The Role of ICT in the Economic Development of North East Africa: Eritrea

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ABSTRACT

Africa has been hard hit with poverty and disease and this has had an immense effect on the quality of social, cultural and political lives of the people. This has made development to move at a very slow pace in the last decades. But the presence of information and communication technologies (ICT) has somewhat carved out an alternative path to development. Notwithstanding the urgency and enthusiasm with using this new medium for social and economic change, the Internet has brought about negative as well as positive contributions to development in Africa. The contributions of scholars in the field of technology in bringing about change in the lives of people in Africa in general and Eritrea in particular will be discussed and analyzed. The reviews and analysis of the contributions of the scholars in the field of development will be critical in judging the overall significance of the role of the Internet in promoting social change.

Keywords: Information and Communication Technology (ICT), Growth Domestic Product (GDP), Computer Mediated Communication (CMC), Education for All (EFA).

1. INTRODUCTION

This paper intends to examine how information and communication technology (ICT) has contributed in promoting economic development initiatives in Eritrea. This is an initial exploratory study that will be accomplished through a critical literature review.

In this modern age, the role of technology in improving the lives of the people cannot be underestimated. Most people, including minorities, more than ever before are now buying goods and services online, sending messages across the globe to loved ones, sending emails to donor agencies for support and receiving instant replies (Ebeling, 2003). The issue of network technology has been one of the fundamental problems affecting development in Africa since 1960. These issues of connectivity and networking are some of the fundamental setbacks that the grass-root developing companies in Eritrea are facing since the Internet boom of the early 1990’s (Moodley, 2002 & 2005).

With this boom, communication for developmental issues has been strengthened. However, there have been some setbacks in terms of Internet literacy and accessibility (Lister, 2002). Not everyone in the third world has the knowledge and ability to use the computer, let alone owning one. Commencing a social development awareness, globalization is a complex phenomenon expressing the union of economic, political, social, and cultural factors interacting in Africa and Eritrea in particular through Information & Communication Technology (ICT) cross-geographic borders.

1.1 Brief History Of The Internet

The Internet has become an invaluable bridge for Africans to regroup and discuss social, political, cultural, and economic issues facing them at home and abroad. The Internet started in America with an initiative from President Dwight D. Eisenhower who saw the need for an Advanced Research Projects Agency (ARPA) that would cater for America’s computer networking and communication in 1957 (Gromov, 1995; McCormick, 2002). This computer networking and communication was used mainly by giant organizations like the military and the government. It was not until the early 1990s that the Internet actually became commercialized. It then became a communication medium between persons. Computers all over the world could then be able to receive data and sounds from other computers stationed in other countries. Computer Mediated Communication (CMC) became very popular for interpersonal communication. It was now very possible for people to use the Internet to send and receive email messages. Thus, the Internet helped tremendously in reducing mobility and making the world a global village.

Africans, living at home and abroad found out that the Internet had greatly contributed in bringing them together as well as contributed in economic development
of their countries. For instance, Ayisi Makatiani's *Africa online* (Economist, 2006) has helped tremendously to expand business initiatives in the continent. As a graduate from the Massachusetts's Institute of Technology, he used his acquired technological skills to help the African continent.

### 1.2 Profile Of The Country

Almost one year after the declaration of Education For All (EFA) at Jomtien, Thailand in March 1990, Eritrea got its independence on May 24, 1991 after thirty years of freedom struggle. It has an area of 121,144 sq km and has an estimated population of 4,670,000 (2005 est.).

It is located in the Horn of Africa, bordered in the North and West by Sudan, in the South by Ethiopia and Djibouti and in the East by the Red Sea. Its capital is Asmara. The population is composed of nine ethnic groups and the country is divided into six administrative regions. The population is about equally divided between Christians and Muslims. Like many African economies, the economy of Eritrea is largely based on agriculture, with more than 70 percent of the population involved in farming and herding. It has the GDP per capita income of $900 (2004 estimates). The country’s agricultural products include sorghum, wheat, corn, cotton, coffee, and tobacco. Cattle, sheep, goats, camels are raised.

