

FROM AFRICAN VILLAGE TO GLOBAL VILLAGE: LESSONS IN BRIDGING THE AFRICAN DIGITAL DIVIDE

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“L’information est la clé de toutes les portes.”

— Telecentre user in Timbuktu

Abstract:

Access to telecommunications facilities and services is almost nonexistent in much of rural Africa. The poorest African countries rank at the bottom of the global list in teledensity and PC density, and rural access to the Internet is extremely limited even in wealthier nations such as South Africa. Several initiatives are attempting to extend access through community based telecentres and innovative universal access and pricing policies. Major sponsors of these initiatives include the World Bank, the ITU, UNESCO, the Canadian International Development Research Centre (IDRC), and USAID. Internet access is now being introduced in urban townships, rural community centres and schools on a pilot basis, typically based on the assumptions that installation of information infrastructure will lead to social and economic development and that the facilities and services themselves will be sustainable.

This paper examines the assumptions underlying these initiatives, and identifies findings from field research and lessons learned in both policy and practice that are relevant not only in Africa but in other rural and developing regions. The paper is based on research carried out during the author’s extensive field work and policy research in Africa on her sabbatical in 1999 when she served as Coordinator of Evaluation and Learning Systems for IDRC’s Acacia Program.

1. Information Gaps

In its Statement on Universal Access to Basic Communication and Information Services, the United Nations noted:

... “The information and technology gap and related inequities between industrialized and developing nations are widening: a new type of poverty — information poverty — looms. Most developing countries, especially the Least Developed Countries (LDCs) are not sharing in the communications revolution, since they lack:

- \$ affordable access to core information resources, cutting-edge technology and to sophisticated telecommunications systems and infrastructure;
- \$ the capacity to build, operate, manage, and service the technologies involved;
- \$ policies that promote equitable public participation in the information society as both producers and consumers of information and knowledge; and
- \$ a work force trained to develop, maintain and provide the value-added products and services required by the information economy.”¹

In Africa, access to telecommunications is generally much more limited than in developing regions of Asia and the Americas. Average teledensity averages only 2.2 lines per 100, and only 1.4 lines per 100 in rural areas where as many as 80 percent of Africans live. See Table 1. It should be noted that this table overestimates

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rural access because the “rest of country” includes everything except the largest city. Also, facilities are not likely to be evenly distributed throughout the country, so that in many rural areas there may be no telecommunications facilities. (Access in South Africa is much better, with 75 percent of South Africans stating that they have access to a telephone within a short walk, largely as a result of universal service obligations imposed on Telkom and the two wireless operators, Vodacom and MTN.)

Table 1: Access to Telecommunications²

Region	Teledensity (Tel Lines/100)		
	National	Urban	Rest of Country
Africa	2.2	5.9	1.4
Americas	32.3	19.2	8.8
Asia	7.3	26.1	6.3
Europe	37.3	48.0	31.5
Oceania	40.3	44.7	38.4
World	7.4	25.0	10.3

Access to the Internet is extremely limited in much of subSaharan Africa.³ Of course, Internet access requires both communications links and information technologies, particularly personal computers or networked computer terminals. At present, the gap in access to computers is apparently even greater than the gap in access to telephone lines. Africa has less than one computer per 100 people, and only about 20 Internet users per 10,000 population. See Table 2. Again, South African access is much better, but access to computers and the Internet is still very limited in the townships and rural communities.

Table 2: Access Indicators⁴

Region	Tel Lines /100	PCs /100	Internet Hosts/10,000	Internet Users/10,000
Africa	2.2	0.8	2.1	21.8
Americas	32.3	20.8	401.3	886.7
Asia	7.3	2.2	7.4	87.2
Europe	37.3	13.9	96.9	488.5
Oceania	40.3	38.4	302.7	1236.5
World	7.4	6.4	73.4	250.3

2. Calls for an African Information Society

At the 1994 ITU Development Conference in Buenos Aires, U.S. Vice President Al Gore called for a Global Information Infrastructure (GII), extending the concept of National Information Infrastructure (NII) that had been promoted domestically by the Clinton Administration. This theme was echoed by the G7 Summit in Brussels in February 1995.⁵ The World Bank added its imprimatur by cosponsoring the first Global Knowledge Conference in June 1995 in Toronto (the Canadian government was the primary cosponsor). The 1996 Information Society and Development (ISAD) Conference held in South Africa was the first international conference convened in a developing country to consider the potential of the new information and communication technologies (ICTs) for development. ISAD noted a link between the information society and

community development in Africa and suggested that, “through links at the community level, a Global Information Community governed by people-centred development values could evolve within the more commercially oriented Global Information Society.”⁶ Meanwhile, African governments had begun to recognize the potential contribution of ICTs to African development, and had established an African Information Society Initiative (AIS).

