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Bridging the Gender Digital Divide: Challenges in Access and Utilization of ICTs for Development at the Devolved Level in Kenya

Awuor Ponge
Associate Research Fellow, African Policy Centre (APC), Kenya
Doctoral Candidate, Department of Gender and Development Studies,
Kenyatta University, Nairobi, Kenya

Abstract:
This study is an attempt to understand the challenges in access and utilization of ICTs across gender in rural Kenya. Technology is an engine for economic growth. Strong links have been made between use of specific technologies and growth. Failure to give priority to ICT strategies that enable developing countries to develop their national infrastructures will exacerbate the gap between rich and poor. This study is pegged on the premise that improving women's access to technology has the potential to spur their economic advancement and stimulate broader economic growth. Regrettably, technology has been underused in unlocking women's economic opportunities in Kenya. Real access to technology is one of the key elements necessary for integrating technology into society. The key issue here is whether the technology in question is available, physically accessible and affordable. An acute lack of infrastructure in Kenya seriously limits opportunities for using ICTs for economic and social development. Women have less income, education, time, mobility, and face religious and cultural constraints that restrict their access to, and use of, technology. Rural women are more disadvantaged than younger, more literate or wealthier urban women. Women are poorly placed to benefit from the knowledge economy because they have less access to scientific and technical education, and less access to skills training and development. Barriers to universal access are not only about the availability of telecommunications infrastructure and computing equipment, but also barriers to individual access, which may be educational and socio-cultural. The potential to advance women economically may be the most exciting transformative feature of technology. Empowering women and improving the efficiency of their work is critical for reducing poverty. Mounting evidence confirms that women's improved economic status produces many positive economic and welfare outcomes for children, families, and societies. Through a comprehensive desk review of the literature available on ICTs access and utilization globally, in Africa and narrowing down to the Kenyan case, this study advances an argument that African women, long deprived of information, education and training can look to advances in information technology to bring learning to their doorsteps. It further argues that Kenyan women cannot be left behind and more so the ones in the rural areas. Technologies, particularly those in the global ICT revolution, give women many opportunities for economic advancement. But without the skills to use the technologies, women can remain on the lowest levels of the economic ladder. Kenya has a Devolved system of Government at the County level that is still in its infancy. This study posits that if the Devolved Governments in Kenya can put appropriate structures and policies in place to capture the digital explosion and attempt to bridge the gender digital divide, then ICTs can promote women's economic advancement by improving the productivity and quality of women's work and generating new employment opportunities. In a nutshell, Kenya's County Governments are progressively emerging as the new platforms for devolving digital opportunities for inclusion for all.

Keywords: *Gender, Digital Divide, ICTs, Access, Utilization, Kenya.*

1. Introduction

1.1. Background

Information and Communication Technologies (ICTs) generally refer to an expanding assembly of technologies that are used to handle information and aid communication. ICTs are a complex and heterogeneous set of goods, applications and services used for producing, distributing, processing and transforming information (Marcelle, 2000; Asenso-Okyere & Mekonnen, 2012). These include hardware, software, media for collection, storage, processing, transmission and presentation of information in any format (i.e., voice, data, text and image), computers, the Internet, CD-ROMs, email, telephone, radio, television, video, digital cameras etc. (Marker, Mcnamara & Wallace, 2002; Gurumurthy, 2004; Dlodlo, 2009).

ICTs are enabling and facilitating technologies. Individuals, community groups, business or government departments with access to affordable communications and computers can use them to save time and money and improve the quality of their work or home lives (The European Commission, 2001:3). Overall, ICTs are grouped under two categories: 'traditional' and 'new'. Traditional (old) ICTs constitute non-electronic media such as print and analogue technologies, i.e., radio, television, fixed line telephones, and facsimile machines (Kituyi-Kwake & Adigun, 2008:127). These technologies have been gradually ingrained in the daily lives of people and communities. 'New' ICTs consist of computers (in all their myriad manifestations) and data processing applications accessible through their use [email, Internet, word processing, cellular phones, wireless technologies and other data processing applications] (Gurumurthy, 2004:6; Marcelle, 2000: 8).

According to Harris (2002:3), the feasibility of ICTs in rural development is only possible when development strategies for information systems and technology are drawn from and harmonized with overall national development strategies. The positive impacts of technology interventions on promoting women's market activity and economic advancement can be fully understood only if implementing actors conduct assessments and evaluations. Unfortunately, many technology-introduction projects have not systematically evaluated their impact on women (Gill *et al*., 2010:20).

ICTs are building new channels for social awareness, mobilizing resources for resource poor women and networking women as well as men who are supportive of human rights goals (Odame, 2005:1). The gender divide within the digital divide can be seen in the lower numbers of women users of ICTs compared to men. The majority of the world's women do not use the Internet. The digital divide within countries broadly reflects the gender divide. Women are in the minority of users in almost all developed and developing countries (Gurumurthy, 2004:22).

ICT can be a catalyst for effective development, but to play this key role it must be combined with appropriate developmental strategies. In a developing country, a development programme generally focuses on a combination of issues – including, for instance, the alleviation of poverty, education, human skills building and the creation of a social environment that is conducive to the provision of universal access to basic welfare systems. ICT interventions in developing countries must address these issues and align with the development programmes of the country being dealt with (Ashraf, Swatman, & Hanisch, n.d.). The United Nations (2005:3) is of the position that if the gender dimensions of ICT, in terms of access and use, capacity-building opportunities, employment and potential for empowerment, are explicitly identified and addressed, ICT can be a powerful catalyst for political and social empowerment of women, and the promotion of gender equality. In rural areas, ICTs can raise incomes by increasing agricultural productivity (Lio & Liu, 2006) and introducing income channels other than traditional farm jobs (Barrett, & Slavova, n.d.).

1.2. Study Justification

The UNDP (2001:3-16) argues that harnessing ICTs for human development requires raising awareness and constituency building across all levels of society. There is evidence however, that in efforts to integrate ICT into a community, with equal access for men and women, there is still a tendency for men to take over (Wamala, 2010). ICTs can only have optimal impacts in rural communities if they are imbedded within other community development initiatives (Harris, 2004:38).

