Chapter 5

Introduction and appropriation of ICTs: Challenges and prospects

It is generally believed that the new ICTs can offer real opportunities to improve the quality of community life. It is also important to deepen our level of reflection on community dynamics and on the constraints encountered when introducing and using ICTs for development.

This chapter seeks to identify the main challenges and problems that were encountered in the process of using ICTs for development in the research conducted under the Acacia program between 1997 and 2000. Naturally, the geographic, socio-cultural, economic, and political contexts of the countries and communities are different. The communities surveyed have, to varying degrees, familiarized themselves with the use of ICTs; however, a number of common problems were identified through the research. And in all projects, ICTs were introduced not only from the perspective of connectivity; they were meant to be integrated into development issues within communities in which the tools were to support.

Community involvement

Community development is a participatory process that must be appropriated by all components of a given community. A key observation in the projects studied was the level of participation of the populations in the process of introducing ICTs. Given the transforming nature of ICTs, it is essential to ensure community participation in all the stages of intorducing ICTs. Appropriation helps guarantee the sustainability of any development action, and more specifically innovative actions. The results of this study demonstrate

that roles and responsibilities of community members evolve over time as a function of project stages and phases.

The participatory process

Launching the project in the community

Given that the great majority of the population have limited knowledge of ICTs, community involvement at the onset of the project is very often limited to a small number of dynamic, avant-garde community leaders who are project initiators. In this case, the community leader is either an elected person or simply a community leader who is credited with a degree of open-mindedness and who participates actively in community activities. Generally, these leaders are found in groups or individuals who have been directly or indirectly in contact with ICTs or who simply have innovative attitudes and who are above all "risk-takers." These leaders are able to develop strategies for working and interacting with different communities (especially rural ones). Because they are often knowledgeable in popular dynamics, and they serve as points of access to the communities, these leaders provide a valuable contribution by developing strategies designed to identify and involve dynamic groups who are likely to use ICTs in the early stages of the project.

In **Kenya,** a group of women were trained before the governance project was launched. This training enabled them to understand the potential advantages of the project and to share their views with other community members. These women were also able to express their own information and communication needs and were therefore more likely to take advantage of ICTs and seek ways to sustain their introduction in the community.

In **South Africa,** a similar approach was used. Many training modules were offered in the Msunduzi project to organizational representatives. This established the basis for their participation in project implementation and helped them to put in place a network to exchange information between various components of the project.

In **Senegal,** a participatory approach was also used in the very early stages of the process of ICT introduction. In a pro-active approach, research institutions (e.g., WARF, GEEP, and ENDA) with some experience in working with grassroots communities were identified to initiate development actions. A series of training programs was offered in how to use office equipment, standard word processing applications, Internet and email, and financial management.

The first group of people trained and involved in project management should transfer what they have learned to a larger group of people by setting up local training activities. This knowledge transfer was not always realized because of constraints faced by the Acacia project in Senegal and the Msunduzi project in South Africa. The main constraints included equipment not being available, poor project management, and poorly trained managers. In the community projects in Uganda and Kenya that were reviewed, this expansion of training could not be carried out because the project equipment had not yet been installed.

Uptake by the community

In the next stage, the communities developed their own strategies designed to use and appropriate ICTs. This was done first within the project and later within the community as a whole. For example, the youth cyber space project initiated by GEEP in Senegal used ICTs to improve communication between different FLE clubs. The ICTs hasten the process of information exchange both between these clubs and between the clubs and project administrators. The TPS units also used ICTs to transmit accounting and financial data to their parent company based in Dakar. This information was used regularly as control data to manage the project and its various subunits.

Through awareness and training strategies, the people started gradually to show a growing interest in ICTs within their communities. They participated actively in this process (either in-kind or financially) and started to use ICT services across board by both individuals and public or private organizations. In most cases, the users take advantage of the equipment and systems, but do not participate in either their purchase or operation. In addition to the participatory process, mechanisms and structures were put in place to support participation. In fact, consultative frameworks were generally set up at the instigation of the community leaders who were involved in initiating the projects.

Consultative framework

Community contributions (e.g., material contributions, adequate premises, and access to a telephone line and electricity) and formal project management structures were important parts of the participatory approach. A second important component was the establishment of management

committees that represented the whole community. Community leaders and management committee members used local channels of traditional communication and local authorities (e.g., local and traditional bodies, traditional chiefs, and local representatives of the administration) to reach all members of the community and also to integrate the project into the social fabric of the community.

In the process of project implementation, the management committees experienced some problems such as irremovable members, members' age, gender disparity in membership, limited logistic and financial means, and divergent needs. Studies have demonstrated that young people are the main users of ICTs and that women represent a large part of the working population, notably in the rural areas. Therefore, it is important to reflect these groups in the membership of the management committees.

Participation is essential for any action to influence individuals or their community. One way to measure this participation is to gauge the level and intensity of the people's reactions to a given action. It is also necessary to clearly differentiate the type and mode of participation as well as the participants during the different stages of project implementation. During the project-launching phase, it is important to clearly target participants at the risk of seeing the projects rejected by the communities. It is important to identify people with innovative attitudes to serve as points of entry into the community. In addition, the research in Uganda and Senegal revealed that it is very useful to use local and traditional communication channels to encourage large-scale appropriation and integration of ICTs into the communities.

Community response

The analyses of the research showed that community response to ICTs is very dynamic. The response varies over time according to the amount of information delivered to the community and the level of usefulness that communities expect from the ICTs. Although this response can be measured by the level of use, the research revealed that many other factors lead to people having a fairly passive response to ICTs (e.g., level of education, information, involvement, and training in ICTs).

Training appears to be an important element in the process of appropriation of ICTs. For example, with training and a good awareness campaign in the CEEWA project, most of the beneficiaries felt they had a good understanding of the opportunities that ICTs can offer. In Senegal, the

research revealed that the uneducated populations who were not trained in ICTs had passive attitudes toward these tools. Their perceptions were based on the tools themselves and not on the content they could deliver. In fact, most of the community members think that ICTs "have not been made for them because they are poor and uneducated." This perception can be explained by the fact that the level of information on ICTs is limited to the equipment alone. Not enough emphasis is placed on the "tool" – the catalyst leading to information and knowledge.