Multilateral organizations such as the World Bank, UNESCO and the International Telecommunication Union (ITU) as well as several bilateral aid agencies and foundations have funded initiatives to increase access to information and communication technologies (ICTs) in Africa. Examples include:

- **Acacia:** The Acacia Program on Communities and the Information Society in Africa sponsored by the Canadian International Development Research Centre (IDRC) is designed to empower sub-Saharan African communities with the ability to apply information and communication technologies [for] their own social and economic development.”⁷ Acacia was planned as the IDRC’s contribution to the AISI. (The project was named Acacia because the Acacia tree is found throughout sub-Saharan Africa.) To develop and test models of community access, Acacia identified four core themes: policy, infrastructure, tools and technologies, and applications. Women and youth are high priority target groups. As a research initiative, Acacia was intended to bring together community-based learning and more traditional evaluation within a single interactive framework. Thus, Acacia includes a major evaluation and learning systems component, with the goal of using systematic and participatory evaluation to learn about the applications and effects of Acacia projects, and to share what is learned with local stakeholders and other Acacia projects, and with others including African governments, NGOs and other development agencies.
- **Leland Initiative:** Named for deceased Congressman Mickey Leland and sponsored by the U.S. Agency for International Development (USAID), Leland is a five-year \$15 million US Government effort to extend full Internet connectivity to approximately 20 African countries in order to promote sustainable development. Leland has three major objectives:
 - X Policies: to create an enabling policy environment;
 - X Pipes: to foster a sustainable supply of Internet services;
 - X People: to promote Internet user applications for sustainable development.Leland is currently active in 15 African countries.
- **InfoDev:** The World Bank points out that ICTs A...open up extraordinary opportunities to accelerate social and economic development, and they create a pressing reform and investment agenda both to capitalize on the new opportunities and to avoid the deterioration of international competitiveness.⁸ The World Bank’s InfoDev initiative aims to address this agenda by funding activities to assist developing countries and emerging economies to harness these technologies. Its strategies include leveraging funds and brokering partnerships to create a network for improved communication and information sharing.⁹
- **WorldLink:** The World Bank has also established WorldLink, a program to provide Internet access for schools in developing countries. African participants to date include: Cape Verde, Mauritania, Mozambique, Senegal, South Africa, Uganda and Zimbabwe.¹⁰
- **The ITU and UNESCO:** are jointly sponsoring multipurpose community telecentres (MCTs) in developing regions; in Africa, MCTs have been installed in Mali, Mozambique and Uganda and are being implemented in Benin and Tanzania.

3. Case Study I: Telecentres

3.1. The Telecentre Concept

Most major cities in Africa now have cybercafes or privately operated telecentres equipped with personal computers linked to the Internet. The African Communications Group plans wireless kiosks for Internet access, with web pages enabling artisans, farmers and other small entrepreneurs to set up shop in the global marketplace.¹¹ South Africa is also supporting the installation of telecentres equipped with phone lines, facsimile, and computers with Internet access through a Universal Service Fund; South Africa now plans to provide Internet access to government information and electronic commerce services through post offices. Many other countries are extending public access to the Internet through telecentres, libraries, post offices, and kiosks.

The term Atelecentre has been used to refer to a variety of means of providing access to information and communication technologies, ranging from cyber cafes to facilities located in public buildings such as libraries and post offices, to stand alone public access centres. For purposes of this analysis, a telecentre must meet two essential criteria:

- X it must provide access to telecommunications services
- X it must be accessible to the public

Thus, a training center that is equipped with computers but has no telecommunications connectivity would not be considered a telecentre; neither would a school computer lab which has Internet access but which can be used only by students and teachers of that school, although both may be effective means of using ICTs for development.

Aside from those factors, telecentres may vary in terms of:

- X location: urban vs., rural, size of community, demographics of population (economic activities, languages used, education levels, etc.)
- X services provided: telephone, facsimile, e-mail, Internet, photocopying, computer training, library materials, etc.
- X business model: profit making, cost recovery, partially subsidized, fully subsidized, etc.