This study is an attempt to understand the challenges in access and utilization of ICTs across gender. It is important to remember that while gender is usually assumed to be synonymous with women, it is not only about women (Carver, 1996). Gender theory is relevant to this study because it illustrates how women are marginalized in information communication technologies (ICTs) and economic development discourse. Gender theory advocates for promotion of human rights for the marginalized groups in society, by sex, age and race.

An appreciation of gender issues is important if we are to improve women competiveness in the digital economy. Women are major players in informal business and own one-third of all firms in Africa (Komunte, Rwashana & Nabukenya, 2012:75). ICTs can be powerful tools for women to overcome discrimination, achieve full equality, well-being and participation in the decisions that determine their lives and the future of their communities. ICTs opens up a direct window for women to the outside world (Hilbert, 2011). Real access to technology is one of the key elements necessary for integrating technology into society. In other words, is the technology in question available, physically accessible and affordable?

Radio has been cited as the most commonly used communication channel in rural Kenya. Nonetheless, the information broadcast on the radio programmes may not always reach the intended audience. Kenya's empirical results indicate that radio and television are the most commonly used ICTs amongst rural women in Kenya. An average of 74.4% use the radio for their information needs, while the TV is used by an average of 37.8% (Wafula-Kwake & Ocholla, 2007:11). For the Association of Media Women in Kenya (AMWIK), there is a clear indication that information, communication and technology (ICT) is a crucial tool for information dissemination not only to create awareness but also prompt social action against issues like gender violence and HIV/AIDS. Information is a powerful tool through which people's attitudes can slowly change towards desired effect so long as information is contextualized to meet the felt needs and issues unique to their lives (Thuo, 2005).

On the basis of the evidence, it is apparent that the risks of failing to participate in the ICT revolution are enormous. Failure to give priority to ICT strategies that enable developing countries and countries in transition both to develop their national infrastructures and to join the GII (Global Information Infrastructure) will exacerbate the gap between rich and poor (Kituyi-Kwake & Adigun, 2008:127) and the idea that wider access to and use of ICTs throughout a country will reduce inequalities in income and quality of life between rural and urban residents is compelling (Barrett, & Slavova, n.d.:16).

According to the fourth Annual Progress Report (APR), ICT plays a critical role in economic development. It is the foundation for knowledge economy. The target of the Government of Kenya therefore is in ensuring equity and universal access in the provision of

ICT services and employment creation. The Medium Term Plan (MTP) was to establish a digital village in each of the 210 Constituencies by 2012. However, in 2011/2012, 67 digital villages were established up from 37 digital villages established in 2010/2011 (Government of Kenya, 2013:43-45). To this end, IT Skills 4 Rural Kenya, is going a long way in ensuring Kenya achieves its Vision 2030 through realization of the ICT targets. So far, IT Skills for Rural Kenya has established 16 Community-based ICT centres across 5 Counties in Kenya, including 3 in Kericho alone. They expect to supply six new centres with equipment in 2014 and these are in Olkejuado, Kisamis, Ganze, Karatina, Kakamega, Siaya and Rachuonyo.[1]

The potential to advance women economically may be the most exciting transformative feature of technology. Empowering women and improving the efficiency of their work is critical for reducing poverty. Mounting evidence confirms that women's improved economic status produces many positive economic and welfare outcomes for children, families, and societies (Gill *et al*., 2010). ICTs are clearly not 'gender neutral' because women know the importance of information and the power that these technologies hold in terms of *breaking out of systematic discrimination* and indeed even gender violence in the household, workplace and village, especially if women organize as producer groups (Odame, 2005:8). Technology is an engine for economic growth. Strong links also have been made between use of specific technologies and growth. Improving women's access to technology has the potential to spur their economic advancement and stimulate broader economic growth. Regrettably, technology has been underused in unlocking women's economic opportunities.

In most developing countries, women lag behind men in using the Internet, mobile phones, and radios. For example, women are estimated to be just 25 percent or less of Internet users in Africa (Gill *et al*., 2010). Including women and their needs and perspectives increases the likelihood that women would have greater access to the technology and actually use it.

2. Gender, ICTs and Rural Development

2.1. Gender Digital Divide and ICTs in Rural Development

The emergence of the ICTs provides an unrivalled opportunity for women to exploit their capabilities to improve their quality of life as well as the contribution for the welfare of the society. The empowering use of ICTs is closely connected to socio-economic development, and this potential towards social transformation demands that everyone should have access. In relation to women, inequality in access to ICT is referred to as 'the gender digital divide'. If access to ICTs can promote sustainable socio-economic development and women lag behind, a significant portion of the world's population must be aided by a targeted approach (Wamala, 2012:3).

Viewpoints on the role of ICTs in rural development can be grouped into four major categories, namely: political, economic, social and technological (PEST). Economic implications primarily focus on the importance of science and technology (Basson, 1996). Basson stresses the need for African governments to utilize science and technology and compete in commerce and industry.

According to Marker, Wallace and Macnamara (2002:14), the Internet dramatically reduces the costs associated with making information available to others and accessing global information and knowledge resources. ICTs do in fact have an impact on the standards of living and on poverty alleviation at various community levels. Examples of ICT access by the African rural poor in addressing their information needs are largely drawn from health, agriculture, community mobilization, education and training (Kituyi-Kwake & Adigun, 2008:128). Technologies, particularly those in the global ICT revolution, give women many opportunities for economic advancement. But without the skills to use the technologies, women can remain on the lowest levels of the economic ladder (Gill *et al*., 2010:17). Today, many services have gone mobile namely, banking, entertainment, trade, health and learning. Mobile phones have become a significant part of ICT investment in the world (Komunte *et al*., 2012:74).

An acute lack of infrastructure in Kenya seriously limits opportunities for using ICTs for economic and social development. Odame (2005:3) point out that women have less income, education, time, mobility, and face religious and/or cultural constraints that restrict their access to, and use of, technology. Odame further argues that some groups of women (i.e. rural women) are more disadvantaged than younger, more literate or wealthier urban women.

