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An Overview of Information and Communication Technology (ICT) Initiatives in Rural Africa Towards Empowerment

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Abstract: Information and Communication Technology (ICT) is transforming global economy, but access to use of ICT is not distributed evenly. This research focuses on addressing major economic, political and social challenges faced by rural Africa to access Information and Communication Technology (ICT). A literature survey was conducted to see the role of ICT for rural development and how different countries developed with ICT initiatives. ICT is vital for poverty reduction and in growth of sectors like agriculture, business, health, tourism, education, governance etc. Computer illiteracy, scattered population, HIV/AIDS illnesses, lack of access to internet and telecommunication facilities and lack of good ICT policies which encourages ICT inflow, have been powerful obstacles for the social and economic growth of rural Africa. The authors present a number of successful ICT initiatives on women empowerment, e-schools, e-government, e-commerce, e-health, e-agriculture and e-business that has helped to access ICT in rural Africa. The paper also gives ideas on how rural Africa can get connected. The case studies will elaborate on ICT initiatives for rural African development. The research also focuses on various ways to close digital divide.

Key words: ICT, information and communication technology, digital divide, rural development.

1. Introduction

Most people in developed countries have started using the Internet for various purposes like shopping and paying bills. But a large percentage of the disadvantaged rural people in African continent have no access to information. The goal of this paper is to highlight how Information and Communication Technology (ICT) can help achieve specific social and economic development of rural Africa by taking into account current ICT industry initiatives in rural Africa.

The case studies given in this paper compares ICT initiatives in rural Africa with other countries. It also highlights ICT for women empowerment in rural Africa and various challenges faced by ICT sector in fighting information poverty and ways to close the divide between information rich and poor.

A literature review was undertaken to study further about these case studies. The research focuses on the need for the least developed countries of Africa to invest in the Information and Communication Technology (ICT) market, especially in sectors like telecommunications, hardware, software, services and internet to help develop economies of scale.

A comparative analysis was undertaken to see how rural people in Africa and other urban counterparts use ICT for development. The authors conduct literature review on ICT initiatives in rural areas of Africa. A case study research was conducted to find out how ICT initiatives in rural Africa can be used for women empowerment and their social well-being.

A comparative analysis using a range of literature sources was undertaken to see how rural people in Africa and other urban counterparts use ICT for development. Much of the information was collected from various journals, books, reports, dissertations and latest news which were available online. Various software packages were used to make creative presentations and documents about this paper.

2. Objectives

1. To identify the implications of rural development.
2. To analyze the current ICT initiatives used in rural Africa for their economic and social development.
3. To identify the impact of ICT for empowerment and social development of rural African women.
4. To identify how ICT diffusion enabled the growth of other countries.
5. To identify the challenges faced by the rural Africa in accessing ICT.
6. To propose a framework for a favourable ICT policy to encourage ICT inflow in rural areas of African continent.
7. To summarize how the digital divide in Africa can be closed

3. Implications for rural African development

The Programme of Action for Least Developed Countries adopted by the Third United Nations Conference on the Least Developed Countries held in Belgium (2001) aimed at halving the cases of extreme poverty by 2015 and at promoting sustainable development in rural countries.

The following excerpt from the document, The Integrated Sustainable Rural Development Strategy (ISRDS) in 2000 reflects views about rural development.

“Rural development is understood to be multi-dimensional, encompassing improved provision of services, enhanced opportunities for income generation and local economic development, improved physical infrastructure, social cohesion and physical security within rural communities, active representation in local political processes, and effective provision for the vulnerable [5].”

Most of the rural areas of the African continent (the least developed countries) are afflicted with

- low income level
- extreme poverty
- poor sanitation and water supply facilities
- low infrastructure for power supply and communication and transport facilities
- high death rates
- extreme climatic conditions
- scattered population

- high drop-out rates of kids from schools at a young age
- illiteracy amongst adults
- crime and illegal drugs due to unemployment
- low economy based on agriculture and fishing

The gap between the information rich and the information poor is just not a quantitative issue of the amount of information available to rural areas, but is also related to the information communication technologies and the necessary skills to utilize them effectively [1].

4. Relevance of ICT to the rural people

(Table 1: ICT initiatives in rural Africa)

(Table 2: Telecom Statistics for Africa, 1995-2005) [14]

There are many issues before information poverty reduction can be achieved by the remote population. Most rural areas in African continent have fewer young tertiary educated people and have limited resources like computers, mobile phones or Internet connection and less public transport facilities.

But there is a rural demand for connectivity in all African countries. Access to information in agricultural sectors will improve the livelihood of farmers. Once internet connectivity is achieved and sufficient training is given, farmers in agricultural sector may use e-mail to communicate with their counterparts and may surf and check relevant information about crops, better production and processing information, and extreme climate changes. Agricultural information portals (e-agriculture) in general can provide messaging system, easy access to agricultural information and discussion forums.