Some potential users do not use ICTs even when they are well informed of the advantages and opportunities that ICTs can offer. For example, the case study in Senegal demonstrated that the great majority of individuals, who were aware that ICTs are useful, do not use them and adopt wait-and-see attitudes. Similar observations were made by Adam and Wood (1999) in Ethiopia. Using a qualitative approach, they found that information on ICTs was not a sufficient condition for their immediate adoption. Adoption requires a long learning period and substantial investments, and often conditions are not met in projects. Therefore, in addition to sustained briefing and awareness sessions, training and technical capacity-building sessions are necessary to encourage potential users to use ICTs.

Use of ICTs

Access to information is deemed crucial to development during this era of a global economy supported by electronic communications. In the Acacia-supported projects that were studied, all social categories, all social groups, and all corporate bodies were to have access to the services provided after the equipment was made available. However, given the novelty of these tools and a combination of many factors, some groups or individuals do not have full access to ICTs. Factors such as age, education level, income, and location limit access to the new ICTs.

The research findings seem to indicate (at least with community access points) that the use of ICTs varied across age groups. Young people (age group 18–35 years) seem to be the most regular users of ICT services (Figure 2). The young were also the most educated in the areas studied (mainly rural or suburban areas), most of them run a profit-making economic activity (in the primary or informal sector), and they were generally active in community associations and organizations. These young people use, in order of importance, email, the Internet, and word processing to find pen-

pals and financial partners, send or receive messages or mail, key in and edit document, and train in data processing. Adults (age group 36–55 years) use, in order of importance, office equipment, telephones, the Internet, and email mainly to key in and edit documents, train in word processing, and find commercial outlets, partners, and business opportunities.

Although the use of the new ICTs is very limited in Kenya and Uganda, it is important to note that in regions where they are now being used, the communities have started to apply them to solve their own problems. They are being used to access specific information, for communication, to design working documents, and for keeping the accounts of organizations and small- and medium-sized enterprises (e.g., arts and crafts traders). The web site established as part of the Msunduzi project in South Africa made it possible, through the networking of community organizations, to collect and disseminate information on the environment. This allowed the communities involved in the project to better manage their own natural resources. In Senegal, community organizations and entrepreneurs, among others, have started to use the new ICTs in their every-day activities.

Figure 2: Age distribution of users of new ICTs
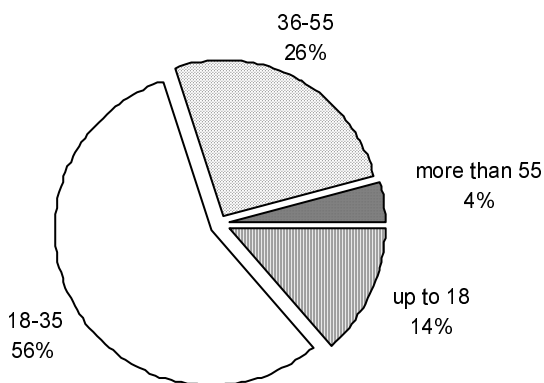
Source: 'Inquiries and questionnaires, ICTs and Community Development Study, Senegal,' November 2000 (Thioune and Sene 2001).

There is also an emerging social appropriation of new ICTs. In fact, in some communities, such as Baraka and Rail in Dakar (Senegal), ICTs are perceived as a means of social rehabilitation and inclusion. In these communities, having an email address or using word processing to prepare accounting documents (e.g., invoices, receipts, budget, and balance sheets) is considered a sign of modernity by the arts and crafts workers. Having a telephone line enhances the standing of domestic servants from these neighbourhoods once considered to be inhabited only by dropouts.

The majority of people or groups who frequently go to community access points and request the services of ICTs, use them more or less regularly after their first contact with these tools (Figure 3) (Thioune and Sene 2001). They are generally willing to go (from the village to the city) to where they can use the services. This shows that people will not be attracted by ICTs (or any other technology) unless they find them to be useful. After they discover them through awareness campaigns and actually use them, they will be much more likely to integrate their use into their everyday life.

Although some individuals or communities have started using ICTs, the great majority of the people in these communities do not use them. Even among those who use ICTs, some have started to question their relevance (particularly access to the Internet). For example, some entrepreneurs in the region of Thiès (Senegal) immediately joined the registered trade system when the TPS unit was opened. This gave them access to trade information and allowed them to pursue business opportunities. They were very enthusiastic at the beginning, and most used the TPS system to offer their goods and services and to seek business opportunities. However, most of these first subscribers now go to these units much less frequently because the trade information they want is rarely available. And the search for information is not free. Therefore, the demand for these services within the TPS units has fallen.

Furthermore, most entrepreneurs who were potential users of this type of service adopted a wait-and-see attitude. They wanted to see concrete evidence that other entrepreneurs had been able to benefit from business opportunities presented by the Internet. This shows the importance of sensitization and the demonstration of the opportunities that ICTs can offer. It also points to the need to establish a network between different communities to share their experiences with a view to learning from each other and to disseminating the lessons arising from community use of ICTs. Notable efforts were made to establish such networks under the Acacia-supported

projects in Senegal, but the results seemed not to match expectations. This suggests there is a need to continue to seek appropriate sensitization and demonstration strategies, methods, and materials to reach the majority of potential users better.

A distinction should also be made between the direct users of the equipment and applications and the users of the information. In fact, experience has shown that although the equipment is used most often, there is still no systematic use of the information drawn from the various existing materials. Such is the case, for example, in the VCMR project in Senegal. The project developed, in collaboration with the Cheikh Anta Diop University of Dakar, and on the basis of the needs identified by the people, resources on health, natural resource management (NRM), and management of community development projects. These resources, though corresponding to the community needs expressed at participatory diagnosis sessions, were not used. The people do, however, request registration forms and word processing services. Therefore, there is a need to determine the order of priorities as well as the information needs, which, of course, keep changing.