Most NGOs make use of wireless technologies, whilst simultaneously integrating new and traditional media. The African Centre for Information and Communication Technology (ACWICT) is one of the Kenyan NGOs committed to the plight of women/girls in ICTs. According to Kituyi-Kwake and Adigun (2008:131), African women, long deprived of information, education and training can look to advances in information technology to bring learning to their doorsteps. Distance education particularly helps disadvantaged communities in rural areas, as it is for those who are looking for a second chance in education. Grown, Rao and Kes (2005:33-34) state that 'empowerment' implies that women must not only have equal capabilities (such as education and health) and equal access to resources and opportunities (such as land and employment), but also the agency to use these rights, capabilities, resources and opportunities for strategic choices and decisions (such as is provided through leadership opportunities and participation in political institutions).

Women want information and to engage in communication that will improve their livelihoods and help them to achieve their human rights. This is a formidable challenge facing all societies in today's world, and especially developing countries. Due to systemic gender biases in ICTs and their applications, women are far more likely than men to experience discrimination in the information society (Odame, 2005:1).

[1] Puri, Shamlal. (2013). 'Kericho to host international symposium on rural growth.' *The Standard Newspaper*, 20 November 2013.

ICTs frequently used to access/receive educational, business/ trade, health, agricultural and social welfare information in Kenya. [n=200]

ICTs	Education		Health		Business		Agriculture		Social Welfare		Av
	f	%	*f*	%	*f*	%	*f*	%	*F*	%	%
Radio	154	77	176	88	130	65	130	65	153	77	74.4
Television	81	41	65	33	71	36	71	36	85	43	37.8
Films	25	13	47	24	13	7	17	9	39	20	14.6
Cell phone	24	12	40	20	14	7	14	7	36	18	12.8
Telephone	7	4	5	3	8	4	8	4	9	5	4.0
Video	7	4	10	5	6	3	10	5	11	6	4.6
Computer/ Internet	5	3	-	-	2	1	-	-	2	1	1.0
Mobile cinemas	5	3	7	4	5	3	5	3	6	3	3.2
CD-ROM	-	-	-	-	-	-	-	-	-	-	-

Table 1: Frequencies of Access to ICTs and Utilization Purpose

Source: Kituyi-Kwake, A. & Adigun, M.O. (2008). Analyzing ICT Use and Access amongst Rural Women in Kenya. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2008, 4(4):127-147. (p.136)

2.2. Utilization of ICTs to Enhance Rural Women's Quality of Life

In Kenya, particularly in the rural areas, the utilization of ICTs cut across gender, but for purposes of this study, rural women mainly use ICTs for the following reasons:

- To listen to news; networking and advocacy
- Search for health information; agricultural information
- Instant messaging; Chat forums; In touch with family and friends
- Search for administrative information; KRA downloads
- E-Commerce/Trade; Buy goods and services; Buy stocks
- Entertainment; Playing/downloading games; Listen, look and download music or films
- Data processing; To fax documents
- For research purposes; Downloading software
- Contact Business Support Agencies; Accessing bank account;
- Internet and related services
- For Distance Education

2.2.1. The Radio

There are radio broadcasts, which aim to give the community advice on hygiene, health and practical finance, mainly for farmers. They aim at changing farming methods, but they also seek to change people's attitudes and behaviour. IIboudo (2003) affirms that the radio has the capacity to enable the broad participation of men and women of a local community. The radio is the cheapest of all mass communication tools, one that rural people can easily obtain. IIboudo further states that the radio has the following qualities:

i. A means of disseminating key information, in a great many languages, and in geographically distant or restricted areas;
ii. A platform for dialogue and debate between developmental stakeholders;
iii. A platform for the expression of rural and urban voices and communities;
iv. A tool for awareness-building and social mobilization;
v. An instrument for research, providing genuine information about rural communities (upwards) to decision makers.

2.2.2. The Mobile Phones

Mobile phones have become personal computers with a wide set of input, output and communication features. This has changed the way women entrepreneurs work, consume, purchase and interact. Mobile phone usage reduces transaction costs. Information flows between actors and allows for the exchange of information without travelling (Komunte *et al*., 2012:74-80). Kenya had 29.2 million mobile phone users by the end of March 2012 while Uganda had 14 million in June 2011. This increase in the number of subscribers is attributed to the expansion of telecom operators who have improved network coverage (Komunte *et al*., 2012:74).

2.2.3. The Telecentres and Cyber cafés

Telecentres are community-based centres with ICT equipment. They are also called information kiosks (Gurumurthy, A. 2004:32), E-Touch or Cyber cafés. They are yet another area in which ICTs are gaining popularity amongst rural women in Kenya (Opala, 2004). These centers offer low-cost communication and information services commonly found in low income and rural areas in developing countries, and are used primarily for basic access to phones, faxes, photocopying, word-processing and other activities such as e-mail and Internet access (Kituyi-Kwake & Adigun, 2008:131).

In some telecentres, particularly in rural areas, services offered are the basic use of equipment – telephones, faxes, photocopying machines. There are indications that higher order services providing government information, for example, are not of key interest to women. Issues such as the education of children, food and firewood are considered to be issues of more concern to women than men. The Government of Kenya has established the one-stop digital shops for all administrative services including e-payment for government services.

In the main, telecentres provide access to telecommunications equipment. Only a few telecentres are beginning to provide a range of information. It is important that telecentres are not used as vehicles for government propaganda. Women and women's organizations (rather than male-dominated traditional and civic local authorities) need to be asked what information women require, whether electronically, verbally or in document form (Jolly, Narayanaswamy & Al-Zu'bi, 2004).

2.2.4. The Computers and the Internet

In many developing countries, computers are being introduced in schools as a tool to support the learning process. Research has shown that classrooms are not free from gender bias and therefore gender-sensitive planning of ICT interventions is a precondition to ensure equal access and effective use by girl students of computers in the classroom environment (Gurumurthy, 2004:31). The Internet has made it possible for people to communicate, network and collaborate on a more global scale than was previously possible, for purposes of advocacy to promote gender equality. Alliances have been built between the local and global organizations addressing issues of gender equality and women's empowerment.