Setting up information kiosks with computers in rural areas so that children could surf the Internet, running training courses to use computers etc., will improve access to ICT. Unlike olden days trainer would play a minor role to introduce the people to use computers or mobile phones, the agenda must be left to the users. It is amazing how almost illiterate people especially kids would start operating on it within the first week itself.

Established in Ghana's capital of Accra in 2001, Busy Internet is the largest privately owned and operated ICT center in Africa [4]. More than an Internet café it is a space for technology and development. AfriConnect offers full range of Internet connectivity in Zambia, Tanzania and Kenya. AfriConnect's iConnect provides high-speed wireless broadband (broad bandwidth technologies) Internet services to Zambia allows customers to plug wireless modem to their PC to get connected.

Rural Communications Development Fund (RCDF) was created in 2001 under the supervision of Uganda Communications Commission. In 2003, the RCDF launched and successfully implemented a pilot project, involving private provision of small numbers of public phones, Internet points of presence (POPs), Internet cafés, ICT training centers, and district information portals [12].

Ghana Dot Gov, an e-government concept which helped to develop an attractive web portal to better relationships between government and citizens, African Virtual University which gives rural African countries with high quality learning resources throughout the world, Mine Action Programme (MAP) for eradicating anti-personnel landmines in Mozambique, New Partnership for Africa's Development (NEPAD) programme to launch e-schools in Uganda, which would equip schools with PC's, software, internet access and health points in support of e-Health are all ICT sector initiatives in rural areas.

Table 2: Telecom Statistics for Africa, 1995-2005 [14]

Africa, Telecom projections, 1995-2005

	Actual								Estimate	Forecast	
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Main telephone lines (000s)	12'550	13'663	15'043	16'719	18'631	19'799	21'377	22'832	25'180	27'900	31'000
North	5'860	6'476	7'208	8'094	9'158	10'230	11'478	12'333	14'151	16'200	18'600
South Africa	4'002	4'259	4'645	5'075	5'493	4'962	4'924	4'844	4'800	4'800	4'800
Sub-Saharan	2'687	2'929	3'190	3'550	3'980	4'607	4'975	5'655	6'230	6'900	7'600
Per 100 inhabitants	1.8	1.9	2.1	2.3	2.5	2.5	2.7	2.8	3.0	3.2	3.5
North	4.6	5.0	5.5	6.1	6.8	7.4	8.2	8.6	9.6	10.7	12.0
South Africa	10.1	10.6	11.3	12.0	12.8	11.4	11.1	10.7	10.4	10.1	9.9
Sub-Saharan	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1
Mobile cellular subscribers (000s)	652	1'166	2'289	4'207	7'586	15'723	25'804	38'020	51'678	61'200	67'000
North		69	175	284	1'007	3'947	8'105	11'788	16'455	19'700	21'700
South Africa	535	953	1'836	3'337	5'188	8'339	10'789	13'814	16'860	18'700	19'800
Sub-Saharan	72	144	278	586	1'390	3'437	6'911	12'418	18'363	22'800	25'500
Per 100 inhabitants	0.1	0.2	0.3	0.6	1.0	2.0	3.2	4.6	6.1	7.1	7.6
North	0.04	0.1	0.1	0.2	0.7	2.9	5.8	8.2	11.2	13.0	13.9
South Africa	1.4	2.4	4.5	7.9	12.0	19.1	24.2	30.4	36.4	39.5	41.0
Sub-Saharan	0.01	0.03	0.1	0.1	0.2	0.6	1.1	2.0	2.8	3.4	3.8
Total telephone subscribers (000s)	13'202	14'829	17'332	20'926	26'216	35'523	47'181	60'852	76'858	89'100	98'000
North	5'905	6'545	7'383	8'378	10'165	14'177	19'583	24'121	30'606	35'900	40'300
South Africa	4'537	5'212	6'481	8'412	10'681	13'301	15'713	18'658	21'660	23'500	24'600
Sub-Saharan	2'759	3'073	3'468	4'136	5'370	8'045	11'885	18'073	24'593	29'700	33'100
Per 100 inhabitants	1.9	2.1	2.4	2.8	3.5	4.5	5.9	7.4	9.1	10.3	11.1
North	4.6	5.0	5.6	6.3	7.5	10.3	14.0	16.8	20.8	23.7	25.9
South Africa	11.5	12.9	15.7	20.0	24.8	30.4	35.3	41.0	46.7	49.7	51.0
Sub-Saharan	0.5	0.6	0.6	0.7	0.9	1.3	1.9	2.9	3.8	4.5	4.9
Internet users (000s)	307	430	867	1'646	2'816	4'586	6'247	10'238	13'857	16'600	18'600
North	23	45	73	156	467	1'060	1'620	3'731	4'890	5'600	6'100
South Africa	280	355	700	1'266	1'820	2'400	2'890	3'100	3'300	3'500	3'700
Sub-Saharan	4	30	94	224	529	1'126	1'737	3'407	5'667	7'500	8'800
Per 100 inhabitants	0.04	0.06	0.12	0.2	0.4	0.6	0.8	1.2	1.6	1.9	2.1
North	0.02	0.03	0.06	0.1	0.3	0.8	1.2	2.6	3.3	3.7	3.9
South Africa	0.71	0.88	1.70	3.0	4.2	5.5	6.5	6.8	7.1	7.4	7.7
Sub-Saharan	0.001	0.01	0.02	0.04	0.09	0.2	0.3	0.5	0.9	1.1	1.3

