

ICT for Ethiopian Community Development

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INTRODUCTION

Ethiopia is the home of Lucy's discovery claimed by science as the oldest female in the search for human beginning—dated 3.2 million years (Johanson & Edey, 1981; Foley, 1997, 2004); headquarters for Organization of African Union since its inception in 1973 (Encyclopedia Britannica Online, 2004); credited for the world heritage site of the churches of Lalibela, a building technology of ten churches hewed from solid rock (Salmon, 2003; United Nation Population Fund, 2001); the only African nation that did not succumb to colonialism, a nation with 13 months of sunshine, and a nation with a long history (Pankhurst, 1961 & 2004; Tegenu, 2004).

Its prominence notwithstanding, Ethiopia today is among the poorest nations in the world. Eighty-two percent of its population lives with under US\$1.00 per day (International Labor Organization, 2000). Eighty-five percent of its population lives in rural settings. With 70 million current population and a growth rate of 2.7% to 3.1% per annum Ethiopia's population is expected to more than double by 2030 (United Nations, 2000). The current rate of population growth threatens Ethiopia's economic stability according to Ethiopia's President, Mr. Girma Wolde-Giorgis (Wolde-Giorgis, 2003).

The Ethiopian government has taken a bold step to reinvent its services and processes utilizing Information and Communication Technologies (ICT). The government is investing U.S. \$130 million to build ICT infrastructure (Negash, 2004a). ICT has been proposed as a means to help Africa overcome its underdevelopment (Polikanov & Abramova, 2003). At the same time, the paucity of Internet infrastructure in countries with developing economies is known to limit technology diffusion (Mosaic Group, 1998). This leaves a major question for policy makers: Will ICT properly applied bring Ethiopia out of its underdevelopment?

This article presents two models. First, an ICT assimilation model to assist top management in understanding ICT complexities; and second, a Communities of Practice model to engage the diaspora in content delivery. The author participated in the assessment of

three national projects, March 2004 to June 2004, and engaged in Communities of Practice to deliver videoconferencing training between Ethiopia and the United States, November 2003 to June 2004. The first model, the ICT assimilation model, is based on the three ICT project assessments. The second model, the Communities of Practice to utilize ICT, is based on the delivery of videoconferencing training. This article presents the lessons learned from one of the videoconference training projects.

The remainder of this article is organized in five sections. Section one provides an ICT background on Ethiopia; section two, ICT assimilation, provides a model developed to support top management understanding of ICT management; section three discusses a case study utilizing ICT for content delivery by Communities of Practice—a model proposed to overcome underdevelopment using ICT; section four, development challenges, highlights potential challenges of ICT implementation; and finally a conclusion is provided.

BACKGROUND

The three Ethiopian ICT projects included in the assessment are as follows:

1. The *SchoolNet* project designed to connect 574 high schools in Ethiopia,
2. The *WoredaNet* project aimed at connecting 597 counties in Ethiopia, and
3. The *Broadband* project which is concerned with delivering high speed Internet access to Ethiopia.

The *SchoolNet* project which was managed by the Ministry of Education aimed to connect all high schools, 574 high schools at the time of this writing, through satellite connection that used very small aperture terminal (VSAT) technology. The *SchoolNet* project delivers teaching lessons via satellite. Quality assurance was controlled at the central broadcasting location. Lessons were broadcasted to each school and archived for re-run at later times. In this setting, rural schools will receive

the same quality of education as their urban counterparts. At the time of writing *SchoolNet* project was in its final phase of implementation, six subject areas were developed and a pilot test was in progress. The effectiveness of broadcasted education with local assisted learning is yet to be seen.

WoredaNet managed by the Ministry of Capacity Building aims to connect 597 counties (called Woredas). *WoredaNet* used VSAT technology to link rural locations. *WoredaNet* exploited ICT's capability to connect geographically dispersed locations through videoconferencing. By bypassing the transportation hurdle, which may take several days to travel from some of the rural areas, videoconferencing intends to provide civic leaders with the ability to conduct business without leaving their offices. Videoconferencing communication is expected to reduce the travel of officials away from their local communities.

