Application of Information and Communication Technologies for Development (ICT4D) to Rural Communities in Kenya

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ABSTRACT

There is growing evidence of the positive role ICTs can play in development, particularly in rural areas of developing countries using public services in the form of telecentres. Emphasizing proactive measures ensures ICTs serve as effective tools for social inclusion, social change, and widespread access, especially for the poor and disadvantaged communities. This research study explores the application of Information and Communication Technologies for Development (ICT4D) in a rural community in Kenya, by evaluating the Nguruman Community Knowledge Center (CKC), established in 2003 by a development organization. This study uses a participatory ethnographic research method that combines participatory techniques and ethnographic research, with the potential of feeding into action research. The research makes use of the communicative ecology approach in evaluating communication and ICTs for development. In this study, ICTs, particularly traditional ICTs (radio and television) significantly contribute to improving people's living conditions by making information available that helps in solving real problems encountered. The expectations of community members who use these ICTs reflect their level of understanding of the relationship that exists between these tools and the improvement of their living conditions as well as enhancing development efforts. The study shows that the context and institutional framework for ICTs in Kenya are changing which reflects the government's commitment to be part of the information society especially in rural communities. Despite this, a gap exists between the aspirations of policymakers and the reality in rural areas owing to the poor state of ICT and general infrastructure.

Keywords: ICT4D, Rural Communities, Development, Telecentres, Kenya

I. INTRODUCTION

There is a belief that ICTs are important tools for revolutionizing social, economic, and political life on a global scale, making it unlikely that nations will thrive without embracing the information age (Wole, 2008). The ICT sector has a major influence on the world's trajectory and the societal well-being of ordinary inhabitants. It has an impact on everything, including growth and the distribution of income and resources. Spiezia (2013) posits that growth rates in ICT investment increase GDP growth and country-specific global competitiveness. Green (2017) concedes that a revolutionary transition from the ICT manufacturing sector to the ICT service sector has taken place, in addition to the ICT sectors' positive effects on the overall economy.

The United States dominates the world in ICT applications. The nation's business dynamism, solid institutional foundations, finance methods, and robust innovation environment are what give it a competitive edge (Schwab, 2018). Regarding the average percentage of the ICT industry in national economies across Europe, the UK (8.53%), Finland (8.12%), Sweden (6.53%), and the Netherlands (6.50 %) have the greatest share of the market. ICT, according to Schwab (2018), is a fundamental component that has various impacts on economic development, productivity, innovation, and competitiveness, especially in developing countries. Gendall (2008) claims that there is mounting evidence of the potential advantages of using ICTs as a strategic tool for reducing poverty. According to Tiwari and Sharmistha (2008), the rapidly expanding export-focused ICT sector is the main engine for India's expanding economy.

Successful ICT initiatives in Africa support strong initial and ongoing training, accessibility to resources, market expansion, government and societal support, and the development of robust networks in remote communities (Maier, & Nair-Reichert, 2007). According to Etta, & Wamahiu (2003), there has been a relatively high and rapidly growing use of public services in the form of telecentres. The importance of ICT4D and poverty alleviation drives the growth of telecentres and the fact that shared access to facilities such as those of these telecentres offers the most guarantees for extending the reach of ICTs to the largest number of populations. Fillip and Foote (2007) note that telecentres are now common on the continent as they are used as places where people can meet, talk, share

information, learn, access information, access internet facilities, contact family members in distant places, transact businesses and a number of information generation activities for developmental purposes.

For over a decade, development partners have advocated the application of ICTs as tools for poverty alleviation in developing countries. Recommendation and implementation of various ICT approaches have been done in many countries including Kenya (Kariuki, 2009). The growth of Kenya's ICT sector has been considerably influenced by global developments and can be evaluated in terms of the number of fixed and mobile telephone lines, tele density, Internet Service Providers (ISPs), internet usage, number of computers and services, broadcasting stations and the market share of each of them (Export Processing Zone Authority, 2005; Government of Kenya, 2006).

The reputation of Kenya as one of Africa's forerunners in the development of ICT is growing quickly. It has consistently been at the forefront of IT advancements and is now one of Africa's leaders in this field. The Internet industry has experienced one of Kenya's strongest growth rates during the last ten years. Since its introduction in 1994, internet usage has increased dramatically across the nation. More than a quarter-million people in Kenya already use the Internet, and there are nearly 100 licensed ISPs (Kenya ICT Strategy, 2006).