Provisional. Updated 01.04.2004.

Source: Telecommunication Development Bureau (BDT), International Telecommunication Union (ITU)

The Sustainable Development Networking Programme (SDNP), has been a pioneer in ensuring ICT is used for development in least developed countries and developing countries, through various ICT programmes and initiatives.

Table 1: ICT initiatives in rural Africa

Case Studies	Strength	Country
Busy Internet	Rural connectivity	Ghana
iConnect (AfriConnect)	Provides high speed wireless broad band internet services and rural connectivity.	Zambia, Tanzania, Kenya
RCDF	Aimed at bringing connectivity, public phones, ICT training centers.	Uganda
Ghana Dot Gov Project	Web portal to better the relationship between government and people.	Ghana
NEPAD programmes	ICT initiative to launch e-schools, free internet access, computers, e-health initiatives.	Focuses on Least developed countries
African Virtual University	Provides global knowledge transfer, e-learning concept.	Least developed countries
Chawama Youth Project's Skills Training Centre and ICT center	Provides skills for women and youth to access internet, check mails, produce wedding cards, business cards.	Zambia
Mine Action Programmes	ICT initiative for eradicating anti-personnel mines	Mozambique
Women's Voices	A video initiative for women empowerment and social participation	Kenya
WOFAN	Identified how radio programmes can be used to improve social and health status of women	Nigeria

4.1. ICT for gender justice in rural Africa

Women play a major role in family, community and social development. Although women constitute 50% of the population of Africa there is an imbalance between women's and men's access to ICT. In recent years radio and mobile phones have played a major role in improving the status of women in rural Africa where some women are denied access to health and literacy.

Women Farmers Advanced Network (WOFAN) which operates in rural areas in northern Nigeria have noticed how women use radio programs to teach themselves about how they are denied basic rights for education and health. Association for Progressive Communications, African Women's Development and Communication Network (FEMNET) [13] has emphasized women's role in decision making and accessing ICT.

Mobile phone users across the world can now send SMS's (Short message Service/ text messages) from their mobile phones to sign an online petition in support of a campaign urging

African governments to ratify the African Union's Protocol on the Rights of Women in Africa [11].

Women's Voices a video initiative in Kenya helped women to learn scripting, shooting and editing. They covered incidents of unrest in their settlements, challenges faced by women, health related risks like HIV/AIDS, orphans left homeless by infected parents, living conditions of elderly and legal issues.

Most of ICT firms have work climate not conducive to women and does not have flexible work practices. Much work has to be done to motivate women workers to play a major role in ICT industry.

4.2. A need to change existing ICT policies

ICT policies for all African nations need to be reviewed. The ICT policies should aim at bridging the digital divide by training people in education, health, business, tourism and government sectors who will in turn help in the social and economic development of the developing nations. African countries need to exempt the ICT industry from corporate income tax to help in the growth of software and communications industry.

In a continent where around 1000 different languages are spoken by 14% of the world population, ICT companies need to develop software packages like accounting and Word processor in at least some of the African languages. E-learning schools must be established in various selected schools in rural places.

African software companies should take educational initiative to provide institutions with access to general ICT, e-mail and Internet. Policies should be in place to include ICT curricula of public schools, limited Internet access should be given for free and workplace training on computer skills should be provided.

The ICT policies should encourage more African and female learners to study science and technology. Policies should encourage poor women to assess opportunities and threats faced by new technologies, and ensure ICT regulations are favourable to poor women.

More ICT training centers should be in place, because skilled labor is in short supply in this sector. Policies should be in place in reducing the cost of computers and Internet connection in rural areas. Training should be provided to all government employees to access ICT and Internet.