3. Accessibility and Utilisation for Development

Women's needs should be taken into account at the design phase and the product customized accordingly. Special efforts provide women with access to technology, such as distributing it in the home rather than at a marketplace to which some women may have difficulty traveling. Assuming this involvement takes place; women are able to use a given piece of technology in a way that enhances their economic activity – either improving their productivity in a position already held or creating new positions and entrepreneurial opportunities. These developments trigger the hallmarks of women's economic advancement: more income is directed to women; their economic decision-making and efficacy at home and in the workplace improves; and they gain access to other assets and financial resources that increase their ability to care for themselves (Gill *et al*., 2010:9).

ASPECT	UNIVERSAL ACCESS	UNIVERSAL SERVICE
Availability	Focused coverage	Blanket coverage
	Public access (e.g., at a pay phone or telecenter)	Private service on demand
	Free emergency calls	Free emergency calls
Accessibility	Walking distance, convenient locations and hours	Simple and speedy subscription
	Inclusively designed premises (e.g., for wheelchair users); inclusively designed terminals or available assistance (e.g., for the blind or deaf)	Inclusively designed terminals and services (e.g., for blind or deaf people)
	Assistance from an attendant	Assistance through the terminal (e.g., by making calls or viewing help pages for the web)
	Adequate quality of service (e.g., having few failed call attempts)	Reasonable quality of service (e.g., having few dropped calls)
Affordability	Options of cash and card payment	Cost of average monthly usage is a small percentage of monthly GNI per capita
	Options of cash and card payment	Options of cash, card, and electronic payment
	Payment per use (e.g., for a single call or message or an hour of Internet access)	Flat rate, bundles of services or low monthly subscription fee

Table 2: Characteristics of Universal Access and Universal Service

Source: Dymond et al., 2010, as quoted in Barrett, M., & Slavova, M. (n.d.). ICT in Agriculture. Module 2: Making ICT Infrastructure, Appliances, and Services More Accessible and Affordable in Rural Areas. p.17

Benefits of ICT for women		Barriers to fully realize benefits
Individual Benefits	Collective Benefits	(barriers affect all, but especially women)
• Empowerment • Increased self-esteem • Reduced isolation • Access to markets • Access to health information	• Economic growth • Improved health • Improved education • Capacity building • Cultural transformation	• Location, infrastructure and connectivity • Time and money • Lack of relevant content • Low education and literacy • Social norms and perceptions

Table 3: Benefits of Access and Utilization of ICTs and Barriers for Women
Source: Terry, A. & Gomez, R. (2010). Gender and Public Access Computing: An International Perspective. The Electronic Journal of Information Systems in Developing Countries, 43(5): 1-17

Women are significant actors in the socio-economic development of any nation. To this end, ways of enhancing female's access to ICT in rural areas include: women sharing ICT experiences, facilitating ICT access for women, creating an enabling environment for ICT in education, and increasing ICT careers for women (Dlodlo, 2009).
The ICT sector is currently more active in urban areas, resulting in wide regional disparities in the distribution of ICT facilities. In order to address this disparity, the Kenya ICT Board (KICTB) is supporting the roll out of new 'electronic centres' called Pasha Centres (also commonly referred to as Digital Villages). Pasha Centres are hubs that provide a host of services to the public via computers connected to the internet, or by using and marketing other ICT-enabled applications (Kenya ICT Board, 2010; Hallberg *et al*., 2011:256).

3.1. How ICT can help Rural Women advance economically
Technologies can promote women's economic advancement by improving the productivity and quality of women's work and generating new employment opportunities. But the countries that most need the benefits of technology often lack the financial and human resources to create the environments needed to foster new technologies. Furthermore, the development of a new technology is only the first in a series of steps that must be fine-tuned if a given technology is to be the key that unlocks the economic potential of women (Gill *et al*., 2010:21).

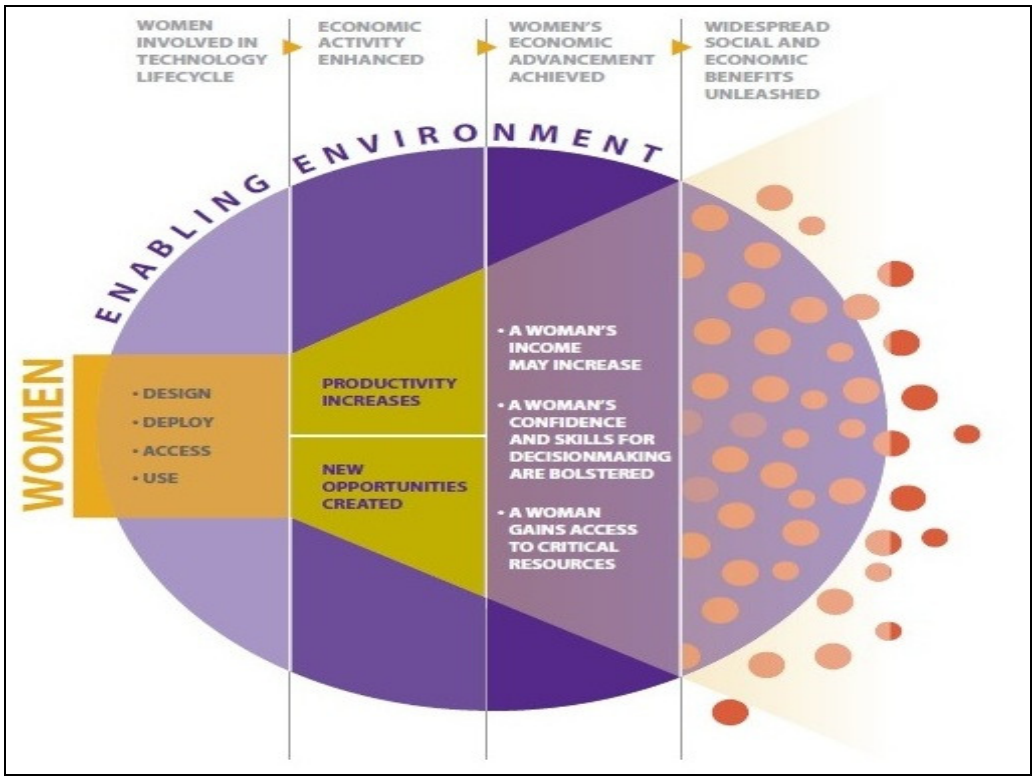

Figure 1: How Technology Can Facilitate Economic Advancement of Women
Source: Gill, K., Brooks, K., McDougall, J., Patel, P., & Kes, A. (2010:8). Bridging the Gender Divide: How Technology Can Advance Women Economically. International Centre for Research on Women (ICRW)

