DETERMINANTS OF PERFORMANCE OF DIGITAL VILLAGES PROJECT IN KENYA

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DECLARATION

This Research Project is my original work and has not been submitted for research and examination of any other institution of higher learning.

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ABSTRACT

The digital village projects is an initiative by the Kenyan Government in Partnership with other stakeholders in the ICT Sector aimed at facilitating the underserved communities' with access to ICT to enhance their general well-being. The role of the centers is to deliver ICT services to marginalized communities with the main objective of narrowing the apparent digital gap by introducing and encouraging the usage of ICT; and creating community communication equipped with a range of ICT services to facilitate Internet access, e-commerce, and e-learning. This study seeks to investigate and examine the issue that influence the performance of the digital villages in an attempt to bridge the digital divide in developing countries and thus institutionalize the foundation of a sustainable model by examining the usage and effects of the services offered in the centers. Descriptive research design was used to carry out the study. The study’s target population was end-users and staff member of the digital villages’ centers setup in Kenya, a part representation of the entire population was drawn from Nairobi County. The study will relied on primary data to guide and used questionnaires for data collection. The data collected was analyzed using both qualitative and quantitative methods.

The study examined how stakeholder participation, level of infrastructure development, demographic profiles and local contents affects the performance of DVP in Kenya. The findings confirm that these parameters affect the performance on the centers in regard to effectiveness, relevance and sustainability. The findings suggests on some of the challenges experienced and ways to curb the same for better performance.

Keywords: ICT-Information Communication Technology, Digital Divide, DVP - Digital Villages Projects
CHAPTER ONE

INTRODUCTION

1.1. Background to the Study

Project management is a discipline adapted in various project environments to plan, organize, monitor and control project resources with intention of successfully achieving a specific goal. In controlled project environment available resources (time, cost and human resource) are utilized appropriately with the aim of achieving effective outcomes (outcome that meets its intended goal), deliver on time, at the budgeted cost, quality and benefits accrued. Project success is perceived as the ability to achieve the projects predetermined goals" (Lim & Mohamed, 1999, p244). Project management discipline is also considered a critical strategic tool especially in the developing countries and that is used in portfolio management in ICT-for-development projects to select, manage and support a portfolio of projects that have the best chance of driving development. As departments and divisions compete for scarce financial and human resources, strategic project portfolio management provides the rational decision framework necessary to make the right project investment decisions that enable organizations to compete and win in the global economy.

Although many developing countries still struggle with the provision of basic services like clean water and electricity, many are increasingly looking to ICT for development projects to improve their social and economic development (Shih, Kraemer, & Dedrick, 2008; Walsham, Robey, & Sahay, 2007). The project management discipline should be adopted into this ICT for development projects for successful implementation, to provide a roadmap, allow for teachable repeatable process and provide benchmarks. Information and Communication Technology (ICT) is defined as computer hardware, software and telecommunications technology. ICT is the world’s fastest growing economic activity; that has turned the globe into an increasingly interconnected network of individuals and organizations communicating and interacting with each other through a variety of channels. The advent of information and communication technologies (ICTs) has indeed
led to technological revolution across the globe and it continues to change the global social and economic environments of countries embracing this technologies.

In Africa the Telecommunications industry has shown tremendous growth in the past decade due to improved infrastructure, low tariff and availability of wireless connections. Internet is recognized not only as a source of information, but also as having the potential of a significant development enabler, with its many applications, and making it particularly important for Africa (Teltscher et. al, 2009). ICT is helping African nations and governments better provide services and information to their citizenry, while African businesses have found new wings that have propelled their businesses far and wide by breaking down physical boundaries. Communication is now easier, faster, and cheaper, thanks to improved technology. Notwithstanding the emergence of Africa as one of the most dynamic regions in terms of ICT growth, the region’s penetration rates remain considerably lower than in other regions. In majority of the African countries, less than five per cent of the population uses Internet (Teltscher et. al, 2009).

The African Continent is adopting and quickly harnessing the benefits from the opportunities that ICT affords faster than any other new technology in its history and so is Kenya. Kenya has always been at the forefront of developments in Information Technology and is emerging as one of Africa’s leaders in this area (Kimacia et al, 2006). Telecommunication services in Kenya were introduced in 1977 and managed as part of a regional network with neighbors’ Tanzania and Uganda and since then, the ICT sector has been continuously growing, greatly influenced by global trends with the fastest growing and most popular ICT in Kenya being mobile phones technology. In 1977, the East African Community under which the regional telecommunications services operated collapsed and as a result, the Government of Kenya established Kenya Posts and Telecommunications Corporation (KP&TC) to run the services. A telecommunications policy statement was issued in 1997 that set out the government vision on telecommunications development to the year 2015. Since the launch of the telecommunication sector reform, Kenya has made great strides in the expansion of telecommunications services. In Kenya, according to the Communications Commission
of Kenya (CCK), the current fixed tele-density is 1.2 percent, while the mobile penetration rate at 51.2 percent, which is still below the world average of 67 percent according to International Telecommunication Union (ITU), (Annual CCK 2010 Report). The report further stated that the continued decline in fixed telephony connections in Kenya has been as a result of increased competition from the mobile service providers. The Government recognizes the role of ICTs in the social and economic development of the nation and has promulgated a national ICT Policy based on the Economic Recovery Strategy for Wealth and Employment Creation. The policy seeks to facilitate sustained economic growth and poverty reduction; promote social justice and equity; mainstream gender in national development; empower the youth and disadvantaged groups; stimulate investment and innovation in ICT; and achieve universal access. ICTs have radically changed the way of doing business. Internet and its enabled business technologies like e-commerce have opened up vast business avenues and transformed the whole business world into a global village, but the potential to exploit the benefits of ICTs largely depends on the access and adoption of these technologies. The status of ICT adoption of an economy is an indicator of its potentiality to exploit the economic opportunities affordable by the new technologies (Singh, 2008). The environment for ICT development has been favorable with the growth of telecommunication sector and infrastructural development that saw the fiber optic cable land in Kenya in September 2009. Kenya’s internet penetration has grown to 19.9 percent; although showing an impressive growth, is still way behind that of other ICT services despite the critical role the World Wide Web plays in socio-economic development. The total number of Internet subscriptions has grown with the growth attributed to terrestrial mobile data/internet subscriptions through GPRS/EDGE and 3G networks (Annual CCK 2010 Report). Synovate, an international research organization, estimated that there are now 3.5 million Internet users in Kenya by 2009 with urban use growing from 22% of respondents in 2007 to 30% in 2009. Rural use grew from 4% to 9% during the same period. The total sample for this random survey was 1,500 people, with 500 of those in a boost sample from across the major districts of Kenya (Synovate, 2009). Currently, the Kenyan government considers the adoption of ICTs as a key step in bridging the digital divide (Wims & Lawler, 2007).
1.1.1 Digital Villages Centers Setup

Digital Villages Project (DVP) is an initiative launched by the government in 2008 in order to bridge the digital divide between the urban areas, peri-urban and rural areas and increase access to ICT, mainly internet access, enhance provision of government services and promote economic development through skill building in ICT and promoting business opportunities. Digital Villages are computer education and resource centers located within disadvantaged communities intended to provide training in and access to Information and Communication Technology (Maryati, 2002). Through a public–private initiative, the government has partnered with service providers to provide internet service to the rural and peri-urban areas through fiber optic cable. The cable were being laid across major urban centers and divisional headquarters, which are closer to the rural communities. DVP branded “pasha” which is a Swahili word that means to ‘inform’, seeks to harness the vast untapped potential of the rural sector by making ICTs more accessible and affordable to the wider population through the development and utilization of ICT facilities in the rural areas. The Pasha Centers 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 project was funded mainly by the World Bank. The digital centers have Internet access, scanners and computers. DVPs in the peri-urban and rural areas will most definitely empower users to become better students, better citizens, better farmers, and skilled workers (Gathanju, 2010).

The key objectives of the DVPs was to provide affordable access and use of ICT resources to rural communities in a sustainable way, increase connectivity of the rural areas and create economic opportunities that will spur rural economic development. Promotion of DVP played a key role in the diffusion and adoption in the rural and peri-urban areas so as to maximize on the benefits that ICT offers to the Kenyan economy and put Kenya in a better economic position locally and globally. There was optimism that the apparent digital gap will be narrowed due to the favorable factors already existing in Kenya.
1.2. Statement of the problem
The digital divide is a multifaceted issue threatening to undermine the economic growth and competitive advantage of individuals, communities and entire regions in emerging economies (Bridging the Digital Divide: Successful Innovations in Private-Public Sector Partnerships- Quinn J. Sutton,). If appropriately implemented, ICT can catalyze and accelerate education reform and economic development (Ngoma, 2010). Ngoma (2010) further sites that ICT is thought of as a reliable vehicle for education, a platform for communication, and a powerful tool for economic growth. Research has indicated that the Kenyan government has made considerable efforts in developing favorable policies towards ICT growth and entering into strategic partnerships bridge the digital divide thorough the facilitation of setting up of Digital Villages within the country. Digital Villages were established to improve information access to the marginalized groups with the aim of bridging the apparent digital gap; however these centers appear to be marginalized with respect to information and knowledge due to the poor process of information and knowledge transfer. While the digital village’s centers were expected to generate and share new knowledge through global and local networks, they are also expected to harness local and traditional knowledge to add value to knowledge networks. Their success will be based on emphasizing the economic gains of the project especially at the grassroots level to encourage their diffusion and uptake and their sustainability will be based on supportive policy, financial business models and social relevance to the target market, the rural and peri-urban areas. The government has developed favorable policies in the ICT sector such as encouraging Internet Service Providers to establish Internet access nodes at all districts and local exchange areas and forming strategic partnerships with the private sector to roll out DVPs as well as provide financial assistance to interested entrepreneurs. The government’s roll out of DVPs is an important step towards closing the digital divide that exists in Kenya and towards achieving economic growth through improving education, government information dissemination, generation of income related activities and promoting employment opportunities.

Despite the various efforts, diffusion and adoption of the DVPs has been slow within the rural and peri-urban regions. The DVP is a new phenomenon with few guidelines on
successfully project implementation due to the relatively recent roll-out of this project. Effects, opportunities as well as the challenges of DVPs have not been subject to an empirical study. A study on the parameters that influence their performance is important to understand local needs, identify problem areas and highlight successful and unsuccessful practices.

1.2.1. General Objectives
The general objective of this study was to find out the factors that determine the performance of the digital village project.

1.2.2. Specific Objectives
This research project explored the following specific objectives:

1. To determine how stakeholders involvement/participations affected the performance of digital villages.
2. To determine how the level of infrastructure development influenced the performance of Digital Villages.
3. To determine how demographic profiles influenced the performance of digital villages.
4. To determine how the availability of local content affected the performance of digital villages.

1.3. Research Questions
The research was guided by the following research questions:

1. How stakeholders' involvement/participations affected the performance of digital villages?
2. How the level of infrastructure development affected the performance of digital villages?
3. How demographic profiles affected the performance of digital villages?
4. How the availability of local content affected the performance of digital villages?
1.4. **Significance and Justification of Study**

This study was to provide key stakeholders in ICT development industry like the Government, development partners and the general public with an insight of the challenges faced in during the project implementation. These includes rigorous policies that do not favor ICT Development projects, lack of physical infrastructure e.g. roads and electricity in the rural areas and lack of funding. Evaluated it relevance in economic development, availability of digital content that will aid in development, and offer practical solutions and also highlight its sustainability in the long run to both bridging the divide and developing the economy.

1.4.1. **Government**

This study will help government understand the parameters determining performance of digital villages and hence will aid in influencing policy formulating.

1.4.2. **Development Partners**

The study is important to strategic development partners, both from the telecommunication sector and Non-governmental organizations, to understand what have been the key challenges with rolling out the project and ways that they can use to efficiently and effectively ensure the service delivered to the rural areas and utilized.

1.4.3. **Public**

The study is important to the public, to steer them towards adopting the digital villages, by creating awareness and buy-in from the communities, help develop employment and business opportunities for the members of public and Kenya as a country stands to benefit.

1.4.4. **Other Researchers**

Moreover, this research will provide recommendations on how to evaluate the performance of digital villages and other ICT interventions for rural development which can be borrowed by researchers across the board.

1.5. **Scope of the Study**

The study focused on the 32 digital villages that have been set up in Kenya. The study will limit itself to Nairobi District where they are highly concentrated (14 Digital centers) and evenly spread in the region compared to other parts of the country.
1.6. Assumptions
The researcher assumed that there would be adequate feedback from the respondents and that the beneficiaries of the digital villages (end users) were aware of the digital villages' centers.

1.7. Limitations
Time was a limitation in this study as the available time did not suffice to carry out a profound test and draw inference to the proposal. A strict schedule to militate against time limit will was drawn and adhered to.

The resources available were also a limitation, but they were utilized optimally for effective research results.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction
This chapter presents a review of the literature related to the purpose of the study which seeks to find out the determinants of the Digital Villages Projects performance.