Figure 3: Frequency of use of ICTs
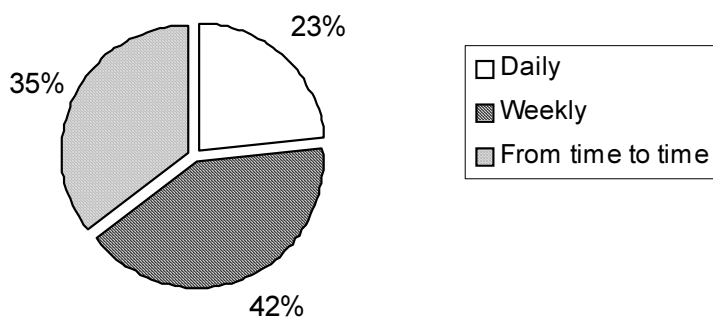
Source: 'Inquiries and questionnaires, ICTs and Community Development Study, Senegal,' November 2000 (Thioune and Sène 2001).

The research also revealed that ICTs are regularly and mainly used for social reasons, and especially to respond to community needs. In fact, ICTs are generally used to contact family members residing in different parts of the world (thus creating a virtual community). The ICTs are mostly used as communication tools; little use is made of their informative potential. Although there were a few reported cases of the use of ICTs to seek information that would serve as inputs or production factors, the potential of ICTs as decision-making instruments is not yet systematically exploited. Nonetheless, ICTs and the information they convey can have a transforming effect when they are used to accommodate user needs. Therefore, they can contribute significantly to the transformation of working methods and processes.

Experience with the TPS units in Senegal revealed that although sources of information are available, entrepreneurs rarely used them. The trade information that was available was generally suited to a structured and well-organized market with sufficient infrastructure. This was not the case in the rural economies in the communities surveyed. These are rather informal economies in "pre-market" situations. Therefore, innovative ways must be found to rapidly integrate these users into this more formal and more structured market, which is both internal and external to the country.

The use of ICTs is currently limited communication, which is of course important because it corresponds to a need expressed by the people. However, there is little use of their informative potential. The challenge is therefore to find appropriate sensitization and demonstration strategies, methods, and materials that will allow the majority of potential users to become aware of the existing relevant information that can be conveyed by ICTs.

What role for women?

It is generally believed that access to information is correlated with access to power, be it economic or political power. The desire for equity and social justice demands that women become active participants and take advantage of the benefits that ICTs can offer. Technological changes can be used to promote improvements in their economic and social conditions, bearing in mind that they represent generally more than half of the population. This issue of access by women is all the more important and urgent because

ICTs are expected to play an expanding role in economic and social development. However, research shows that there is a great disparity between men and women in terms of access to ICTs and information.

Although it is proven empirically that women use ICT services in the urban, suburban, and rural areas, this use remains marginal compared with men. Overall, in Kenya, Uganda, and Senegal, women seem to be marginalized in the use of ICTs. There seems to be a tendency for traditional access and control mechanisms to apply to the use of ICTs. Study findings in Uganda and Kenya showed that where traditional technologies are mostly used (telephone, for example), women use ICTs less than men. In Senegal, where the new ICTs were actually used, the same tendencies to marginalize women were revealed in the use of ICTs.

Figure 4: Gender distribution of users of new ICTs

29%

71%
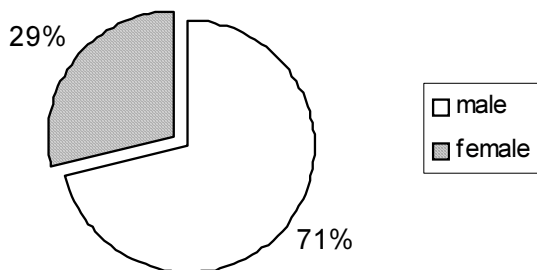
☐ male
▨ female

Source: Thioune and Sène, 'Inquiries and questionnaires, ICTs and Community Development Study, Senegal, November 2000' (2001).

According to Rathgeber (2000: 27), "feminist philosophers interested of science have observed that female cognitive structures differ from those of men. This has implications for women's attitudes and approaches to the use of ICTs." This differentiation was demonstrated in Malaysia where an inquiry into the behaviour of girls and boys in schools revealed that there is a significant difference between them in relation to the use of ICTs and to the attitudes adopted toward ICTs. According to Nor Azen et al. (2000),

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because boys receive more training and have more regular access to computers, they use ICTs more than girls. Unlike girls, the boys also declared that they have greater technical capacities (programming and maintenance).

A study conducted in Australia (Fluck 1995) revealed that girls use computers relatively more often than boys at school, but that boys use them twice as often outside school. Another study, conducted in Great Britain (Cole et al. 1994), found that when they are put in similar access conditions with boys, girls use computers as much as do boys, but specifically in relation to their lessons. ELSA–Acacia observed a similar tendency in its study on schools network in Senegal (Camara and Thioune 2001). The school cases seem to be different from experiences in communities. In fact, in community ICT access points (telecentres, for example), apart from considerations linked to the cognitive nature of women, exogenous factors such as income, service access costs, education level, and management mode do not seem to favour women.

In most cases, ICTs seem to be less profitable to women than men because technologies are often associated with men. Women are often more active in "non-technical" professions and generally have perceived psychological barriers toward these tools. In fact, comments from women in the case studies (in Senegal, Uganda, and Kenya) that ICTs were not made for them tend to confirm this attitude toward ICTs.

Byron and Gagliardi (1998) seem to confirm Rathgeber's (2000) assertion about a gender difference in cognitive processes. They believe indeed that "the difference in the amount of time spent using ICTs seems to have to do with attitudes as well as issues of access, boys appearing to be more process-oriented in their use, girls more goal-oriented."