Telecentres are only one of many ICT initiatives in Africa, but they are perhaps the most visible, as they are designed specifically for community access. Acacia has established telecentres on its own in Uganda; in collaboration with the Universal Service Agency in South Africa; and in collaboration with the ITU and UNESCO in Mali, Mozambique,¹² and Uganda (jointly sponsored telecentres are also being implemented in Benin and Tanzania). These projects are referred to as multipurpose community telecentres (MCTs), and are equipped with a variety of facilities including pay telephones, a facsimile machine, a photocopier, and several computers equipped with basic software and connected to a telephone line through which they can access e-mail, and in most cases, the Internet's worldwideweb. (In some cases, the available bandwidth is too limited for Web access.) The centres are intended to stimulate and support local capacity for informed decision-making—particularly in the areas of health, education, economy, governance and general socio-economic development; and the production of information to foster local development. In general, the projects are designed to develop sustainable models to meet the information and communication needs of the communities, with the assumption that these models will likely evolve during and following implementation.

3.2. Telecentres and Development

Telecentres are a means of providing access to tools to create, access, and share information. Thus, in order to determine whether or how telecentres may contribute to development, it is necessary to understand what information is needed in their communities, and what other factors may influence the initiation and impact of activities that may be considered developmental (from economic, social, cultural and/or political perspectives).

Many of the developmental goals proposed for telecentres assume causality between use of the telecentre

and a specified outcome. There is an implied chain of inference that must be made explicit in order to trace a causal connection between provision of the telecentre and development. This analysis may be complex because telecentres are typically intended to serve a variety of community needs, which may not be as clearly defined as in projects designed for a particular sector or target group. Based on evaluation of other community access projects and fieldwork to date on telecentres in Africa, for telecentres to have an impact on development, at least the following are required:

Community access:

- X the equipment must be conveniently located;
- X the telecentre must be open at hours when people want to use it;
- X the services must be affordable to the target groups;

Awareness:

- X community members must be aware of the centre and the services it offers,

Skills:

- X community members must be able to use the equipment or to get assistance in doing so.

Lack of Barriers:

- X there must not be constraints that would unduly hinder the impact of the utilization of the ICTs (e.g. lack of jobs or entrepreneurial activities; cultural norms that affect certain groups such as women; lack of transport to reach new markets, etc.)

Some benefits may accrue to individuals who use the telecentre such as getting help in emergencies by contacting a doctor and saving time by using telecommunications to arrange transport logistics or to substitute for traveling to the city. Other benefits may require more complex types of information-seeking or use by people with institutional affiliations, such as members of community organizations, entrepreneurs, employees of NGOs, businesses or government agencies, etc.

Two concepts from theory of the diffusion of innovations are relevant to this analysis:

- **The two-step (or multi-step) flow model:** i.e. the real beneficiary may not be the ICT user. For example, the user may be the agricultural extension agent, the health worker, the social worker; while the beneficiaries are the farmers, women and children, disadvantaged groups, etc.;
- **The early adopter:** Some people are more likely to use ICTs sooner than others: for example, those with more education and those with clearly defined information needs such as teachers, medical staff, community leaders, artisans who need to find markets, and merchants who need to contact suppliers, etc.

3.3. Beyond Anecdotes

There are numerous sources of information on telecentres,¹³ including websites, conference papers and reports from field visits, many of which contain stories and anecdotes that provide useful insights and lessons learned. A problem with stories is that they may lead to unsubstantiated conclusions or overgeneralizations, based on assumptions rather than careful analysis. The following are examples of statements made about telecentres:

- X Women are more likely to use telecentres if telecentre staff are women (or include women);
- X The business model makes a difference in development impact (e.g. a business-oriented telecentre is likely to contribute less to social and/or political development than one with explicit development goals).
- X The skills and attitudes of the telecentre staff make a difference in developmental impact (e.g. a person trained in tracking down information or a person with community outreach skills may contribute to more

developmental use of the telecentre);
\$ Training a core group of users results in more usage of ICTs (or faster take-up by target groups) than a drop-in self-teaching approach.

In fact, all of the above are assumptions that may be based on experience at one or more sites, but have not been broadly substantiated. However, systematic evaluations have been implemented at several of the Acacia project sites, and for African telecentres jointly sponsored by the Acacia, the ITU and UNESCO.

3.4. Timbuktu, Mali

The fabled city of Timbuktu was once a trading crossroads and medieval centre of learning and religion. Now much smaller and no longer on the shores of the Niger River, which has changed its course, Timbuktu remains an important regional trading centre of about 20,000 people on the edge of the Sahara, more than 600 km from Bamako, the capital of Mali. SOTELMA, the Malian telecommunications operator, provides service to Timbuktu via satellite by leasing capacity on Intelsat. SOTELMA is a partner in the Timbuktu telecentre project, and has provided three hours per day of free Internet access during the pilot project phase.