2.2 Theoretical framework
It is fundamental to assess the process of how ICTs are being introduced and implemented in a community (Gigler, 2004). ICT projects are known to be beneficial, but if initiated inappropriately into a community, they can fail, become unsustainable, or even have harmful effects on rural livelihoods. Essentially, rural ICT projects should be monitored and evaluated to demonstrate good project management, learn lessons for future projects, and show that there is accountability for work (Myers, 2005: 6). For instance, Pade, Mallinson and Sewry (2008: 4) propose a Rural ICT Project Life Cycle (RICT-PLC) model which comprises project management techniques associated with the critical success factors (CSFs) for rural ICT project sustainability. These CSFs aim to alleviate and limit the influence of the challenges associated with ICT use in rural communities. The phases across a rural ICT project life cycle should encapsulate the CSFs of sustainability that are sensitive to the complex rural environment. The extent, to which appropriate project practices that consider the CSFs are applied, may reveal the potential sustainability of an ICT project in a rural area.

ICTs can be used as a strategic lever for socioeconomic development and as a competitive tool in an increasingly global and deregulated market (Jelassi, 2010). The rapid development and proliferation of ICTs has accelerated the economic and social change across all areas of human activity worldwide-and continues to do at a rapid pace (Nandi, 2002). This has led to its embracement across all aspects of human endeavor for and as a means of access, processing and dissemination of information to those with access of ICT; it has been integrated into virtually all aspects of life, redefining the political, economic, social, and work environments. It is widely believed that universal access to ICT will promote economic development, global interaction, and learning that
can in turn enhance standards of living and improve social welfare (Dewan & Riggins, 2005).

2.3 Empirical Review

2.3.1. Economic Effects DVPs in the Rural Areas
Access to internet brings numerous impacts which include the ability to expand economic opportunities and innovation, increase trade and productivity, reduce business costs, create jobs and encourage foreign investment. Broadband networks to rural areas can spread economic efficiency and productivity, diversifying income by supporting both non-agricultural employment and higher incomes from agricultural jobs (Intel, 2009). In many instances, poor people have experienced benefits in the form of increased income; better health care; improved education and training; access to job opportunities, engagement with government services; contacts with family and friends; enterprise development opportunities; increased agricultural productivity (Singh, 2008). Broadband networks can be used to bring more citizens and businesses from rural and remote areas into the formal national economy. Transitioning more people into the formal economy can enable governments to strengthen the basic infrastructure such as roads, schools, hospitals among others in rural areas (Intel, 2009). Rural areas account for a large part of the business sector, in particular agriculture microenterprises and SMEs, improvement in the use of ICTs by businesses in the rural areas has led them to expand their market and reduce costs, thereby increasing revenue and contributing to poverty alleviation (Fredriksson, Barayre, Fondeur and Stanyukora, 2009).

In Canada, Churchill Community Network is based in the rural area of Manitoba, its businesses uses the Internet connection to promote their products and services, to market tourism opportunities globally and to increase the potential for the export of goods (Cameron, Annis and Everitt, 2005). In Tunisia, the government adopted a knowledge based economy through internet connectivity and implemented an ICT strategy, that saw ICT sector’s share of the country’s GDP rise from 2.6 percent in 1997 to 10 percent in 2008, the government achieved this through its strategy in ICT education, reaching all parts of the country, provision of government services online, government incentives to set up ICT ventures and the increasing spread of a digital culture (Jelassi, 2010).
Internet deployment has provided opportunities for Korea’s ICT industry. 300,000 jobs have been created, and the sector is growing three times faster than the rest of the economy especially in the development of search engines and local content, Korea has also developed a competitive advantage in certain market niches of the ICT industry such as online gaming, where the Korean companies are the biggest global players (Korean National Statistics, 2007). In Western China, in a rural area called Tongnan, information centers that have been set-up by the United Nations Development Programme (UNDP) have been used by farmers to access pricing information and benchmark their prices for locally produced goods before selling them to the town areas (Jinqiu, Zhao, Hao, Xiaoming, Banerjee and Indrajit, 2009). Jinqui et al (2009) further added that business-oriented farmers benefited most from the information services in monetary terms, as they used internet to locate other markets outside their locality.

CCK supported VSAT connectivity in Sabatia (Koibatek) that has mainly benefited the Sabatia Farmers Co-operative Society in Eldama Ravine which basically deals with dairy farming products; Chwele (Bungoma West) that has benefited Mavuli Self help Group in Chwele, which mainly handles income generating activities for small scale entrepreneurs (CCK, 2007). In Zambia, a rural area called Macha, internet usage by community members includes e-learning, buying goods such as second-hand cars from Japan, improving knowledge on agricultural techniques and acquiring education material. Digital culture in Tunisai according to Jelassi (2010) has led to the annual creation of, on average, 400 private enterprises and closing the digital divide through ICT access in rural areas through the use of special buses equipped to serve as mobile computer laboratories, with Internet connections and educational tools and games targeted at young users. For a developing country to increase its productivity and for the populace to enjoy an improved quality of life, it is therefore essential that rural areas are developed to the extent where new opportunities are created and innovations occur (Seshardi, 2007).

2.3.2. Social Effects
Internet has the ability to alter commerce, education, government and communications. It affects the construction of and response to social problems such as poverty and education (Servon, 2002). Internet access is seen as a factor that will affect many of the other
activities because of its broad role in development and crosscutting impact on all aspects of human life (Davos, 2003). (Selouani and Hamam, 2007) stated in their report that Ruiz (2004) found that broadband access is an important part of enhancing rural community development in the United States, improving the economy, health care, and general quality of life as rural areas cannot remain economically or culturally viable without the high-speed connection of broadband Internet. Indeed, without having the same telecommunications facilities, such as broadband, afforded to other parts of the country, rural communities suffer from inadequate social services, weakened businesses, and a deficient quality of life.

The huge disparity in Internet access is undesirable because it demonstrates that people of different communities do not have equal opportunities to benefit from technology in their daily lives. According to Selouani and Hamam (2007), one of the consequences of lack of those facilities is that young people move away from their smaller childhood towns to urban places that offer more opportunity. Moreover, small-town businesses cannot compete with urban businesses, and social programs, such as health and education, are negatively affected in rural communities, without technologies such as broadband Internet. Davos (2003) emphasized that many rural areas literally become ghost towns as people move to areas that offer greater work opportunities and education that take advantage of broadband technology. Because the increasing economic and cultural isolation of rural communities presents a social problem, the question of how to ensure that these areas have access to the broadband Internet begs an answer from the government.

Internet had a positive effect by making the daily operations easier for 81 percent of the rural population in Canada (Selouani and Hamam 2007). Access to the Internet is also a tool for individuals who use it to build networks with others with common interests and for keeping contact with friends and family (Cameron et al, 2005). Cameron et al (2005) further added that it has helped volunteers run free training sessions for the rural public in Canada so that rural users can learn how to use email applications and the Internet and over 200 have students used it for educational purposes. Internet is not a panacea for rural development, but it does bring new information resources and can open new
communication channels for rural communities. It offers a means for bridging the gaps between development professionals and rural people through the initiating interaction and dialogue, new alliances, inter-personal networks, and cross-sectional links between organizations (Richardson, 1996). Internet projects for rural development must begin with the real needs of the local community of users. Internet enables people to learn from one another and work together, project outputs are not so much driven by technical concerns as they are by human knowledge and social relationship concerns. Perceived popularity of the Internet and perceived characteristics of the Internet served as necessary conditions to enable Internet adoption in the rural areas. Greater exposure to internet access can better prepare rural citizens for an eventual urban transition while at the same time reducing urban desire.

**2.3.3. Access to Information**

ICT allows for dissemination of information to people, promoting knowledge transfer that is necessary for economic development and the subsequent education and empowerment of the African people (Gathanju, 2010). Many schools in developing countries remain deprived of any form of Internet access, a number of others have connected all their schools, often with broadband access. Jordan, for example, has connected 80 per cent of its schools, with 73 per cent of them having a broadband connection, the teachers are highly qualified in information technology and most of the country’s schools make use of Internet-assisted learning. Training enough teachers to use and teach ICT skills remains a challenge in most developing countries (ITU, 2010).

According to Minishi-Majanja (2007) he stated that Fourie and Bothma (2006) observed increased use of the World Wide Web in private, social, business lives of many people and hence noted that it is a vital component for providing an enabling structure for schools, universities, careers and other use for information and communication. With computer penetration in Kenya at 8 percent, growth of internet is dependent on literacy levels of ICT and availability of communication gadgets. Increased use of internet has increased productivity and overall boost of regional and international trade due to availability of information and ease of access to other businesses through websites, and this is possible if users are literate on its use (Fredriksson et al, 2009). Richardson (1996)
in his report stated that World Bank (1995) observed that Internet was used as a research sharing and information dissemination system. Improved communication and information access are directly related to social and economic development, unprecedented challenges brought on by the changing global economy and the challenges that come along, people at all levels need access to information to make critical decisions. Internet is a medium of communication, and is perhaps the most flexible medium currently available, it has the potential to be integrated within a wide variety of projects that have objectives such as local participation, training, education, research (especially participatory research), technical support and institutional strengthening. Whenever a project involves people who need to communicate and share information across geography, across social groupings, between and within organizations, and throughout production systems, there is a need to create flexible systems of communication and information sharing (Richardson, 1996).

In Western China, information centers have been set up, during the non-farming seasons the information centers were crowded with farmers, whose information requests ranged from prices of farm produces to cultivation skills, health care to external job opportunities, most frequently visited websites were the local agricultural websites and government websites, local farmers come to the center for information when their pigs contracted an unknown disease and the veterinary was not around, or for information regarding the sanitization of pens and the right additives to the forage (Jinqiu et al, 2009). In Nigeria, Owerri Digital Village was launched in Imo State, Eastern Nigeria to provide disadvantaged Nigerian youth in rural communities with access to information to enhance their lives, create jobs, slow urban migration and promote self-sufficient communities (Ugwuegbu, 2002).

In Colombia, low-income rural communities ended their isolation through satellite-based internet solution that provides cost-effective and reliable flow of education materials, teacher training, and communications. Students are able to use the computers during class or during their free time, in order to allow them the opportunity to learn at their own pace and spend more time on a given subject if needed. In addition, the computers will serve
teacher training needs. Approximately 2,000 teachers have been trained in computer and Internet use and they take virtual courses as part of a continuing education program (Sáenz, García and Wolff, 2002). In Seattle USA, the success of students is increasingly determined by access to the information and resources that are available online, and which depend on the ability to connect at high speeds. Many low-income households in Seattle remain unable to afford home Internet access this affects students' ability to complete homework (Martinez, 2010). Access to the Internet is no longer a luxury or privilege for only a few people but is a necessity (Mphidi, 2008). The disparity in access to ICT which results in differences in class, race, age, culture, geography or other factors can affectively deprive certain citizens to participate in the global economy (Kroukamp, 2005).

2.3.4. Challenges of DVPs in the Rural Areas

Infrastructure

Absence of infrastructure in rural areas follows directly from the low population density: the cost of infrastructure is generally proportional to the area covered, while the benefit depends on the number of people affected. Thus, unlike urban areas, the cost of infrastructure on a per person basis is simply too high: even if capital is readily available and government hurdles are low, the net increase in productivity due to the infrastructure is limited by the density, and thus cannot sustain the investment based on return alone (Brewer, 2005). Fixed broadband penetration in Kenya is at 5.5 percent as at 2008; limited number of fixed telephone lines has also constrained the deployment of broadband access via Asymmetric Digital Subscriber Line (ADSL), and largely limits it to urban areas (Teltscher et. al, 2009).

Internet Point of Presence (POPs) exist in fifty percent (50%) of the Kenyan districts. This has improved as compared to the situation in 2002 when Kenstream nodes were only available in 14 districts (Kashorda and Waema, 2002). However, this level of penetration of Internet nodes is way below the 100% planned by 2010 as per the Universal access strategy where all districts have a POP (Waema, 2004). The major bottleneck for rural connectivity in Sub Saharan Africa is electricity. Without a constant source of electricity, computers cannot be used. Only fifteen percent of Sub Saharan Africa rural households
have electricity (ITU, 2007). Irregular or nonexistent electricity supplies are common in Africa, especially outside major towns. Rural areas are less connected, where even where ICT infrastructure exists, its use is constrained by lack of inadequate supportive infrastructure in particular electricity and to a much lesser extent, transport systems (Fredriksson et al, 2009). Another systemic problem is that road and rail are limited, costly to use, and often in poor conditions, resulting in barriers to the increased movement of people and goods; increased mobility is needed to implement and support a pervasive network infrastructure and also for the increased economic and social activity that would occur with greater physical movement of people (Jensen, 2001). In Ethiopia, 94% of the 6,000 internet accounts are concentrated in the capital, Addis Ababa due to limited telecom infrastructure (Parliamentary Office of Science and Technology, 2006).

Currently in Kenya, rolling out services to the peri-urban and rural areas, telecommunication service providers and PDNOs are using wireless infrastructure, at a much lower cost, to provide internet connectivity. Wireless technology may help poor nations leapfrog into the future if they can get assistance to harness the new technology, especially in places where no infrastructure exists wireless is most effective, in helping nations leapfrog generations of telecommunication technology and infrastructure and empower its people (Baijal, 2004). Service providers can build out the wireless backbone first and upgrade links one at a time to fiber, based on economic business case. Trustworthy, transparent and non-discriminatory legal, regulatory and policy environment is necessary to maximize the social, economic and environmental benefits of the information society (Intel, 2009).