The challenge faced by researchers is to find the most appropriate technological medium that can be adapted to women's conditions. However, other factors seem to contribute to the limited access of women to ICTs. Women's low level of income, limited education, and non-involvement in ICT projects seem, indeed, to constitute significant factors that limit their access to ICTs. In fact, in the sites surveyed in Senegal, women were generally not consulted during the preparatory, acquisition, installation, and ICT exploitation phases. As a result, the existing systems are generally not adapted to their needs. And yet, the involvement of women in this digital era is deemed crucial by all observers.

It appeared from the case studies that women participate actively in projects they have been involved in from the beginning. For example, in the

ENDA project headed by a woman, most of the community telecentres were either managed by a woman or by a woman and a man (mixed management). In these telecentres, women used ICTs in the same (or even higher) proportion as men. In many projects, however, gender equality is not a specific objective. As a result, when it comes to planning, it is important to think of ways to encourage women's leadership in project implementation if women are to be efficiently and successfully involved.

Obviously, projects that specifically target women attract their greater participation (e.g., CEEWA in Uganda). Available evidence suggests that women can participate fully in the development of their community through the opportunities presented by ICTs. One interesting case involved Serbatim women entrepreneurs in Dakar. Starting with a single computer, they were able to expand their computer services business by using the Internet to search for new clients. They were also able to place their children in community telecentres (job creation). Furthermore, by using their network of partners and email, these women were able to receive additional training and to participate in overseas trade fairs. In this way, they increased the visibility of their community and could tap prospective business opportunities.

Education level

Research findings revealed that regardless of the fact that most of the Acacia-supported projects are based in rural or suburban areas, users of ICTs are well educated (formal education) and most of them can read and write in English (in South Africa, Kenya, and Uganda) and French (in Senegal). A great proportion of them can also read and write at least one of their local languages. Does that mean that the uneducated are excluded from access to ICTs? It is prevalent said in the literature that limited education is one of the factors that limits access to ICTs.

Although the functional relationship between ICTs and education level was not studied, such a relationship seems to exist. It is risky to exclude the uneducated from development projects. They are greater in number in the rural areas, generally have very low literacy rates (in French and English), and represent the majority of the working population of these countries. In Senegal, for example, 70% of the working population is found in the primary sector (mainly rural). Similar proportions are observed in Uganda and Kenya. This active population should be one of the engines of growth. Therefore, the challenge is to find technological solutions that can be directly or indirectly

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used by these people both to improve their living conditions and to participate fully in economic and social development in the context of an information economy.

The uneducated need not be totally excluded from the use of ICTs because they can get assistance from the managers of community telecentres or points of access. These people can help them with certain ICTs, such as the telephone, because the messages to be received or conveyed can be given orally and generally in the local language of the user. However, the situation is quite different when it comes to computers, the Internet, or email, which generally require the ability to read and write.

Location

The location of ICT projects seems to be an important factor in universal access. This research revealed a degree of difference between rural and urban areas. In fact, due to the quality of infrastructure and the vicinity of more formal and more structured markets, urban communities seem to benefit more from ICTs than those located in the rural areas. One can compare the sites of Maka Coulibantang in Senegal, a land-locked area without electricity, Vulindlela in South Africa, and Rubaya and Buwama in Uganda, where telephone lines are limited due to the geographic situation (mountainous and rocky area), with the school community of Lycée Blaise Diagne in Dakar, and Yeumbeul, which is located in the suburban area of Dakar. In the latter two cases, it was the high cost of service, not the absence of infrastructure, that limited the use of ICTs.

The findings of the case study on Senegal suggest that the types of applications or technologies used, the user profiles, and the number of users vary on the basis of location (urban versus rural). Tables 16 and 17 show that in Ross-Béthio, a largely rural area, telephone is used more often than in Joal, which is an urban district. However, the level of use of the new ICTs (Internet, email, and word processing) is higher in Joal than in Ross-Béthio.

The level of economic activity (and thus income availability) seems to be an important factor for differentiating between the level and type of ICT use. In Ross-Bethio, more use was made of searches for office and trade information; whereas, in Podor people used email more than any other application. Ross-Bethio is largely a farming area (irrigated farming is practised thanks to the availability of water throughout the year) with low rates of migration; whereas, Podor is rather a rural, administrative and school town,

with a high migration rate.

Similar tendencies in the use of the new ICTs were observed in Uganda with respect to traditional ICTs such as the telephone. Telephones are used more often in areas closer to urban centres than in more rural areas (because of infrastructure problems and restricted availability of equipment).

Training and capacity building

Africa does not have all the technical skills required for the efficient development of ICTs, particularly because technologies are imported and are fast-changing (Lohento 2001). According to Davison et al. (2000), ICTs were developed, to a large extent, in the context and for the cultural and social standards of rich countries (i.e., Western Europe, North America, East and Southeast Asia, and Australia). In this context, an appropriation of ICTs for development implies the need to develop the indigenous technical skills needed to significantly reduce the current gap between Africa and developed countries.

Research findings show that training is essential for ICT use and appropriation. ICTs constitute a new challenge for the countries where the Acacia program is concentrated. Training and awareness campaigns appeared to be the project's first activities: training in computer use, office software applications, use of email, and Internet navigation. However, the people trained were generally those directly involved in telecentre management (operators and, to a lesser degree, management committee members on different project sites), and many community members obviously lacked appropriate training to use ICTs for their needs.

The technical skills of the managers of community access points seem to be confined to using standard applications. Generally, these managers received no technical training in maintenance of ICTs. As well, those who act as intermediaries between the demand for and supply of information also lacked the technical means and skills to collect, process, store, transform, and disseminate information through materials in different languages and channels appropriate to the end users. In the communities surveyed in Senegal and South Africa, specific training was given according to the objectives and areas of ICT application (e.g., training in web site development and maintenance, natural resource management, and financial management techniques). However, because of differences in the training standards for managers of community access points, the training could not

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be used efficiently. There were attempts at translating training modules into local languages (Zulu in South Africa, for example), but not in a systematic way.

