.000	4.550	4.15	4.95
	Skills	23.066	24	.000	4.590	4.18	5.00
	Technology	24.493	24	.000	4.630	4.24	5.02
	Affordable Bandwidth	13.688	24	.000	3.910	3.32	4.50
	Infrastructure	18.188	24	.000	4.470	3.96	4.98
	Equipment	30.921	24	.000	4.830	4.51	5.15
	Others	24.815	24	.000	5.990	5.49	6.49
Context	Community Background	13.691	24	.000	3.990	3.39	4.59
	Surrounding Environment	20.801	24	.000	4.310	3.88	4.74
	Economic/ Social Activities	24.120	24	.000	4.430	4.05	4.81
	Infrastructure	21.857	24	.000	4.550	4.12	4.98
	Security	33.277	24	.000	4.830	4.53	5.13
	Literacy Level	18.544	24	.000	4.430	3.94	4.92
	Others	26.549	24	.000	6.230	5.75	6.71
Constraints	Religion	6.981	24	.000	2.350	1.66	3.04
	Politics	6.981	24	.000	2.350	1.66	3.04
	Customs	6.391	24	.000	2.230	1.51	2.95
	Gender	5.565	24	.000	2.030	1.28	2.78
	Environmental Factors	8.137	24	.000	2.710	2.02	3.40
	Security	12.655	24	.000	3.510	2.94	4.08
	Funding	12.655	24	.000	3.510	2.94	4.08
	Reliable Electricity Supply	13.930	24	.000	3.710	3.16	4.26
	Reliable Bandwidth	16.800	24	.000	3.870	3.39	4.35
	Others	22.860	24	.000	4.670	4.25	5.09
Successful Implementation of DVPs	Provision of e-government Services	15.979	37	.000	2.634	2.30	2.97
	Generation of income	15.263	37	.000	2.792	2.42	3.16
	Employment	16.496	37	.000	3.450	3.03	3.87
	Training	22.929	37	.000	4.134	3.77	4.50
	Provision of affordable services ,	17.435	37	.000	2.976	2.63	3.32
	Bringing services closer to the people	19.158	37	.000	3.924	3.51	4.34