The *Broadband* project intended to provide high speed Internet access at reduced costs. Ethiopia announced broadband services in May 2004. Ethiopia used terrestrial-optical technology and satellite connection to link to the global Internet network.

The ICT development gap between countries with developing economies and industrial countries is significant. For example, in 2004 the number of Internet users¹ in Africa was estimated around 1.3 million from a population of 768 million, i.e., only 0.17% or 1.7 persons per thousand population of Africans have Internet access. This is alarming when compared to an industrialized country like the U.S. where every other person, 50% of the population, has Internet access (Computer Industry Almanac, 2000). Africa, with 12.8% of the world's population (United Nations Population Fund, 1999), accounts only for 1% of the global Internet users (Polikanov and Abramova, 2003). The number of Internet subscribers in Ethiopia in 2000 was a meager 2,500 at a time when the population was 60 million (Jensen, 2001). This represents about one in 25,000 people.

In 1996, only 11 nations in Africa had access to the Internet, but by 2003 all 54 nations had Internet access (Polikanov & Abramova, 2003). While this represented a commendable progress, Internet access to the public at large and availability of computers was not widespread. In East Africa, Kenya and Uganda lead ICT use while Tanzania and Ethiopia follow. However, it needs to be noted that a large number of Internet users in Kenya and Ethiopia are international organizations and humanitarian agencies located in Addis Ababa and Nairobi (Polikanov & Abramova, 2003). This further demonstrates just how low Internet access is to the general public. According to government officials from the Economic Commission for Africa, use of the Internet in Ethiopia accounts for only 1% and Internet for adminis-

trative purposes is extremely low (Polikanov & Abramova, 2003).

In 2000 the average dial-up cost in Africa was US\$68 per month (Jensen, 2001) compared to about US\$20.00 in the U.S. The cost differential for Internet access between the U.S. and African countries is magnified when the cost is adjusted for individual income. These cost differentials are largely due to government monopolies (Jensen, 2001). Ethiopia and Mauritius, for example, have an official monopoly on Internet services (Polikanov & Abramova, 2003).

A MODEL FOR ICT ASSIMILATION

ICT has become essential for business operation in many sectors. The author was invited to assist in the ICT assimilation effort at the various ministries in Ethiopia. Several brainstorming and interview sessions were conducted with management executives who were responsible for ICT projects. Findings from the interviews and experience from the videoconference trainings led to a quest for a model to explain ICT assimilation. This section extends the Chatterjee et al. (2002) model for ICT assimilation in countries with developing economies by including the organizational culture and technology development awareness framework used in the Ethiopian ICT projects (Negash, 2004a).

ICT serves as a key tool and enabler for continuous country development (Kasim, 2004). In industrial countries ICT diffusion has shown a significant positive impact on gross domestic product (Jalava and Pohjola, 2002; Oliner and Sichel, 2000; Pohjola, 2001) and plays a critical role in economic growth (Grossman and Helpman, 1991; Barro and Sala-i-Martin, 1997). ICT investment has greatly contributed to the economic growth of industrial countries like the United States (Sichel, 1997) and it may provide better economic opportunities for countries with developing economies (Lee, 2001). ICT implementation is not free, however. It requires investment in human capital and research and development (Redding, 1996) by the host country. If the host country does not have the domestic capability to absorb the technology spillover then the ICT diffusion will be futile (Abramovitz, 1979).

Chatterjee et al. (2002) used structuring, metastructuring, and institutional theory to explain how top management championship, strategic investment rationale, and extent of coordination affect Web assimilation. The proposed ICT assimilation model (Figure 1) extends the Chatterjee, et al. model by including two constructs: (i) the impact of organizational culture and (ii) the moderating effects of technology development awareness on top management. In this article only the

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