3.1.1. ICT Skills Training

There is need for high-skilled IT training for women in the education institutes, and also the need to train women in technical and career skills to enter and compete in the high-skilled ICT labour force. There is need to establish training centres in each of the small trading centres so that the issue of distance should not be a hindrance. However, this will still be dependent on the availability of infrastructure. This will create training jobs to women already trained in ICT to train the others.

3.1.2. Village mobile phones

Women entrepreneurs sell mobile phone usage to other women and men – This can facilitate women's roles as entrepreneurs who operate businesses that require communications services or who even own the pay phone centre serving a community.

3.1.3. Outsourced ICT services

Outsourced IT jobs, such as software support, report writing – essays, dissertations, stories for newspapers, especially online newspapers etc. – These can generate many new employment opportunities for women.

3.1.4. ICT Telecentres and Kiosks

Fee-based ICT products and services at community centres – Can provide relatively affordable means of accessing vital business skills and market information relevant to women's income-generating activity, so that women could start small businesses.

3.1.5. Market Information

For women who sell their goods in local markets, enhanced access to market information via mobile phones has helped them set better prices for their products. Further, by helping clients improve their market earnings through faster access to information, the phone operators' services facilitate other local economic activity. Availability of markets and market information gives farmers the potential to bargain and improve their incomes, to seize market opportunities through the adjustment of production plans and better allocation of production factors, and also to use the information to make choices about marketing. The development and use of ICTs are playing a critical role in this regard.

3.1.6. Other Extension Services

There are a number of ICT-based initiatives which cater for non-market information and extension services including financial, utilization of best agriculture practices, research, weather, climate, and distribution and supply chain management. Some of the initiatives include: KenCall Farmers' Helpline, Kilimo Salama, M-PESA, Mali Shambani.

3.1.7. Mobile Banking and E-Banking

New ICTs provide opportunities to reorganize economic activities in ways that can bypass the traditional dependence of women producers on male-dominated and exploitative market structures, including 'middle-men'. In many places, initiatives are being tried that link women artisans directly to global markets through the Internet, as well as support their activities with market and production information (Gurumurthy, 2004:28). E-banking and especially mobile banking is another ICT-based service which has had a tremendous impact on the socio-economic status of farmers. Through innovative schemes such as M-PESA, farmers are able to send and receive money using their mobile phones. We also have M-SHWARI, M-KESHO, and the banks have also introduced localized access like Co-Op Kwa Jirani and KCB Mashinani. The latest is the KCB mobile banking. All these have been made possible through the ICTs revolution.

4. Challenges to Access and Utilisation of ICTs by Women

Many factors impact women's access to and use of ICTs, including the ICT infrastructures, social norms, time budget allocation, education, employment, and available content and cultural constraints.

4.1. Access to Capital and Ownership of ICT services

One of the main reasons women lack access to capital is that laws, policies, and social customs often favour men's ownership of assets. Inheritance laws and social customs in many developing countries prohibit women from owning property, limiting their ability to take out loans that require collateral for large technology purchases.

4.2. Time and Responsibility

The heavy burden of unpaid household responsibilities on women often leads to 'time poverty', the absence of discretionary time women can dedicate to personal interests, paid labour, education, or other endeavours. Among those endeavours is learning skills that would allow them to adopt new technologies to improve their productivity or start a small business.

4.3. Distance of ICT Services

Places where internet has been used by women and men include: at home, at work, at place of education, at other people's house, at cyber cafes and telecentres. ICT services are usually far away, more especially in the remote rural areas. Women do not have the

pleasure to walk long distances to look for technology. They would rather walk the long distances to look for food, water and firewood. Roads networks in most of the rural areas in Kenya are also very poor and in bad shape.

4.4. Computer Illiteracy

Internet access increases with the level of education for both women and men. In most countries the gender divide tends to narrow at higher levels of education (OECD, 2007). Most rural women are still educationally disadvantaged. Insufficient training and inappropriate technology, also impact on access to ICTs by women. Women are poorly placed to benefit from the knowledge economy because they have less access to scientific and technical education, and less access to skills training and development. Women tend to be relatively under-represented in computing sciences (OECD, 2007; Wamala, 2012).

4.5. Socio-Cultural Factors and Technophobia

Women are constrained by social norms that confer control over much technology to men. At home, husbands might regulate the family radio, mobile phone, or television, controlling when and how other family members use them. Barriers to universal access are not only about the availability of telecommunications infrastructure and computing equipment, but also barriers to individual access, which may be educational and/or socio-cultural (for example, technophobia). Social norms governing interactions in public places also influence Internet usage patterns. The following are some socio-cultural factors that impede women's use of ICTs, particularly in rural areas:

- → Cultural attitudes discriminate against women's access to technology and technology education.
- → Women are less likely to own communication assets – radio, mobile phone.
- → Women in poor households do not have the income to use public facilities.
- → Information centres may be located in places that women are not comfortable visiting.
- → Women's multiple roles and heavy domestic responsibilities limit their leisure time.
- → Centres may not be open when it is convenient for women to visit them.
- It is more problematic for women to use facilities in the evenings and return home in the dark.[2]

4.6. Exclusion in Technology Design

Women in developing countries do not receive the basic education and training needed to be ready technology adopters and are often seen only as 'users' or 'receivers' of technology, not as innovators, and are underrepresented in higher education programs in science, technology, and engineering.

