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Access to and Use of Information in Mukuru and Kangundo Digital Villages, Kenya

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Abstract: The study investigated access to and use of information by local communities in Mukuru and Kangundo digital villages with a view of proposing measures that will enhance the usability of the digital villages as a source of information. The study was informed by information chain model whose key elements: local content, economic resources, social resources and action resources formed the basis for the research. Qualitative research approach with purposive sampling technique was used to identify the two digital villages and the respondents under the study. Data was collected from a sample size of 50 respondents consisting of 2 managers of the digital villages, 7 staff members, 40 users and 1 key informant using interview method. Observation and documentary analysis were used as secondary data collection method. Data analysis was done qualitatively and presented using direct excerpts, narrative explanations and supported by figures and tables. Findings show that local communities require all kinds of information in their day to day life with particular emphasis on agricultural and health information. However, there is a general observation that digital villages are not being used by local communities to access this information due to lack of technological know how, shortage of finances and the social perception of the digital villages. The study recommends review of the current digital villages' model in order to enhance their usage as a source of information. This includes collaborating with local institutions to generate local content so as to meet the needs of local communities, marketing of digital villages as a source of information and improving quality of services offered in the digital villages. The study concluded that, access and use of information in the digital villages should be enhanced by addressing the challenges and adopting a new framework of implementation proposed under this study.

Keywords: Access to information, Digital villages, Information needs and Telecentres, Information communication technology.

I. Introduction

The vision and the guiding principles of the World Summit on the Information Society (WSIS) envisage promoting the use of Information and Communication Technology (ICT) in provision of information access to the local communities. According to Plan of Action adopted by WSIS of improving connectivity and access to ICT, one of the indicative targets is connecting marginalized and rural communities with ICT and establishing community access points (WSIS, 2003). The WSIS action plan provides a detailed guide on establishing multi-purpose community public access points which requires that individuals, organizations and communities benefit from having access to information and knowledge from these access points.

The Government Kenya recognizes the importance of ICT in economic development and has therefore initiated major steps to promote its use. One of the major initiatives that the Government is pursuing is the Digital Villages Project (DVP) also known as telecentres. Gomez and Hunt (1999) views telecentres as a solution to the development problems around the world because of their ability to provide desperately needed access to Information and Communication technologies (ICT). Telecentres have considerable latent for narrowing the digital divide in remote, rural and disadvantaged communities. They can be especially useful in helping developing countries and rural areas take advantage of the information economy, access education, government information, healthcare and other services, and develop socially and economically.

The Telecentre concept has been widely adopted in the United States, Canada and Australia. However, in these countries the focus is more on advanced services such as Internet access and video conferencing rather than on basic telephone services (Jensen and Esterhuysen, 2001). In developing countries in Africa and elsewhere, public facilities are needed for basic access, and for value-added services that can contribute to the social and economic welfare of the community. Over the past two decades, ICT access points have proliferated in many developing nations with the support of governments, donor agencies, non-governmental organizations (NGOs) and commercial enterprises.

The need to improve accessibility of information in sub Saharan Africa led to a number of telecentres being established by various organizations. The major aim was to ensure that there is improved flow information to the rural and marginalized

communities. According to Kamba (2009) over 35 telecentres were established between 1997 and 2000 by the International Development Research Centre (IDRC) through its ACACIA projects in several African countries including Benin, Uganda, Tanzania, Mali, Senegal, Mozambique and South Africa.

In Kenya, the government, together with external stakeholders and private contractors, is increasing its ICT investments in order to bridge the digital divide. According to ICT board (2010), most of the ICT facilities in Kenya are 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 Kenya ICT Board is implementing the Digital Villages project (DVP) under the Kenya Transparency Communications Infrastructure Project, which will see a creation of network of information facilities across the country.

The project has been branded to "pasha" which is a Swahili word that means to 'inform'. The Digital Village Project (DVP) is an integral part of an innovative public private partnership (PPP) for taking ICTs to the rural communities in Kenya. DVP seeks to harness the vast untapped potential of the rural sector by making information more accessible to the wider population through the development and utilization of ICT facilities in the rural areas.

According to the ICT board, the objective of the project is to provide a suite of services to the public via computers connected to the internet. The services include government services; community based services as well as a host of commercial services. Specifically, digital villages are supposed to provide the following services to the rural communities:

- Enhance information as communities shall be exposed to news and trends that may positively impact their lives.
- Provide employment for Kenyans both directly through economic activity that the centre will generate and secondarily through the opportunities that the information will provide.
- Enhance 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 Centres.

The digital village concept was part of a digital inclusion strategy aimed at easing access to technology and information in rural areas. They were envisaged to bring about much transformation in the rural areas of Kenya by providing access to information, services and means of communication.

II. Statement of the Problem

The dearth of documented evidence on general performance of the digital villages can be interpreted to mean that digital villages project is being implemented without due consideration of lessons that can be learnt from other community based ICT initiatives especially in terms of access and use of information. Similar initiative already exists in many communities across the country in the form of telecentres, for example, the Communication Commission of Kenya (CCK) telecentres and Maarifa centres by the ALIN foundation. As is the case for any major project, before further developments are planned, there is a need to conduct an evaluative assessment. This study therefore, undertakes to examine the extent to which people use existing digital centres to access information and identify factors affecting their use. By conducting such a study, the dynamics surrounding use of such facilities can be better understood. With this understanding, variables influencing use of the digital villages can be isolated and appropriate measures can be implemented to ensure that their intended purpose of easing access to technology and information in the rural areas is achieved.

III. Objectives of the Study

A. Objectives of the Study

- To determine the information needs of the communities served by Kangundo and Mukuru digital villages.
- To examine the sources of information used by the communities in Mukuru and Kangundo to access information.
- To find out the extent to which Mukuru and Kangundo digital villages are used by the communities to access information.
- To examine the factors affecting the access and use information in the Mukuru and Kangundo digital villages.
- To make recommendations and propose a framework for improving access and use of information in digital villages.

B. Research Questions

- What are the information needs of the communities served by Kangundo and Mukuru digital centres?
- What kinds of information sources do people prefer to use?
- To what extent are digital villages being used to gain access to information?

- What role can the digital villages play in meeting information needs of the community?
- What factors affect access and use of information in the digital villages?

IV. Theoretical Framework

This study was guided by the Information chain model postulated by Heeks in 2005 as illustrated in Fig. 1.

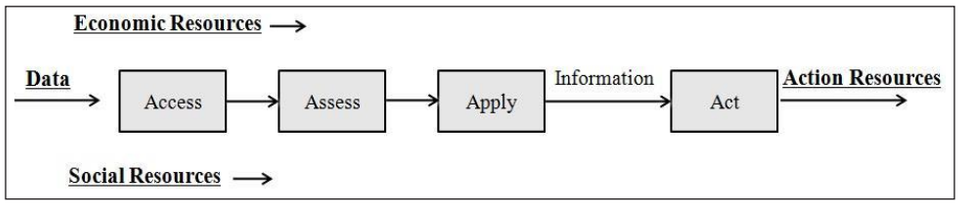

Fig. 1: The Information Chain Model (Heeks, 2005)

Information chain model has been utilized in studies across a range of disciplines. The most notable works relating specifically to ICTs and information access includes: Heeks, 2005; Heeks 2008; Gigler, 2004 and Akther, 2012. Heeks in his work gives much more focus on information above information driven technologies. He considers the technology to be useless, as long as it does not support information processes. Emphasizing Heeks view point, Gigler (2004) points out that, technological factors such as infrastructures, computer ownership and access to technology cannot solve the major challenge of ICT development. He considers the major challenge to be transferring data access from internet into meaningful information and availability of social resources to implement the information into the practices in the communities.