Gathanju (2010) stated that “Policy measures can be taken to expand ICT access in rural areas where the market is not attractive enough and also to stimulate demand”. In Kenya, there has been an increase in service providers operations within the rural areas based on the increase in bandwidth licensing from CCK. In 2008 operators deployed 148 backhaul links for network expansion mostly in rural areas. To promote rural connectivity, good general policy is to use lower frequencies for rural connectivity and encourage service providers’ to start with limited coverage and expand it as the economy grows (Brewer,
2005). Regulatory authorities need to encourage tower sharing agreements between operators. Not only does this reduce an entry barrier for new operators, which is good for spurring competition in rural areas, but the pooling of tower infrastructure helps operators expand into rural markets thereby helping universal service obligations. Network sharing has been prevalent in India with more than one third of all towers shared as of June 2009, this has helped in the rapid rise in subscriber numbers across rural areas as opposed to Democratic Republic of Congo (DRC), where active subscription penetration remains very low at 13 percent during the same period spanning vast distances between inhabited areas is a huge challenge to operators (Jotischky and Reed, 2010).

Government participation is important in encouraging adoption and equal distribution of ICT within a country. In Kenya, CCK continues to support the universal access initiative by giving fifty percent (50%) discount on annual frequency fees for microwave links installed in rural areas. This incentive has encouraged the major operators such as mobile companies to increase their coverage in rural areas, thus supporting the socio economic development in the localities (CCK 2008 Annual Report). The primary motivation for growth in ICT has come from the private sector, with the role of governments being that of a facilitator, for creating an enabling environment (Teltscher, Gray and Magpantay, 2009). Without encouragement and incentives, operators are unlikely to roll out broadband networks in non-urban areas, where the majority of citizens live. To make such rollouts cost-effective, governments can take a number of actions, such as offering tax incentives, implementing initiatives that promote the sharing of infrastructure, liberalizing licensing conditions and providing more efficient spectrum allocation (Intel, 2009). Inadequate technological infrastructure to support the integration of ICTs in the rural life, such as poor or lack of national ICT policy, low internet connectivity, inadequate supply of electricity, and inadequate number of computers affects rural areas internet diffusion.
2.3.5. **Internet Access**

One of the major initiatives that the government is pursuing is to improve the ICT infrastructure in order to bridge the digital divide and lower the costs of communication. Limited country-wide ICT awareness has hindered cultural and attitudinal change; therefore development of ICT parks and DVPs will gradually lead the low-cost provision of ICT goods and services and facilitate the growth and establishment business initiatives (Vision 2030). Africa has an Internet penetration that lies well below the world’s 2008 penetration of 23 per cent. This is consistent with the limited availability of fixed telephone networks in the region, which are necessary for Internet dial-up and fixed broadband access. In majority of the African countries less than five per cent of the population uses Internet (Teltscher et. al, 2009). In Sub-Saharan Africa, less than one percent of African villages have a public Internet facility (ITU, 2008).

Internet market represents an important area of ICT growth and development, with the development of ICT come new methods through which information, knowledge, and skills can be shared across geographical boundaries at the touch of a button. This presents a great opportunity for information dissemination and the subsequent education and empowerment of the African people (Gathanju, 2010). In the developing countries, home Internet penetration is as low as 12 per cent, and much lower in most rural households. Where home access to the Internet is low, it is particularly important for countries to invest in public Internet access. Many governments across the world are actively promoting public access and some are turning libraries, museums and post offices into Internet cafés. In Bhutan, for example, 40 per cent of all localities have a Public Internet Access Centre. Since 2003, the Royal Government of Bhutan, in cooperation with International Telecommunication Union (ITU) and other partners, has been revamping post offices in remote and rural locations into ICT centers, allowing rural inhabitants to join the information society. In Mexico, almost 40 per cent of the 7000 public libraries offer visitors Internet access. All archives have a broadband Internet connection, and efforts are being made to digitize them (ITU, 2010).

In Estonia, Village Road 3 is an Information Society initiative targeted specifically at enhancing Internet access in rural areas. Village Road 3 aims to bring broadband
connectivity to rural areas so that the level of access becomes the same as in urban areas. In Lithuania, almost 500 Public Internet Access Points have been established with the goal that no rural dweller is more than 10 kilometers away from the Internet (ITU, 2008). Nigeria has been successful in promoting rural internet access through digital villages. The Lagos Digital Village project has seen more than three hundred students taught, six certification courses taught with trained tutors from volunteers, Microsoft recently partnered with the digital village to widen its coverage through promoting participation of information technology suppliers and champion creative uses while the Nigerian government’s role is in the digital village project is to provide an enabling environment and bring the project closer to the community (Sesan, 2005).

Lack of trust in access points because of unreliable Internet connectivity affects their sustainability in the rural areas, unreliable internet access reduces access to information for rural users, and improved communication and information access are directly related to social and economic development (Parliamentary Office of Science and Technology, 2006). Internet efficiency is poor as many rural center as they experience downtimes (Minishi-Majanja, 2007). Internet penetration in Kenya is low and lags behind the penetration of other ICT services despite the liberalization of the sector. Bridging the digital divide has been slow due to most of the service providers being located within the main cities where the population levels are high, having only two dominant Public Data Network Operators (PDNO) having geographical presence in Kenya. Rural connectivity has a chance to be a powerful new rural infrastructure that enables local economies and leads to education, social development, and in turn to other kinds of infrastructure. In the best case, rural connectivity will bring new options to these regions, produce a visible improvement in the quality of life, and reduce the pressure towards urbanization with its associated societal costs (Brewer, 2005). Connection of the rural areas is an asset to and an opportunity to an economy (Baijal, 2004). The high cost of mobile usage makes it too expensive for regular Internet access in Africa, high international tariffs and lack of circuit capacity, obtaining sufficient international bandwidth is a major problem in most countries, and although conditions have improved recently, users generally still have to contend with substantial congestion at peak times (Jensen, 2001). The low Internet usage
is affected mainly by the high cost of Internet service mostly through dial up charged per minute. ICT is seen as the missing link in poverty alleviation and development which can only be achieved through affordable access. Reduction in consumer internet tariffs has improved access to many low income areas. The Government’s commitment towards implementation of a national and international fiber network is expected to enhance the positive impact of ICT services on the economy in the coming years through the provision of cheaper and affordable bandwidth (CCK, 2007). Low response in rural areas and yet the costs remain high, then the digital gap will remain unsolved. Many potential users are too poor to afford any form of access to ICT. In Ethiopia 40% import tariffs on ICT equipment makes it too costly for all but the elite (Parliamentary Office of Science and Technology, 2006).

Over the years, it has become manifest that rural users cannot use the same Internet traffic as the urban users. However, most access points in rural areas use the very expensive VSAT connectivity while the urban friends are using such simple and cheap connectivity solutions like the Code Division Multiple Access (CDMA) (Parliamentary Office of Science and Technology, 2006). To encourage internet use, service providers need to use price discrimination and offer lower connection prices to the rural centers as opposed to the urban centers so as to encourage usage of internet by rural customers. Internet availability and affordability are critical for widespread adoption of ICT in learning institutions mainly universities which are adopting ICT in their learning processes (Kashorda and Waema 2008).

2.3.6. Local Content
One significant reason as to why some groups choose not to access the internet is because the content is not relevant or interesting to them, hence the need for content that is relevant to them (Cullen, 2001). Local content is information provided in languages spoken locally and reflecting the values, lifestyle and the needs of local community, such content has helped create new business opportunities and improve information that is critical for Small Medium Enterprises such as agricultural market information or weather forecast (Okuttah, 2009). Nakaseke tele-centre in Zimbabwe noted that the lack of local content on the Internet increases its unpopularity among the rural people thus making
connectivity sustainability very difficult. 98 percent of online information is in English language of which the community members are not familiar. The submission in part implies that appreciable content is complementary to the reliable connectivity and usage (Parliamentary Office of Science and Technology, 2006). Further findings from ITU (1999) identify content and language as major determinants on internet use. Potential users would therefore use the internet more frequently if they can access content that will help then access new markets, cheaper raw materials or technology. This would enhance value of the internet.

Absence of local relevant content has been cited as one of the reasons that lowers the number of users in the rural areas, so in Kenya, the government through the ICT board launched of its Sh320 million grant in June 2010 to promote the development of relevant digital content and software. The money targets entrepreneurs in the film, education, entertainment and advertising industries and is aimed at driving up Internet penetration and promoting local content, a potential area for revenue generation (Obura, 2010). In order to improve the uptake of Internet services, the CCK through the community ICT tele-centres, partnered with implementing agencies in the development of local content that is geared towards assisting communities to access information that is beneficial for their day-to-day activities (CCK, 2008). Investing in the development of local content in key, local content increases demand for Internet services and is necessary for sustainable Internet business. Since the Internet Services were introduced in Kenya, the proportion of local content has been very limited and this has therefore affected the growth of the Internet (CCK, 2008). The cultural aspect of the information control becomes then the key to community development through the access to the information highway. Some tend to keep the information they get through Internet as a means to increase their power on the community; others tend to share it (Gopnik, 1996). At the interface of ICT and indigenous knowledge is the challenge of culture and language. It is difficult for information and knowledge to be effectively disseminated to communities who need it if language issues are unresolved (Ng’ambi, 2006). The development of online content and applications in local languages should be promoted, for example, through the digitization of books and documents to create an e-culture (ITU, 2010). Such systems are critical in
helping drive the ICT agenda in the country. How they are implemented and their relevance to the people is vital to success. One such program is a U.S. $106 million program being implemented by the Kenya Transparency and Communication Infrastructure Project (KTCIP) and is being funded by the World Bank. The KTCIP has developed a digitized program that will allow Kenyan farmers to get up-to-the-minute market information for their farm produce. This in essence eliminates middlemen who have been known to exploit farmers and reap higher profits while the farmers make a skimpy income from their hard work (Gathanju, 2010). The Kenyan government has promoted the local content development; this has created job opportunities for software programmers and will help in preservation of culture and encourage usage by rural population.

In Western China, the information centers set-up by UNDP provides the local farmers with relevant agricultural information. The village centers played an important role in the Internet diffusion and usage in rural areas as they provided farmers with the opportunity to directly operate the computers and surf the net. In addition to providing training for farmers in using the Internet, the center also invited agricultural experts and technical staff to lecture on new seeds, the control of pests as well as computer literacy. The trainings were carried out in several phases to target different segments of people (Jinqiu et al, 2009). Inability in incorporating the development needs of the local people, which are essential for wide adoption and sustained usage of the new technology. Lack of local content will reduce the diffusion and adoption of internet in the rural areas, need for developing local content will promote job creation and culture storage. In rural India, they developed E-Choupal program in 2000, using a common portal, the site is loaded with information on farming practices by respected and successful farmers within the village and other farmers access the farming practices, and also weather forecasts, crop price lists in nearby markets and the latest sowing techniques, these improvements have resulted in productivity gains for the farmers (Bhatnagar, Subhash, Dewan, Torres and Kanungo, 2007). The Latin America School of Network Foundation in collaboration with the Institute for Connectivity in the Americas has launched a portal called WiLAC designed to support wireless connectivity implementation. Rural Internet use has grown
over the past four years, but in some ways, rural areas continue to be a frontier. Though growing, rural Internet penetration has remained at 10 percent and is still behind the national average in each of the last four years. This gap is probably has to do with the low population density and high cost of service in these locales, as well as the lower levels of income and education that characterize rural areas (Okuttah, 2009).

2.3.7. Sustainability of DVPs in Rural Areas
Sustainability can be described as ‘the ability of a project or intervention to continue in existence after the implementing agency has departed’ (Harris et al., 2003, p. 2). Issues related to sustainability have been examined in two main categories – financial (or economic) and social sustainability (Bailur, 2007b).

Financial Sustainability
DVP are initially startup grant funds and aid in form of reduced tariffs, special investments from donors. It is necessary to identify models which are financially sustainable and commercially viable. These models must have clearly defined schemes for government subsidy with respect to the provision of public services.