A few quantitative studies offer concrete proof of a connection between ICT and poverty alleviation, despite the significant investment made in the ICT sector. Studies that have looked at this have discovered, however, that there is no assurance that ICT will have a beneficial effect on reducing poverty. In their analysis, Torero and von Braun (2006) demonstrate that the so-called digital divide is a smaller component of a much larger development divide and that access to ICT is dependent on resources, income, and educational attainment. They contend that rather than the other way around, socio-economic progress promotes more usage of ICTs. ICT literacy influences ICT access and usage.

ICT development can potentially result in negative consequences. There have been demonstrations that spending on ICT leads to intra-household conflict, encourages male control over resources, and diverts funds from food and other necessities. Indeed, there have been concerns expressed about the exploitation of child labor and the potential use of conflict minerals in the production of ICT equipment (Bosamia, 2013). The positioning of ICT within the local context of skills and requirements, just like any other technology, requires both a strong political economy and the political will to prioritize development issues.

1.1 Statement of the Problem

In Kenya, as with the rest of the world, ICTs have the potential to aid the accomplishment of social outcomes such as increased availability of education and healthcare, improved civic dialogue, and citizen participation in development processes in the country. However, despite the many challenges facing Kenya, development partners have made ICTs a reality, especially in rural communities (Bailey, 2009). However, the establishment of ICT infrastructures in rural areas comes with challenges such as the availability of affordable technology, insecurity, poor maintenance, connectivity issues, unreliable power supply, and weak policies and regulations regarding rural ICT initiatives. Economic, political, and social sustainability are key areas of concern in bankrolling ICT in rural areas (Jhunjhunwala, 2008; Bailey, 2009). The inability of Kenyans, particularly those from rural areas, to acquire information on topics unrelated to their own life is also a problem that influences their lack of news, education, innovation, and possibilities (Kariuki, 2009).

Torero and von Braun (2006) and Jensen (2007) are of the view that there are literature deficiencies concerning the impact of ICT on rural development. On their part, Mwololo and Miroro (2014) posit that in this situation, it is tempting to question whether investments in ICT represent a worthwhile option for rural areas. This makes it untenable to proffer empirically informed ways of quantifying the impact of ICT without extensive research, which underlines the importance of studies such as this.

II. LITERATURE REVIEW

Efforts to define ICTs often provide a range of descriptions. There is no one agreed definition of ICTs. However, the concept of ICTs applies to several situations (poverty reduction, development, empowerment, social change) with circumstances different from each other. More often, ICTs are associated with the Internet, computers, and the World Wide Web (Gerster & Zimmermann, 2003). International Telecommunication Union (ITU) (2003) adapts a service-based definition of ICTs as "the new breed of information technologies generated by the progressive merger between telecommunications and computing" (p. 12) and includes VoIP, the Internet, e-applications such as e-government services, e-business, telemedicine, and e-learning. ICTs are directed at specific development activities (Gerster & Zimmerman, 2003) in this view. Similarly, the Economic Commission of Africa (ECA) cited in ALIN-EA (2005) describes ICTs as including "internet service provision, telecommunications equipment, and services,

information technology equipment and services …network-based information services and other related information and communication activities (p. 160). While the definitions from the views above adopt an activity-based description, their focus revolves around a technical approach that assumes a provision and production side (Gerster & Zimmermann, 2003) to conceptualizing ICTs.

Generally, within different sectors (health, education, and, agriculture), ICTs have been described as technologies that allow information to be processed, stored, and disseminated (Tinio, 2003; Davies, 2006**;** World Bank, 2002). This view adopts a utility side of conceptualizing ICTs. Chapman & Slaymaker (2002) for instance define ICTs**:** " […] a range of electronic technologies which when converged in new configurations are flexible, adaptable, enabling and capable of transforming organizations and redefining social relations […] ICTs, therefore, is an expanding assembly of technologies that can be used to collect, store and share information between people using multiple media" (p.1). On the other hand, ICTs are as "…electronic means of capturing, processing, storing, and communicating information. ICTs are based on digital information […] and comprises computer hardware, software, and networks" (Heeks, 1999, p.3).