Telecoms field is highly dynamic, and hence there is a need for a flexible policy that is of interest to the rural people. The following ICT policies are recommended for rural areas:

- To set policies that provide support, training and professional development for the use of ICT services.
- To set policies to raise the competition between various Internet Service Providers, by providing local dialing access.
- To set policies that encourages women for equal access of ICT-based activities and their high participation in ICT policy formulation.
- To set policies that stimulate rural people to use ICT services, by encouraging community-centred telecentres and giving subsidized access in schools.
- To set policies that encourages the development of online communities, in the agricultural and health sector.
- To set policies to improve access to ICT at low cost, through public institutions.

5. ICT diffusion and its economic impact in other countries

ICT sector had been the fastest growing economy from early 80's. The impact of media, and other education and communication materials in giving sources of information on Oral Polio Vaccine as a move to eradicate polio In India serves as a good lesson to learn by other rural African areas to eradicate communicable diseases.

The diffusion of ICT and its economic impact across OECD (Organisation for Economic Co-operation and Development) countries like US, Australia Canada and other European Union countries serves as good indicators on why the other least developed nations should become OECD members.

Some reasons for this great ICT diffusion in OECD areas in recent years include low costs of internet access and significant reduction in prices of ICT equipments like PC's workstations and communication equipments, sales or purchases via EDI (electronic data interchange) and e-commerce developments in OECD countries.

Digital Partnership SA's e-learning initiatives for internet connectivity, providing free software and training in disadvantaged schools are worth noticing. Countries like U.S have used Wi- Fi networks (wireless networking) extensively to get connected, because it is the means for inward investments. There is a move to make South African cities, Tshwane and Johannesburg "digital cities" like Knysna where Africa's first municipal Wi-Fi broadband network (IEEE 802.11 standards) offered VoIP and internet access.

6. Challenges faced by ICT sector in fighting information poverty in rural areas

The first time Consuela Mosquera, an inhabitant of one of the poorest areas of Peru – Cajamarca province – came near to a computer she was so afraid she did not dare touch it [9]. This is also the typical scenario in rural areas in African countries when it comes to using computers. But if sufficient training is given they will learn to surf the net and use mobile phones very fast.

Some of the challenges faced by the ICT industry in rural Africa include,

- rural resistance to change
- lack of a good ICT policy
- rapid technological changes
- limited bargaining power to access technology
- high cost of internet access and equipment
- lack of understanding of ICT sector
- lack of access to low cost devices for telecommunications
- scattered population in rural areas of Africa
- availability of resources like computers
- illiteracy
- lack of e-commerce software for banking and tourism industry
- lack of interest in technology adaptation
- lack of infrastructure
- lack of participation in international meetings, seminars and themes related to ICT for development
- rapid changes especially in software and communication industry

7. Directions for future research

Although literature survey would throw light on various ICT initiatives in Africa, there is little information on whether ICT policies for rural Africa are implemented and monitored. There is a need to investigate more on ICT policies for the least developed countries of Africa

More research is needed to investigate on the use of ICT especially by rural African women. Women constitute half of the total African population and play a major role in the economic and social well-being of households. So there is a need to promote gender equality and empower rural African women.

There is an area of concern regarding information awareness and ICT project handling skills of the rural people. There are issues surrounding online crime, which remains a grave concern in West Africa for home users and businesses. Not much information could be gathered about these areas. This is scope for further research in the above mentioned areas.

8. Conclusion and Summary Recommendations

Rural Africa's economic scale can improve with the growth of communication industry, electronic industry, internet users, software industry and the business market related to these industries. Empowerment of women in rural areas would help community's capacity to develop.

Although there is an urge to access information amongst people in rural areas, they are faced with various challenges and the digital divide is increasing. The digital divide can be closed by:

- abolition of import duty and taxes on ICT related equipments
- encouraging local manufacture of equipments, which reduces cost
- by improving the affordability of connectivity
- low licensing costs in telecoms markets
- by creating an encouraging business friendly environment
- Potential use of GSM (Global System for Mobile Communications) technologies which allows low terminal and service cost and ISDN compatibility
- local training in ICT skills which reduces high cost of expatriate skills
- standardizing obtaining of licenses across several countries
- permitting VoIP (Voice over IP) telephone calls
- Use of distribution channels like VSAT (Very Small Aperture Terminal), Wi-Fi (wireless networking), WiMax (Worldwide Interoperability for Microwave Access – a powerful version of Wi-Fi) technologies which adds value and saves money
- Active involvement in NEPAD programmes which focuses on ICT initiative to launch e-schools, free internet access, computers, e-health.
- forming an African Economic Development Community (like SADC- Southern African Development Community) which strengthens free trade and investment linkages.

Technology per se does not solve economic problems, but availability of ICT will have a significant impact on development in areas of education, health, agriculture, business, tourism, government and education.

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Telecom statistics for Africa, 1995-2005 (Table 2) is reproduced with the kind permission of ITU (International Telecommunication Union).

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