Social Sustainability
Over the last decade, social sustainability of telecentres remains one of the key issues facing digital inclusion projects (Mayanja, 2006). One of the factors impacting the sustainability is the capacity of telecentres to recognize and address emerging needs of the communities (McConnell, 2001). If the activities of a DVP are to be lasting and viable, they must take account of the social and cultural of the operating community, and must respond appropriately to that context. People in the community feel themselves empowered by the centres, Community acceptance is essential to overall sustainability. DVP staff may need to assume a role in community development activities in order to achieve social sustainability. Additionally, with the difficulties associated in achieving a balance between financial and social sustainability, further empirical research is needed to investigate factors which facilitate these aspects of telecentre operations (Kuriyan et al., 2006)
2.4 Conceptual Framework
The below diagram shows the relationship between independent variables and dependent variable

**Independent Variable**

- Stakeholders Involvement
- Level of Infrastructure Dev.
- Demographic Profiles
- Availability of Local Content

**Dependent Variable**

Performance of Digital Villages Project:
- Effectiveness
- Relevance
- Sustainability

Stakeholders Involvement Participation, level of infrastructure development, social factors availability of local content among others are the key in determining the performance. These factors to some great extent influence the efficiency, reliability and sustainability of digital villages.
2.5 Research Gaps

There has been a number of valuable studies carried out on the performance of Digital Villages Project all of which present evidence on their capability to narrow the digital gap. However, none of these studies provide a picture of the changes over access in physical infrastructure, adoption and adaption rate and benefits accrued on their use.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction
This chapter presents the methodology and procedures that were used for collecting and analyzing the data in this study. It discusses the research design especially with respect to the choice of the design. In this chapter, the population of the study is also defined as well as the sample size and sampling procedures. In addition, the chapter describes the research instrument used, discusses the methods of data collection, analysis techniques and presentation.

3.2 Research Design
This was the overall plan of conducting the study in order to answer the research questions and achieve the objective of the study. In this section, the researcher identified the specific research design appropriate for the study as Descriptive research design, where methods of analyzing correlations between the multiple independent variables were employed.

3.3 Target Population
Cooper and Schindler (2001), defines a population as the total collection of elements about which the researcher wishes to make some inferences. The total number of digital villages' centres setup across Kenya are 32. Central Province has a total of 11; eight in Nyeri County and one in Nyahururu Town, Karatini, and Kerogoya Counties respectively. Coast Province has one in Malindi County, while else Eastern Province has two, one in Kitui and Makutano Counties respectively. Rift Valley Province has two also, one in Eldoret County and one Narok Counties. A total of two in Western Province and Nairobi Province registering the highest number with a total of 14 centers. Distribution of the centers in shown under Table 1.1

The researcher target populations were the end-users of the centers and DVP center staff members. There was an indefinite number of end user in each centre and at least five support staff in each centre.
3.4 Sampling Design

Sampling frame is a list of elements in the population from which a random sample is to be drawn from (Gill and Johnson, 2002). The degree of generalization of the study depends on the accuracy of the sampling frame from which the sample is selected. Through purposive sampling Nairobi County with a total of fourteen (14) DVP centers in the County was selected as a sample from the entire population. Stratified probability sampling was also used where the researcher divided the population into two homogenous groups called strata: the end-user and the DVP staff members. Due to homogeneity of the respondents, end-users from the digital villages were randomly selected for the study and staff members from each of the digital centers in Nairobi giving a total of 71 respondents.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>End- users</td>
<td>59</td>
</tr>
<tr>
<td>DVP staff</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Sample Size</strong></td>
<td><strong>71</strong></td>
</tr>
</tbody>
</table>

3.5 Data Collection

This includes the various methods of collecting data that were applied to gather raw data from the field before it was presented for analysis and tabulation. Primary data was used for this study. Primary data are those which are collected afresh and for the first time and are original in character (Kothari, 2004).

There are several instruments that can be used to collect primary data, one of which is questionnaires. The main advantage of using questionnaires is low cost when the sample is large and widely spread geographically and it is free from interviewer bias (Kothari, 2004). Based on this, questionnaires were adopted as a tool for collecting data for this research. The study used structured questionnaires with a list of possible alternatives and unstructured questionnaires with open-ended questions giving respondent freedom of response.
3.6 Research Procedures

The questionnaires designed by the researcher based on the research questions were pre-tested to ascertain the validity and reliability of the data collection instrument before actual administration. Pretesting was done by administering the questionnaire to a few respondents selected randomly from the sample size. Based on the results of the pre-test; the researcher made necessary adjustments and ensured clarity on the final questionnaire so that the questionnaire was self-administered through drop and pick method. All questionnaires were coded to ensure ease of analysis of the data collected. After administering of the questionnaires, they were systematically organised to facilitate analysis.

3.7 Data Analysis

The data collected from the field was then assessed and analyzed using descriptive statistics such as frequency tables, mean, standard deviation, variance, so as determine the quality of information from the feedback given by various respondents. The process involved assessing and evaluating the questionnaires, the data was then be analyzed using Statistical Program for Social Scientists (SPSS) Computer software and presented in form of MS Excel charts, tables, graphs and pie-charts. Data completeness and uniformity was maintained to facilitate application of other data analysis techniques like coding, data organization, data classification and tabulation. The qualitative data obtained from open ended questions were also analyzed and interpreted. The indicators of the dependent variable were tested separately by having question on each.
CHAPTER FOUR

DATA, ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents data that has been collected through questionnaires. Data was coded, edited, organized and analyzed and finally presented both qualitatively and quantitatively using descriptive statistical tools such as tables, graph and charts. The aim of the analysis and presentation was to determine the factors that influence the performance of digital villages’ project in Kenya.

4.2 Demographic Statistics

A total of 71 respondents were drawn from the target population, the target population comprised of end-users and support staff of the digital villages, centres.

Table 4.1

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>55.9</td>
</tr>
<tr>
<td>Female</td>
<td>26</td>
<td>44.1</td>
</tr>
<tr>
<td><strong>Age bracket</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-30</td>
<td>41</td>
<td>69.5</td>
</tr>
<tr>
<td>31-40</td>
<td>18</td>
<td>30.5</td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>10</td>
<td>16.9</td>
</tr>
<tr>
<td>College Diploma</td>
<td>36</td>
<td>61</td>
</tr>
<tr>
<td>University Degree</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td><strong>Level of Comp. Skill</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>12</td>
<td>20.3</td>
</tr>
<tr>
<td>Average</td>
<td>21</td>
<td>35.6</td>
</tr>
<tr>
<td>Good</td>
<td>23</td>
<td>39</td>
</tr>
<tr>
<td>Very Good</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td><strong>Av. use the DV Center</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once every two weeks</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Once a week</td>
<td>14</td>
<td>23.7</td>
</tr>
<tr>
<td>Two or three times a week</td>
<td>31</td>
<td>52.5</td>
</tr>
<tr>
<td>Daily</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>59</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Author (2012)
4.2.1 Gender

Out of this number, 59 end-users and 12 support staff responded. The response was highly reliable with 55.9% of the end-users being male and 44.1% as female; these findings are in line with the Kenya economic survey findings which show that although the ratio of male to female was almost equal, there were more male than female. For the support staff 41.7% were male while 58.3% were female which indicates that the female are more empowered than male in terms of being employed in the DV centers.

4.2.2 Age Distribution

Out of 59 respondents, the majorities (69.5%) were in the younger aged between 19-30 years who had a quick adoption of information communication technology (ICT). In the second position was those aged 30-40 who made up 30.5%. For the support staff, there was equal distribution of employees in two age brackets including 19-30 years and 31-40 years each at 50% as show in table 4.1 above. This finding reveals that majority of the employees were still young generation who were fast learners of ICT as they used the internet more often.

4.2.3 Education Level

Based on the results presented in Table4, majority (61 %) of DVC users had diploma level of education followed by 22% who had university degrees while 16.9% had secondary level. From the findings, majority of the respondents using the local Cyber cafés were either seeking to chat with their friends or drafting their curriculum vitae in such of jobs. Once the respondents had graduated, they move out in search of jobs hence the reason for visiting the cyber cafés for CV drafting and sending via the net. For others, they visited the cyber so as to use the social networks in connecting with friends. For the support staff the findings showed that majority (92%) of the employees had college diplomas while 8% had university degrees as indicated in table 4.1. The employees were educated hence were well equipped to deal the challenges that came by in the course of their work.
4.2.4 Level of computer skill

On the level of computer skill, 39% of the end-users had good computer skills; 20% who had average skills; 20% had basic skills whereas 5% had very good computer skills. This shows that few end users took interest in being trained on computer skills as skills are acquired through training on computer packages. As for the employee’s in the DVC, 58% had good computer skills, 25% had average computer skills while 17% had very good computer skills as shown in the figure 4.1 below. The findings imply that most of the support staff had good computer skills that are useful in informing and training the local users on how to access information. This is necessary especially for their key role in disseminating computer skills and knowledge to the locals. The basic skills are also important in troubleshooting issues as they arise.

Figure 4.1: Level of Computer Skills for the DVCs Support staff

4.2.5 Average Usage of Digital Village Center

On the number of times the end users had been using the digital village center, 53% used the centers twice or thrice a week, 24% used it once a week and 22% used it daily while 2% used it once in every two weeks. The DVC were normally open on a daily basis. However, to allow the users to do other duties the users were free to walk in at their convenience hours within the stipulated working days. However, individuals were free to choose the days they wanted to use the Centers which conforms to the findings of Brewer (2005) who states that unlike urban areas, the cost of infrastructure on a per person basis
is simply too high: even if capital is readily available and government hurdles are low, the net increase in productivity due to the infrastructure is limited by the density, and thus cannot sustain the investment based on return alone as shown in Fig 4.2.

For the support staff, the study wanted to establish how frequent the centers were used by the end users, from the findings, 75% indicated that their DVCs were used frequently while 25% said they were used less frequently as indicated in figure 4.2 below. This finding indicates that the locals used the DVC frequently to access information from the internet and some are eager to learn on how to use computers.

**Figure 4.2 Use of Digital Village Center**

4.3 **Performance of Digital Villages Centers**

The study sought to determine the end-users and supports staff opinion of the performance of DVC to examine different factors.

4.3.1 **Performance of DVPs**

The findings indicated that the end-users agreed that Digital Village project had been beneficial to the community to a moderate extent as shown by a mean score of 3.24 and std deviation of 1.318; Since the mean is above moderate (3), it indicates that the DVCs projects were beneficial to the communities. On whether DVC had eased the community's access to information the mean was 3.46 with a standard deviation of 1.264 which indicates that the DVCs contributed a lot to the well-being of the community. On whether DVC project had promoted social co-existence of the communities, the mean
was 3.08 with a standard deviation of 1.164 showing that the DVC had promoted the social coexistence as community members met and interacted with one another freely as they continued using the DVC services.

On relevance of services offered to the needs of the community, the mean was 2.88 with a standard deviation of 1.190 meaning that the Digital Village Project offered services relevant to the communities’ needs. This was in the form of educating members on the developments in Information Communication and Technology. According to Intel (2009) broadband networks to rural areas can spread economic efficiency and productivity, diversifying income by supporting both non-agricultural employment and higher incomes from agricultural jobs. In addition, the finding is supported by Singh (2008) who states that in many instances, poor people have experienced benefits in the form of increased income; better health care; improved education and training; access to job opportunities, engagement with government services; contacts with family and friends; enterprise development opportunities; increased agricultural productivity. In Western China, in a rural area called Tongnan, information centers that have been set-up by the United Nations Development Programme (UNDP) have been used by farmers to access pricing information and benchmark their prices for locally produced good before selling them to the town areas (Jinqiu, Zhao, Hao, Xiaoming, Banerjee and Indrajit, 2009). This information is presented in Fig 4.3 below
4.3.2 Factors Influencing Service Delivery at the DVP Centers

The study sought to examine the extent to which following factors influenced the service delivery at the DVP centers. On whether power outages influenced the service delivery at DVP centers the mean was 3.67 with a standard deviation of 1.231. This high mean indicates that the DVCs suffered negative effects from power outages which hampered their service delivery. Unstable network influenced the service delivery as indicated by a more than average mean of 3.92 with a standard deviation of 1.084; inadequate computers too influenced DVCs service delivery as supported by a more than average mean of 3.83 with a standard deviation of 0.835. Inadequate computers mean that the end users have to share the few available computers hence having to access them in shifts. Service delivery of the DVCs was also hampered by the inadequate local content as supported by a mean of 4.08 with a standard deviation of 1.084. Limited local content limited the end users association with the information acquired. Nakaseketele-centre in Zimbabwe noted that the lack of local content on the Internet increases its unpopularity among the rural people thus making connectivity sustainability very difficult. 98 percent of online information is in English language of which the community members are not
familiar. The submission in part implies that appreciable content is complementary to the reliable connectivity and usage (Parliamentary Office of Science and Technology, 2006).

Service delivery was also hampered by lack of trust in access points because of unreliable Internet connectivity which affected their sustainability in the rural areas, unreliable internet access reduced access to information for rural users. Improved communication and information access are directly related to social and economic development (Parliamentary Office of Science and Technology, 2006). Internet efficiency is poor as many rural center as they experience downtimes (Minishi-Majanja, 2007). Irregular or nonexistent electricity supplies are common in Africa, especially outside major towns. Rural areas are less connected, where even where ICT infrastructure exists, its use is constrained by lack of inadequate supportive infrastructure in particular electricity and to a much lesser extent, transport systems (Fredriksson et al, 2009) illustrated in fig 4.4 below.

**Fig 4.4 Different Factors Influence Service Delivery**

![Figure 4.4](image)

Source (Author 2012)

4.3.3 Challenges Encountered in the DVC

The employees were requested to indicate some of the challenges they encountered in the running of the DVCs. 67% of the employees indicated that DVCs suffered from
inadequacy of computers while 33% felt it was not a challenge. This affirms Intel (2009) who indicated that inadequate technological infrastructure to support the integration of ICTs in the rural life, like inadequate number of computers affects rural areas internet diffusion.