According to Heeks (2005), the contribution of ICTs to socio-economic development must be founded on an understanding of information in development. He believes that understanding Information chain provides means for understanding the activities and resources required for information to contribute to development. The model shows that the utter presence of data is not enough, but that communities need to be able to access the data, assess its qualities and apply it to their own local needs. The four elements in which the model is anchored include data resources, economic resources, social resources and action resources.

In conceptualizing the information chain model with the current study, the researcher looked at data resources as the availability of local content in digital villages, economic resources as the infrastructure and affordability of services in the digital villages, social resources as the technological knowhow and the perception of the digital villages by the local communities, and finally the action resources as the ability of the users of digital villages to use information for development.

V. Literature Review

A. The Concept of Telecentres/Digital Villages

Access to information has the potential to bring about the needed social and economic change in a society (Ariyabandu, 2009). However, with the advent of new technologies there is a tendency for rural communities to be left behind in information access. This is aggravated by information evolution that has resulted in greater socio-economic inequality in society due to different level of access to computers and Internet. To mitigate such inequalities, Atieno (2013) proposes the use of telecentres to provide access to computers and Internet to allow for the public to access information. Ariyabandu (2009) advocates for telecentres as they provide public as opposed to private access to Internet and computers which has allowed better access to information and knowledge to remote and rural areas. Jensen and Esterhuysen (2001) add that community access points (telecentres) are the only source, for many rural and remote areas in developing countries, to ensure access to ICT for everyone.

The origin of telecentres can be traced back to 1980s when the first telecentres where established in Scandinavia and Denmark as social experiments in promoting the use of advanced information communications technology. Buhigiro (2012) as cited by Benjamin (2001), noted that the Scandinavian telecentres were established as means of improving access to telematics in rural and isolated areas.

In 1983, the first "community technical centre" was established in Harlem in the United States. According to Molnar and Karvalics (2000) the main objective of the community technical centres was to reduce the unfavourable effects of the digital gap that had evolved between the upper and lower layers of the American society in the access to, and use of, basic technological and communicational devices such as telephones.

In 1985, more telecentres were established in the remote villages of Vemda-len and Harjedalen in Northern Sweden. According to Molnar and Karvalics (2000) the establisher of the telecentres in swenden, saw the main aim of telecentres as the provision of basic telecommunications services for the local, isolated population. Some years after the birth of the first telecentre, the number of European telecentres grew to some hundred; sentiments supported by Benjamin (2001) who pointed out that more than 230 telecentres had been established in Australia, Austria, Canada, Denmark, Finland, Germany, Ireland, Japan, Norway, Sweden, the UK and the USA by early 2000s. The main aim of establishing centres in these developed

countries was to bring access to ICTs for people who normally do not have access to them.

In mid 1990s, telecentres started spreading in developing countries with the support of development agencies. In Africa, Telecentres have received considerable support from UNESCO, the International Telecommunication Union (ITU), the International Development Research Centre (IDRC) and a number of other international development agencies. The governments of a number of countries, as well as telecommunications operators, have also contributed to the spread of access to services. There are several pilot telecentre projects scattered throughout the continent. They have been set up to test different models, mechanisms of implementation and strategies for sustainability. The most well known of these projects are the ITU/UNESCO/IDRC projects in Benin, Mozambique, Uganda, Mali and Tanzania, and the South African programme supported by the Universal Service Agency (Hunt, 2005).

The Digital villages' project originated from the Kenyan government's recognition that ICTs have been centered mainly in the urban areas, resulting in glaring disparities between urban and rural areas in the distribution of ICT facilities (Kenya ICT Board, 2009). The government in partnership with the private sector is taking ICTs to rural and underserved communities and making the ICTs affordable and accessible to the underserved and rural populations (Kenya ICT Board). The project, initiated in 2008 by the Kenya ICT Board and funded mainly by the World Bank, aims at providing a suite of services to the public, especially those in the rural areas via computers connected to the internet.

Some of the services include health information, market price, e-learning platforms, online courses on vocational training, gaming and ICT, business & entrepreneurship training resources, agency banking services, employment opportunities both directly and indirectly through the economic activities the centers generate, and government services, for example, National Social Security Fund (NSSF) statements, driving license application forms and police abstracts (Kenya ICT Board, 2009).

According to the (Kenya ICT Board, 2009) the Digital Villages' aims were to; enhance social and economic development, create employment, Increase ICTs connectivity in rural and underserved communities, offer services such as e-learning platform and improve provision of government services.

Kenya ICT Board counts on three Pasha Models for their Pasha Centers, they include: The Capability Maturity Model (CMM), basic model (basic office services, internet surfing, and e-mailing), Standard model (basic skills courses, face to face support, and access to government services), Advanced model (remote technical support, wireless access to satellite places, educational and vocational course training room, and health advice room). Services currently offered are inconsistent across the two centres; basically they range from basic to standard. They mainly depend on the IT experience of the staff in the centre at the time.

B. Telecentres and Information Accessibility

Information access and use has been considered for a long time as a means through which rural and disadvantaged communities can achieve any meaningful development. This sentiment is supported by Kamba (2009) who asserts that having access to the right information can address major problems that hinder rural community development and it can also improve chances for livelihoods. He argues that lack of access to adequate and right information at the right time to the rural communities undermines the efforts of improving the living conditions of the rural people by both governments and non-governmental organizations.

Gomez and Hunt (1999) views telecentres as a solution to the development problems around the world because of their ability to provide desperately needed access to Information and Communication technologies (ICT). They can be especially useful in helping developing countries and rural areas take advantage of the information economy, access education, government information, healthcare and other services, and develop socially and economically. In emphasizing the importance of information, Bell (1979) (as quoted by Kamba, 2009) notes that:

> "The changing pattern of the new information age, the dependence upon information to create innovation and change, places a high premium on the ability of nations to access and use information to create advances in the society. Therefore, to produce a desire to change in human development, information deserves utmost attention for as long as man natural curiosity inheres in him (Bell 1979:235)".

The achievement of an information-based society is one of the main priorities of the Government towards the realization of national development goals and objectives for wealth and employment creation. Digital villages is seen by the government as the means to which this noble idea can be achieved. This is supported by Kamba (2009) who opines that connecting the rural communities to the global network can be made possible through the establishment of innovative community information centre (ICIC). When carefully designed and implemented (Kamba, 2009), ICIC promises great potentials in establishing a dynamic network for preserving, ordering and transmitting information to the rural communities. However, in this age of information revolution, providing the infrastructure, hardware and software alone is not sufficient. There is ample evidence to suggest that the sustainability of digital villages depends on recognizing the dimensions of access, because without sufficient access, digital villages will not be able to justify their existence, nor be demand-driven.

C. Information Needs

In his study, Dervin's (1992) notes that people seek information when they have identified gaps in their knowledge that prevent them from making sense of a situation in which they find

themselves, solve a problem at hand or make an informed decision. Identifying information needs is the first step towards satisfying the needs. According to Mtega (2012), an information seeking process involves a number of steps, including: identifying information sources, consulting the sources and accessing information. He notes that the choice of information sources is influenced by factors such as age, level of education and Economic factors sentiments supported by Akanda and Roknuzzaman (2013) who are of the opinion that information needs of the rural communities maybe different mainly due to reasons such as level of education, economic activities, and social status. Having knowledge of how these factors influence information seeking behavior is important for improving access and usage of information in local communities.

Issa (2009) in his study of information needs of rural dwellers in Kwara State, Nigeria, analyses several information needs of rural and disadvantaged communities in developing nations. In his analysis he identified a set of information needs such as health, agriculture and allied occupations, education, housing, employment, legal matters, crime and safety, policies and government. According Kwigizile, Chilongola, and Msuya (2011) rural communities require information on agriculture, education, career development, health, non-governmental organization activities, Government related information and micro credit information.

Mtega (2012) in his study concluded that rural communities needed all types of information, although each individual has specific information needs related to specific individual problems. Mtega further states that information needs vary from one individual to another due to different social economic conditions, occupation and basic survival needs.