The telecentre was initially set up in a room in the hospital compound because of the availability of power and telephone lines. Although it was open to the public, the telecentre was not centrally located; it has now been moved to space on the main town square (la Place de l'indépendance) next to City Hall (la Mairie). In fact, the Mayor is an avid booster of the telecentre, and has introduced a \$10 departure tax for all air passengers leaving Timbuktu to help support the telecentre.

For the baseline study, questionnaires were administered to 212 respondents, leaders of 12 organizations were interviewed, and six focus groups were held with residents expected to have high potential as MCT users: high school teachers, tourism operators, leaders of women's groups, artisans, medical professionals and youths. Although Timbuktu is the most physically isolated of the telecentres reported on here, the people were less isolated than might be expected in their communication use. Fully 25 percent of those interviewed used the telephone at least once a week, while merchants and those in the tourism industry made frequent use of phone and fax. About 70 percent listened to the radio at least once per week, and 58 percent watched television (also transmitted by satellite and then rebroadcast locally) regularly. However, there was considerable dissatisfaction with communication facilities and services, with respondents citing unavailability, high cost, and unreliability of access to information.

There were considerable differences in communications use among various subgroups. Middle-aged men, especially civil servants and businessmen used telecommunications and mass media the most, while women, younger, older and poorer groups were less likely to use these facilities. Women in public administration also stated that they were much less likely to have access to a telephone or fax at work than their male counterparts.

Information priorities among adults include education, professional development, religion and health, while priorities for teenagers also included health, religion, and education as well as entertainment, news and sports. (Timbuktu is still considered a major Moslem religious centre, and has several famous mosques that are more than 500 years old.) Despite the reputation of Timbuktu as a conservative, religious community, few people expressed concern that increased access to external information would be culturally harmful.

In general, the community was enthusiastic about the telecentre, expecting that it would reduce the cost of communications, increase access to professional information, and provide opportunities for the community of Timbuktu to make it self known to the outside world and create links with external partners and markets.¹⁴ In fact, early indications were that the telecentre was beginning to fulfill these expectations. According to logs for a three month period in 1999, the top three activities at the telecentre were computer use, e-mail and Internet

access, and training in computer skills. The three largest user groups were students, staff of nongovernmental organizations (NGOs) and medical staff from the hospital. About 35 percent of the telecentre users were women.

Given its original location at the hospital, health workers were identified as one of the target user groups. They clearly recognized the need for information, and most learned quickly how to use the facilities. A physician interviewed in the baseline study commented: "Information is the fuel of medicine. Here we have none. Year by year, we are falling behind." By the time the telecentre was moved to the town square, he was using e-mail and the Internet regularly to get medical information, and the medical staff had requested that at least one computer with Internet connection remain at the hospital. Other early adopters included a tour guide who had used e-mail to arrange a trip in the desert on camelback for visitors. School teachers were looking up materials for use in their classes; one of the teachers had noted that the school books were few and so old that he had no map of post colonial Africa. The value of the telecentre was summarized by a woman who wrote in the log book: "L'information est la clé de toutes les portes" (information is the key to all doors). This could serve as the motto for all developmental ICT initiatives in Africa.

3.5. Nakaseke, Uganda

Nakaseke, Uganda, a rural community about 60 km. from the capital, was chosen by the Ugandan government for a telecentre pilot project because its people had suffered greatly during the recent civil war. Subsistence agriculture is the main economic activity in the area; there is also a hospital in the town and a teachers college nearby. Nakaseke is 12 km along a dirt road from the main highway, and there is no regular public transportation to the nearest market town, from which minibuses run to Kampala.

A baseline study using the same methodology as in Timbuktu, was carried out in Nakaseke in March 1999.¹⁵ In Nakaseke, the primary forms of communication were sending and receiving letters and listening to the radio; those with more education tending to send and receive letters more frequently. The main purpose of communication was for social or family matters. More than 50 percent of teachers, business people, civil servants and health and development workers reported sending information to Kampala at least quarterly. Letters were most commonly used, although messengers and personal travel were also cited. Only four percent reported using a telephone (which would have required traveling over the dirt road to the main highway and then to the nearest town).

Most of the population, including women and young people, are farmers. Their highest priority needs included information on markets, prices, and new market opportunities; information on how to obtain inputs such as good quality seeds and breeding stock; and sources of capital. Small business proprietors said that they needed information on record keeping; they expressed interest in the computing and telecommunications facilities of the telecentre, but said that the businesses they dealt with did not have access to such facilities. The staff of the local hospital stated that they sometimes used taxis to send messages, which was expensive and not fast enough in emergencies. They also wanted continuing education and information on innovations in medicine, and expressed interest in using the telephone, photocopier, and e-mail and Internet.