On power rationing, 75% of the employees indicated power rationing was challenge while 25% felt it was not a challenge. In addition, 67% of the employees cited poor infrastructure as a challenge while 33% answered no and felt it was not a challenge as indicated. These findings are in line with Intel (2009) who asserts that inadequate technological infrastructure to support the integration of ICTs in the rural life, such as poor or lack of national ICT policy; low internet connectivity affects rural areas internet diffusion.

The DVCs were also affected by insecurities as supported by 92% of the DVC employees while 8% were not in agreement. This posted a challenge as the DVCs were not totally secure. Another challenge that the DVCs faced included limited Government support which limited the amount of resources available to the local communities for DVC expansion. This was supported by 92% of the employees who cited lack of government support as a major challenge to them while 8% felt it was not a challenge. The primary motivation for growth in ICT has come from the private sector, with the role of governments being that of a facilitator, for creating an enabling environment (Teltscher, Gray and Magpantay, 2009). Without encouragement and incentives, operators are unlikely to roll out broadband networks in non-urban areas, where the majority of citizens live. To make such rollouts cost-effective, governments can take a number of actions, such as offering tax incentives, implementing initiatives that promote the sharing of infrastructure, liberalizing licensing conditions and providing more efficient spectrum allocation (Intel, 2009).
4.3.4 How to overcome Challenges in the DVC

The study also sought to establish the ways that can be used to overcome challenges at DVC. From the findings, 58% of the employees suggested that community should get involved and interested on issues concerning the DV centers as shown in Fig 4.6 below.

Most (92%) of the employees indicated that reduction of rates charged at DV centers could be used to counter the challenges while 8% felt it couldn’t counter the much. One of the factors impacting the sustainability is the capacity of telecentres to recognize and address emerging needs of the communities (McConnell, 2001). If the activities of a DVP are to be lasting and viable, they must take account of the social and cultural of the operating community, and must respond appropriately to that context. People in the community feel themselves empowered by the centres, Community acceptance is essential to overall sustainability. DVP staff may need to assume a role in community development activities in order to achieve social sustainability.

Also, 83% of the employees cited education to the whole community as way to overcome the challenges, further, 92% of the employees felt that introduction of software...
to addressed people's needs would be appropriate in overcoming the challenges whereas 8% indicated otherwise as shown in fig 4.6 below. ICT allows for dissemination of information to people, promoting knowledge transfer that is necessary for economic development and the subsequent education and empowerment of the African people (Gathanju, 2010). Many schools in developing countries remain deprived of any form of Internet access, a number of others have connected all their schools, often with broadband access. Jordan, for example, has connected 80 per cent of its schools, with 73 per cent of them having a broadband connection, the teachers are highly qualified in information technology and most of the country's schools make use of Internet-assisted learning. Training enough teachers to use and teach ICT skills remains a challenge in most developing countries (ITU, 2010). Cameron et al (2005) further added that it has helped volunteers run free training sessions for the rural public in Canada so that rural users can learn how to use email applications and the Internet and over 200 have students used it for educational purposes.

The 75% of the employees also cited improving infrastructure as a way of countering the challenges at DVC while 25% were of different opinion as they felt it would not counter the challenges as presented in Fig 4.6 below. In Kenya, CCK continues to support the universal access initiative by giving fifty percent (50%) discount on annual frequency fees for microwave links installed in rural areas. This incentive has encouraged the major operators such as mobile companies to increase their coverage in rural areas, thus supporting the socio economic development in the localities (CCK 2008 Annual Report). The environment for ICT development has been favorable with the growth of telecommunication sector and infrastructural development that saw the fiber optic cable land in Kenya in September 2009. Kenya's internet penetration has grown to 19.9 percent; although showing an impressive growth, is still way behind that of other ICT services despite the critical role the World Wide Web plays in socio-economic development. The total number of Internet subscriptions has grown with the growth attributed to terrestrial mobile data/internet subscriptions through GPRS/EDGE and 3G networks (Annual CCK 2010 Report). Synovate, an international research organization, estimated that there are now 3.5 million Internet users in Kenya by 2009 with urban use
growing from 22% of respondents in 2007 to 30% in 2009. Rural use grew from 4% to 9% during the same period.

Majority (92%) of the employees also suggested improvement of security in the area as a way of countering the challenges. According to Jensen (2001) increased mobility is needed to implement and support a pervasive network infrastructure and also for the increased economic and social activity that would occur with greater physical movement of people. Currently in Kenya, rolling out services to the peri-urban and rural areas, telecommunication service providers and PDNOs are using wireless infrastructure, at a much lower cost, to provide internet connectivity. Wireless technology may help poor nations leapfrog into the future if they can get assistance to harness the new technology, especially in places where no infrastructure exists wireless is most effective, in helping nations leapfrog generations of telecommunication technology and infrastructure and empower its people (Baijal, 2004).

92% of the employees cited introduction of other power source e.g. generators as a way of countering the challenge of power outage at the DVC while 8% indicated otherwise as shown in Fig 4.60 below. Also, 92% of the employees pointed out government and donor support as a way of overcoming the challenges while 8% felt otherwise as shown in fig 4.6 below. In Tunisia, the government adopted a knowledge based economy through internet connectivity and implemented an ICT strategy, that saw ICT sector’s share of the country’s GDP rise from 2.6 percent in 1997 to 10 percent in 2008, the government achieved this through its strategy in ICT education, reaching all parts of the country, provision of government services online, government incentives to set up ICT ventures and the increasing spread of a digital culture (Jelassi, 2010).
4.3.5 Improving Performance of Digital Village Projects

The study also sought to examine opinions on how the performance of digital village projects can be improved. From the study findings, 51% of the end-users indicated it could be improved by creating awareness to the public of the existence of DV centers/educating users for free (community)/sensitizing as shown in Fig 4.7 below. These findings are supported by Richardson (1996) who observed that whenever a project involves people who need to communicate and share information across geography, across social groupings, between and within organizations, and throughout production systems, there is a need to create flexible systems of communication and information sharing. Majority (79%) of the end-users indicated that performance of DVP could be improved by introducing more hi-tech equipments e.g. computers at affordable rates as presented in fig 4.7 below. This can be backed by Baijal’s (2004) observation that wireless technology may help poor nations leapfrog into the future if they can get
assistance to harness the new technology, especially in places where no infrastructure exists. Wireless is most effective in helping nations leapfrog generations of telecommunication technology and infrastructure and empower its people.

85% of the respondents were of the opinion that the performance of DVP could be improved by availing local contents relevant to the community needs whereas as shown in table 4.7 below. Further, 97% of the end-users representing the majority indicated that performance of the DVP could be improved by charging users affordable rates. Similarly, 90% of the end-users were of the opinion that performance of DVP could be improved by providing good infrastructure/opening more centers country wide while 10% were of different opinion that providing good infrastructure couldn’t improve performance as shown in fig 4.7 below. 97% of the end-users were in agreement that performance of DVP could be improved by having security at DVC. Finally, majority (97%) of end-users indicated that performance of DVP could be improved by the introduction of E-learning whereas 3% felt that performance could not be improved failure to introduce of E-learning as presented in Fig 4.7 below.

Fig 4.7 Ways to Improve DVP

| Source (Author 2012) |
4.3.6 Effects of different parameters to the performance of DVP

The end-users affirmed that all four parameters' influence the performance of DV Centers in a very great extent. 50% of the end-users indicated that stakeholders involvement, level of infrastructure development and availability of local content influences performance, while over 40% indicated that community demographic profiles is influences performance to a great extent and very great extent as shown in the Fig 4.8 below

Fig 4.8 How different parameters' affects the performance of DVP

<table>
<thead>
<tr>
<th></th>
<th>Little extent</th>
<th>Moderate extent</th>
<th>Great extent</th>
<th>Very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder involvement</td>
<td>3.4%</td>
<td>8.5%</td>
<td>6.8%</td>
<td>54.2%</td>
</tr>
<tr>
<td>Level of infrastructure development</td>
<td>6.8%</td>
<td>5.1%</td>
<td>30.5%</td>
<td>57.6%</td>
</tr>
<tr>
<td>Communities' demographic profile</td>
<td>1.7%</td>
<td>13.6%</td>
<td>40.7%</td>
<td>44.1%</td>
</tr>
<tr>
<td>Local content</td>
<td>6.8%</td>
<td>5.1%</td>
<td>25.4%</td>
<td>62.7%</td>
</tr>
</tbody>
</table>

4.4 Stakeholder involvement/Participation

4.4.1 Stakeholder involvement and participation in the DVPs

The study sought to investigate the extent to which the end-users agreed with the statements on stakeholder participation in the DVPs. According to the findings, the end-users felt that the government had been fully committed to DVPs to a little extent as shown by a mean of 2.42 and std. deviation of 0.951; the financing partners had fulfilled their mandates as promised to a little extent as indicated by a mean of 2.44 and std. deviation of 1.087; the community had participated in matters concerning the DVPs to a
moderate extent at a mean of 2.64 and std. deviation of 1.126; and the community was keen to see the DVP project continued in future to a great extent as recorded by a mean of 3.81 and std deviation of 1.042. These findings correspond to that of Teltscher et al. (2009) who asserts that fixed broadband penetration in Kenya is at 5.5 percent as at 2008; limited number of fixed telephone lines has also constrained the deployment of broadband access via Asymmetric Digital Subscriber Line (ADSL), and largely limits it to urban areas. Government participation is important in encouraging adoption and equal distribution of ICT within a country. In Kenya, CCK continues to support the universal access initiative by giving fifty percent (50%) discount on annual frequency fees for microwave links installed in rural areas. This incentive has encouraged the major operators such as mobile companies to increase their coverage in rural areas, thus supporting the socio economic development in the localities (CCK 2008 Annual Report). The project is funded mainly by the World Bank. The digital centers have Internet access, scanners and computers. DVPs in the peri-urban and rural areas will most definitely empower users to become better students, better citizens, better farmers, and skilled workers (Gathanju, 2010). This is information is presented in table 4.2 below.

### Table 4.1: Different stakeholder's participation the DVP

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The government has been fully committed to DVPs</td>
<td>2.42</td>
<td>0.951</td>
</tr>
<tr>
<td>The financing partners have fulfilled their mandates as promised</td>
<td>2.44</td>
<td>1.087</td>
</tr>
<tr>
<td>The community has participated in matters concerning the DVPs</td>
<td>2.64</td>
<td>1.126</td>
</tr>
<tr>
<td>The community is keen to see the DVP project continue in future</td>
<td>3.81</td>
<td>1.042</td>
</tr>
</tbody>
</table>

Source: Author, 2012

4.4.2 Enhancement of Shareholders Involvement in the DVPs for Better Performance

The study sought to determine the end-users opinion on how the shareholders involvement in the DVPs could be enhanced. From the findings, 63% of the end-users
were of the opinion that shareholders involvement could be enhanced if the community shows interest in the usage of DV centers while for 37% that was not the case presented in Fig 4.9 below. (98%) of the end-users also agreed that shareholders involvement could be enhanced by giving education to users In addition, 63% of the end-users were in agreement that shareholders involvement could be enhanced if stakeholders/government support/ reliable stakeholders fund the DVC whereas 37% were of different opinion. Similarly, majority (93%) of the end-users felt that shareholders involvement could be enhanced by opening more DVCs to cover all rural areas whereas 7% were of the opinion that the shareholders involvement could not be enhanced if more DVCs are opened to cover all rural areas as illustrated in fig 4.9 below.

Further, the findings indicated that 93% of the end-users agreed that shareholders involvement could be enhanced by providing services suitable for all in the community while 7% felt that shareholders involvement could not be enhanced if services provided are not suitable for all in the community as shown in fig 4.9 below.

**Fig 4.9 Ways to enhance stakeholder's participation in the DVP**

![Bar chart showing ways to enhance stakeholder's participation in the DVP](image-url)

Source: Author, 2012
4.4.3 Support staffs opinion on the community’s relationship and the DVC.
According to the findings, the employees were neutral that community was very involved in the digital center services and the community was interested but not involved in the Center's services as shown by means of 3.08, 2.58 and std. deviation of 1.165 and 1.084 respectively; they also disagreed that the community was neither interested nor involved in the activities of the digital center at a mean of 2.42 and std. deviation of 1.165; and the community was not aware of the existence of the digital center in the area at a mean of 2.25 and std. deviation 0.965. This is well presented in table 4.3 below. McConnell (2001) states that one of the factors impacting on the sustainability of DVPs is the capacity of telecentres to recognize and address emerging needs of the communities; If the activities of a DVP are to be lasting and viable, they must take account of the social and cultural of the operating community, and must respond appropriately to that context. People in the community feel themselves empowered by the centres, Community acceptance is essential to overall sustainability. DVP staff may need to assume a role in community development activities in order to achieve social sustainability. Additionally, with the difficulties associated in achieving a balance between financial and social sustainability, further empirical research is needed to investigate factors which facilitate these aspects of telecentre operations (Kuriyan et al., 2006).