D. ICT and Local Content

There is a deluge of information available through information and communication technologies (ICTs) but the amount of data that is directly relevant to local communities may be relatively small. According to Organization for Economic Co-operation and Development (OECD), the content that is most important to people is typically in their own language and is relevant to the communities in which they live and work, this relevant content is often referred to as local content. There is a strong need to create local ICT based content, relevant and accessible to the community, in order to make the digital villages truly a community centre.

ICTs have the ability to disseminate information widely both locally and globally, but there is a danger of the local communities consuming irrelevant information since most of the content in these ICTs are global and does not fit the needs of local communities. Ballantyne (2002) in his study on collecting and propagating local content development, notes that developed countries are more ICT-enabled than developing countries and have published much more of their local content, resulting in the danger of developing countries having easy access to globalized knowledge and thus turning them into consumers of distant and potentially irrelevant information.

Currently, content for ICT applications primarily originates from developed countries and therefore the content produced in the developed countries is often not appropriate or useful in developing countries (Subramanian, 2010). To facilitate greater access to ICT and more relevant use of these technologies, there needs to be an emphasis on content development at the local level. ICT initiatives which aim to bring local communities and other marginalized groups into existing global information flows may fall short unless attention is paid to local knowledge systems and content.

Kenya is at the forefront of innovation in local content on the Internet as attested by the adaptation of global solutions (QECD, 2011). Websites such as uzanunua.com, an adapted version of e-bay is used by Kenyans to buy and sell goods online which helps in marketing of products by local communities. There is a huge potential for Kenyan initiatives and the local content being generated. Ushahidi, a local software developed to provide more and accurate information about post election Violence in 2008, have benefited other countries such as Chile, Haiti, Russia and Japan in the aftermath of Disasters in their countries.

The Kenya government has also been in the forefront in the creation of local content through its e-government services and the Tandaa project at the ICT authority. The government seeks to increase and diversify sources by promoting employment in the development of local content on the Internet. It is providing incentives to local content providers through reduced licence fees, loans for the development of local content, access to technical assistance and training as well as awards for best content providers (Bruegge, 2011). According to QECD, government through the ministry of Information and Communication has created content that is not only being consumed locally but all over the world for example, the Tinga Tinga tales, an African folklore tales have been commissioned by BBC for its CBeebies channel and by Disney Channel for its Disney Junior block.

E. Challenges to Information Access from Telecentres

Buhigiro (2011) in his study on the role of telecentres in promoting socio-economic development in Rwanda, views affordability of services and ability of users to access information as a major challenge among Local communities. Majority of people in developing countries who live in rural areas depend on subsistence farming such as agriculture and livestock farming, and have insufficient funds to pay for the information services offered in the digital villages. In support of this view, Falch & Anyimadu (2003) pointed out that "although there is an obvious need for access to telecommunication facilities in rural areas, it may not be possible to provide the service at prices affordable to the local community".

According to Panos (1998) new communications technologies are revolutionizing access to information but the revolution is unlikely to reach the poor. In a world where 80% of the world's population has no access to reliable telecommunications, and one third has no access to electricity (Panos, 1998), it is hardly surprising that the ICT based Information reaches few poor people. Likewise, more than half of the low-income countries' population is illiterate, with a far greater proportion unable to read English, the language that dominates digitized information (UNDP 1998). In Kenya for Instance, a survey conducted by the Kenya National Bureau of Statistics (KNBS) indicated that there are roughly 20.6 million Kenyans living in households whose reported income expenditures was insufficient to afford basic necessities. The survey further indicate that majority of the 46 per cent of the population living below poverty line are in rural areas. The poverty level in rural and semi-urban areas makes it difficult for communities to access and use information in the digital villages.

ICT initiatives is an expensive venture, the cost associated with acquisition of infrastructure is not affordable to local communities. Although government and donor agencies have tried to come up ICT based projects such as telecentres, very few exist in low-income countries (Heeks 1999). The Kenyan government through Kenya ICT board has started Community based projects such as the Digital Villages' Project and KENNet to cushion the communities against the overt resources so that they can be able to access information from the internet.

The electrical infrastructure to supply electricity is a major obstacle in Kenya. Electricity is not only expensive for a local community project with a very limited budget but power outages and rationing affect the operation of such initiatives. According to Hellström (2003), Power shading and electrical spikes can easily destroy the equipment which is expensive to acquire. He argues that there is need to acquire Uninterrupted Power Supply (UPS) unit so as to ensure that computers are shut down properly even power goes off.

Foley, Alfonso & Ghani (2002) identifies economic factors such as low-income, low level of education and lack of technology that influences use of Information in telecentres. Akinsola, Herselman & Jacobs (2005) also added other factors that influence the use of ICTs by rural communities: These include low literacy rates; lack of awareness/understanding of ICT; the cost of financing and the availability of funds; technology adaptation; lack of technical capacity/maintenance; and lack of infrastructure and social amenities.

To better understand the role of ICT in community development, it is necessary to explore the factors that influence the use of digital villages, often categorized as socioeconomic factors and socio-personal factors. Various scholars have discussed these factors for example, Ellen (2000) described socio-economic factors as low-income, low level of education and lack of technology skills and socio-personal factors include attitudinal and behavioral issues such as low level of awareness, interest and acceptance of ICT usage. Akinsola, Herselman & Jacobs (2005) also added other factors that influence the use of ICTs by rural communities: These include low literacy rates; lack of awareness/understanding of ICT; scattered population in rural areas; the cost of financing and the availability of funds; technology adaptation; lack of technical capacity/maintenance; and lack of infrastructure and social amenities such as roads, water, energy and health.

VI. Research Methodology

One of the fundamentals in the design of this study was to develop a robust and scientifically grounded methodology that would provide rich and detailed data about access to and use of information in the digital villages. To achieve this, a clear methodology was adopted known as a "research onion". It provides a clear framework that explains methods and strategies used in a research. The diagram below illustrates the research design framework adopted, see fig. 2 below.

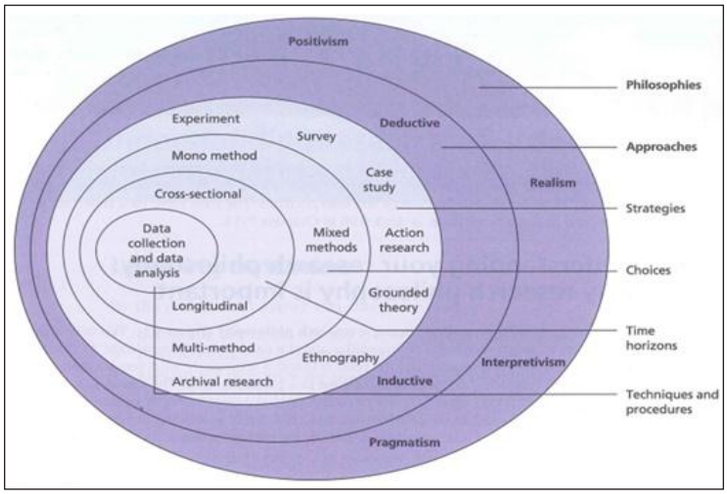

Fig. 2: Research Onion Diagram (based upon Saunders et al's diagram, 2009)

The essential elements of the research methodology as adopted include the philosophical orientation of the researcher; the research approach adopted; appropriate research strategies; the research time lines that are under review; and the data collection techniques employed by the researcher.

The study adopted qualitative research approach which is defined by Denzin (2000) as a naturalistic method involving interpretive approach to its subject matter. In this study, qualitative research approach made it possible to get respondent's experiences from their own perspectives. The study population comprised the staff and end-users of the Mukuru and Kangundo digital villages.

Purposeful random sampling technique was used in selecting the users to be included in the research. According to wood (2008) purposive random sampling is a process of identifying a population of interest and developing a systematic way of selecting cases that is not based on advanced knowledge of how the outcomes would appear. The aim here is to increase credibility and not to foster representativeness.