According to logs from a three month period in 1999, the top three services used were videos, photocopying, and periodicals. The top three occupational groups using the telecentre were students, farmers and health workers (from the nearby hospital). Unlike the other telecentres in this study, printed materials are a major component of the resources at the Nakaseke telecentre. One of the staff members is a librarian, and the centre has a collection of children's books, high school text books and development materials, as well as some videos provided by the British Council. It also subscribes to several newspapers and magazines. High school students come to the telecentre to study (most do not have textbooks of their own); literate adults come to read the periodicals, and children come to watch videos. About 22 percent of the telecentre users during this period were women.

3.6. Buwama and Nabweru, Uganda

The same basic evaluation methodology was used to conduct baseline surveys at two other Acacia-sponsored telecentres in Uganda, at Nabweru, in a periurban district about 6 km from central Kampala, and at Buwama, an agricultural and trading center about 60 km from Kampala. However, responsibility for these studies was entrusted to Makerere University's Institute for Social Research, so that local researchers would take over responsibility for the evaluation of these projects, as well as the next phases at Nakaseke.

Nabweru subcounty is one of the fastest growing districts in Uganda, with a population of about 53,000 and is easily accessible to central Kampala. Trade, particularly retail, is the major economic activity; a significant number of adults are also salaried employees in Kampala. The telecentre is located in a building that also houses local government officials, and is adjacent to a police station. Buwama subcounty is larger and poorer, with a total population of about 350,000 and literacy of only about 30 percent. Major economic activities are crop farming, particularly coffee and horticulture, and fishing and fishmongering. Subsistence agriculture is also prevalent. However, the town is situated on a main highway, and has several coffee merchants as well as retail traders, as well as a post office and other government facilities. The telecentre is located in a building shared with an NGO, and near to local government offices.

In both communities, the population is young, and more than 85 percent of potential users were under 45 years of age. Only those with at least primary education were able to read and write English; a higher percentage had completed primary school in periurban Nabweru than in rural Buwama. Both communities relied heavily on sending letters to communicate outside the community; residents in Nabweru also used the telephone (public telephones were available), while people in Buwama depended on messages sent with travelers or commuter taxis.¹⁶

As in the other locations, the survey itself served to inform the residents about the existence and services of the telecentre while giving the telecentre staff and others serving as interviewers a greater understanding of community information needs and expectations for the telecentre. At both sites, the business community was interested in information on prices, while women wanted information on health care and credit schemes, and youth were seeking information on sports and entertainment, as well as education and job opportunities.

4. Case Study II: HealthNet

SATELLIFE is a US-based nonprofit organization whose mission is to build healthier communities in the developing world through the application of information technology (IT), using HealthNet, a "network of networks" that provides health professionals in several African countries with low-cost e-mail and access to a wide range of electronic information resources. The term "HealthNet" was initially conceptualized as a communication network comprised of satellite ground stations accessing a low earth orbiting (LEO) satellite from remote health sites in Africa, but has evolved into a more complex entity that employing a variety of technologies to deliver e-mail and electronic information resources.

In each country where HealthNet functions, the network is locally owned and operated by a project partner. These local HealthNets have evolved into a variety of models, from projects within larger institutions to independent, self-sustaining or nearly self-sustaining NGOs. (Recently, SATELLIFE has opened access to its information services to all health professionals in the developing world, regardless of their e-mail service provider.)¹⁷

The HealthNet networks have been used not only for e-mail, but also to disseminate a suite of information services including electronic publications, discussion groups, and GetWeb, a tool that enables e-mail users to extract text from World Wide Web sites. They note: "To health professionals for whom medical journals

are an unaffordable luxury, these services are an information lifeline.” SATELLIFE estimates that over 2,700 health professionals, the majority of whom are in Africa, now receive e-mail and information services through local HealthNets. An additional 8,000 health professionals subscribe to the organization’s information services. However, the actual number of beneficiaries is likely significantly higher because many subscribers share information with colleagues.