There is a fishing industry and some pearl fisheries remain in the Dahlak Archipelago. The country’s natural resources include gold, copper, potash, zinc, iron, and salt, but they have not yet been exploited. Off shore oil exploration was begun in the mid-1990's. Eritrea has little manufacturing beyond food processing, textiles, and building materials. Many Eritrean’s work outside the country and their remittances substantially augment the GDP. Imports (consumer goods, machinery, and petroleum products) greatly exceed the value of exports (livestock, sorghum, and textiles). The country’s main trading partners are Saudi Arabia, Sudan, and Italy (Rena, 2006).

The Ethiopian-Eritrea war in 1998-2000 severely hurt Eritrea's economy. GDP growth fell to zero in 1999 and to 12.1 percent in 2000. The May 2000 Ethiopian offensive into northern Eritrea caused some $600 million in property damage and loss, including losses of $225 million in livestock and 55,000 homes. The attack prevented planting of crops in Eritrea's most productive region, causing food production to drop by 62 percent. The erratic rainfall keeps the cereal product well below normal, holding down growth in 2002-04. Even during the war, it is observed that Eritrea developed its transportation infrastructure, asphalting new roads, improving its ports, and repairing war damaged roads and bridges. Since the war ended in 2000, the government has maintained a firm grip on the economy. Eritrea's economic future depends upon its ability to master social problems such as illiteracy, unemployment, and low skills, and to open its economy to private enterprise so the Diaspora’s money and expertise can foster economic growth (Rena, 2006).

Since its independence, the country has been undertaking number of developmental programs in rebuilding its war damaged economy particularly education sector. There are five levels of education in Eritrea, pre-primary, primary, middle, secondary, and tertiary. Education is as natural as the right to breathe. However, Eritrea pledged to achieve the universalization of primary education and to increase the national literacy rate. The literacy rate is reported to be 57 percent (Rena, 2005). There are nearly 700,000 students in the primary, middle, and secondary levels of education (Moe, 2006). There are about 1100 schools and more than 12,000 teacher in Eritrea and two Universities (University of Asmara and the Eritrea Institute of Technology) as well as several smaller colleges and technical schools. One of the most important goals of the Eritrea's educational policy is to provide basic education in each of Eritrea's mother tongues as well as to develop self-motivated and conscious population to fight poverty and disease.

Getting Rid Of Poverty

Eritrea, like most other African countries has had her share of economic and political depression due mainly because of war in part on the imposition of the sanctions. For example, "means of communication were not constructed in the colonial period so that Africans could visit their friends. More important is still they were not laid down to facilitate internal trade in African commodities" (Rodney, 1981, p.209). Unlike most African countries that suffered the negative effects of colonization and were able to partially recover from it with self-rule, Eritrea was still rocked by apartheid. This had an immense effect on the economic and political lives of the people.
The increasing rate of poverty in mostly the rural areas of the country brought about violence, rape, banditry, death and diseases like HIV/AIDS. The only way that the government of Eritrea had to deal with these issues was to embrace the challenges of globalization. Technology became the answer to solve the acute economic problems of the people. Snyman et al., (2003) in their article "Getting information to disadvantaged rural communities: the center approach", made this observation:

President Isaias Awerki articulated the vision and plan for ICT in Eritrea, “In telecommunications, the extension of mobile telephone services is growing demand. Expansion of fixed and mobile telephone services coupled with narrow and broadband internet access through satellite linkup, which is principally aimed at enhancing information services for education and students, are additional communications projects the government is pursuing vigorously” (Eritrea Profile, vol. 12, No.22, May 25, 2005).

The issue of involving Eritrea in the digital age was primarily due to the fact that globalization was forcing the entire continent of Africa to keep pace with the rest of the world. For instance, Limb (2005) stated that "New strategies for digital publishing, preservation, and access are evolving among Africans and Africanists, but face daunting problems, most notably in Africa" and since "...electronic publishing and learning developments are increasingly dominating global educational and scientific trends".

Media Communication, especially broadcasting was the medium to be used as a tool to educate, and at the same time inform the people on another important area of development like AIDS. The dangers of AIDS/HIV disease was one of the primary causes of death in the country.

Technological innovations had to be used not only for information dissemination, but more importantly, to create educational and health awareness for the people of Eritrea. Digitalizing the telecommunication and the broadcasting industries in Eritrea was the only way for the country to go "global." This happened because the major roadblock that the country faced during the apartheid era was now something of the past. Thus, economic and technological development became a possibility.