4.7. Emergence of Cybercrime

Emerging crime through the utilization of ICTs threaten to take away the safe and secure space and denying women the ability to appropriate ICTs for their empowerment and development due to safety concerns. Most victims are women; most stalkers are men. Stalkers are generally motivated by the desire to control the victim. The use of mobile phones and internet to stalk, abuse, traffic, intimidate and humiliate women is palpable in developing countries including Kenya. It is estimated that 95% of aggressive behaviour, harassment, abusive language and denigrating images in online spaces are aimed at women and come from partners or former male partners (UN, 2006). The lack of specific cybercrime/cyber security legislation makes it even more difficult to punish those who use ICTs tools to conduct violence against women (Munyua, Mureithi & Githaiga, n.d.; Gurumurthy, 2004:23).

5. Addressing the Challenges of Access and Utilisation

5.1. What needs to be done by Technology Entrepreneurs

To address women's underrepresentation in high-skilled ICT occupations, lack of access and low utilization of ICTs, there is need to launch a training initiative to provide women with the skills to use ICTs. Access to ICT is important, but is not in itself, sufficient condition for women's appropriation (utilization) of technology (Huyer & Sikosha, 2003:14)

5.1.1. Partnerships

Different sectors have different strengths and weaknesses. Many NGOs have access to lower- and middle-income women that the private sector lacks, whereas the private sector has the experience of creating markets for products that might be necessary for a technology solution to become sustainable.

5.1.2. Invest in Training

It is not enough to introduce a technology and expect women to use it – they need to be trained in how to use it and reap its many benefits.

[2] These issues are highlighted in Gurumurthy, A. 2004. 'Gender and ICTs: Overview Report'. http://www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf (Accessed 19 November 2013). Look at page 24 of the document.

5.1.3. Inclusion in Technology Design

Too often, women are taken into account only when marketers want to sell to them. Early engagement in focus groups can often help innovators identify the broad problems that technology can solve and the best ways to customize it for women's use.

5.1.4. Location of ICT for Ease of Access

Women generally have heavy responsibilities, particularly those involving their families, which result in time constraints. It is therefore imperative that ICTs are incorporated not only according to the information needs of women, but also in light of other activities and projects aimed at empowerment, e.g. women's NGOs, health centres, educational institutions, self-employment and entrepreneurial centres, and even churches. In this way, women would be able to experience the tangible use of ICTs.

5.2. What the County Governments Should Do

Policymakers in County Governments can promote the economic advancement of women through technologies through different means.

5.2.1. Education and Training

Giving equitable opportunities to women and girls to receive education and training in science and technology, including in technology design and development, management, and maintenance. They should develop the case for gender-specific requirements for girls training and education, and if need be, affirmative action in access at the training institutions.

5.2.2. Partnerships

There is need for partnership between the Central Government and the County Government departments; and also between the County Governments and the Sub-Counties and villages to provide services in remote areas. They can also partner with a number of providers of wireless services, such as Safaricom, Airtel and Orange. This is already seen in the transport industry where Safaricom is providing *Vuma Online*[3] in public transport in selected routes. They can also partner with international organizations like IT Skills 4 Rural Kenya to continue the spread of accessibility of ICTs to the remotest places in the country.

1. Improve and expand rural infrastructure by focusing on public shared access facilities, with special focus on wireless technologies and electrical power sources. Policy efforts should make sure infrastructure extends into rural and remote areas.
2. Invest in and promote shared access for rural communities. Community-based approaches can overcome barriers to individual ownership and provide the setting for additional training programs.
3. Promote and support the development of local content in local languages. Local language content will improve the accessibility and inclusiveness of ICT applications. It can also serve as an opportunity to capture and record local practices and knowledge.
4. Support adult literacy programs in rural areas. Although many ICTs make use of audio and video to overcome illiteracy, ongoing support for adult literacy remains an important issue to address.
5. Promote and facilitate the establishment of public-private partnerships in the implementation of rural projects. As the overview module revealed, both public and private actors are integrating a range of ICTs in agricultural value chains. Collaboration between them can reduce costs and help extend the benefits to a greater number of individuals.

Source: *Adapted from Association for Progressive Communications 2010.*

Figure 2: Policy Recommendations for Gender-Aware Universal Access and Rural Development

5.2.3. Infrastructure Development

Investing in the infrastructure required for the use of many technologies is critical for the County Governments. For example, many ICTs such as faxes and the Internet require telecommunications infrastructure and electricity, both of which are limited in rural areas of developing countries. Wired telecommunications infrastructure tends to reach rural areas in the wake of complementary rural access infrastructure such as roads and electricity and the expansion of public services such as education. It is in this complementary infrastructure that the Governments need to heavily invest, apart from the computer hardware.

[3] This is a corporate social responsibility initiative from Safaricom, a mobile service provider in Kenya, to make wireless internet accessible free of charge in selected public transport in the capital city, Nairobi. They expect to roll it out to other areas in coming days.

5.2.4. Business Regulation and Taxation

Providing the regulatory environment to encourage business practices that facilitate women's access to and use of technologies through, for example, taxation policies, should be one of the priorities of County Governments. Efforts to encourage and incentivize public-private and multi-sector collaboration for the distribution of technologies to women are particularly needed. There is need to investigate women's entrepreneurship in the ICT sector to identify barriers to success, explain differences in rates of business formation and business growth.

5.2.5. Gender-Integration in Policy-Making

There is need for the County Governments to integrating gender equality goals and gender analysis into technology-related policies and programs. This can be achieved in part by increasing women's participation in policy and decision-making positions, allocating funding specifically for technologies for women, and providing training in gender issues to government officials. The County Executive Committee Member in charge of ICT should facilitate and promote the establishment of a Gender Unit within a Regulatory Agency; review, revise or develop new regulations, circulars issuances and procedures to remove any gender bias; promote gender analysis as part of the policy process; develop and establish systems to gather gender statistics; and promote dialogue with other national entities like other ministries, regulatory bodies, etc.[4] The County Governments should also design tools and frameworks for incorporating gender equality perspectives in ICT policy.