SATELLIFE characterizes HealthNet as the embodiment of a “low-tech high impact” approach, relying primarily on telephone lines and low-earth-orbit (LEO) satellites to provide its clients with a store-and-forward link to the Internet. Although these technologies preclude real-time Internet access and high-bandwidth telemedicine applications, the organization believes HealthNet has retained its appeal for many users because of its relative affordability, because the technology is less expensive than that employed by commercial operations and because SATELLIFE, and in some cases donor agencies, have subsidized operating costs.¹⁸

According to SATELLIFE, the key lessons learned from more than a decade of HealthNet operations include:

- **The Technology Continuum.** HealthNet has been successful in meeting the information and communication needs of its constituents by evolving along a technological continuum that allows for increasingly sophisticated service while keeping end-user costs to a minimum.
- **Institutional Capacity.** HealthNet has been successful only in locations where it has been possible to build institutional capacity or leverage existing capacity, and where there has been a strong sense of local ownership.
- **Sustainability.** HealthNet operations can become self-sustaining or nearly self-sustaining with virtually no financial assistance from SATELLIFE when a business model is implemented.
- **Training.** Investments in technology must be matched with investments in training — for both system operators and end users — if the technology’s full potential is to be realized.¹⁹

5. Lessons from the African Experience

With the exception of HealthNet, most ICT initiatives in Africa are too recent to have generated definitive evaluation results to date. However, based on evaluations underway as well as case studies by various researchers and fieldwork by the author, the following lessons and issues can be identified:

5.1. Projects:

- **Training:** Simply installing or donating equipment is not likely to result in developmental use. While some people may be curious enough to learn to use the equipment by trial and error (as was demonstrated in India where illiterate children learned to use a computer²⁰) in general, project staff need training in operating and trouble-shooting the facilities if they are to help others to use them. A telecentre manager in South Africa stated: “[It’s as if] the USA [Universal Service Agency] gave me a car, but didn’t teach me to drive. How can I get a driver’s license if I don’t know how to drive?”
- **Business Skills:** In addition to learning how to operate the equipment, project managers need to learn basic business skills. For example, most do not have any background in budgeting, tracking expenses, or bookkeeping; neither do they know how to use information from keeping accounts to set prices for their services or estimate future revenue requirements for sustainability.

- **Information Intermediaries:** While some people may need minimal guidance in how to search the Internet or use other sources to find the information they need, in most cases, the project staff may be called upon to help customers find information. Thus, in addition to basic technical training, they need to learn how to do searches of the Web and available CD ROMs and also to identify other local or regional sources of information such as libraries, government agencies, research institutes, aid projects, etc.
- **Appropriate Technologies:** Relatively simple technologies may suffice if the information needs of users are understood. For example, a store-and-forward satellite system has provided important medical journal articles as well as e-mail to African medical schools; a two-way radio network in Uganda enables rural birth attendants to get help when they need to send a patient with a difficult delivery to the hospital.
- **Sustainability:** Not enough attention has been paid to sustainability of ICT projects. The generic multipurpose telecentre is likely to be difficult to sustain in communities without a strong economic base or other source of revenue such as teachers, medical staff, NGO and aid workers, etc. A more successful model in such locations may be ICT support for a sector such as health or education (cf. HealthNet and WorldLink). However, as HealthNet notes, such projects also face challenges in becoming self-supporting.
- **The franchise model:** Public sector organizations, whether they are government departments or development agencies, are generally not very good project implementers. There are numerous examples of delays, inefficiency, and generally poor management when these organizations take responsibility for installing facilities such as telecentres. One approach is to contract out such installations, but of course, the contractor must be properly selected and supervised. Another approach is the franchise model which seems to have worked quite well in South Africa. Local entrepreneurs can set up public telephone franchises to resell services of the wireless operators. These facilities are frequently located in shipping containers, which are used for everything from phone shops to butcher shops in South Africa. Another successful South African model is PostNet (rather like Mailboxes Etc.) which franchises storefront business centers equipped with stamps, copying machines and fax in urban and suburban areas.

5.2. Developmental Impact

- **Developmental Benefits:** While systematic evaluation is still in the early stages, there are indications of the potential of ICTs to contribute to African development:
- **Entrepreneurship:** For example, an Ethiopian established an online service for Ethiopians abroad to buy gifts such as live sheep to be delivered to their families; craftspeople are selling wares overseas through websites.
- **Training:** ICTs can provide training opportunities for motivated learners. For example, a technician at a computer training center in Soweto, South Africa, obtained his Microsoft Windows NT certification online.
- **Medicine:** A doctor in Timbuktu looks up medical information on the Internet and consults with physicians overseas; faculty and students at African medical schools search medical databases and download articles from medical journals.
- **Education:** Teachers download and photocopy materials to be used in the classroom.
- **Gender:** At telecentres in Mali, Uganda, and Mozambique, from 30 to 45 percent of the users are women, despite the fact that women typically have less education and exposure to technology than men in these societies.²¹