According to Melkote and Steeves, (2001), if development has to take place in a country, the people have to be liberated first. Their opinions are equally shared by Paolo Friere (1970) who admits that concretization of the masses- in this case through information dissemination- is the key to achieving success with development. But government leaders must be willing to embrace development and be prepared to withstand the challenges.

2. ROAD TO DEVELOPMENT

Development of basic infrastructures in Africa has been a slogan for most countries in the continent after they gained independence in 1990. Prior to improving the lives of the people, the colonizers used assimilations and acculturations tactics to get the people to imitate western ways of life

2.1 Pan-Africa Network and Information Technology

United Nations Secretary-General Kofi Annan underlines, that ICT can play in furthering and enhancing sustainable development. Everywhere in the developing world, especially in Africa, governments are launching ambitious ICT infrastructure initiatives, radically changing their communications policy frameworks and situating ICT at the heart of their self reliance movement as a strategy. ICT has become an indispensable tool in the fight against poverty in Africa. ICT provides developing nations with an unprecedented opportunity to meet vital development goals such as poverty reduction, basic healthcare, and education, far more effectively than before. Those nations that succeed in harnessing the potential of ICT can look forward to greatly expand economic growth, dramatically improved human welfare and stronger forms of democratic governance. ICT in changing world and Africa should identify specific policy prescriptions undertaken by countries illustrating the application of ICT tools and strategies for income generation and human poverty eradication, enhancing economic opportunities and reducing the gap in social equity. It focuses on human development, which meets UNDP mandate in the area for development by concretely promoting human development and eradicating poverty. Human development resumes its centrality and freedom becomes the principal means and ends of development. Amartya Sen observed that it would become essential to ‘develop and support the institutions, including democratic systems, legal mechanisms, market structure, educational and health provisions, media insight and framework to reinstate freedom at the core of human development initiatives’[Sen, A, Development As Freedom, Knopf, New York, 1999].

The Pan-African Network (PAN) aims to bridge the digital divide in Africa Continent and propose tele-education and telemedicine services to the member countries of the African Union (AU). President Dr. Abdul Kalam announced the willingness of Government of India to provide seamless and integrated satellite, fiber optics and wireless network connecting 53 African countries including Eritrea during the Pan African Parliament, Johannesburg, on 16 Sept 2004. The PAN assignment
the child mortality; Improvement of maternal health; and Gender equality and empowerment of women; reducing Eradication of poverty; Universal primary education; part of human development on the following aspects like:

Ministry of External Affairs (MEA, Govt. of India) and Telecommunications Consultants India Limited (TCIL) are supervising this project. Different AU member countries like Burkina Faso, Burundi, Cote d'Ivoire (Ivory Coast), Djibouti, Ethiopia, Gambia, Ghana, Mauritius, Tanzania, Senegal and Seychelles have signed the agreements with the TCIL. The hub for the network is likely to be located in Senegal. The proposed network will link five regional universities, 53 learning centers, 5 regional super specialty hospitals and 53 remote hospitals from African countries and 6 universities and 5 super specialty hospitals from India will coordinate in the network North East Africa particularly Ethiopia has already been started a pilot project and will be the first beneficiary of the PAN project.

The ICT experiment testing is already done in this direction to strengthen connectivity of all African countries. This will provide three Connectivity channels like (i) Heads of the State Network for e-governance, (ii) Tele-education network for higher education, skill enhancement and capacity building, and (iii) Tele-medicine for providing health care and super specialty medi-care. This network will be in position by early 2007. Eritrea as a part of Horn of Africa should concentrate as part of human development on the following aspects like: Eradication of poverty; Universal primary education; Gender equality and empowerment of women; reducing the child mortality; Improvement of maternal health; and the development of a regional partnership for development.