Convergence as noted above is between new (digital) technologies such as telephones, wireless cellular phones, communication satellites, computers laptops, and the Internet, with old technologies that use traditional media such as radios, television, analog telecommunication networks, and technologies based on information held in books, newspapers, and manuals (Melkote & Steeves, 2001; Heeks, 1999). The convergence is what Gerster and Zimmerman (2003) describe as "simply lending old technologies new relevance" (p.7). Largely, the scope of ICTs as a tool to promote various development objectives has increasingly been recognized (UNCTAD, 2010). However, at this point, it is important to understand what 'development' means before exploring how ICTs can best contribute to its goals and objectives.

2.1 Information and Communication Technologies for Development (ICT4D)

As with ICTs, drawing a clear line as to what ICT4D is has proved somewhat difficult. Acacia (2003) describes ICT4D as a situation where *"…the intended impact of using ICTs as tools is to help alleviate poverty and improve communities' wellbeing*". Arguably, Sreekumar & Sanchez, (2008) note that ICT4D is a strategic component of ICT expansion and suggest that it is "a loosely defined inter-disciplinary field which assumes a unidirectional relationship between ICTs and development" (p.160). Generally, ICT4D is a broad term that refers to the application of ICTs in the field of socio-economic development and which aims at bridging the digital divide by ensuring equitable access to current communication technologies (ICT4D, 2008).

There is an intertwining between communication and development where one guarantees the other (Sosale, 2007). Yet, historically, systematic use of communication for development has been underutilized. Arguably, development and communication according to Mefalopulos (2008) "… are two terms heavily loaded with different conceptions and a richness of uses and functions S-shaped by their various theoretical underpinnings" (p.39). For many years, the development community has acknowledged the importance of communication in the development process citing the most essential component of good communication as putting people at the center of the communication process (Deane, 2004; FAO, 2007; Singh, 2005).

Communication according to Servaes (2007) is crucial in the development process such that "…development programs cannot produce change without an ongoing, culturally and socially relevant communication dialogue among development providers and clientele, and within the recipient group itself" (p.15). Communication is a crucial component in initiatives that require voluntary behavior change. Most efforts put into the development communication involve assisting people to develop themselves and their communities, which certainly requires voluntary actions (Colle, 2007; Nobuya, 2007).

For many in the development communication field, the concept of communication implies the use of media (Melkote & Steeves, 2001; Servaes, 2000; Servaes & Malikhao, 2007; Servaes & Malikhao, 2005) such as radio or television programs, printed material, and educational videos, among others in information dissemination activities which were considered to be indicators of development (Bessette, 2004; Sosale, 2007; Melkote & Steeves, 2001). However, although development strategies in developing countries vary widely, the models of communication used to assume a relatively linear process, mainly as a message going from sender to receiver (Melkote & Steeves, 2001; Servaes & Malikhao, 2005).

Communication media have been hailed as being significant, especially in raising awareness and knowledge about a given problem, generating public interest and demand, placing the problem on the public agenda and gathering social support, and generally supporting development-oriented projects (Servaes, 2000; Waisbord, 2005). Moreover, some development communication practitioners according to Nobuya (2007) have begun recognizing communication as the objective in and of itself as it plays an important role in empowering people, enabling expression and dialogue,

raising awareness of socio-structural issues, and fostering self-reflection among marginalized and disadvantaged communities.

Since the mid-1970s, the growth of ICTs and their application in development has been gradually rising. Development practitioners have shown increasing interest in the role played by ICTs in development. The potential of ICTs for reducing poverty and promoting growth, especially in developing countries has increased rapidly. The spread of ICTs has however increased globalization and brought in new complexities and challenges to the field of development communication. These are in terms of power shifts where the network society continues to widen the gap between the information haves and have-nots, and those that can access and use the new electronic network of information also known as the digital divide (Melkote & Steeves, 2001; Ogan, et al., 2009; Chapman & Slaymaker, 2002; Thioune, 2003).