- **Beneficiaries:** Donors have debated whether ICTs have much utility for African rural populations who are largely illiterate. One strategy, of course, is to concentrate on the literate “early adopters” and to reach the next generation through schools or community centers accessible to youths. However, such services can be valuable even for illiterates. For example, a member of parliament from Uganda stated that his father sent many telegrams during his lifetime, but could neither read nor write. Local scribes wrote down his messages. Similarly, as noted above, “information brokers” ranging from librarians to cybercafe staff can help people with limited education to send and access electronic information.
- **Short Term vs. Long Term Impacts:** A danger of the recent enthusiasm about the role of ICTs in development is unrealistic expectations among donors and policy makers who expect significant short term impacts. Of course, there may be some dramatic examples of the value of access to information such as a farmer getting a much better price for produce, artisans finding markets, health workers getting assistance to save lives, etc. But much of the impact is likely to take longer and be much more indirect. Better information about planting methods could eventually result in better yields and thus more income for farmers; schools with access to the Internet could result in more graduates prepared to continue their education or to qualify for jobs, etc. But these effects take time!
- **Context:** The developmental impact of an ICT project may depend on many other factors. For example, training in using computers may lead to jobs for youths in periurban townships in South Africa, but not for youths in rural communities. Getting information about prices for produce in the city will not help farmers to avoid the middleman unless they can transport their crop to market. Similarly, finding out how to eradicate a pest may not be useful unless the farmers have access to credit to buy the pesticide.

5.3. Policy

- **Restructuring:** Perhaps the single most important step that can be taken in Africa to increase access to ICTs is to liberalize the communication sector. Monopolies, even if corporatized or partially privatized, are slow to meet pent-up demand, and are known for high prices and low service quality. While liberalization has made larger inroads in developing regions of Asia and Latin America, change is beginning in Africa. Many (but not all) African countries have allowed private, competitive ISPs. (Exceptions include Ethiopia and Malawi, among others). A few have opened the door to competition in cellular services. Competition can work. MTN and Vodacom compete vigorously in South Africa, now targeting young blacks with “pay as you go” services and a variety of packages and nationwide roaming. MTN has taken their aggressive marketing approach to Uganda, where they were licensed as the second carrier (the first, with the PTT as its major shareholder, had effectively cream-skimmed the affluent business and government customers in Kampala). Through a combination of aggressive marketing, pay as you go services, and affordable pricing, MTN signed up more than 80,000 customers in its first year, most of whom had no other telephone service, so that now there are more wireless subscribers than fixed lines in Uganda, a country much poorer than South Africa.
- **Resale:** Franchised telephone booths operate in several francophone African countries; in Senegal, phone shops known locally as telecentres, average four times the revenue of those operated by the national carrier.²²
- **Demand:** Indicators other than population and household income may be better predictors of demand for communication services in Africa. One study estimates that rural users in developing countries are able collectively to pay 1 to 1.5 percent of their gross *community* income for telecommunications services.²³ The ITU uses an estimate of 5 percent of *household* income as an affordability threshold. To generate revenues to cover capital and operating costs of the network, the average household income required would be \$2060; for a more efficiently run network, it would be \$1340.²⁴ Using the higher estimate, 20 percent of households in low income countries could afford a telephone. As noted above, MTN in Uganda has dropped prices and used prepayment through smart cards to reach customers with limited incomes.

- **Regulation:** Independent regulatory bodies are needed to set and enforce policies on competition, universal access and tariffs. Most African countries have no history of independent regulation; also the necessary expertise is in very short supply. Most professionals with the necessary background would be working for the PTT. However, some countries are making significant progress in setting up regulatory bodies, such as SATRA in South Africa, UCC in Uganda, and CCK in Kenya. Yet the verdict is still out, even in South Africa, on whether these agencies can actually enforce the rules in a competitive environment.

6. Conclusion

To improve access, I believe that the single most important step African countries can take is to liberalize their telecommunications sectors. Until the sector is liberalized, investments by development banks and other donors in infrastructure are likely to achieve much less than their potential. A new digital switch doesn't help much if there is no incentive to repair the faults in the outside plant. Cost reductions in satellite technology will not benefit the end user if the only provider of satellite facilities is a monopoly operator. Businesses and NGOs will not be able to take advantage of the power of the Internet unless there are providers able to offer bandwidth that is expandable, reliable, and affordable. Even the best intentioned officials in monopoly PTTs simply cannot move their organizations (and often change their own mindsets) without the prod of competition.