Another phenomenon was noted in the school environment in Senegal. Pupils played a role as trainers in some institutions. These pupils received some training through their participation in the management committees of youth cyber spaces and have provided ICT training to teachers. This is a very important outcome of the training and learning process of ICTs because younger people, who account for over half of the Senegalese population, seem to be more attracted to new ICTs than older people. This attraction of the young to the new ICTs is also observed in Uganda and Kenya.

Countries like Senegal, Kenya, and Uganda have no ICT policy, and particularly no training policy on ICTs. This limits training and hinders the process of socially appropriating ICTs. The ELSA–IDRC study (Camara and Thioune 2001) on ICTs in school communities in Senegal demonstrated that schools were rather conservative in their approach. Because the curriculum did not include any policy to integrate new ICTs, they were not used much in schools especially by school administration and teaching staff. Despite this constraint, the survey confirmed the relevance of the approach taken by the youth cyber spaces project to focus on the training of teachers and administrative officers (who seem to be most averse to change). By raising their awareness, and demonstrating to them the opportunities that the inclusion of ICTs in school curricula can offer, they were more likely to change their approach.

The analysis of training and capacity building standards revealed that the unavailability of training materials is also an important problem. The challenge is to find appropriate training formats and contents for the many and variable needs of the target communities. The most appropriate training methods and processes would also have to be determined for each community group (e.g., women, youth, and entrepreneurs).

Information delivery

The findings from these research projects revealed that mass media (television, radio, and newspapers) have played a major role in the provision of information on ICTs to the rural populations. In Senegal, radio is the main source of information on new ICTs (for 72.3% of the population) followed by television (71.6%) and newspapers (56.3%). These media are used because they are appropriate and provide easy access to information. In the context of inadequate technical infrastructure, high illiteracy rates, and relatively low income, these media can be combined with ICTs to collect, process, and disseminate information to local communities, especially in local languages.

In the current context in African countries, community access points to ICTs and telecentres seem to offer the most appropriate ways to provide broad access to ICTs. Telecentre operators can serve as important information relays to potential users by finding, processing, and storing useful information on media that can be used by local populations to help achieve their development goals. Unfortunately, such media are not always available.

Content

Many elements influence ICT content production in Africa. Most of the content is published, on the Internet in English and to a lesser extent in French. As well, the rate of illiteracy is very high on the continent (about 70% of the population) both in official (mainly English and French) and local languages.

Rural African economies are still in a "pre-market" situation, and most of the information available on the Internet does not necessarily correspond to the needs of rural communities. Sometimes the information is simply not presented in a format that is understandable and accessible to these communities. School communities also face problems when adapting and using Internet content. Even when content is adaptable, its translation into understandable language and presentation in appropriate and affordable formats require technical skills and financial and technical resources that are not always available in the communities concerned.

Study findings revealed that content production and development are very limited. Such is the case of the Msunduzi project, which started with a consultative and participatory process to identify the information to decide on the information to be published on its web site. This site contains information formatted like a newspaper (because of access constraints a paper version is

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also distributed to reach as many people as possible). In this way, information on environmental matters and rehabilitation measures appropriate for the Msunduzi River environment are distributed in different ways to the target community. In Senegal, under the VCMR project, specific content was developed and released in CD-ROM format. This CD-ROM included specific applications on local governance, resource management, and preventive health that had been developed in Microsoft Access. These examples seem to be isolated cases because many constraints continue to restrict content development: technical constraints include limited numbers of computers and limited human resource capacities; economic constraints include high costs of computer services and content adaptation; and knowledge constraints require answers to questions such as what are the information needs, how can content be adapted to local needs, and in what form should the information be presented? These questions remain unanswered.

New ICTs remain a comparatively recent innovation in most of the countries covered by these studies, especially in rural areas. For rural populations to be able to choose the types of applications, services, and content that they need, they must first become familiar with the technologies and then learn about applications and content that are adapted to their realities and needs. However, because their knowledge of ICTs is still very limited, it is difficult for them to make decisions about content and applications that may be appropriate to their needs.

Within these projects, little concern was given to identifying the changing needs of the populations as they grow more familiar with ICTs. Therefore, information and communication needs must be regularly updated. When development-support organizations become involved in projects, their intervention should focus on the development of relevant local content adapted to community needs.

Technologies

Few countries are capable of radical innovation as R&D becomes more expensive and complicated. For these countries, a more relevant indicator is the capacity, in terms of know-how and wealth, to make the appropriate choice between competing technologies and to develop or adapt alone technology to fit their own needs (Hawkins and Valantin 1997).

In South Africa, Kenya, Uganda, and Senegal basic telecommunication infrastructures (e.g., radio, facsimile, telephone, and television) exists, and many modern technologies are often available (e.g., fibre optic lines, Internet, cellular telephone, satellites, and high capacity data transfer networks). These countries have policies in place to encourage expansion and modernization of telecommunication equipment. The majority also have liberalized telecommunications policies. Whereas, the telecommunications sector was once a state monopoly, it has been liberalized and fierce competition exists between operators. This has contributed to considerable improvements in the technological environment, including an increase in the number of services offered and the introduction of new technologies. The emergence of private operators has led to a steady increase in the use of cellular phones, local private radio stations are growing rapidly, and email use has increased as the number of telecentres has risen.

However, the unique aspect of the Acacia program was that it supported projects in the marginalized areas of these countries. As in many villages and marginalized areas of Africa, the system of communication as well as access to ICTs was deficient. These areas were also lacking in more traditional technologies and services – electricity, water and sanitation systems, radios, and telephones. When the VCMR project was started in Senegal, the sites of Sinthiou Malem and Maka Coulibantang had no power supply and power generators were used to supply electricity. A similar situation was observed in Kenya. The project had to be transferred to another village because to the absence of power frustrated the initial target communities.