ICTs and their development application are central to the rapid development of 'lower-income' regions, particularly Africa. Experience over the past decade reveals that a vibrant and competitive ICT sector is required for developing countries such as Africa (Otiso & Moseley, 2009; Guislain, et. al., 2006). International organizations share and foster the widespread belief of the benefits ICTs have in the developmental context. This is seen in the increase of programs and initiatives in this field, especially in Africa that have considerable influence not only on the implementation of specific programs but also by supporting policy formulation processes (Nulens & Van Audenhove, 1999; Granqvist, 2005).

The recent spread and use of ICT in poverty reduction and development in Africa is a function of infrastructure (availability, operation, and maintenance), access (public access facilities existing relevant information content, sufficient capacity at different levels nationally, regionally, and globally) and supportive-enabling environments (including certain regulatory frameworks and an overall policy framework that supports clear economic and political governance). However, there is a need to address these factors at all levels by all the stakeholders (African Partnership Forum, 2008).

Africa has emerged as one of the most dynamic regions in the growth of ICTs, although the continent's absolute figures, as well as penetration rates, remain low. Unlike the strong ICT investments and adoption of new technologies in the rest of the world, Africa remains far behind especially in ICT penetration levels, although it has made impressive gains. Given the potential for ICTs to cause transformation, development analysts believe these tools can play an important role in the development process (International Telecommunications Union, 2009; Thioune, 2003; Tiwari, & Sharmistha, 2008; African Partnership Forum, 2008).

ICTs are effective transformers of African countries. However, one of the major developmental challenges facing Africa is its ability to develop the capacities, strategies, and mechanisms necessary to take maximum advantage of these new technologies and their opportunities. Other challenges are adapting the ICTs to local conditions and understanding the innovations to suit their development needs (Thioune, 2003). There is also a noticeable lack of analysis on the impact of ICTs on development in Kenya. Most of the documentation is mostly on policy and very little on ICT4D. On the contrary, there is a plethora of official and legal documentation of policies. This may be an indication that the government is making all the steps in formulating policies but has not looked at the real impact of ICTs on development, especially in remote rural areas.

III. RESEARCH METHODOLOGY

The study adopted the Ethnographic Approach. In this design, the study uses the main tools and principles of ethnographic research. Data collection was from participant observation in Nguruman during June and July 2010. There was Observation of relevant formal and informal events taking place in the CKC and the community. Research documentation is a primary component of the ethnographic research process. Achievement of this was through keeping a clear and detailed record of all the data gathered in the form of field notes, transcripts, diagrams, maps, charts, and other material. Consequently, analysis is a continuous part of the research process that can extend indefinitely and involves coding, organizing, and exploring the data collected.

IV. FINDINGS AND DISCUSSIONS

4.1 Access to and use of ICTs in Nguruman

This study demonstrates that ICTs have the potential to become important enablers for fighting and reducing poverty reduction only if communities can adapt their applications to their ends. The concept of telecentres in rural areas is based on enabling more people to use the ICTs, and the more they learn how to use them, the more they generate new innovative ideas. Findings from the key informants pointed out that accessing e-services such as e-

Government, e-Education, and e-Health has contributed significantly to the poverty reduction process in the country. This study did not see evidence of these advantages. Based on the findings from this study, the Nguruman CKC has the characteristics of a basic telecentre that acts as a community access point where people can use conventional ICT tools such as computers, newspapers, the internet, and telephone and it provides knowledge and training services such as basic computer skills. It has minimal information marketing, is heavily consumer-driven, and is a public service offering no fees.

According to the key informants of this study, ICTs in Kenya have contributed to Kenya's economic growth. This is through the new mobile banking initiative, which has seen the growth of the local industry, has in turn increased employment opportunities, and reduced the rural-urban migration. Although the key informants stated that a direct contribution to Kenya's economic growth is through foreign investors with a focus on ICTs and that Kenya's GDP is slightly over 3.5% because of ICTs, evidence of how this affected the local community was difficult to determine in the case of the Nguruman CKC.

ICTs are important components in advancing economic growth and reducing poverty. They are not only mediums of communication but also an enabler of development and an opportunity for developing countries to access the global information infrastructure and participate in the knowledge economy (Levy & Banerjee, 2008; Zhao, 2008; Melkote & Steeves, 2001; Guislain, et al., 2006). Based on the findings, the availability of ICT tools for knowledge creation, generating, and sharing information in Nguruman shows that the community is not left behind in the digital world, even though the CKC is rated the sixth remotest center in the world. ICT tools mostly used by participants are cell phones, radio, televisions, newspapers, computers, the internet, world space receiver, and the iPod.