3. THE HRD EFFORTS IN ICT IN ERITREA

The Government of Eritrea recognizes that globalization is a reality, and if Eritrea is to benefit and prosper in a global economy, the country must empower its citizens with the knowledge, skills and attitudes to compete in the global market. --- Education is the chief mechanism of government to build a responsive citizenry. In a rapidly changing world, education must be flexible and adaptable to change, and must also recognize and respond to the human resource capacity needs both domestically and internationally”. (Framework for Integration of ICT, National Curriculum of Eritrea, Ministry of Education, Eritrea, July 2005:1.), Minister of Education, has identified the over all vision of ICT in Education, which lays the foundation of recent policy directives and this National Feasibility Study for ICT in Education:

1. “ICT in education as a key contributor to improving the quality of education in Eritrea, and engendering life-long learning skills, such as information processing, critical thinking and problem solving.

2. ICT will be integrated both vertically and horizontally through out the educational provision of Eritrea.

3. A top priority will be given to providing access to ICT in remote areas of the country, people with special needs, and girls.

4. ICT will be utilized to support training and continued professional development of teachers, management and operations staff, and the public at large”

Eritrea is developing a new national curriculum in all sub-sectors of education. The MoE sees ICT as an integral part of the education experience, and envisions ICT to be consideration at all levels and across all subjects achieved by the curriculum. Courses will be developed primarily by the Department of General Education (DGE) with assistance from teachers having developed their own curriculum, and will cover basic operations of computers, and a variety of productivity software. Secondary and technical schools either have computers labs, or will be the first to receive them” (Framework: 4). Currently, the integrated ICT in Education is initiated in Eritrea through

- Development of a National Policy for ICT in Education
- Feasibility Study for ICT in Education and
- National Curriculum Framework for ICT in Education.

All three policies will strengthen Education Sector Development Programme (ESDP) to move forward in a defined policy framework and strategic environment (National Feasibility: 16). The budget for ESDP ICT program in Phase-1 is US$ 8044,000, Phase-2 is US$ 4309,000.50 and Phase-3 is US$17,480,000.90 (National Feasibility: 67-81). The MoE is taking the lead to define National Policy relates to ICT having different objectives like to identify important components of effective ICT integration to build awareness among the entire education sector, to outline a cross-sector strategy for pragmatic implementation of the policy to help integrate processes and minimize wastage and to narrow the “digital divide” by addressing key constraints through the use of ICT.
4. NATIONAL POLICY FOR ICT IN EDUCATION


4.1 National Feasibility Study on ICT in Education


The most comprehensive ICT training organized by the MoE took place in CTTC, University of Asmara, in Spring 2005 that sponsored by the World Links NGO based in Washington, DC, the one-week program trained 100 teachers are using ICT for teaching and learning. WL also sponsored the training of 50 schools directors in basic ICT skills, ICT tools for administration, the basic e-mail skills(National Feasibility: 37). WL has programs in over 20 countries around the world, and maintains an open online community of educators that share ideas, lessons, and experiences with the community. In addition to the 126 computers for the 6 pilot schools, WL has also secured 384 additional refurbished computers for Eritrea. The FAIR is a Norwegian NGO aiding developing countries and supplying computer networks and training. Currently, FAIR is working in Zoba Northern Red Sea, installing network computer labs of 50 computers in 4 secondary schools, and 3 middle secondary schools. By 2005/2006, all 7 FAIR computer labs will be installed, and all teachers trained to administer the lab (National Feasibility: 57-58).

4.2. FRAMEWORK FOR INTEGRATION OF ICT

The ESDP and ICT are working under the common objectives that highlight to inform the education community of the intent and plans of the MoE for ICT in education, to travel to all Zoba capitals for first-hand assessment and analysis of the ‘State of-Play’ of current infrastructure and human resource capacity for installing and using computers for teaching and learning in local secondary schools, to identify cost components important for accurate budget development for procurement, installation, and maintenance of ICT in secondary schools and technical schools and to provide options for connecting computers to the Internet in secondary schools (National Feasibility: 28).

The Computer labs are planned to contain up to 50 computers. To coordinate, facilitate, and produce multimedia and related ICT materials for education purposes, the ICT Unit, the departments of Adult & Media Education, Technical & Vocational Education Training (TVET) and DGE will establish a media development steering committee coordinated by the ICT Unit'. Sector-wide implementation of the new curriculum will take from 3 to 5years, depending on the level. The MoE will look closely at satellite transmission solution for piloting curriculum. The MoE website will then become an archive of experiences important for creating a support system for teachers (Framework: 5-10).