5.2.6. Gender-Disaggregated Data

Supporting the collection of gender-disaggregated statistics and indicators related to key technologies. Such data are lacking and can be complemented by research on the contextual and locally-specific factors that limit women's access, such as laws pertaining to property rights and women's ability to obtain credit when formulating policies. The County Governments should commission studies to determine women's participation in technical education at all levels, and access and participation in technological research and industry development; and to collect data on women's interaction with ICTs including Personal Computers (PCs), wireless and other technologies; access to internet etc.

5.3. List of Acronyms

ACWICT	–	African Centre for Information and Communication technology
AMWIK	–	Association of Media Women in Kenya
APR	–	Annual Progress Report
GII	–	Global Information Infrastructure
HIV/AIDS	–	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICRW	–	International Centre for Research on Women
ICTs	–	Information and Communication Technologies
IDRC	–	International Development Research Centre
IT	–	Information Technology
ITU	–	International Telecommunications Union
KRA	–	Kenya Revenue Authority
MTP	–	Medium Term Plan
NGOs	–	Non-Governmental Organizations
OECD	–	Organization for Economic Cooperation and Development
PCs	–	Personal Computers
TV	–	Television
UN	–	United Nations
UNDP	–	United Nations Development Programme

4. References

i. African Women's Voices. (n.d.) 'Women and ICT in Africa.' Available Online at: www.globalknowledge.org/gkps_portal/view_file.cfm?fileid=1137 <Accessed on 20 February, 2004>.
ii. Asenso-Okyere, K., & Mekonnen, D. A. (2012). The Importance of ICTs in the Provision of Information for Improving Agricultural Productivity and Rural Incomes in Africa. Working Paper 2012-015: January 2012. Addis Ababa: UNDP Regional Bureau for Africa.
iii. Ashraf, M., Swatman, P & Hanisch, J. (n.d.). 'Some Perspectives on Understanding the Adoption and Implementation of ICT Interventions in Developing Countries.' Available online at: http://www.ci-journal.net/index.php/ciej/article/view/297/387 <Accessed on 19 November 2013>

[4] These are some of the Gender-aware guidelines for policy-making and regulatory agencies recommended by the International Telecommunications Union (ITU) Task Force on Gender Issues. They can be found in Gurumurthy (2004:41-42).

iv. Association for Progressive Communications. 2010. 'GenARDIS 2002–2010: Small Grants That Made Big Changes for Women in Agriculture.' Available online at: http://www.apc.org/en/system/files/Genardis_EN.pdf <Accessed on 29 November 2013>

v. Barrett, M., & Slavova, M. (n.d.). Overview of ICT in Agriculture: Opportunities, Access, and Cross-Cutting Themes ICT in Agriculture. Module 2: Making ICT Infrastructure, Appliances, and Services more Accessible and Affordable in Rural Areas. Available Online at: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module2.pdf <Accessed on 29 November 2013>

vi. Basson, N. (1996). Passage to progress: the CSIR's journey of change 1945-1995. Johannesburg: Jonathan Ball Publishers.

vii. Carver, T. (1996). Gender is not a synonym for women. L. Rienner (Boulder) Publishers.

viii. Dlodlo, N. (2009). 'Access to ICT Education for Girls and Women in Rural South Africa: A Case Study.' Technology in Society, 31(2):1-12.

ix. Gill, K., Brooks, K., McDougall, J., Patel, P., & Kes, A. (2010). Bridging the Gender Divide: How Technology can advance Women Economically. International Centre for Research on Women (ICRW). Available online at: http://www.icrw.org/publications/bridging-gender-divide <Accessed on 19 November 2013>

x. Government of Kenya. (2013). Fourth Annual Progress Report 2011-2012 on the Implementation of the First Medium Term Plan (2008-2012) of Kenya Vision 2030. Nairobi: Ministry of Devolution and Planning.

xi. Grown, C.; Rao Gupta, G.; and Kes, A. 2005. 'Taking Action: Achieving Gender Equality and Empowering Women. Task force on Education and Gender Equality'. http://www.unmillenniumproject.org/documents/Gender-complete.pdf <Accessed 19 November 2013>.

xii. Gurumurthy, A. 2004. 'Gender and ICTs: Overview Report'. http://www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf (Accessed 19 November 2013).

xiii. Hallberg, D., Kulecho, M., Kulecho, A., & Okoth, L. (2011). 'Case Studies of Kenyan Digital Villages with a Focus on Women and Girls.' Journal of Language, Technology & Entrepreneurship in Africa, 3(1):255-273.

xiv. Harris, R. (2002). Rural Development Theories and ICTs. http://www.tanzaniagateway.org/docs/framework_for_poverty_alleviation_with_ICTs.pdf <Accessed 19 November 2013>.

xv. Harris, R. (2004). Information and Communication Technologies for Poverty Alleviation. Bangkok: UNDP/APDIP. Available online at: http://www.apdip.net/publications/iespprimers/eprimer-pov.pdf <Accessed on Retrieved 6 November, 2005>

xvi. Hilbert, M. (2011). 'Digital Gender Divide or Technologically Empowered Women in Developing Countries? A Typical Case of Lies, Damned Lies, and Statistics.' Women's Studies International Forum, 34(6):479-489.

xvii. Huyer, S & Sikosha, T. (2003). Overcoming the Gender Digital Divide: Understanding ICTs and their Potential for the Empowerment of Women. INSTRAW Research Paper Series No. 1. INSTRAW Virtual Seminar Series on Gender and ICTs.

xviii. Kenya ICT Board. (2010). About Pasha. Available online at: http://www.ict.go.ke/index.php <Accessed on 11 November 2010>.