There is a common belief among researchers that the larger the sample the better the results which is not necessarily true. In qualitative studies the aim is not to get a representative sample of the population but to get valid, meaningful and insightful information from the sample size. According to Hardon, Hodgin and Fresle (2004), qualitative researchers often refer to the redundancy criterion: that is, a researcher should stop collecting data when there is no new information is forthcoming. Mason (2010) in his study, sample size and saturation in PhD studies, notes that although there are other factors that affect sample size in qualitative research, saturation has always been the guiding principle for researchers during data collection. In quantitative studies, the desirable sample size is determined by the expected variation in the data: the more varied the data is, the larger the sample size that will be needed to attain the same level of accuracy.

In trying to identify samples within each case study the researcher did not attempt to obtain a representative sample of digital villages users because the variables with each community were too numerous for this to be achievable. The researcher visited the digital villages for a month on weekdays and purposely randomly identified 2 users who could provide the researcher with information. From this perspective, the researcher was able to interview 20 users in Mukuru and 20 in Kangundo Digital villages. The researcher settled on this numbers after it had reached a point of saturation and no new information was forthcoming.

Qualitative research data collection methods were used to collect data. This included: interview method, documentary analysis and observations. According to Mills (2003), qualitative research uses narrative and descriptive approaches for data collection to understand the way things are and what they mean from the perspective of the research respondents. The study adopted face to face interview method of data collection because it has a distinct advantage of enabling the researcher to establish rapport with potential participants and therefore gaining their cooperation. It allowed the researcher to clarify ambiguous answers and when appropriate, seek follow-up information.

Data was analyzed using qualitative methods of data analysis defined by White (2005) as "a systematic process of selecting, categorizing, comparing, synthesizing and interpreting data to provide explanations of the single phenomenon of interest". In analyzing data for this study, the researcher opted to use thematic analysis, a qualitative analytic method, described by Braun & Clarke (2006) as a method used to identify, analyze and report patterns or themes within data. The process involved familiarization and coding of raw data collected from the field to give it meaning based on trends, patterns and relationships. Once the patterns had been identified, data was grouped to create themes that were used in the study. Coming up with themes in the study required careful reading and re-reading of the data. Inferences made from the analysis enabled the researcher to come up with conclusions and recommendations.

VII. Data Analysis

A. Response Rate

Response rate has always been taken seriously in research since it has implications on validity and reliability of findings. When the response rate is high in any study, then it is most likely that the quality of the findings will also be high. This study has the benefit of 100% response rate. Different strategies were adopted by the researcher to boost the response rate including making efforts to build personal relationship with the respondents, scheduling meetings through appointments set by the respondents and designing the interview schedules smart. The table below gives a summary of the response rate:

Table 1: Response Rate Analysis

Sampled Population Groups	Sample Population	Number of Respondents
Users of the DV	40	40
Managers of DVs	2	2
Staff of DVs	7	7
Director DVP	1	1

B. Demographic Data

Demographic characteristics such as age, gender and level of education was included in the research to provide ideal information on the characteristic of users of the digital villages. David (2000) believes that factors such as age, level of education and gender affect the use of telecentres in accessing information. Although the respondents were purposely, this was done randomly without due concern for gender. A summary of the demographic data collected is discussed below;

a. Distribution of Respondents by Gender

Hallberg, D., Kulecho, M., Kulecho A. and Okoth, L. (2011) in their case studies of Kenyan digital villages with a focus on women and girls agrees with the current study that the wide majority of the users of digital villages are men. They noted that male users generally believe that women have a lack of knowledge and understanding of ICT. It is not difficult to see that the dominant view is in reality the idea that technology is a male device and this induces fears on the women wishing to use technology. However, in Mukuru digital village the opposite is true (See table 1), majority of the users of the digital villages are women. This can be attributed to the fact that Mukuru centre is located in a girl's institution and majority of the users are students from the institution. The manager notes in the interview that "*... the centre has been of great help to the girls."* (MM1)

Table II: Distribution of Respondents by Gender (N = 40)

Study area	Male	Percentage	Female	Percentage
Kangundo Blossom Centre	18	90%	2	10%
Mukuru Promotion Centre	5	25%	15	75%
Total	23	57.5%	17	42.5%

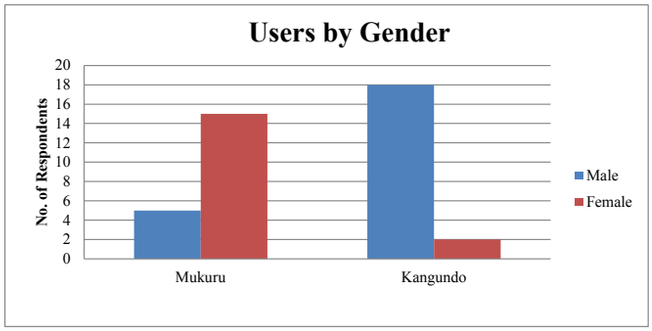

Fig. 3: Category of Users (n=40)

c. Distribution of Respondents by Age Group

As shown in table 3, most of the respondents were aged between 20-29 years old, closely followed by under 20 years. Respondents between ages 30- 39 years and those who were 40-49 years constituted the least number of respondents. From the observation made during the study, Majority of the visitors and users of the centres were young people aged between 17 and 35 years. A manager in Kangundo sums up the whole picture when he notes that, *"older people are not interested in the digital villages because they believe that technology is for the young people and it is too much for them"(KM1).*

Table III: Distribution of Respondents by Age Group

Age (years)	Mukuru Centre (n=20)		Kangundo centre (n=20)		Overall (n=40)	
	Response	Percent	Response	Percent	Response	Percent
Under 20	7	35%	5	25%	12	30%
20-29	11	55%	10	50%	21	52.5%
30-39	1	5%	3	15%	4	10%
40-49	1	5%	1	5%	2	5%
50 and above	0	0%	1	5%	1	2.5%
Total	20	100%	20	100%	40	100%

b. Distribution of the Respondents by Level of Education

Regarding the level of education, majority of the respondents were secondary school leavers and graduates, while a few of the respondents had tertiary/college level of education. Those with primary school level of education had the least number (6) of respondents as shown in table 3. From analysis, it can be deduced that literacy level was an important component in determining the persons who visit the digital village. The findings aligns with literature review which indicated that low level of education and lack of technology skills are the key challenges affecting the use of telecentres in developing countries (Akisnola et al., 2005; buhigiro, 2012).

Table IV: Distribution of the Respondents by Level of Education (n=40)

Education level	Response rate	Percentage (%)
Primary School	6	15%
Secondary School	15	37.5%
Tertiary/college	9	22.5%
University	10	25%
Total	40	100.0%

d. Distribution of Respondents by Occupation

Turning to distribution by occupation, majority of the respondents are students, teachers, health workers, farmers, and

those who are unemployed. A few of the respondents form a group of other professions, namely civil servants, carpenters, builders, and market sellers. The fact that different categories of users visit the digital villages' shows that each individual has specific information need related to his occupation. The finding agrees with Mtega (2012) who concluded that people have specific information needs which relate to the specific problems they face and the decision they have to make. For instance, one of the farmers included in the study noted that: *"I use this centre to check the prices of mangoes in Nairobi before I take them to the market to avoid being exploited by traders" (R18).*

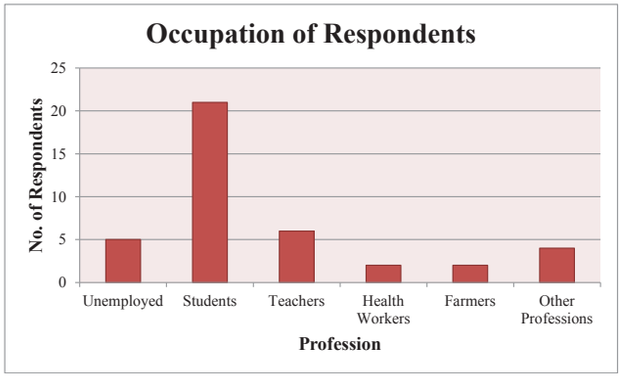

Fig. 4: Distribution of Respondents by Occupation (n=40)