In most of the areas where ICTs were introduced under the Acacia program, the people became relatively familiar with the ICTs either by seeing or using them. However, the people still tend to make more use of the available traditional technologies in these areas – radios, telephones, and duplicating machines. The specific contribution of the Acacia program was its support for the introduction of digital technologies (including the Internet) to marginalized rural and suburban areas. As a research program, its purpose was to test the adaptability of these tools to be able to offer African countries a wider range of technological choices. Accordingly, through pilot projects, the communities were given access to different equipment that had been previously unknown to most of the people or only in limited use. Computers and accessories as well as other tools such as CD-ROM and scanners were introduced. ICTs are slowly making their way into the communities. The

Acacia program accelerated the introduction of new technologies. As user needs grew clearer and more sophisticated, new equipment was called for and often supplied. As a result, information and access to equipment became diversified and varied from one area to another and from one site to another.

In the communities surveyed in Kenya, Uganda, and Senegal, the most frequently used technologies are, in order of importance: telephone, word processing, facsimile, email, and Internet. In Kenya, for example, at Makueni and Kakameya, 73% of the people used the telephone compared with only 18% who used the computer for word processing, 18% who used the facsimile machine, and 3% who used email. Nobody reported surfing on the Internet. Also in Uganda, the new ICTs were not used very much (Tables 18–22). The majority of people most frequently use the telephone (58% of those interviewed) and only 6.4% and 9.0% of those surveyed said they had used email and word processing services. Not even one respondent mentioned surfing on the Internet. Apart from the telephone, the facsimile machine is also used, but mainly by people involved in very profitable activities (5.1%).

Widespread use of the telephone was consolidated by the opening of community telecentres by Acacia, mainly on ENDA sites located in the suburbs of Dakar, Senegal. Similarly, in South Africa (Burton 2001), the project brought access to the Internet to communities in Sobantu, Woodlands, Willowfontein, Georgetown, and Vulindlela communities. Therefore, the technical conditions for the extension of ICT use in the communities can be met. The increasing demand for new equipment confirms that there is a capacity to absorb new electronic equipment. Facsimile is widely accepted because it is easy to access (easy to use and low cost), which implies that if new ICTs become very common, available, and ultimately accessible and affordable, they might be used on a larger scale. The use of new ICTs largely depends on their accessibility. Although an operator can assist with the use of a facsimile machine, the use of email requires some skills. This implies that a good command of new ICTs is a prerequisite for their extensive use.

The technologies that have been introduced to date have been generally based on fixed telephone lines. Some studies have looked at technology adaptability (infrastructure and equipment) because Internet access problems continue to be very common in many areas. For example, in Matam, Senegal, users of the youth cyber space spent weeks without access to the Internet (partly because of narrow bandwidth). In Vulindlela, South Africa, the community has frequent connectivity problems that prevent access to the project web site. In some mountainous areas of Uganda, fixed telephone

lines are not very common and, therefore, web technology is not widely accessible to communities. The constraints associated with cable technologies suggest that alternative technologies (wireless for example) that can promote widespread access to new ICTs should be pursued. Efforts should also be made to seek mechanisms that combine new technologies with more traditional ones to help meet the needs of the people at the lowest possible cost.

Prerequisites for ICT use

Although significant progress has been observed in the telecommunication infrastructure, major constraints still hinder the promotion of universal access to ICTs. These constraints prevent potential users and communities in areas far from the capital cities from deriving substantial benefits from the use of ICTs. Most of the infrastructure continues to be concentrated in large urban centres. In general, the development of the technological environment provides a significant potential to use ICTs for development purposes. However, in the surveyed rural and suburban areas, telecommunication and economic infrastructures remain inadequate. Of course, sectoral policies and initiatives targeted at specific areas of ICT application do exist in South Africa, Kenya, Uganda, and Senegal. Regulatory bodies have been established, particularly in the context of liberalizing the telecommunications sector (in Senegal the regulating body was established in 2002). However, all these countries lack a consistent, systematic, and integrated ICT policy that reflects the global macro-economic situation in each country. This can both prevent universal access and nullify the benefits expected from ICTs.

Some individuals have managed to use specific ICTs in isolated cases, mainly for electronic trade. However, others, due to financial, institutional, and logistic constraints have been unable to take advantage of these opportunities. This is reflected in the case of the Sinthiou Malem-based commercial venture, Thiané et Frères, in Senegal:

> I know that you can do good business with the Internet, but you need a sound financial position. I learnt this at my own expense when I wanted to buy galvanized wire. Our venture operates a small-sized wire netting unit, and I saw on the Internet a very attractive price offered for galvanized wire (about one third of the selling price in Dakar, all costs included). But, to take advantage of this low price, I would have needed to buy a large quantity. Because I did not have a lot of cash, I could not benefit from this

opportunity. (Statement made by Cheikh Thiané at the Feedback Workshop on ICTs and Community Development, Senegal, July 2001)

The lack of adequate basic infrastructure, such as power supply, is also an impediment. For example, the implementation of the Acacia governance project had to be transferred to another site because of power supply problems. This frustrated the first target community. In Senegal, in the villages of Maka Coulibantang and Sinthiou Malem, which are located far from Dakar, there was no power supply and power generators were used to operate telecentres. This also caused a number of problems such as the high cost of fuel and computer breakdowns caused by power fluctuations. In another example, the lack of proper storage facilities, and inadequate organization among the women, prevented women fish wholesalers in Joal, Senegal, from satisfying the demand of "virtual" customers. The absence of adequate storage facilities for the perishable fish made it impossible for the women to meet the quality and quantity demands of their new customers. Many similar examples attest to the need for a policy and institutional environment that favours democratic access to ICTs and provision of supporting infrastructure. Training in the management of small- and medium-sized businesses is also required. Entrepreneurs must be able to manage their operations and activities to take maximum advantage of the opportunities offered by ICTs. To participate in electronic business, many quality, quantity, and cash requirements must be met

There is also a lack of systematic ICT policy in the countries studied. For example, existing policies limit the institutionalization of ICTs in education in Senegal. A multidimensional approach is required to develop an integrated vision of how ICTs might best be used to support development. Considerations of how to use ICTs for development purposes must be integrated into the existing political, economic, cultural, and social framework.