Tertiary Education, particularly Department of Computer Science at the Eritrea Institute of Technology (EIT) will play important role in ICT strategies for General Education. The Faculty of Education, the Department of Computer Science and other relevant areas of study at EIT will collaborate with HRD at the MoE to identify instructors, tutors, or mentors to help in the administration of the distance learning program for teacher upgrade. The strategies for adult literacy include developing an awareness campaign for ICT among illiterate adults utilizing all types of media, grade resources for reading and writing. Programs (cove health, environment, civic issues, agriculture, and programs for teaching methodology, early childhood education and HIV/AIDS) are developed in local languages (Framework: 15-20). TVET provides job skill programs in a technical schools and 3 advanced technical schools in Eritrea TVET agricultural programs will work closely together in developing strategies for implementing ICT into Agriculture field under mother tongue (Framework:21-22).
The ICT Unit of MoE will develop a series of awareness and orientation seminars and workshops for policy makers to help develop the conceptual framework among educators, especially for application of ICT for teaching and learning in both formal and non-formal sectors of education. The MoE website will include a public awareness aspect as well. The educational aspects of the MoE website will be coordinated by the ICT Panel at the DGE, working closely with the MoE ICT Unit, and liaising with the AME and TVET. (Eritrea Profile, Vol.13, No. 85, 30th December 2006 Part-III).

Today, new technologies are rapidly reshaping the livelihoods of people throughout the world. The Operations Officer for Eritrea Education Sector Development- Program Management Unit (ESDP-PMU) (during his discussion on 09.10.2006), examines, “Teacher professional development in the use of technology in the classroom will enhance and improve the capabilities of teachers through a relevant teacher professional development programs in the use of technology, including computer literacy skills training and more advanced professional development in the pedagogical application of those skills. Workshops, seminars and short courses (160 hours or more as per the plan) will be developed and”. He further emphasizes, “The specific training workshops will be held for school directors of the 50 schools targeted under the Eritrea Education Sector Improvement Program (EESIP), along with other key administrative personnel at the Zoba and Sub-Zoba levels”. Mr. Haddish Tesfamariam observes, “All the selected secondary schools (50 in number) having strength of 2000 students will be offered a computer laboratory with 25-30 computers and the provision of two laboratories depending on the student strength will be kept. It is expected that 16 schools currently be connected to the Internet using dial-up ISP”.

ESDP-PMU sources advertised for the procurement of IT and Office Equipment for Secondary schools and mentions, “ The State of Eritrea has received a loan from the African Development Fund (ADF) in the amount of UA 13,600,000.00 towards the cost of the Eritrea Education Sector Development Program, and intends to apply part of the proceeds of the loan to cover eligible payments under the contracts for the supply of IT and Office Equipment for Secondary schools. Bidding is open to all bidders from eligible member countries as defined in the Africa Development Bank’s (ADB) Rules of Procedure for the Procurement of Goods and Works and the last date for application is on or before 14:00 local time on December 18, 2006” (Eritrea Profile, vol.13, NO.62, Dated 11th October 2006). “The ADF project will equip 30 science laboratories and 40 workshops at a total of 30 schools (Table-1) and by providing 20 computer laboratories and 400 sets of computers to 20 schools. It will also provide reference and library books, as well as teaching aids for 50 schools. To enhance the quality of teaching at the secondary level, the government has embarked on recruiting highly qualified teachers internationally, on a cost-effective basis, to meet rising enrolments as a provisional measure over a 5-year period, pending the training of Eritreans in teacher training institutes and at university level.

It is worth noting that Eritrea is using internationally recruited teachers because the number of Eritreans in the teaching force is not enough. As the trained Eritreans take over the teaching positions, the internationally recruited teachers will be gradually phased out. Based on projections of demand for teachers, the project provides for the financing of 450 person/years of teachers, mainly in the areas of science, math and technology. To optimize the effectiveness of teachers, the government will strengthen the present orientation, guidance and counseling already being provided to arriving teachers. --- The international recruitment of teachers as a transition measure will enable at least 30,000 Eritrean to gain access to quality education”. (Africa Development Fund, Education Sector Development Programme, June 2004:20).