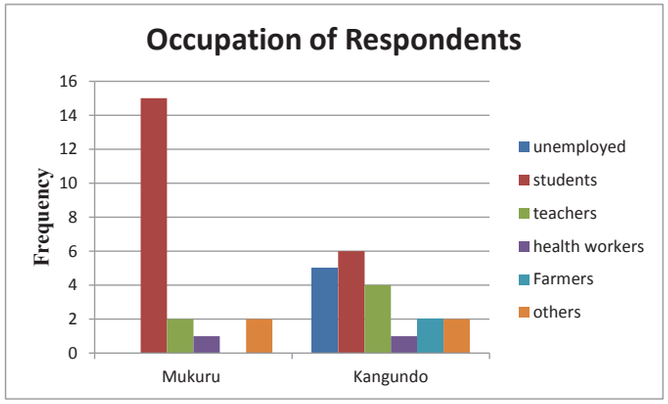

Fig. 5: Comparison of Kangundo and Mukuru by Occupation

It is obvious from finding, that the main digital village users are students, followed by teachers. Comparing the data on these groups shows that the percentage of students is higher in Mukuru than in Kangundo but the opposite is true with regard to teachers. This could be explained by the fact that most of the Mukuru digital village users are students at the educational centre where the digital village is located.

C. Information Needs Analysis

An information need is a gap in a person's knowledge expressed as a question (Mtega, 2012). Usually information needs vary among individuals, communities and professions. According to Islam and Ahmed (2012) information needs of rural communities from all countries are very similar, although rural communities they do vary from region to region and from country to country depending on socio-economic conditions. These needs are mostly related to the daily life of rural dwellers. In this study, users of digital villages expressed strong need for all categories of information with majority indicating the need for health information, academic information, agricultural information and local /international news. A few of the respondents indicated that they required political information. The findings are in line with literature review which indicates that rural and disadvantaged communities in developing nations require information on health, agriculture, education, employment among others (Issa, 2009). The findings are also reinforced by the argument of Mulozi (2008) who revealed that telecentres have provided an opportunity to local farmers to access information that enable them to improve farm practices, market price information, linking agricultural products to market, and increase in income levels.

Given that the respondents could indicate more than one type of information needed, overall one could say that all the categories of information were important to the users, but with particular emphasis on health care and academic information. All respondents considered information to be important for their daily lives and their professional or economic activities, and that it should be made available in the digital villages.

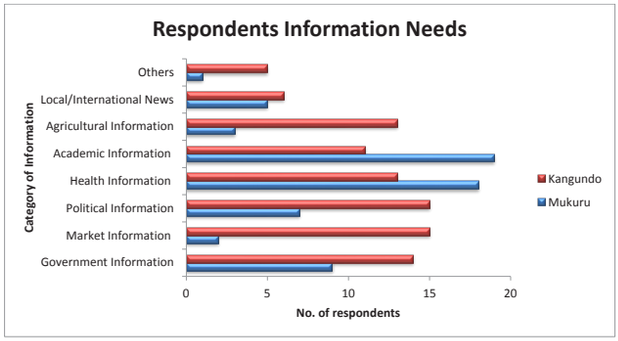

Fig. 6: Information Needs of Digital Village Users (n=40)

Further analysis of the information needs showed that respondent's occupation, age, and level of education influenced the need for some types of information. For instance, it was found that all of the students and teachers included in the study needed academic information. It was also found that the farmers included in the sample needed agricultural information; health workers needed health information. On the other hand, all respondents with secondary, college and university level of education required health information.

D. Sources of Information

The finding of the study has revealed that rural and disadvantaged communities need information to improve their knowledge and

in making decisions that could improve their quality of life. They therefore, try to meet their information needs by utilizing the information sources which are accessible to them and which they feel comfortable to use.

There were several sources of information used by people in the study area. The information sources used included radio, television, newspaper and magazines, government officials, face-to-face encounters, leaflets, libraries and the internet. The findings indicated that radio was the most commonly used source of information with majority of respondents reporting to having used it. Information was also sort from other sources that included: television, newspapers and magazines, leaflets and posters, Internet and libraries. It was found out that government officials' was the less consulted source of information with only a few of the respondents reporting to have used them to access information for their day to day life. The views agrees with the findings of the studies by Etta (2001), Mtega (2012) and zaid 2005 who identifies radio, televeison, Internet and libraries as major sources of information among rural communities.

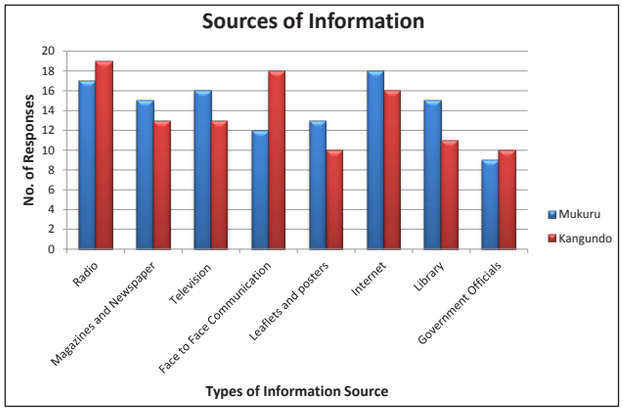

Fig. 7: Sources of Information (n=40)

E. Services Offered at the Digital Villages

This section addresses the third objective on services offered in the digital villages. According to the ICT board, the objective of the project is to provide a suite of services to the public via computers connected to the internet. Although, the main objective of the digital villages was to provide internet services, there were other services being offered in the digital villages such as telephone services, photocopying services, printing and typing services and finally pasha portal services. Since the digitals villages adopts a Government- Franchise model whose broad purpose is both commercial and people oriented (Mukerji, 2008) the staff of the digital villages feels that the digital villages will not make any profit if they offer only internet services. The digital villages can therefore be categorized as basic telecentres based on the services they provide (Jensen and Esterhuysen, 2001).

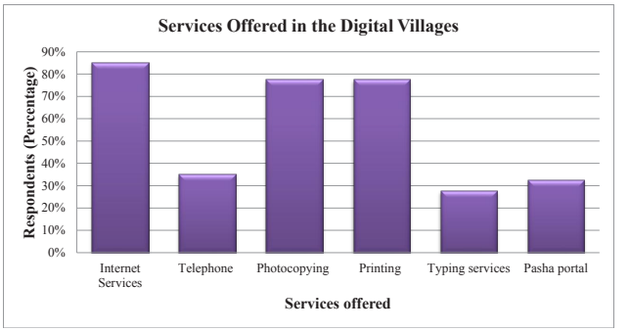

Fig. 8: Overall Distribution of Services Used by Respondents (n=40)

Analysis of the services offered in the digital villages as shown in Fig. 8 above shows that internet services is the most requested service by the users. This clearly shows that majority of users visit the digital villages to use internet services. The respondent agree that the digital villages have provided the communities with services associated with information and communication technologies (ICTs), such as e-mail and use of computers, at acceptable prices. It has also been possible to combine these with support services such as photocopies, and printing service for instance one user indicated that:

> "I had come to search for police abstract form from the internet but I will also require it in hard copy for me to be able to fill"

The facilities used in telecentres play a major role in promoting community access to information for social activities, commercial/business growth, and research purposes (Fontaine, 2002).

a. Quality of Services Offered at the Digital Villages

The users were asked if the quality of services they are being offered meet their expectations. A summary of their responses is shown in table 5 below:

Table V: Some of the Excerpt on the Quality of Services Offered in the Digital Villages

Response	Theme
You never come here for KRA pin and leave without...if you look at how clear there photocopy is, then you can only conclude that their services are excellent	Meet expectations
Although the Internet is sometimes very slow, generally I can say their services are good.	Partially Meets expectations
The services offered are good but there still room for improve especially support in the use of pasha services.	Partially Meets expectations

E-mail and Internet have enable the community to access varied information about what is going on in the world and Kenya in particular.	Meets expectations
The services does not meet my expectations as I expected better services than the normal cyber cafes but since I can transact my business no problem.	Doesn't meet expectations

b. Use of Internet Services in the Digital Villages

The question was in response to the fourth objective on the extent of use of digital villages to access information. According to ICT board, the objective of the project is to provide a suite of services to the public via computers connected to the internet. It was therefore important for the study to find out how internet services have been used by users to access information.