Table 16: Types of services used at the TPS Unit at Joal, Senegal
(January 1999 to November 2000)

Services Used	Organizations and Institutions	Individual Users		Total
		Women	Men	
Internet navigation	14	41	60	115
Email	43	27	226	296
Word processing	432	18	256	704
Trade registration	12	0	15	27
Advertisements	6	0	3	9
Scanning	1	0	0	1
Faxing	1	0	3	4
Training	0	2	3	5
Total	509	88	565	1162

Source: Thioune and Sène 'Calculations based on database maintained by Joal TPS unit' (2001).

Table 17: Types of services used at Joal (urban area)
and Ross-Béthio (rural area) in Senegal (November 2000)

Services Used	Organizations and Institutions		Individual Users				Total
			Women		Men		
	Joal	Ross-Béthio	Joal	Ross-Béthio	Joal	Ross-Béthio	
Internet navigation	14	3	41	0	60	15	133
Email	43	9	27	6	226	53	364
Word processing	432	33	18	1	256	50	788
Trade registration	12	0	0	0	15	4	31
Opportunity ads	6	0	0	0	3	0	9
Scanning	1	0	0	0	0	0	1
Faxing	1	0	0	0	3	0	4
Training	0		2	1	3	0	6
Search for business opportunities	0	0	0	0	0	1	1
Telephone calls	0	21	0	0	0	17	38
Total	509	66	88	8	566	140	1375

Source: Thioune and Sène 'Calculations based on databases maintained by TPS units in Ross-Béthio and Joal in Senegal' (2001).

Table 18: Types of services used in different locations in Uganda (2002)

Region***	Location	Services* (%)					
		Tel.	Fax	Internet	Word processing	Email	Others**
Nakawa	Banda	60.0	40.0	0.0	20.0	0.0	0.0
	Bugolobi	60.0	0.0	0.0	0.0	0.0	20.0
	Bukoto	80.0	20.0	0.0	20.0	40.0	20.0
Nabweru	Kazo-Nabweru	100.0	0.0	0.0	60.0	0.0	40.0
	Manganjo	80.0	0.0	0.0	0.0	0.0	20.0
	Nansana	75.0	0.0	0.0	25.0	0.0	0.0
Buwama	Mbizzinya	66.7	16.7	0.0	16.7	16.7	16.7
	Jalamba	25.0	0.0	0.0	0.0	25.0	0.0
	Katebo	66.7	0.0	0.0	0.0	33.3	66.7
Rubaya	Karujanga	70.0	0.0	0.0	0.0	0.0	30.0
	Kibuga	38.5	0.0	0.0	0.0	0.0	7.7
	Rwanyena	23.1	0.0	0.0	0.0	0.0	0.0

Source : Etta et al. (2001).

Note: * Multiple responses given; ** mainly photocopying; *** regions of Nakawa, Nabweru and Buwama are covered by CEEWA; Rubaya by AHI.

Table 19: Main sources of information on ICTs in Uganda

Information Sources	Answers*	
	Percentage	Number
Radio	69.2	54
Television	23.1	18
Newspapers	20.5	16
Project	12.8	10
NGO	24.4	19
Acacia project	23.1	18
Other	17.9	14

Source: Etta et al. (2001).

Note: * Based on multiple responses.

Table 20: First time ICTs were used in Uganda

	Percentage	Number
Before 1998	35.6	16
1999	20.0	9
2000	44.4	20
Total	100.0	45

Source: Etta et al. (2001).

Table 21: Frequency of use of ICTs in different locations
in Uganda (2000)

Region*	Location	Frequency (%)			
		Every day	Every week	Never	Some times
Nakawa	Banda	33.3	0.0	33.3	33.3
	Bugolobi	0.0	0.0	66.7	33.3
	Bukoto	50.0	25.0	0.0	25.0
Nabweru	Kazo-Nabweru	0.0	0.0	0.0	100.0
	Manganjo	0.0	50.0	0.0	50.0
	Nansana	0.0	66.7	0.0	33.3
Buwama	Mbizzinya	50.0	25.0	0.0	25.0
	Jalamba	100.0	0.0	0.0	0.0
	Katebo	0.0	66.7	0.0	33.3
Rubaya	Karujanga	0.0	14.3	0.0	85.7
	Kibuga	0.0	16.7	0.0	83.3
	Rwanyena	0.0	0.0	0.0	100.0

Source: Etta et al. (2001).

Note: * Regions of Nakawa, Nabweru and Buwama are covered by CEEWA; Rubaya by AHI.

Table 22: Reasons for using ICTs in Uganda (2000)

Region*	Location	Reason (%)							
		Work	Contact family members	Trade	Education and research	Agric. info.	health info	Leisure	Others
Nakawa	Banda	0.0	60.0	20.0	0.0	0.0	0.0	0.0	0.0
	Bugolobi	20.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bukoto	60.0	80.0	20.0	0.0	0.0	0.0	0.0	0.0
Nabweru	Kazo-Nabweru	60.0	80.0	40.0	0.0	0.0	20.0	0.0	0.0
	Manganjo	0.0	40.0	20.0	0.0	0.0	0.0	0.0	0.0
	Nansana	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
Buwama	Mbizzinya	50.0	50.0	16.7	16.7	16.7	16.7	0.0	0.0
	Jalamba	25.0	25.0	0.0	25.0	0.0	0.0	0.0	0.0
	Katebo	66.7	100.0	33.3	33.3	0.0	0.0	0.0	0.0
Rubaya	Karujanga	50.0	70.0	10.0	20.0	0.0	0.0	0.0	10.0
	Kibuga	23.1	30.8	0.0	0.0	0.0	0.0	0.0	0.0
	Rwanyena	7.7	15.4	0.0	0.0	0.0	0.0	0.0	0.0
	Moyenne	28.2	48.7	12.8	6.4	1.3	2.6	3.8	2.6

Source: Etta et al. (2001).
Note: * Regions of Nakawa, Nabweru and Buwama are covered by CEEWA; Rubaya by AHI.