Through these ICT tools, levels of general and technical literacy tend to increase through radio programs, basic computer learning skills, or even iPod broadcasting. This concurs with a study by Etta & Parvyn-Wamahiu (2003). In their study, Radio, for example, is the most effective way of disseminating information for rural development in Kenya. Ownership of radios is far higher than any other electronic tool. Existing radio networks reach an estimated 60% of the African population. In Nguruman, many community members watch television at home or the CKC for information, which has, in different ways, changed their thinking, attitudes, and behaviors for instance one participant watching national news during prime time helps her know what is going on worldwide. People have however reduced dependence on the CKC as they can listen to the radio at home, as they carry on with their lives. Radio and television broadcasting and to some extent iPod broadcasting has continued to play a key role in creating awareness of, and interest in innovations in Nguruman. It is important to note that the Radio is a traditional media (Thioune, 2003) developed long before the discussion of ICTs began.

The Radio, a traditional media is doing the development job in the rural areas far much better than new ICTs. This necessitates the question, what is the need for using so much money in equipping telecentres in rural areas with computers? As these need solar energy and batteries due to lack of power and their use is only limited to playing games and getting into Facebook or email. The Nguruman CKC has several computers that are not functioning because lack of power to run more than two computers and besides, there is a lack of control of the user such that most of the users play computer games and are interested in getting into Facebook and sending an email. In terms of development, Radio seems to be a key contributor by providing people with information on development programs such as health, civic education, agriculture, education, and entrepreneurship (mostly provided by the government, NGOs, self-help groups, Church-based organizations, and ordinary people), which has a more direct impact on their thinking, attitudes, and behaviors. Listeners are allowed to call (using a mobile phone) to ask questions about the different ideas being presented. Such an example shows the importance of getting everyone involved in the development process in a more participatory manner. So, should the emphasis be put on Radio then? because it not only has better programs and is richer in information but it is easily accessible and more popular in use?

Without a doubt, Nguruman CKC has brought community members of this rural area into direct connection with ICTs. However, the usage pattern at the CKC shows that services especially those related to computers are more popular particularly among male youth, leaving out whole sections of the community members. Computer use among the older population tends to be very low. Information services (for farmers, teachers, and students) have moderate levels of demand. Computer use among the youth was mainly for playing computer games, basic computer learning, and accessing the Internet (Facebook) and email services. There was an observation on the non-use of the advisory services offered at the center. This was due to the lack of skilled personnel for such services. As mentioned in the literature, demand for information and computer services in rural areas are underused and therefore does not show a tendency to increase over time. Furthermore, these services tend to be difficult to maintain over time due to telecommunication problems and the lack of electricity (Etta & Parvyn-Wamahiu, 2003) as experienced in Nguruman where only solar power is in use.

When the CKC was established, people used it to make phone calls due to the lack of cell phone coverage in the area. Safaricom network has since covered the area, which has decreased the use of the telecentre. The study shows that mobile phones were the most commonly used technology for communication to maintain links between geographically dispersed family members by facilitating direct and immediate communication. Telephone use, therefore, facilitates the ongoing function of extended family support networks. This reflects in a study by Parkinson (2005) in Uganda and South Africa that showed telephones are for communicating with family members. Telephone use according to Parkinson cuts across all sectors of society, for instance rural, mainly subsistence-based family members use the phone to be in touch with formally employed relatives based in the cities and other towns.

Inequalities of access in terms of age, gender, education, literacy level, and cultural issues emerged as major factors influencing the use and access to the Nguruman CKC. An interesting observation was the absence of older people at the center. This echoes inequalities of access to ICTs arising from broader social inequalities based on gender and formal education (Tacchi & Martin, 2008). Etta & Parvyn-Wamahiu (2003) found that telecentre users in Africa have been disadvantaged based on gender, age, education, literacy levels, and socioeconomic status. There was an observation on the absence of the elderly and disabled population at the telecentres. My study corroborates this view and shows that older people believe ICTs are only for their children, especially the youth.