5. ICT IN EDUCATION AND ITS ROLE IN ERITREAN SOCIETY

The pace of technical change is increasing and it is beyond the capacity of society to understand and manage its impact. Technical change has helped people in their daily battle for survival. Despite the potential of new technologies to change the livelihoods of people living in poverty, Eritrea Institute of Technology (EIT) and other education institutions should plan to strengthen its limited access to appropriate technologies as well as information and knowledge about technical options. From a long-term perspective, people living in poverty need to be able to adapt and select and use the technology that suits them according to their own discretion with the help of their children studying for example in EIT. Moreover, EIT provides the computer subject to all disciplines (Arts, Social Science, Commerce and Science) entitled Introduction to Computer Science to all students admitted as freshman.

Technology innovations are vital for growth and poverty reduction in developing countries. ICT and Human Development Efforts in Eritrea are recognized as a major determinant of economic growth. The irony is that the technologies to meet these needs are growing in Eritrea, but they are not accessible to the people who need them most. EIT should initiate in this direction as a case study and advertise short term orientation courses, Certificate, Diploma and Degree courses in ICT to its students and non-teaching employees. There should be sufficient courses to nearby villages like Daro-Paulos, Adi-rasi, Adcm-nager, Kutmo-awlie, Ababarda, Himbirti, Adi-
The telecommunication regulatory policies in Eritrea have been liberalized in a way that exports of communication services are encouraged. These are positive insights to job creation and efficient productivity for the Eritrea and the continent of Africa. This is the key to introducing the Internet to the people who are still getting use to western style technology.

The question that will arise given this situation is that technology has brought hope as well as despair. Hope in the sense that many foreign companies would be able to invest in Eritrea. In the long run, the people would have to learn new skills and work as labor forces in the companies that need their technological know-how. This is a kind of low-income job that does not warrant excessive literacy. But if the machines were going to do the job what would happen to the labor force? They would have to relocate. In a country like Eritrea it is going to take a long time before the majority labor force in the country become dynamic. The absence of African languages in the pool of Internet integrated languages of operation has greatly affected the way the populace can use it for communicative and developmental purposes. One major hurdle that Eritrea is facing on this issue of technology and economic growth is whether the overall Growth Domestic Product (GDP) of the country would be positively or negatively affected as a result of the emergence of ICTs.

There are two issues of concern here. The first issue is the question of the relationship between information technology and job creation and job destruction. The debate often gets framed in terms of whether technology is creating jobs by improving productivity and stimulating overall demand, or whether it is eliminating jobs by replacing workers with machines and automated production process.

This is what creates a worrisome situation. Instead of depending on the West for the manufacture of the software and hardware, Eritrea could develop her own manufacture industry with the support of the West and in that case, the rest of Africa can then import relatively cheap software and hardware from Eritrea through a free market system that enable free movements of goods and services.

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6. CONCLUSION

From the above study, it can be seen that Africa is still lacking behind in superhighway technology. Even though there is some glimmer of hope in the horizon with the example of Eritrea, Senegal in the sub-Saharan region of Africa and almost all the Northern countries like Egypt, Tunisia, Morocco and Libya, there are still inherent problems with respect to the Internet. The Internet enjoys greater utility in the western countries due in part to the increase subscription rates. Almost all households have telephone lines and many users have the wireless personal communication services like cellular phones, palm pilots, laptop computers that can easily be connected to the Internet. These gadgets are also present in most African countries, but the cost of purchasing and maintaining them is a lot more expensive for them when compared to situations in the West. This is one of the reasons why the Internet is going to take a while before becoming a vital communicative medium in Africa.

For the purpose of economic development in terms of creating tele-centers for Africa's goods and services, there are advantages as well as disadvantages. The advantage of using the Internet to sell Africa's goods is that turnover rates will rapidly increase. Most buyers who love certain ethnic items in Africa but who are living in Europe can just go online and purchase them and have them delivered right home within a short period of time.

The western powers need to stop manipulating Africa as an ancillary continent that must succumb to western models of modernity. Africa's cultural, economic and social worth ought to be recognized as vital for her development. This is why other scholars have proposed alternative model for Africa when foreign models fail to reconcile with existing structures.

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