Conclusion

The fact that ICTs are increasingly integrated into the development programs of African countries is confirmed by their prominent position in the New Partnership for Africa's Development (NEPAD). Steps are being taken to gradually institutionalize ICT tools in the economic and social system of African countries to promote more rapid integration of these countries into the information economy. However, Chapter 2 of this study shows that these steps are still limited and that general strategies or policies that integrate ICTs into the global macro-economic framework of these countries are lacking. Integration of African nations into the information economy will require far-reaching actions that will affect all aspects of economic and social life. However, the potential exists for ICTs to be used in all fields of activity if the constraints limiting their transforming effects can be lifted.

The main objective of this study was not to assess Acacia's assumption that African communities can find new ways to improve their living conditions with ICTs. However, research has shown that ICTs, and particularly the new ICTs, can contribute to improving the living conditions of African populations. ICTs can make this contribution by helping to meet the dynamic and changing expectations of Africans for access to information on such subjects as agriculture, education, and governance. As people become familiar with ICTs, they discover the opportunities that these tools can offer and express their needs on the basis of the anticipated usefulness of these technologies. In other words, they anticipate the capacity of ICTs to deliver information that will solve the practical and concrete problems they face. As demonstrated in Chapter 4, the communities have undergone substantial changes in their effort to appropriate the tools. The changes, which have occurred at the individual level and within community organizations, include capacity building, acquisition of new skills, more efficiency in community activities, and better integration of previously marginalized groups. Therefore, it is urgent to take far-reaching actions to meet not only expectations but also to consolidate the advances that have been made in ICT appropriation by these African communities.

This research identified several challenges and problems that were common to the countries studied. However, most of these challenges and problems affect the whole of Africa. The challenges must be faced by the communities themselves, researchers, and decision-making bodies (states as well as research and development financing institutions). Generally, these

challenges relate to participation and ICT appropriation mechanisms and to materials and formats that can be used to collect, organize, disseminate, and share useful information and knowledge using ICTs. Other challenges include: the availability of adequate formal and informal training in, and with, ICTs; the establishment of an institutional framework that favours the use of ICTs for development purposes; and the provision of democratic access to ICTs for all community members.

The following recommendations suggest actions that can help ensure that ICTs serve the development needs of Africa.

1. There is no single way of introducing ICTs. The process is dynamic and consists of several stages in Africa. The first stage consists of raising awareness about the potential of ICTs for community development. The second stage is to encourage basic use of ICTs. The third stage consists of providing specific products and content to meet local demands (e.g., materials in national languages and products tailored to the needs of specific sectors of the population, such as disabled people). This is a challenging situation for researchers and development organizations, which must be able to adjust to the pace of increasing community needs. Political decision-makers are also affected by these challenges because they must set up legal and regulatory frameworks that create the optimum conditions for equal access and appropriation of ICTs within and by communities

2. Participation is a crucial problem in the process of introducing and promoting the use of ICTs for community development. In the communities surveyed, ICTs were generally introduced through projects and community participation was often limited to complementary contributions. The research findings demonstrate that appropriation mechanisms have been initiated within the communities, but finding ways to involve large segments of the population still constitutes a real problem, even when people are aware of the potential usefulness of ICTs. In-depth studies must be carried out to understand the decision-making mechanisms of the different community actors with regard to ICTs. It is equally important to try to better understand the attitude of communities toward changes, so as to identify the factors that underlie the adoption of ICTs by poor rural communities.

The research revealed that negative external factors (e.g., inequality and discrimination) are associated with the process of introducing ICTs. Such factors must be identified and taken into consideration when seeking to encourage the use of ICTs to support equitable, harmonious, and well-balanced development. The access of poor communities to ICTs seems to be determined by several factors (e.g., site, income, sex, age, language, and education level). However, more systematic studies and in-depth analyses based on data collected over a long period are needed to identify the kind, type, and sense of the relationships between ICT use for development and these different factors. With such studies, it should also be possible to determine the relationship between the use of ICTs and the different factors that are identified. Such analyses and study seems to be most relevant when confined to a homogeneous geographical area such as a country.

3. One of the major research findings of this study is that women barely use ICTs, and when they do women use these tools less than men, even when they are relatively literate. Knowing that women's involvement, despite some resistance and constraints, is a prerequisite for their participation in the information economy, steps should be taken to promote some kind of positive discrimination toward women. In terms of future plans and interventions, projects specifically designed for women seem to offer efficient ways to obtain this involvement. Women's involvement in project management and the promotion of leadership by women, are also important conditions for enhancing their participation and appropriation of ICTs. Research should also be conducted to find information media tools and applications adapted to women's conditions, needs, and roles in the community, and to their mode of thinking (Rathgeber 2000). Such research could help minimize the socio-cultural constraints that limit access by women to ICTs.

4. As a rule, the technologies that were introduced were adapted to the limited infrastructure available at the study sites. However, due to installation costs and the recurrent expenses involved in the use of new technologies (i.e., Internet and email), alternative technologies (e.g., satellites with wireless technology and multimedia tools) could be used in future projects to improve community access. The number of

community access points could also be increased to combine the more familiar traditional technologies with the new ICTs.

5. Adaptable and affordable alternative technologies are needed to ensure universal access to ICTs. In light of the findings of this research, one can affirm that ICTs can actually contribute to improving the living conditions of the populations. It is necessary to assess the amount of real change and to identify and evaluate the effects that ICT use have on income levels (both for individuals and the community). Knowing that income is an important factor in the evaluation of individual and community standards of living, further research based on real experiences is needed to better understand and measure the economic impact of ICTs on poverty reduction and wealth production.

6. Due to country specificity and the importance of institutional context to ICT project implementation, national approaches should be encouraged to study the use of ICTs for development purposes. A national institutional environment seems to be a relevant framework for conducting studies on ICTs and development.