I am not advocating a "wild west" policy that would open doors to competition without a legal framework and oversight. The result of that approach, as we have seen in other parts of the developing world (e.g. Jamaica and Guyana) would likely be some improvement in service availability and quality, but at a high price and only in the most profitable areas. Yet establishing a regulatory agency with expertise and clout is extremely difficult. Most of the professionals in the country with the necessary technical and economic expertise are likely to be working for the industry they would be expected to regulate. Even if they are moved "across the street" they may initially have little incentive to enforce regulations on their former colleagues and managers. And they are likely to be tremendously understaffed and underresourced compared to the companies they are to regulate (of course, this is also true in industrialized countries, but the legal system is more likely to be able to enforce rules and decisions.)

Universal service obligations must be clearly thought out and enforced. South Africa is often cited as an example of the success of regulation requiring extension of service. However, the result is decidedly mixed. The good news is that some 85 percent of South Africans, and at least 75 percent in rural areas, now state that they have access to a telephone, usually through public payphones in most communities. This is a dramatic improvement over a decade ago, and appears to be significantly attributable to USO obligations imposed on Telkom and the two wireless providers. However, there does not seem to have been any effort to monitor coverage of "disadvantaged areas" so that there are many examples of phones installed by several operators in some more accessible communities, and other locations that remain unserved. Even where service is now available, operators appear to assume that it will not be profitable, and that simply installing the phone meets their obligation. Rural phones are often out of order; another problem is unavailability of phone cards (card phones are commonly installed to reduce vandalism) in local shops or post offices, etc.

Another example of poor management and poor enforcement is the program to extend access through installation of telecentres in townships and rural areas, administered by the Universal Service Agency (USA), which was established to implement this program and reports to the Ministry of Communications. Despite resources from a Universal Service Fund and some international donors, the installation of telecentres is woefully behind its targets. Part of the problem may be the inexperience of the staff and the apparent inability of the public sector agency to manage the project. However, a significant proportion of the telecentres that have been established by the USA still had no telephone service as of mid 2000. The projects were clearly not a high priority to Telkom, although it is obligated to provide service, and the USA seemed completely unable to enforce completion of the installation either on its own or through referral of the problem to the regulator (SATRA) or

the Ministry of Communications. (Telephone service was installed very quickly at telecentres opened by the former Minister, Jay Naidoo, who visited several on an African Connection motor rally, but other telecentres languished for months with no connectivity.)

At the project level, development agencies should concentrate on applications rather than technology. With competition and lowered import tariffs, ICTs will become more accessible in Africa. However, helping Africans to use them for social and economic development and to create relevant content is a far greater challenge.

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NOTES

1. United Nations Administrative Committee on Coordination (ACC), A Statement on Universal Access to Basic Communication and Information Services, @ April 1997. Quoted in ITU: *World Telecommunication Development Report*, 1998, p. 10.

2. Derived from International Telecommunication Union. *World Telecommunication Development Report 1999*. Geneva: ITU, 1999.

3. It should be noted that Japan and Australia are included in the Asia/Pacific in this chart; the estimate in the text includes them with industrialized countries of Europe and North America.

4. Derived from International Telecommunication Union. *World Telecommunication Development Report 1999*. Geneva: ITU, 1998.

5. See Hudson, Heather E. *Beyond Infrastructure: A Critical Assessment of GII Initiatives*. @ Competition, Regulation, and Convergence : Selected Papers from the 1998 Telecommunications Policy Research Conference, ed. Ingo Vogelsang.

6. See www.idrc.ca/acacia.

7. See www.idrc.ca/acacia.

8. Source: www.worldbank.org/html/fpd/infodev/infodev.html

9. Ibid.

- ¹⁰ See www.worldbank.org/worldlink.
- ¹¹ Petzinger, Jr., Thomas. A Monique Maddy uses Wireless Pay Phones to Battle Poverty. @ *Wall Street Journal*, September 25, 1998, p. B1.
- ¹² For more information on the Mozambique telecentres, see the article by Polly Gaster in this volume.
- ¹³ See, for example, www.idrc.ca/acacia; www.globalknowledge.org; www.infodev.org.
- ¹⁴ Scharffenberger, George. "Timbuktu Multipurpose Telecentre Baseline Survey: Community Information and Communications Profile." Washington, DC: Pact Institute, January 1999.
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- ¹⁸ Ibid.
- ¹⁹ Ibid.
- ²⁰ See www.cnn.com/virtualvillages.
- ²¹ Hudson, Heather E. Field research and unpublished reports, 1999.
- ²² ITU, *World Telecommunication Development Report*, 1998, pp. 77-78.
- ²³ Kayani, Rogati and Andrew Dymond. *Options for Rural Telecommunications Development*. Washington, DC: World Bank, 1997, p. xviii.
- ²⁴ ITU, *World Telecommunication Development Report*, 1998, p. 35.