Table 4.3: Communities Relationship with the DVC

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The community is very involved in the digital center services</td>
<td>3.08</td>
<td>1.165</td>
</tr>
<tr>
<td>The community is interested but not involved in the Center's services</td>
<td>2.58</td>
<td>1.084</td>
</tr>
<tr>
<td>The community is neither interested nor involved in the activities of the digital center</td>
<td>2.42</td>
<td>1.165</td>
</tr>
<tr>
<td>The community is not aware of the existence of the digital center in the area</td>
<td>2.25</td>
<td>0.965</td>
</tr>
</tbody>
</table>

Source: Author, 2012
4.5 Level of Infrastructure Development

The study sought to establish the effects of different levels of infrastructure development on the DVP.

4.5.1 End-users opinion on different factors of Infrastructure of the DVP

According to the findings, the end-users agreed that there had been good infrastructure for DVP service delivery to a moderate extent as shown by a mean of 2.78 and std. deviation of 0.811; There had been enough computers at the DVP centers to a moderate extent at a mean of 2.68 and std. deviation of 0.539; There had been steady electricity supply at the DVP centers to a moderate extent as indicated by a mean of 3.08 and std. deviation of 0.566; the DVP centers were easily accessible to a moderate extent at a mean of 3.22 and std. deviation of 0.811; and There were enough furniture at the DVP centers to a moderate extent as shown by a mean of 2.68 and std. deviation of 0.681.

Fredriksson et al (2009) observes that rural areas are less connected, where even where ICT infrastructure exists, its use is constrained by lack of inadequate supportive infrastructure in particular electricity and to a much lesser extent, transport systems. Another systemic problem is that road and rail are limited, costly to use, and often in poor conditions, resulting in barriers to the increased movement of people and goods; increased mobility is needed to implement and support a pervasive network infrastructure and also for the increased economic and social activity that would occur with greater physical movement of people (Jensen, 2001). In Ethiopia, 94% of the 6,000 internet accounts are concentrated in the capital, Addis Ababa due to limited telecom infrastructure (Parliamentary Office of Science and Technology, 2006). Fixed broadband penetration in Kenya is at 5.5 percent as at 2008; limited number of fixed telephone lines has also constrained the deployment of broadband access via Asymmetric Digital Subscriber Line (ADSL), and largely limits it to urban areas (Teltscher et. al, 2009). This is well illustrated in table 4.4 below.
Table 4.4 Opinion of different factors of Infrastructure development

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There has been good infrastructure for DVP service delivery</td>
<td>2.78</td>
<td>0.811</td>
</tr>
<tr>
<td>There has been enough computers at the DVP centers</td>
<td>2.68</td>
<td>0.539</td>
</tr>
<tr>
<td>There has been steady electricity supply at the DVP centers</td>
<td>3.08</td>
<td>0.566</td>
</tr>
<tr>
<td>The DVP centers are easily accessible</td>
<td>3.22</td>
<td>0.811</td>
</tr>
<tr>
<td>There are enough furniture at the DVP centers</td>
<td>2.68</td>
<td>0.681</td>
</tr>
</tbody>
</table>

Source: Author, 2012

4.5.2 Assessment on the facilities at the DV Centers

From the findings, the end-users were neutral that the facilities and equipment provided by DV Centers were satisfactory as shown by a mean of 2.53 and std. deviation of 0.838; the interior conduciveness at the Center was satisfactory at a mean of 2.68 and std. deviation of 0.84; and the internet speed share was appropriate at a mean of 2.51 and std. deviation of 1.073. Internet penetration in Kenya is low and lags behind the penetration of other ICT services despite the liberalization of the sector. Internet efficiency is poor as many rural center as they experience downtimes (Minishi-Majanja, 2007). This is presented in table 4.5 below.

Table 4.5 Assessment on the facilities at the DV Centers

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilities and equipment provided by DV Centers are satisfactory</td>
<td>2.53</td>
<td>0.838</td>
</tr>
<tr>
<td>The interior conduciveness at the Center is satisfactory</td>
<td>2.68</td>
<td>0.84</td>
</tr>
<tr>
<td>The internet speed share appropriate</td>
<td>2.51</td>
<td>1.073</td>
</tr>
</tbody>
</table>

Source: Author, 2012
4.5.3 Infrastructure Development and DVP performance

The end-users were asked to indicate their opinion on how the level of infrastructure development influenced the performance of DVP. The findings showed that 70% of end-users felt that appropriate internet speed allows users to use more time the DV centers influence the performance of DVP whereas 73% of the end-users agreed that good infrastructure e.g. conditions in our centers increases the level of performance of DVP while 27% agreed bad infrastructure e.g. conditions in our centers lower the level of performance of DVP as shown in fig 4.10 below

Fig 4.10 Infrastructure and DVP performance

4.6 Local content

4.6.1 Local content affects Performance of Digital Villages in Kenya

The study sought to investigate the extent to which the end-users agreed with the factors as a result of lack of local content affected performance of Digital villages in Kenya. From the study findings, the end-users agreed that lack of local content on the Internet increased its unpopularity among the rural people as shown by a mean of 4.32 and std. deviation of 0.955; they were neutral that 98 percent of online information was in English language of which the community members are not conversant with as indicated by a mean of 2.75 and std. deviation 1.183; they agreed that local content increased demand for Internet services and was necessary for sustainable Internet as recorded by a mean of
3.92 and std. deviation of 1.071; they also agreed that lack of local content reduced the diffusion and adoption of internet in the rural areas at a mean of 4.27 and std. deviation 1.031; and they strongly agreed that developing local content promoted job creation and culture storage at a mean of 4.53 and std. deviation of 0.796. This information is presented in Fig 4.11 below. This findings is supported by Cullen (2001) who states that one significant reason as to why some groups choose not to access the internet is because the content is not relevant or interesting to them, hence the need for content that is relevant to them. Investing in the development of local content in key, local content increases demand for Internet services and is necessary for sustainable Internet business. Since the Internet Services were introduced in Kenya, the proportion of local content has been very limited and this has therefore affected the growth of the Internet (CCK, 2008). In rural India, they developed E-Choupal program in 2000, using a common portal, the site is loaded with information on farming practices by respected and successful farmers within the village and other farmers access the farming practices, and also weather forecasts, crop price lists in nearby markets and the latest sowing techniques, these improvements have resulted in productivity gains for the farmers (Bhatnagar, Subhash, Dewan, Torres and Kanungo, 2007).
4.6.2 Access to Local Content

According to the findings, the end-users were neutral that information needs of local users were available in DV Centers as recorded by a mean of 2.63 and std. deviation of 1.032; local information through local web pages was adequately available at a mean of 2.54 and std. deviation of 1.006; the information provided by DV Centre's was locally useful and valued information as indicated by a mean of 2.98 and std. deviation of 1.106; and the information available at the DVP Centers were only available in English language at a mean of 2.56 and std. deviation of 1.071. Jinqiu et al, (2009) notes that in Western China, the information centers set-up by UNDP provides the local farmers with relevant agricultural information. The village centers played an important role in the Internet diffusion and usage in rural areas as they provided farmers with the opportunity to directly operate the computers and surf the net. In addition to providing training for farmers in using the Internet, the center also invited agricultural experts and technical staff to lecture on new seeds, the control of pests as well as computer literacy. The trainings were carried out in several phases to target different segments of people. This information is well illustrated in table 4.6 below.
Table 4.6: Access to Local Content

<table>
<thead>
<tr>
<th>Information needs</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>in DV Centers</td>
<td>2.63</td>
<td>1.032</td>
</tr>
<tr>
<td>Local web pages</td>
<td>2.54</td>
<td>1.006</td>
</tr>
<tr>
<td>DV Centre's info</td>
<td>2.98</td>
<td>1.106</td>
</tr>
<tr>
<td>Available in English</td>
<td>2.56</td>
<td>1.071</td>
</tr>
</tbody>
</table>

Source: Author, 2012

4.6.3 Relevance of content to community needs

From the findings, the end-users were neutral that the information provided by DV Centers was Up-to-date on markets and prices at a mean of 3 and std. deviation of 1.16; the DV Centers information was more relevant to the local needs as shown by a mean of 2.73 and std. deviation of 1.08; they found the information provided by the DV Centre was easy to use as recorded by a mean of 3.27 and std. deviation of 0.784; and DV Centers information was comfortable with their needs at a mean of 2.8 and std. deviation of 1.126. This is well illustrated in Fig 4.12 below.
4.6.4 Extent to Which Digital Center Affected Spheres of Society

The study also sought to establish the extent to which digital center had affected the spheres of society. From the findings, the employees agreed that digital center had affected education to a great extent as recorded by a mean of 3.92 and std. deviation of 0.996; economy/entrepreneurship to a great extent indicated by a mean of 3.58 and std. deviation of 1.084; entertainment to a great extent at a mean of 3.83 and std. deviation of 0.937; and advertisement to a great extent as shown by a mean of 3.5 and std. deviation of 0.798. This is well indicated in table 4.7 below. Rural areas account for a large part of the business sector, in particular agriculture microenterprises and SMEs, improvement in the use of ICTs by businesses in the rural areas has led them to expand their market and reduce costs, thereby increasing revenue and contributing to poverty alleviation (Fredriksson, Barayre, Fondeur and Stanyukora, 2009). In Canada, Churchill Community Network is based in the rural area of Manitoba, its businesses uses the Internet connection to promote their products and services, to market tourism opportunities globally and to increase the potential for the export of goods (Cameron, Annis and Everitt, 2005). Internet deployment has provided opportunities for Korea’s ICT industry. 300,000 jobs have been created, and the sector is growing three times faster than the rest of the economy especially in the development of search engines and local content, Korea
has also developed a competitive advantage in certain market niches of the ICT industry such as online gaming, where the Korean companies are the biggest global players (Korean National Statistics, 2007).

Internet had a positive effect by making the daily operations easier for 81 percent of the rural population in Canada (Selouani and Hamam 2007). Access to the Internet is also a tool for individuals who use it to build networks with others with common interests and for keeping contact with friends and family (Cameron et al, 2005) Many schools in developing countries remain deprived of any form of Internet access, a number of others have connected all their schools, often with broadband access. Jordan, for example, has connected 80 per cent of its schools, with 73 per cent of them having a broadband connection, the teachers are highly qualified in information technology and most of the country’s schools make use of Internet-assisted learning. Training enough teachers to use and teach ICT skills remains a challenge in most developing countries (ITU, 2010). According to Minishi-Majanja (2007) he stated that Fourie and Bothma (2006) observed increased use of the World Wide Web in private, social, business lives of many people and hence noted that it is a vital component for providing an enabling structure for schools, universities, careers and other use for information and communication. With computer penetration in Kenya at 8 percent, growth of internet is dependent on literacy levels of ICT and availability of communication gadgets. Increased use of internet has increased productivity and overall boost of regional and international trade due to availability of information and ease of access to other businesses through websites, and this is possible if users are literate on its use (Fredriksson et al, 2009). Richardson (1996)
<table>
<thead>
<tr>
<th>Sphere</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>3.92</td>
<td>0.996</td>
</tr>
<tr>
<td>Economy/Entrepreneurship</td>
<td>3.58</td>
<td>1.084</td>
</tr>
<tr>
<td>Entertainment</td>
<td>3.83</td>
<td>0.937</td>
</tr>
<tr>
<td>Advertisement</td>
<td>3.5</td>
<td>0.798</td>
</tr>
<tr>
<td>Politics</td>
<td>2.75</td>
<td>1.215</td>
</tr>
</tbody>
</table>

Source: Author, 2012
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the findings from chapter four, and also it gives the conclusions and recommendations of the study based on the objectives of the study.

5.2 Summary of the Findings

5.2.1 Demographic profile

For the end users, 59 responded. 69.5% of were young aged between 19-30 years followed by those aged 30-40 at 30.5%. 61% of DVC users had diploma level of education followed by 22% who had university degrees while 16.9% had secondary level. Majority of the respondents using the local Cyber cafes were either seeking to chat with their friends or drafting their curriculum vitae in such of jobs. On the level of computer skill, 39% of the end-users had good computer skills; 20% who had average skills; 20% had basic skills whereas 5% had very good computer skills. The users visited the centers twice or thrice a week, 24% used it once a week, 22% used it daily while 2% used it once in every two weeks.

For the support staff, 41.7% were male while 58.3% were female. On age brackets, support staff were equally distributed between two age brackets including 19-30 years and 31-40 years each at 50%. Majority (92%) of the employees had college diplomas while 8% had university degrees. 58% had good computer skills, 25% had average computer skills while 17% had very good computer skills.

5.2.2 Performance of Digital Villages' Projects

The Digital Village project was beneficial to the community as it eased the community's access to information and promoted social co-existence of the communities as community members met and interacted with one another freely as they continued using the DVC services. The DVCs also offered services relevant to the community's needs in the form of educating members on the developments in Information Communication and Technology. The finding is supported by Singh (2008) who states that in many instances,
poor people have experienced benefits in the form of increased income; better health care; improved education and training; access to job opportunities, engagement with government services; contacts with family and friends; enterprise development opportunities; increased agricultural productivity.