In the study, respondents were asked about their use of internet services in the Digital villages. Analysis show that 34 users reported to having used the Internet to access information. Of those who had used the internet services, they were further asked what they use internet services for and the results were summarized into five key areas which included: Education services, employment and entrepreneurship, health and wellness, social activities and e-government services.

Use of Internet services across the five areas varied considerably, ranging from a maximum of 22 users engaged in social activities to just 6 engaging in employment and entrepreneurial activities (Fig. 9).

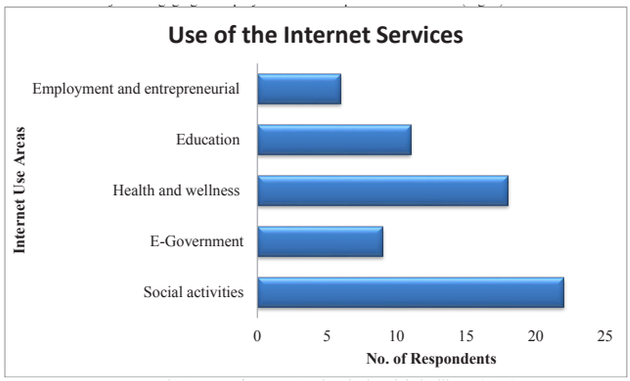

Fig. 9: Uses of Internet Services in the Digital Villages (n=34)

The following sections examined specific activities associated with use in the areas described above, with discussion of the user characteristics most prominently associated with each activity.

- *Social Activities*

By observations and interviews it was noted that social networking is what most customers do at the Digital Village. This is the culture that customers coming to the Digital Village center are accustomed to. Most of the users in this segment visited social network sites such as facebook, twitter and instagram in order to build social networks. The sites helped them get in touch with old friends or make new friends. One of Respondent notes that:

> *"I am here to catch up with friends in facebook and also see what is trending...I lost my smart phone, so this is the only place I can come to access social media (R2)"*
>
> *The researcher also confirmed through observation where at the time of research majority of the users could be seen logged into facebook and other social networks applications.*

Communication with family and friends came out strongly in the research with some of the users communicating with friends and family through E-mail in order to maintain stronger family ties or find support for a personal issue. Respondent (R7) in his response to use of internet services to communicate with friends notes that:

> "I use internet to communicate to my friends within the country and abroad through e-mail and chat. I have a relative in United States and we communicate through Email and sometimes through chat"

Lastly some of the respondents suggested a wide variety of entertainment and social uses for the internet services, including listening to music, downloading music to portable electronic music players where possible or watching videos on sites like YouTube.

- *Education*

Drawing from the National ICT policy of 2006, e-government strategy of 2003 and Sessional paper no. 1 of 2005, ICT integration in education is a key pillar in attaining socio-economic development in Kenya. ICT has improved the quality of education in Kenya by providing students and teacher's quality information materials. As earlier stated most of the users of the digital villages were students and teachers of which some are pursuing their education. Analysis of the results shows that most of the users access the Internet to do their homework, learn about educational programmes, apply for financial aid (HELB loan) and lastly apply for programmes in institution of higher learning.

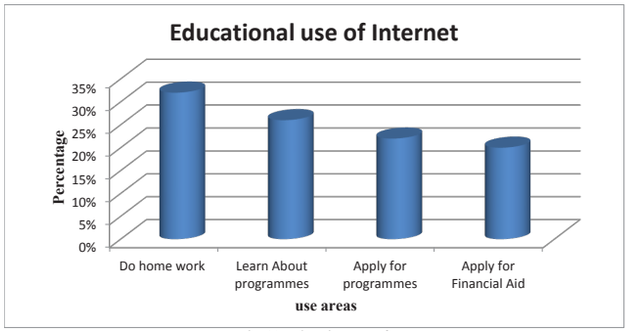

Fig. 10: Education Use of Internet

A first step in meeting educational needs for many users is learning about a program of study majority of Internet users who engaged in educational activities indicated that they used Internet to look for information on educational programs. The process of applying for college and other educational opportunities and obtaining financial aid has moved online along with many other educational activities in recent years as noted by one of the respondents:

"Last month I was here trying to revise the courses I had applied through JAB...nowadays everything is done online and today I am here trying to apply for HELB".(R16)

Without access to the Internet, entry to the higher educational system can be a tedious and difficult, sometimes impossible, process. DV provide an important role in providing educational opportunities for many people in this area that's the reason over 50 percent of the Internet users engaged in educational activities use the internet for applying for programmes and financial aid. As noted by respondents (R11 and R12):

"Digital villages have provided me with opportunity to apply for scholarships and colleges abroad... I wish to get a chance to study abroad one day"

- Health and Wellness

The Kenyan government does not have any policy on E-health that can be used at the Digital Villages. According Kulecho (2012) there are no studies that have been conducted on E-health and digital villages. Most of the studies are on E-health systems that can be used in hospitals. Digital villages provide a means through which health information can be disseminated to the rural communities. According to Kangundo manager:

"The pasha portal has a lot of information on health especially on HIV/AIDS but most people looking for these information, access it directly through the Internet using google search engines. There is need to create awareness to the people on the availability of health information in the pasha portal".(KM1)

The study indicated that users of the digital villages used internet services to access health information. The respondents indicated that they accessed health information which ranged from information on Disease, illness, or medical condition; information about diet and nutrition; and information about health care providers and health insurance. Majority of the users searched for exercise and fitness information. According to a user in Mukuru digital village;

"Information about diet and nutrition is important for girls as they like to maintain their bodies and keep fit." (R15)

Another user in Kangundo digital villages, in response to the question notes that:

"There have been increase in the cases of cancer not only here in Kangundo but throughout the country, I therefore visit the digital villages to read more about the causes of cancer, prevention and treatment. It is always important to have that knowledge"(R3)

- E-government

The Kenyan Government recognises the importance of ICTs in facilitating service delivery. The Kenya vision 2030 identifies ICT as a key enabler of a globally competitive and prosperous nation. It envisages an information and knowledge based society by the year 2030. According to Waema and Mitulla (2011), the national ICT policy highlights the overall goal of e-government, which is to make the government more result oriented, efficient and citizen centred within the broader framework of IT, Broadcasting, Telecommunication and Postal Services, while on the other side, the e-government strategy aims to refine the relationship between the government and the citizens, with the objective of empowering them through increased and better access to public services.

The main aim of establishing digital villages across the country was to provide a suite of government programs and services to the local communities through the internet. The study showed that, users access the internet in the digital villages to find out about government programmes and services, to download government forms and police abstracts, to find out about government permits and licenses while others used the internet to learn about laws and regulations especially on stating a business. According a respondent in Kangundo:

"The reason I am here today is to renew my driving license. The e-citizen platform has really made our work easier. There is no more travelling to Kenya Revenue authority offices to renew a driving license". (R6)

- Employment

According to Kenya National Bureau of Statistics (KNBS), unemployment rate in Kenya averaged 22.43 percent from 1999 until 2011. This is measured by the number of people actively looking for a job as a percentage of the labour force. This can be translated to mean that close to 10million people are looking for employment. On the other hand, prospective employers that include Government, Non Governmental Organizations and private sectors advertise job opportunities through their websites and in most cases encourage online job application. This has necessitated job seeks to Internet services in their search for employment.