xix. Kenya ICT Board. (2012) – Kenya ICT MasterPlan to 2017 – Kenya National ICT policy development. http://www.ict.go.ke/docs/MasterPlan2017.pdf <Accessed on 19 November 2013>

xx. IIboudo J.P. 2003. 'The role and use of rural radio in Africa'. In: The one to watch – Radio, new ICTs and interactivity. ftp://ftp.fao.org/SD/SDR/SDRE/ruralradio/publications/The%20One%20to%20Watch/pdf/chapter16.pdf <Accessed 19 November 2013>.

xxi. Jolly, S., Narayanaswamy, L. & Al-Zu'bi, R. (2004). 'Gender and ICTs: Supporting Resources Collection.' Brighton: Institute of Development Studies. http://www.bridge.ids.ac.uk/reports/cep-icts-src.pdf <Accessed on 19 November 2013>

xxii. Kituyi-Kwake, A. & Adigun, M.O. (2008). 'Analyzing ICT use and access amongst rural women in Kenya.' International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2008, 4(4):127-147.

xxiii. Komunte, M., Rwashana, A. S. & Nabukenya, J. (2012). 'Comparative Analysis of Mobile Phone Usage among Women Entrepreneurs in Uganda and Kenya.' African Journal of Computing & ICT, 5(5):74-86.

xxiv. Lio, M., & Liu, M. (2006). 'ICT and Agricultural Productivity: Evidence from Cross-country Data'. Agricultural Economics, 34(3):221–28.

xxv. Manfre, C. (n.d.). Overview of ICT in Agriculture: Opportunities, Access, and Cross-Cutting Themes ICT in Agriculture. Module 4: Extending The Benefits: Gender-Equitable, ICT-Enabled Agricultural Development. Available Online at: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module4.pdf <Accessed on 29 November 2013>

xxvi. Marcelle, G. M. (2000). 'Transforming information and communications technologies for gender equality'. Available Online at: http://www.undp.org/gender/resources/mono9.pdf <Accessed 10 November 2005>.

xxvii. Marcelle, G. M. (2002a). 'From Conceptual Ambiguity to Transformation: Incorporating Gender Equality and Women's Empowerment in the ICT arena.' United Nations Division for the Advancement of Women (DAW) Expert Group Meeting on "Information and communication technologies and their impact on and use as an instrument for the advancement and empowerment of women" Seoul, Republic of Korea, 11 to 14 November 2002. Available online at: http://www.un.org/womenwatch/daw/egm/ict2002/reports/Paper-GMarcelle.PDF <Accessed on 19 November 2013>

xxviii. Marcelle, G. M. (2002b). 'Getting Gender into African ICT Policy: A Strategic View'. In E. M. Rathgeber, & E. O. Adera (Eds.) (2000). Gender and the Information Revolution in Africa. Chapter 3. Ottawa: IDRC. pp. 35-84.

xxix. Marker, P., Mcnamara, K. & Wallace, L. (2002). 'The significance of information and Communication technologies for reducing poverty'. http://www.digitale-chancen.de/transfer/downloads/MD369.pdf <Accessed 19 November 2013>.

xxx. Munyua, A., Mureithi, M., & Githaiga, G. (n.d.). Women and Cybercrime in Kenya: The dark side of ICTS. Working document v1. Kenya ICT Action Network. Nairobi: KICTANET.

xxxi. Odame, H. H. (2005). Gender and ICTs for Development: Setting the Context. Gender and ICTs for Development: A Global Sourcebook. pp. 13-24.

xxxii. OECD. (2007). Working Party on the Information Economy. ICTs and Gender. Organization for Economic Co-operation and Development. Directorate for Science, Technology and Industry Committee for Information, Computer and Communications Policy. OECD.

xxxiii. Opala, K. (2004). Kenyan farmers discover the Internet. http://web.idrc.ca/en/ev-47033-201-1-DO_TOPIC.html <Accessed 2 January 2004>.

xxxiv. Puri, Shamlal. (2013). 'Kericho to host international symposium on rural growth.' The Standard Newspaper, 20 November 2013.

xxxv. Terry, A. & Gomez, R. (2010). Gender and Public Access Computing: An International Perspective. The Electronic Journal of Information Systems in Developing Countries, 43(5): 1-17.

xxxvi. The Commonwealth of Learning. (2002). Summary of the Meeting Report on 'Gender Issues and Barriers to Information and Communications Technologies', Sponsored by The Commonwealth of Learning, The International Development Research Centre and The New Zealand Agency for International Development. June 24-26, 2002; Ottawa, Canada. Available online at: http://www.col.org/PublicationDocuments/pub_GenderIssuesICT_Report.pdf <Accessed on 29 November 2013>

xxxvii. Thuo, J. W. (2005). Creating awareness on Violence Against Women using ICT's in Central Kenya. http://www.pambazuka.org/en/category/internet/27920 <Accessed on 19 November 2013>

xxxviii. UNDP. (2001). Information Communications Technology for Development. Essentials: Syntheses of Lessons Learned No. 5. Available online at: http://www.undp.org/eo/documents/essentials_5.PDF <Accessed on 29 November 2013>

xxxix. United Nations. (2005). 'Women 2000 and Beyond – Gender equality and Empowerment of Women through ICT.' Published to Promote the Goals of the Beijing Declaration and the Platform for Action. United Nations: Division for the Advancement of Women Department of Economic and Social Affairs

xl. United Nations. (2006). 'In-depth Study on All Forms of Violence Against Women. Report of the Secretary-General.' Available online at: http://daccess-ods.un.org/TMP/7121883.html <Accessed on August 10, 2008>.

xli. Wafula-Kwake, A. K., & Ocholla, D. N. (2007). The feasibility of ICT diffusion amongst African rural women: A case study of South Africa and Kenya. International Review of Information Ethics, 7, 1-11.

xlii. Wamala, C. (2010). 'Does IT Count? Complexities between Access to and Use of Information Technologies among Ugandan Farmers.' PhD thesis. LTU Printing press.

xliii. Wamala, C. (2012). Empowering Women through ICT. Spider ICT4D Series No. 4. Stockholm University: Spider – The Swedish Program for ICT in Developing Regions.