The service delivery at the DVCs were influenced by a number of factors: power outages influenced the service delivery at DVP centers as the DVCs suffered negative effects from power outages which hampered their service delivery. Another challenge to performance was unstable network and inadequate computers too influenced DVCs service. Inadequate computers meant that the end users had to share the few available computers hence having to access them in shifts. Service delivery of the DVCs was also hampered by the inadequate local content as supported by which limited the end users association with the information acquired. The submission in part implies that appreciable content is complementary to the reliable connectivity and usage (Parliamentary Office of Science and Technology, 2006). Service delivery was also hampered by lack of trust in access points because of unreliable Internet connectivity which affected their sustainability in the rural areas. Improved communication and information access are directly related to social and economic development (Parliamentary Office of Science and Technology, 2006).

5.2.3 Stakeholder involvement/participation

On stakeholder participation end-users felt that the government had been fully committed to DVPs to a little with a mean of 2.42 and std. deviation of 0.951; the financing partners had fulfilled their mandates as promised to a little extent as indicated by a mean of 2.44 and std. deviation of 1.087; the community had participated in matters concerning the DVPs to a moderate extent at a mean of 2.64 and std. deviation of 1.126; and the community was keen to see the DVP project continued in future to a great extent as recorded by a mean of 3.81 and std deviation of 1.042. On enhancement of stakeholder participation 63% of the end-users were of the opinion that shareholders involvement could be enhanced if the community show interest in the usage of DV centers while 37% had a different opinion, 98% felt that user education could enhance performance for 63% of them if stakeholders/government support/ reliable stakeholders fund the DVC, (93%)
suggested that by opening more DVCs to cover all rural areas could enhanced if stakeholder involvement.

The supports support were neutral on the community's involvement on DVC service with a mean on 3.08, 2.58, and also disagreed that the community was neither interested no involved in the activities of the DVC at a mean of 2.42 and std. deviation of 1.165; and on communities 'awareness on the existence on DVC in the ares at a mean on 2.25 and std deviation on 0.965

5.2.4 Infrastructure Development

70% of end-users felt that appropriate internet speed allows users to use more time the DV centers influence the performance of DVP whereas 73% of the end-users agreed that good infrastructure e.g. conditions in our centers increases the level of performance of DVP

In relation to the employees of DVC, the study found that the employees agreed that power outages, unstable network influenced, inadequate computers influenced and inadequate local content influenced the service delivery at DVP centers to a great extent all with means above 3.67. The employees also indicated that inadequacy of computers only attracted a few users/lack of enough equipment e.g. computers as challenge. They also cited power rationing, poor infrastructure, network instability, fire outbreak, insecurity in the area and lack of government support as a major challenger to the DVC. In addition, the employees strongly agreed that user education could improve the performance of the DV centers, development of infrastructure would help curb some of the challenges, stakeholder participation was key in influencing DV Centers Performance and availing more local content would enhance relevance of DV Centers to the community.

Further, the employees suggested ways that could be used to overcome challenges at DVC including community should get involved and interested on issues concerning the DV centers, reduction of rates charged at DV centers, education to the whole community, introduction of software to address people's needs, proper infrastructure, improvement of security in the area, introduction of other power source e.g. generators and government
and donor support. The employees were also neutral that community was very involved in the digital center services and the community was interested but not involved in the Center’s services. However, they disagreed that the community was neither interested nor involved in the activities of the digital center and was not aware of the existence of the digital center in the area but agreed that digital center had affected education, economy/entrepreneurship, advertisement and entertainment to a great extent. Moreover, majority of the employees disagreed that digital centers satisfied all the digital village users’ information technology service needs. They also felt that services which should be introduced so as to effectively serve the needs of the community as Health -how to give first Aid on certain ailments, agriculture, scanning and lamination, stable power source e.g. generators, high tech-equipments, current services should be improved and education and E-learning.

5.2.5 Local Content

The end-users agreed that lack of local content on the Internet increased its unpopularity of DVC among the rural people as shown by a mean of 4.32 and std. deviation of 0.955; they were neutral that 98 percent of online information was in English language of which the community members are not conversant with as indicated by a mean of 2.75 and std. deviation 1.183; they agreed that local content increased demand for Internet services and was necessary for sustainable Internet as recorded by a mean of 3.92 and std. deviation of 1.071; they also agreed that lack of local content reduced the diffusion and adoption of internet in the rural areas at a mean of 4.27 and std. deviation 1.031; and they strongly agreed that developing local content promoted job creation and culture storage at a mean of 4.53 and std. deviation of 0.796.

The end-users were neutral that the information provided by DV Centers was Up-to-date on markets and prices at a mean of 3 and std. deviation of 1.16; the DV Centers information was more relevant to the local needs as shown by a mean of 2.73 and std. deviation of 1.08; they found the information provided by the DV Centre was easy to use as recorded by a mean of 3.27 and std. deviation of 0.784; and DV Centers information was comfortable with their needs at a mean of 2.8 and std. deviation of 1.126. This is well illustrated in Fig 4.10 below.
5.3 Conclusion

The study therefore concludes that Digital Village project is beneficial to the community, eases the community's access to information, promotes social co-existence of the communities and offers services relevant to the community's needs, which is in line with Nandi (2002) who states that the rapid development and proliferation of ICTs has accelerated the economic and social change across all areas of human activity worldwide and continues to do at a rapid pace.

The performance of digital village projects should be improved by creating awareness to the public of the existence of DVC as per Vision (2030) document that highlights that Limited country-wide ICT awareness has hindered cultural and attitudinal change; therefore development of ICT parks and DVPs will gradually lead the low-cost provision of ICT goods and services and facilitate the growth and establishment business initiatives. Educating users for free, community sensitizing, introducing more hi-tech equipments e.g. computers at affordable rates, availing local contents relevant to the community needs, charging users affordable rates, providing good infrastructure/opening more centers country wide, having security at DVC and introduction of E-learning. Also, the government should be fully committed to DVPs and the financing partners to fulfill their mandates as promised, the community participated in matters concerning the DVPs and keen to see the DVP project is continued in future. Jelassi (2010), the government of Tunisia adopted a knowledge based economy through internet connectivity and implemented an ICT strategy, that saw ICT sector’s share of the country’s GDP rise from 2.6 percent in 1997 to 10 percent in 2008, the government achieved this through its strategy in ICT education, reaching all parts of the country, provision of government services online, government incentives to set up ICT ventures and the increasing spread of a digital culture.

On stake holder involvement, the study concludes that this should be enhanced in the DVPs for better performance, by the community showing interest in the usage of DV centers, giving education to users, stakeholders/government support/reliable stakeholders funding the DVC, opening more DVCs to cover all rural areas, providing services suitable for all in the community as McConnell (2001) highlights that one of the factors
impacting the sustainability is the capacity of telecentres to recognize and address emerging needs of the communities.

There should also be good infrastructure, enough computers at the DVP centers, steady electricity supply at the DVP centers, DVP centers to be easily accessible and enough furniture at the DVP centers for DVP to ensure good service delivery. Further, the study concludes that the interior conduciveness at the Center is satisfactory, the internet speed share is appropriate, the facilities and equipment provided by DV Centers is satisfactory, appropriate internet speed allowed users to use more time at the DV centers.

The study also concludes that DVP projects didn’t cater for the needs of all ages, all genders didn’t visit the DVPs and DVP services were not simple and easy to use, and that enough training was not offered to the local community on how to use DVP services. On the same note, it concludes that DV centers is improved by developing software that will contain all the needs of the community/prioritize community needs/simple system to cater for all community members, provision of DV centers in both urban and rural centers, training all people how to operate the center (services offered), charging affordable rates at DV centers, participation of stakeholders in management, in Kenya the CCK, (2008) through the community ICT tele-centres, partnered with implementing agencies in the development of local content that is geared towards assisting communities to access information that is beneficial for their day-to-day activities in order to improve the uptake of Internet services. Creating awareness of the existence of DV centers, Safe and secure environment, good infrastructure could improve the DV centers to cater for community needs.

Similarly, the study concludes lack of local content on the Internet increases its unpopularity among the rural people, 98 percent of online information is in English language of which the community members are not conversant with, local content increases the demand for Internet services and is necessary for sustainable. Ngambi (2006) states that at the interface of ICT and indigenous knowledge is the challenge of culture and language. It is difficult for information and knowledge to be effectively disseminated to communities who need it if language issues are unresolved. The lack of local content reduces the diffusion and adoption of internet in the rural areas and
developing local content promotes job creation and culture storage; ITU (2010) suggests that the development of online content and applications in local languages should be promoted, for example, through the digitization of books and documents to create an e-culture. Information needs of local users are available in DV Centers, local information through local web pages is adequately available, the information provided by DV Centre's is locally useful and valued information and the information available at the DVP Centers are only available in English language, the information provided by DV Centers is Up-to-date on markets and prices, DV Centers information is more relevant to the local needs, the information provided by the DV Centre is easy to use and DV Centers information is comfortable with their needs. The end-users agreed that stakeholder involvement; level of infrastructure development; communities' demographic profile; and the quantity of local content affects the performance of DVPs.

In relation to the employees of DVC, the study concludes that power outages, unstable network influenced, inadequate computers and inadequate local content influences the service delivery at DVP centers; also, inadequacy of computers only attracted a few users/lack of enough equipment e.g. computers, power rationing, poor infrastructure, network instability, fire outbreak, insecurity in the area and lack of government support as a major challenge to the DVC. In addition, the study concludes that user education improves the performance of the DV centers, development of infrastructure help curb some of the challenges, stakeholder participation is key in influencing DV Centers Performance and availing more local content enhances relevance of DV Centers to the community.

Further, the study concludes community were involved and interested on issues concerning the DV centers, reduction of rates charged at DV centers, education to the whole community, introduction of software to address people’s needs, proper infrastructure, improvement of security in the area, introduction of other power source e.g. generators and government and donor support in order to overcome challenges at DVC. Parliamentary Office of Science and Technology, (2006), states that there is a low response in rural areas and yet the costs remain high, then the digital gap will remain unsolved. Many potential users are too poor to afford any form of access to ICT. In
Ethiopia 40% import tariffs on ICT equipment makes it too costly for all but the elite. The community was interested and involved in the activities of the digital center and was aware of the existence of the digital center in the area, digital center affected education, economy/entrepreneurship, advertisement and entertainment, and digital centers did not satisfy all the digital village users’ information technology service needs.

5.4 Recommendation
The study recommends training of community members so as to grow skills concerning DV centers/education to all users (community) on internet, good management of DV centers by stakeholders together with the users, provision of enough resources at DV centers and good infrastructure/improved infrastructure, creating awareness of existence of DV centers, reliable support from the stakeholders and government in order to improve the performance of DVPs. Provision of local contents at DV, safe and secure accessible areas by all and reduction of the purchasing price of equipment so that more DVP centers can be opened.

The study also recommends introduction of Health -how to give first Aid on certain ailments, agriculture, scanning and lamination, stable power source e.g. generators, high tech-equipments, current services should be improved and education and E-learning services so as to effectively serve the needs of the community.

5.5 Recommendation for further research
This study focused on four parameters that determine performance of Digital Villages Projects in Kenya further research be conducted to explore other parameters that influence development and adoption of Information and Communication Technology projects in relation to the achievement of the Kenya vision 2030.

5.6 Limitations of the study
Time was be a limitation in this study as the researcher had organize to meet the respondents to administer the questionnaires and collect them the end users and staff within the short study period. However a strict schedule was drawn and adhered to. The resources available may also be a limitation, but they will be utilized optimally for effective research results.
REFERENCES


Mrayati, M. (2002). Possible models of initiatives to promote ICT for employment and poverty alleviation


APPENDICES

Appendix 1: Questionnaire 1 End-User

Please fill the following questionnaire to help in a study of seeking to investigate the parameters that determines the performance of digital village’s project in Kenya.

Your contribution by answering this questionnaire will help meet the objectives of this study.

NB YOUR INFORMATION WILL BE KEPT PRIVATE AND CONFIDENTIAL.

SECTION ONE: DEMOGRAPHIC INFORMATION

1) Please indicate your Gender.
   ( ) Male               ( ) Female

2) What is your age bracket?
   ( ) 19 – 30 Years       ( ) 31 – 40 Years
   ( ) 41 – 50 Years       ( ) Over 50 years

3) What is your highest level of education?
   Secondary               ( ) Master’s degree       ( )
   College diploma         ( ) others (please state) ..........................................
   University degree       ( )

4) What is your level of computer skill?
   None ( )                Basic ( )                     Average ( )
   Good ( )                Very Good ( )

5) How often do you use the digital village center on average? (please tick one)
   Once a month ( )        once every two weeks ( )
   once a week ( )          two or three times a week ( )
   Daily ( )

SECTION TWO: GENERAL ISSUES

6) Please indicate the extent to which you agree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>very great extent</th>
<th>great extent</th>
<th>moderate extent</th>
<th>little extent</th>
<th>no extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Village project has been beneficial to the community</td>
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<tr>
<td>Digital Village project has eased the</td>
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</tbody>
</table>
7) In your own opinion, how can the performance of Digital Village projects be improved?

8) Please indicate the extent to which you agree with the following statements.