Findings are in line with the literature (Odame, 2005; Tacchi & Martin, 2008; Best & Maier, 2007) and show that the gender gap in terms of meaningful access to ICTs remains. In Nguruman, very few women use the CKC. Odame (2005) asserts the gender gap still exists because women are rarely involved in the needs assessment of ICTs for development. The attitude that high-end information technology 'is not for women' who are still being treated as passive recipients of information and not active information users and communicators is rampant There is considerable delay in addressing the limitations faced by women in accessing supposedly 'public' information spaces, or even private sector initiatives such as cyber cafes" (p. 16). Women "do not feel welcome in telecentres because of the "maleness" of the environment and the accompanying intimidation" (Colle, 2001, p. 12). Intimidation impedes the participation of the women in the telecentre initiative (Etta & Parvyn-Wamahiu, 2003; Colle, 2001; Roman & Colle, 2002a). This is certainly the case in Nguruman. This study suggests the use of local female ICT champions, to provide access opportunities and develop tools and content specific to the priority needs of women (Gill et al., 2010).
The most common users of the Nguruman CKC are high school students or those who have just completed high school, all of whom are young men. In many telecentre initiatives throughout the world, the youth are the largest part of the population using computers and Internet opportunities.

An IDRC telecentre study in Latin America, Uganda, and Mozambique by Etta & Parvyn-Wamahiu (2003), shows that most of the users were students between the age of 15 and 34 years and the majority of these were male. The implication for this demonstrates that the CKC has become a male, youth information center rather than a community information center. Therefore, there needs to be a rethinking of the rationale of such projects to include the roles of info mediators, which are key in facilitating access and effective use of the initiatives (Fillip & Foote, 2007).

Education emerged as another major determinant in the use and access of ICTs. A general belief indicated by the participants was that the CKC was for the educated or knowledgeable. There was also the popular view that computers are devices for the educated only. Not surprisingly, most of the people who used computer-related services tend to have a higher level of education (high/secondary school and above) and often had prior experience with computers through school, work, or personal introduction. This restricts spontaneous appropriation of ICTs even where physical access is availed as Parkinson (2005) argues.

Further observations reveal that culture influences access, especially among women in the community. Age and cultural issues were crosscutting, such that older female participants indicated that it was culturally inappropriate for them to visit the center, which was usually flocked by young men the age of their sons. Some participants expressed of fear handling ICTs at the CKC. As mentioned in Chapter two, deficiencies in literacy, education, language, cost, locality, technophobia and the perceived role of women in society impede their access to and use of ICTs initiatives such as telecentres. These barriers exist widely, however they are more severe among African women as well as in some parts of Asia and Latin America (Roman & Colle, 2002b; Etta & Parvyn-Wamahiu, 2003).

From my observation, the CKC has not been able to demonstrate a strong way of overcoming the barriers to access faced by many community members. In this case, people need to have other channels for building their knowledge of and confidence in using ICTs. This study suggests the need to have trainers to build the capacity of the community in ICTs and development issues, for instance, entrepreneurship. This study also suggests the need to understand gender inequalities and obstacles to full participation and through this initiate a kind of response to gender issues to engage women fully in the development process.

What emerges from these findings revolves around access and exclusion from ICTs based on socio-economic factors. This mirrors the idea that ICTs can intensify and reinforce existing economic, political and social inequalities

depending on how they are designed, deployed, and accessed (McNamara, 2003). The implication of this is that governments need to take proactive measures in ensuring ICTs serve as effective tools for social inclusion through widespread access, especially for the poor and disadvantaged to benefit (Watson, 2007).

4.2 Role of the Government in Influencing the Growth of ICTs for Development

Findings from the key informants demonstrate the government's commitment to preparing rural communities to be part of the information society at a legislative and policy level, for instance through the implementation of the Universal Access projects also called digital villages and the laying of the fiber optic cable that will connect every District in Kenya with the digital world. The introduction of reforms and measures in this sector has influenced the growth of ICTs in Kenya. Evidence of this is by the views of the key informants, who identified the liberalization of the market, the introduction of interconnection policies to reduce the interconnection charges between the various mobile service providers, and regulating tax on ICT tools that can be availed to the rural population. This highlights a gap between the aspirations of the legal and policy framework, and the reality in rural areas. In Nguruman, there is one mobile service provider, which indicates a monopoly still exists, intermittent electricity supply, and high connectivity and maintenance costs. This means that there is no optimum realization of the advantages hoped for by the decision and policymakers.