Respondent (R12) in his response to the use of Internet services at the digital villages notes that:

"Access of daily newspaper is expensive for me since am still jobless and the fact most of the vacancies are advertised online, gives me the reason to visit the digital villages."(R12)

Analysis of the study show that users visit digital villages to access information on employment or career opportunities. Specifically, they use Internet services to search for job opportunities; submit job application online and to learn how to prepare their resumes. A user in Kangundo (R7) summed it up when he noted that:

"Walking around offices dropping your application is tiresome and you can easily give up, but in the Digital

village, you can do what would take you a week to do in one day."(R7)

c. Use of Pasha Portal in the Digital Villages

Digital villages were supposed to provide a suite of government information to the users through the pasha portal but from the findings, majority of the users were not aware of the existence of pasha portal in the centres. Only a few of the users were aware of the existence of the pasha portal.

The respondents were further asked the kind of information they have accessed from the pasha portal. From Table 6, a list of different types of information was mentioned including: Police abstract, Information how to apply KRA pin, application of Public service commission jobs, ministry of health programmes, and generally other government programmes.

Table VI: Information Accessed from the Pasha Portal

Type of Information	Respondents (n=11)
KRA pin application	4
Police abstract information	6
Ministry of health programmes	2
Application of PSC jobs	7
Government Information	5
NSSF Statements	1
HELB and government bursaries	3

Most of the users felt that the information they accessed from the pasha portal was relevant to their need because they had gone specifically to look for that information and the fact they got the information from the digital village they felt that their information need had been met.

F. Challenges Affecting Access to and Use of Information in the Digital Villages

The finding from the study reveals a number of challenges which influence the use of digital villages. Some of the challenges that align with literature review include; literacy and level of education, language barriers, lack of awareness and skills, and lack of technological skills. Foley et al. (2002) in his study categorized challenges influencing the use of telecentres into socio-economic challenges and socio-personal challenges. The socio-economic challenges include low- income, low level of education and lack of technology skills, and socio-personal challenges as attitudinal and behavioral issues such as low level of awareness, interest and acceptance of ICTs usage, and language barrier.

To get clear perspective on the challenges affecting use of information in the digital villages, the responses were analyzed under three major themes including financial challenges, technological challenges and social challenges. The results were summarized as follows:

Table VII: Challenges Affecting Access and Use of Information in the Digital Villages

Key Challenges	Sample extracts	Specific challenges
Financial challenges	• The cost of accessing internet service is expensive for the locals. One Kenya shilling per minute is very expensive and again there is no difference with the local cyber cafes. • It is expensive to pay for utilities such as electricity, repay the loan from government and which makes it difficult make profit.	• Cost of services • Channeling of funds • Cost of utilities (staff, electricity)
Technological challenges	• Internet is sometimes very slow especially when you are downloading something. • Most users experience difficulty in searching for information in the internet	• Low bandwith/slow connection • Poor searching skills • Power outages and blackouts
Social challenges	• Shortage of funds makes it very difficult for us to carry outreach and publicity programmes in order to create awareness among the community • People in the village are not aware of the existence of the digital village. Some confuse it with the normal cyber cafes around.	• Lack of awareness by community • Lack of outreach and publicity • Lack of local content • Low level of education

In an effort to determine the strength of these challenges, the study came up with the frequencies with which all the themes appeared in the responses. An in-depth analysis of the key themes is as follows:

a. Financial Factors

Financial factors affecting use of digital villages in accessing information include cost of services, channelling of funds by government and cost of utilities such as electricity, rent and staff. The major challenges the users were facing is cost of services. The cost of the services prohibited the users from utilizing the services fully. This challenge according to the managers of the DV was attributed to the high poverty level in community and the high cost of bandwidth.

Secondly, there was a major concern by the owners of the digital villages on how the funds were being channelled. The

process of accessing the funds was taking long and being a loan that needs to be paid back, the service providers were left with little or no grace period to prepare for repayment. This has led to the services being charged higher than the expected prices as was expressed by the users as their biggest issue.

Lastly, the cost of utilities has skyrocketed according to the managers of the digital villages. The cost of renting space, electricity and payment of salaries for support staff was very expensive and thus affect the costing of the services in the digital villages.

b. Technological Factors

When ICTs are present, some members of any population demonstrate a reluctance to use that technology. They may be anxious or they may be fearful about the new technology, and that technophobia raises a barrier to broader use of ICTs. Issues such as poor information searching skills, power surges and blackouts, low bandwidth or slow connection come out as some of the technological factors affecting access to information in the digital villages.

c. Social Factors

The literacy and levels of education is the most concern within the rural communities as revealed in the findings of the study to be the most challenge to the use of Digital Villages to access information. Majority of the users where of the view that low level of education and literacy in the community was the major issue for not using digital villages. This can be attributed to the fact that majority of the people in rural areas do not know how to read and write especially adult people and this affect the use of pasha centre facilities. The Manager of Kangundo digital village notes that *"...Illiteracy and low levels of educational attainment can hinder many rural people from using, or even visiting the telecentre, unless measures are put in place to take care of both literate and illiterates"(KM1).*

The awareness and existence of Digital village's services are important to rural communities when used effectively. Nevertheless, the study findings identified lack of awareness as another challenge that influences the use of Digital Villages to access information. The findings of the study revealed that local communities are not aware of the existence of the Centres and the services they offer.

From the research, it came-out clearly that lack of outreach and publicity is a major challenge affecting use of the digital villages. Managers and staff of the digital villages admitted to the fact that they have not carried any publicity of outreach programme in order to create awareness of the existence of the digital village. A manager in Kangundo noted that

> *"shortage of funds makes it very difficult to carry out publicity and outreach programmes."(KM1)*

According to the Directorate of ICT board incharge of digital villages, some of the challenges affecting implementation of Project include:

- Internet connectivity is expensive in rural areas for example, it is approximately three times higher in Kangundo than Nairobi.
- Power failures are regular.
- Low business plan submission rate.
- Profitability is inconsistent among pilot Pashas.
- Gap between available funds and entrepreneurs awareness of program/funding.
- Entrepreneurship training is effective, but more enablement services are needed. Reliable and sustainable enablement platform between entrepreneurs is needed.
- Willingness of Consumers to Utilize Services.
- ICT literacy rate is low (~30% of population). ICT literacy must be a priority to foster adoption and usage of DVs and ensure viability and success.
- 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. ICT usage must provide a clear and present benefit to citizens in order to be adopted by the majority.
- National level programs tend to have high awareness rate, but complete communication plans reaching to all citizens are lacking.

To address the above challenges the directorate suggested the following measures:

- Assess existing infrastructure to better understand affordability, reliability, and speed.
- Re-evaluate contracts with ISPs and network providers with a goal of providing affordable and reliable service.
- Re-open the application process for KICTB Entrepreneurship Training and set a minimum level of ICT skill requirement in order to apply. This will help increase the number of viable business plans submitted by potential entrepreneurs.
- Incorporate ICT training into primary education curriculum.
- Create local content development plan in support of local content needs.
- Create comprehensive communication plan focused at reaching grass roots level.

VII. Conclusion

This study attempted to investigate the extent to which digital villages were being used by local communities to access information. The study examined access to and use of information in Mukuru and Kangundo digital villages by identifying information needs of users and factors affecting

access and use of digital villages. These informed the recommendations made and the proposed framework.

Digital Villages' Project is anchored in Kenya Vision 2030 and the ICT strategy of 2006 in which the Government hopes to achievement an information-based society by harnessing the use of ICT in provision of information. The government intended to have digital villages in rural areas and disadvantaged urban areas from which local communities can access information. The idea behind the DV project was noble but it has failed to meet the expectations, the findings of the study confirm that the level of use of the studied Digital villages to access information was very low (20% of users) despite the limited access to information faced by the local communities.