9) In your own opinion, how can the stakeholder involvement in the DVPs be enhanced to for better performance
10) Please indicate the extent to which you agree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very great extent</th>
<th>Great extent</th>
<th>Moderate extent</th>
<th>Little extent</th>
<th>No extent</th>
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</thead>
<tbody>
<tr>
<td>There has been good infrastructure for DVP service delivery.</td>
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<td>There has been enough computers at the DVP centers</td>
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<td>There has been steady electricity supply at the DVP centers</td>
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<td>The DVP centers are easily accessible</td>
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<td>There are enough furniture at the DVP centers</td>
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11) In your own observation, to what extent do you agree with the below statement on infrastructure at the DV centers.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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</thead>
<tbody>
<tr>
<td>The facilities and equipment provided by DV Centers are satisfactory</td>
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<tr>
<td>The interior conduciveness at the Center is satisfactory</td>
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<tr>
<td>The internet speeds are appropriate</td>
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</table>

12) In your own opinion, how does the level of infrastructure development influence the performance of the DVP?

13) According to your observation, to what extent do you agree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<tbody>
<tr>
<td>DVP projects caters for the needs of all ages</td>
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<tr>
<td>Both Male and Females community members visit the DVPs</td>
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<td>agree</td>
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<td>Non village residents are free to use the DVP centers</td>
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<tr>
<td>DVPs services are simple and easy to use</td>
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<tr>
<td>Enough training is offered to the local community on how to use DVP services</td>
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14) In your own opinion, how can the DV Centers be improved to cater for all community members’ needs?

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15) To what extent do you agree that the following factors as a result of lack of local content affect performance of Digital villages in Kenya?

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<thead>
<tr>
<th>Factors</th>
<th>strongly agree</th>
<th>agree</th>
<th>neutral</th>
<th>disagree</th>
<th>strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>lack of local content on the Internet increases its unpopularity among the rural people thus</td>
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<tr>
<td>98 percent of online information is in English language of which the community members are</td>
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<tr>
<td>local content increases demand for Internet services and is necessary for sustainable Internet</td>
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<tr>
<td>Lack of local content reduces the diffusion and adoption of internet in the rural areas</td>
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<tr>
<td>Developing local content promotes job creation and culture storage.</td>
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</table>

16) To what extent do you agree that the following statements on Access to local content

<table>
<thead>
<tr>
<th>Factors</th>
<th>strongly agree</th>
<th>agree</th>
<th>neutral</th>
<th>disagree</th>
<th>strongly disagree</th>
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</thead>
<tbody>
<tr>
<td>Information needs of local users are available in DV Centers</td>
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<tr>
<td>Local information through local web pages is available adequately</td>
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<td>The information provided by DV Centre’s is locally useful and valued information</td>
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<td>The information available at the DVP Centers are only available in English</td>
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17) To what extent do you agree that the following statements on Relevant content to needs

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<tr>
<th>Factors</th>
<th>strongly agree</th>
<th>agree</th>
<th>neutral</th>
<th>disagree</th>
<th>strongly disagree</th>
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<tr>
<td>The information provided by DV Centers is Up-to-date on markets, prices and so on</td>
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<tr>
<td>The DV Centers information is more relevant to the local needs</td>
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<tr>
<td>I found the information provided by the DV Centre is easy to use</td>
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<td>DV Centres information is comfortable with my needs</td>
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18) Please indicate the extent to which the following factors influence the performance of DVPs

<table>
<thead>
<tr>
<th>Factors</th>
<th>very great extent</th>
<th>great extent</th>
<th>moderate extent</th>
<th>little extent</th>
<th>no extent</th>
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</thead>
<tbody>
<tr>
<td>Stakeholder involvement</td>
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<tr>
<td>Level of infrastructure development</td>
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<tr>
<td>Communities' demographic profile</td>
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<tr>
<td>The quantity of local content</td>
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19) In your own words, what would you recommend be done to improve the overall performance of DVPs?

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To Very
Appendix II: Questionnaire 2: DVP Staff

Please fill the following questionnaire to help in a study of seeking to investigate the parameters that determines the performance of digital village’s project in Kenya.

Your contribution by answering this questionnaire will help meet the objectives of this study.

NB YOUR INFORMATION WILL BE KEPT PRIVATE AND CONFIDENTIAL

SECTION ONE: DEMOGRAPHIC INFORMATION

1) Please indicate your Gender.
   ( ) Male       ( ) Female

2) What is your age bracket?
   ( ) 19 – 30 Years       ( ) 31 – 40 Years
   ( ) 41 – 50 Years       ( ) Over 50 years

3) What is your highest level of education?
   Secondary ( ) Masters Degree ( )
   College diploma ( ) others (please state) ......................
   University degree ( )

4) What is your level of computer skill?
   None ( )       Basic ( )       Average ( )
   Good ( )       Very Good ( )

SECTION TWO: GENERAL ISSUES

5) Is your digital village centre used frequently?
   Yes ( )       No ( )

6) How would you rate the usage frequency of the centers?
   None ( )       Basic ( )       Average ( )
   Good ( )       Very Good ( )

7) If yes above, to what extent has this center been useful to the users and other people in your area (community) needing their services? Use a likert scale of 1-5 to tick as appropriate, where 5 is very great extent, 4 great extent, 3 moderate extent, 2 little extent, and 1 to no extent
   To Very great extent ( )       To Great extent ( )       To a Moderate Extent ( )
   To a little extent ( )
8) Please indicate the extent to which the following factors influence the service delivery at the DVP centers

<table>
<thead>
<tr>
<th>Factors</th>
<th>Very great extent</th>
<th>great extent</th>
<th>moderate extent</th>
<th>little extent</th>
<th>no extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power outages</td>
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<tr>
<td>Unstable network</td>
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<td>Inadequate computers</td>
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<tr>
<td>Inadequate local content</td>
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9) In your own words, what are some of the challenges encountered in Digital Village Centres?

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10) According to your observation, to what extent do you agree with the following statements?

<table>
<thead>
<tr>
<th>Factors</th>
<th>strongly agree</th>
<th>agree</th>
<th>neutral</th>
<th>disagree</th>
<th>strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>user education can improve the performance of the DV centers</td>
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<tr>
<td>Development of infrastructure will help curb some of the challenges</td>
<td></td>
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<tr>
<td>Stakeholder participation is key in influencing DV Centers Performance</td>
<td></td>
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</tr>
<tr>
<td>Availing more local content will enhance relevance of DV Centers to the</td>
<td></td>
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</tr>
</tbody>
</table>

11) What other ways can be used to overcome challenges at the DV Centers?

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

12) According to your observation, to what extent do you agree with the following statements about the relationship between the community and the Digital Center?
<table>
<thead>
<tr>
<th>Relationship</th>
<th>strongly agree</th>
<th>agree</th>
<th>neutral</th>
<th>disagree</th>
<th>strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The community is very involved in the digital center services</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The community is interested but not involved in the Center's services</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>The community is neither interested nor involved in the activities of the digital center but are aware of its existence</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>The community is not aware of the existence of the digital center in the area</td>
<td></td>
<td></td>
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</tbody>
</table>

13) To what extent has the digital center affected on the following spheres of the society?

<table>
<thead>
<tr>
<th>Sphere</th>
<th>Very great extent</th>
<th>great extent</th>
<th>moderate extent</th>
<th>little extent</th>
<th>no extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economy/Entrepreneurship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entertainment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertisement</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Politics</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

14) Does this digital center satisfy all Digital Village users' Information technology service needs?

Yes ( ) No ( )

15) In your opinion, what other services would you like introduced so as to effectively serve the needs of the community (end users)?

..........................................................................................................................................................
### Appendix III Table 1.1 List of Population

<table>
<thead>
<tr>
<th>Client</th>
<th>Province</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Eazy Cyber</td>
<td>Central</td>
<td>Nyahururu Town</td>
</tr>
<tr>
<td>2  Brookfield Academy</td>
<td>Central</td>
<td>Nyeri - Karatina</td>
</tr>
<tr>
<td>3  Dr. Kamundia Girls High School</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>4  Muthinga Market</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>5  Kangumbiri Girls Secondary</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>6  Dedan Kimathi Memorial High School</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>7  Mathakwani Secondary School</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>8  Kiriti Secondary School</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>9  Huhoini Secondary School</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>10 Nyeri Technical</td>
<td>Central</td>
<td>Nyeri - Tetu</td>
</tr>
<tr>
<td>11 Datawise Cyber</td>
<td>Central</td>
<td>Kerugoya</td>
</tr>
<tr>
<td>12 Malindi Ynet International,</td>
<td>Coast</td>
<td>Coast- Malindi</td>
</tr>
<tr>
<td>13 Stembao Enterprise</td>
<td>Eastern</td>
<td>Kitui</td>
</tr>
<tr>
<td>14 M &amp; A Computers</td>
<td>Eastern</td>
<td>Meru - Makutano</td>
</tr>
<tr>
<td>15 Cyber Safari Souvenir</td>
<td>Nairobi</td>
<td>Nairobi - Embakasi</td>
</tr>
<tr>
<td>16 Kamiti Secondary</td>
<td>Nairobi</td>
<td>Nairobi - Githurai 44</td>
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<tr>
<td>17 Succinct Business Services (Huruma Cyber)</td>
<td>Nairobi</td>
<td>Nairobi - Huruma</td>
</tr>
<tr>
<td>18 Maita Enterprises</td>
<td>Nairobi</td>
<td>Nairobi - Kihawa</td>
</tr>
<tr>
<td>19 Advanced Information Management</td>
<td>Nairobi</td>
<td>Nairobi - Kikuyu</td>
</tr>
<tr>
<td>20 Resource Center for Slums</td>
<td>Nairobi</td>
<td>Nairobi - Kibera</td>
</tr>
<tr>
<td>21 Alliance Boys High School</td>
<td>Nairobi</td>
<td>Nairobi - Kikuyu</td>
</tr>
<tr>
<td>22 Regional Systems</td>
<td>Nairobi</td>
<td>Nairobi - Kikuyu</td>
</tr>
<tr>
<td>23 Excel Girls High School</td>
<td>Nairobi</td>
<td>Nairobi - Kitengela</td>
</tr>
<tr>
<td>24 Al Tawon Youth Islamic Center</td>
<td>Nairobi</td>
<td>Nairobi - Korogocho</td>
</tr>
<tr>
<td>25 Make a Better World Kenya</td>
<td>Nairobi</td>
<td>Nairobi - Mukuru South B</td>
</tr>
<tr>
<td>26 Kangundo Blossom,</td>
<td>Nairobi</td>
<td>Nairobi -Kagundo</td>
</tr>
<tr>
<td>27 Kaswesha Housing Cooperative</td>
<td>Nairobi</td>
<td>Nairobi - Kariobangi</td>
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<tr>
<td>28 Mamlaka Hill Chapel (Hotspot)</td>
<td>Nairobi</td>
<td>Nairobi- Statehouse</td>
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<tr>
<td>29 Poa Place Resort Center (Hotspot)</td>
<td>Rift Valley</td>
<td>Eldoret</td>
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<tr>
<td>30 Loshon Intergral Digital Cyber</td>
<td>Rift Valley</td>
<td>Narok Town</td>
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<td>31 Mundeku Digital Village</td>
<td>Western</td>
<td>Western Kenya</td>
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<tr>
<td>32 World Link Computers (IEARN KENYA)</td>
<td>Western</td>
<td>Kakamega</td>
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## Appendix IV – Project Time Schedule

<table>
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<tr>
<th>WEEK</th>
<th>ACTIVITY</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>4</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td></td>
<td>Pilot Testing</td>
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<tr>
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<td></td>
<td>Data Editing</td>
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<tr>
<td></td>
<td>Data Coding &amp; Entry</td>
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<td>Submit Report</td>
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</table>
## Appendix V – Research Budget

<table>
<thead>
<tr>
<th>1</th>
<th>Proposal Writing</th>
<th>Unit</th>
<th>Price/Unit</th>
<th>Kshs.</th>
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<tr>
<td></td>
<td>Typing and printing the proposal</td>
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<td>2000</td>
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<tr>
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<td>Photocopying and binding of Proposal</td>
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<td>150</td>
<td>750</td>
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<td></td>
<td>Miscellaneous</td>
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<td>Sub-total</td>
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<table>
<thead>
<tr>
<th>2</th>
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<tr>
<td></td>
<td>Typing and photocopying tools for data collection</td>
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<td>Travelling and telephone expenses</td>
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<td></td>
<td>Data entry and analysis</td>
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<tr>
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<td>Research assistant training and wages</td>
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<td>Stationary</td>
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<td></td>
<td>Sub-total</td>
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<table>
<thead>
<tr>
<th>3</th>
<th>Production of final report</th>
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<tbody>
<tr>
<td></td>
<td>Typing and printing of final copy</td>
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<td>2500</td>
<td>2,500</td>
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<td></td>
<td>Photocopy and Binding final copy</td>
<td>5</td>
<td>200</td>
<td>2,000</td>
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<tr>
<td></td>
<td>Miscellaneous</td>
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<td>5,000</td>
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<tr>
<td></td>
<td>Sub-total</td>
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</table>

|   | Grand total                              |      |            | 52,750|