The government has introduced a law, the Communications Amendment Act of 2008 that created a universal service fund to support ICT infrastructure rollout in economically unviable areas. This is evidenced by the several centers similar to the Nguruman CKC that have been established in different areas in Kenya, which are supported by the universal service fund such as the school-based ICT centers and Community ICT centers supported by the Communications Commission of Kenya (Communications Commission of Kenya, 2010). As mentioned in the literature review, African countries have now begun gradually implementing strategies for including new ICTs on their development agenda towards the development process (Thioune, 2003).

The study by Thioune (2003) indicates that Kenya has introduced significant reforms in the telecommunications sector such as privatizing companies, liberalizing, and putting an end to monopolies. Nonetheless, like other African countries, Kenya does not appear to have an integrated vision of the policies implemented in its telecommunications sector. The reforms established are still sectoral. Vaughan (2006) argues that many ICT strategies adopt a sectoral approach to implementing ICTs. The formulation of a consistent and systematic policy is yet to be achieved. Thioune (2003) suggests, "An integrated approach, which would be more holistic in terms of policies designed to introduce and to appropriate ICTs for development, [needs to be adopted]" (p. 7).

Labelle (2005) purports that while there are many types of ICT strategies to choose from; an integrated approach to ICT development and deployment is more likely to produce human, social and economic development success over a long-term period. However, whether ICT policies and strategies are created separate or incorporated with sectoral policies and strategies, it is agreed that national priorities for poverty reduction should first be created including particular initiatives for pro-poor growth. This study suggests that there should be broad-based participation at all levels in developing the strategies (adopted from Vaughan, 2006).

4.3 Challenges/Barriers to Successful Implementation of ICT Initiatives

The greatest challenge to the successful implementation of ICT initiatives indicated in the findings was financial in terms of the cost of setting up the initiatives in the rural areas, the cost of having trained staff or local entrepreneurs at the centers, the cost of installing new ICTs, insuring them and the cost of connectivity. The high cost of the equipment, supplies, and maintenance was a constant problem for ALIN-EA because they bear the burden of funding the CKC on a monthly basis. In addition, the general infrastructure in Nguruman is of concern, especially concerning the lack of electricity supply.

The findings also indicated that age, gender disparities, and gender roles form significant barriers. As previously mentioned, there was a notable absence of older people at the CKC. Gender disparities exist around the community's cultural background and reflect the attitude of the community towards women. With regard to gender roles, there is an indication that the social roles and behaviors of women in the community impede their opportunity to engage with the CKC. Martin (2008) suggests that for successful community involvement in a local initiative, it is imperative to understand the gender relations in the community. This study supports this view.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The availability of ICTs in Nguruman shows that it is progressing in the digital age. However, the availability of technologies and the real impact on communities' development are not synonymous. This research set out to answer this question, along with several sub-questions relating to gender, age, illiteracy, and power structures that influence access and use of ICTs within the community. The overall findings indicate that the ICT has changed some people's lives who have used it to varying degrees. For instance, to enhance working performance using the computer, enhancing the performance of students through basic computer skills and accessing relevant information on development using the internet, publications, and media services.

However, it is only accessible to a small section of the population. This study shows that women, especially, and older people have been left out in accessing and using the facility due to major factors in terms of age, gender, and illiteracy. In addition, ICTs in this community face many institutional, socio-economic, and technical problems such as poor infrastructure, gender, and cultural issues that impede access and use among women, and telecentre sustainability. The ongoing social and financial sustainability of the center in terms of ownership and management requires constant attention.

5.2 Recommendations

Connectivity is important for the successful implementation of ICTs in rural areas because it relies on the telecommunications infrastructure provided and controlled by the government and licensed operators. The emphasis therefore should be on the growth of the telecommunications infrastructure by encouraging public-private partnerships and investments. The government and development agencies should take proactive measures to ensure ICTs serve as effective tools for social inclusion and social change, and widespread access, especially for the poor and disadvantaged. Increasing access and use of ICTs among women can drive their economic improvement and stimulate broader economic growth. Developers and decision-makers, therefore, need to know what technologies women need to increase their economic opportunities.

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