When ICTs are present, some members of any population demonstrate a reluctance to use that technology. They may be anxious or they may be fearful about the new technology, and that technophobia raises a barrier to broader use of ICTs. This is true with the digital villages as confirmed by the study whereby 39.6% of the respondents believed that technological challenges affect the use of digital villages. Other social factors like lack of awareness, low level of education and illiteracy influenced too affect the use of the Digital villages. Creating of awareness is paramount for the success of any project.

The study findings further indicated that digital villages offers a variety of services to local communities which have created opportunities and benefits such as computer knowledge skills, job creation, increased income, study opportunities, and access to information in areas of education, health, agriculture market prices, and government information. However, there are several factors affecting use of digital villages such as financial challenges, technological challenges and social challenges that need to be addressed. The study shows that, high cost of using the Internet compounded by the high poverty level of the local community affects the use of digital villages. Very few people can afford to use the Digital villages mostly due to large service fee associated.

So as to meet their objectives, digital villages should provide information relevant to people's need. Information packages should be in different formats that different groups of information seekers can be able to access information. As different information seekers prefer different information services, the number of information services provided should base on user preference, moreover; user fee should be relevant to the average income of the digital villages' users, this can optimize the use of information services by a majority of farmers who are financially poor, an equal importance towards an information rich society.

VIII. Recommendations

To enable digital villages in Kenya meet their objectives better, the following recommendations are suggested:

A. *Improving Quality of Services: t*he issues of cost of services vis-à-vis the services provided and lack of awareness come out clearly as some of the factors affecting use of digital villages (Section 4.7). This can be attributed to the quality of services provided in the digital villages. For better performance of digital villages, the quality existing services provided should be improved. Digital village services should be improved so as to provide a variety of services among users. This will help to attract many users and provide opportunities to earn more income that can in turn be used to expand the services.

B. *Location of Digital Villages:* Since digital villages are meant for provision of information services in rural and marginalized areas, it is expected that they are located in relevant areas. Location consideration is important for digital villages to meet their objectives. Some of digital villages in Kenya are not located in rural areas per se; they are located in areas with many alternative information sources for instance Kangundo digital village is located Kangundo town. It is recommended that digital villages should be located in appropriate areas.

C. *Improved Marketing of Services:* Digital villages owners should strive to market their services strongly to create awareness to as many people in the community as possible so as to improve the feasibility of their services. If possible the existing digital villages should form a consortium to increase their lobbying capacity to approach donor community communities. This will also help them to eliminate possibilities of service redundancy.

D. *Collaboration with Institutions:* The finding of the study Indicated lack of local content as one of the reason local communities don't use digital villages. The researcher believes that local institutions of Learning, research and financial produce a lot of content that if accessed can be of help to the society. It is the believe of the researcher that through collaboration with institutions such as Kenya Agricultural Research institute(KARI), ICIPE, education Institutions such as universities among others; digital villages will be enriched with local content that will be helpful and meet the needs of local communities.

E. *Properly Resources Co-ordination:* Although government has released funds for the digital villages' project, the owners of digital villages are finding it difficult to access these funds. The Banks which were given the money to distribute have put unfavourable conditions for the entrepreneurs to access the funds (see 4.7.4). The ICT authority should come up with a central level institutional mechanism with clear mandate and mission to coordinate, facilitate and support digital villages' related activities.

F. *Content Production:* From the findings of the study lack of local content in the digital villages came out strongly as one of the challenges affecting access and use of digital villages. There is need for the government and

the ICT Authority to develop local content, services and solutions that cater for the local needs and requirements of the communities. Failure by digital villages to meet expectations can be attributed to the fact that most of them provide content or services that does not meet the needs of the local communities.

G. *Social Amenities:* Lack of basic amenities such as electricity and Internet connection makes it very difficult to operate a digital village in the rural areas. It is therefore important to consider starting a mobile digital village because of its ability to reach a wide area and serve more people.

X. Framework for Improving Access to Information in the Digital Villages

A key objective of the study was to provide a framework that will help improve access to information in the digital villages. Key issues affecting access and use of information emerged during the study which informed the framework proposed by the researcher. The framework presented below was developed from the views and experiences of a small group of users and consequently does not aim to be comprehensive. The intention is that this framework be seen as a starting point when considering future development of digital villages because it is based on the experiences and views of users and the people who work in the digital villages.

The research framework is based on four key elements; collaboration, Local content, branding of Digital Villages and publicity and outreach programmes. These elements formed the basis in which the framework was developed.

A. *Collaboration:* There is a lot of information being generated by the academic institution, research organizations, agricultural institutions and government departments that is required by the local communities in their day to day life. Through cooperation and collaboration between these institutions and the digital villages' project secretariat, digital villages can be used to disseminate this information thus creating an informed society.

B. *Local Content:* one significant reason as to why some groups chose not access information from the digital village is because the content is not relevant to their needs. Local content is information provided locally and reflects the values, lifestyle and the needs of local community. Lack of local content on the internet increases unpopularity of digital villages among the local community. It is therefore important for digital villages to provide Local content that can satisfy the needs of the locals. This can be achieved by collaboration with local institutions as explained above.

C. *Publicity and Outreach Programmes:* The community needs to be made aware of the existence of these Centres and the services they offer. Lack of awareness came out strongly as one of the challenge faced in access and use of digital villages. It is also evident that most people still visit government offices for services that can easily be accessed through the Centres.

D. *Rebranding of Digital Villages:* Rebranding will enable the local community differentiate between Digital Villages and other centres providing ICT services in the community such as cyber cafes. The cost of services in the digital villages should be reasonable so as to encourage the local community to access information from these centres. The services offered should also be unique in the sense that, digital villages should offer services that are not offered by other ICT centres in the community. Services such as e-government and agricultural information services should be synonymous with the digital villages.

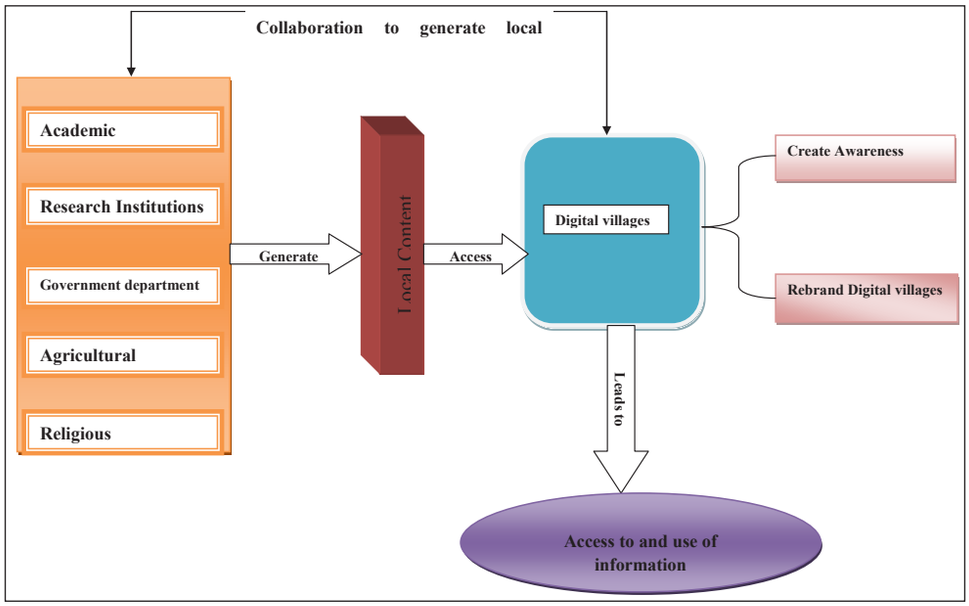

Fig. 11: Proposed Model for Information Access in Digital Villages

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