

## CONFERENCE NEWS

# Information and communication technologies and social development in Senegal

Report of the UNRISD meeting  
16–17 July 2001, Dakar, Senegal

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## Introduction

This report provides a summary of the discussions that took place on 16–17 July 2001 in Dakar, Senegal, at the meeting organized by the United Nations Research Institute for Social Development (UNRISD). At this meeting, a review was made of the efforts carried out by the research group that began its work a year earlier, under the direction of Momar-Coumba Diop, to examine issues related to information and communication technologies (ICTs) in Senegal.

As is well known, this area of concern is an increasingly important element in the objectives of the central government of Senegal (CGS) and of other actors for whom these issues have taken on central importance.

Information available in Senegal regarding ICTs has been enhanced by international co-operation activities (e.g., the ACACIA programme of the International Development Research Center (IDRC), by the work of groups such as the Observatory on Information Systems, Networks and Information Highways in Senegal (OSIRIS) and, particularly, through the journal *Batik*<sup>1</sup> and the work of Senegalese and foreign researchers.

Among this body of work, the research topics supported by UNRISD can be associated with the following findings:

First, economic policies in the subregion have significant social impact, worsening the living conditions of the majority of the population. A number of sources point to increased poverty, deterioration of health infrastructure, difficulty among school-age children in attending school, household decisions on resource allocation to the detriment of education and health, and survival strategies that have a destabilizing effect. Moreover, references to development policy on the part of governmental decision makers have become increasingly infrequent, with social policy receiving even less attention. Since the early 1990s, combating poverty has become the dominant issue in most of the countries of the subregion.

A growing body of literature indicates that, in the present context, many of the hopes for progress and social change depend on the development of ICTs. However, technical advances by themselves do not improve the lot of the majority. Not all groups are similarly equipped to deal with these changes. Hence, it seemed important for both UNRISD and Senegalese researchers to initiate a discussion of ICTs focusing on the

major challenges for Senegal—economically, politically and culturally—while bearing in mind the central issue of social development and the effort to combat exclusion.

An initial mission to Senegal, in 1999, was led by Thandika Mkandawire, Director of UNRISD, and Cynthia Hewitt de Alcántara, Deputy Director, in order to dialogue with various leaders in government and in the private sector, as well as with other researchers. The goal—working in collaboration with Momar-Coumba Diop—was to identify the most innovative topics for research. The idea that emerged was to form a team composed of academics, journalists and private sector experts.

## **Objectives and structure of the research**

The objective of the research supported by UNRISD was to focus on the relation between information technologies and social development, taking into account that information and the associated technologies cannot be reduced to mere technical questions. Rather, the technologies must be seen in the framework of a profound restructuring of capitalism (more flexible management, decentralization and networking of enterprises, the supremacy of capital over labour, the decline of the labour movement and global integration of financial markets) that serves to aggravate inequalities. The discussion could not ignore important questions of social mores and customs, or those requiring reassessment of conventional wisdom, particularly relating to that which is far away.

Other important questions also emerged from the process. What social, economic, institutional and policy innovations promote an environment in which these technologies improve the living conditions of disadvantaged groups? What basic elements are needed to build an information society that is open to all, rather than a world with growing inequalities between the information “haves” and “have-nots”?

In order to launch the research and give it a solid foundation, certain guidelines were set forth, most notably the following:

- Avoid an overly general approach to the role of information technologies in the future of the “developing world,” concentrating, rather, on specific issues that have the potential to affect public policy making.
- Take account of cultural, historical and institutional factors that influence the use of information technologies, with a view to improving the living conditions of disadvantaged groups. In this connection, it is important to focus on questions associated with identities and differences. Though we may observe the construction of an identity that confers membership in the larger world, we must also examine forces working against globalization, focusing on the primary identities around which individuals form groups.
- Provide opportunities for collaboration, allowing experts from different parts of the world to provide their input regarding the socioeconomic, political and cultural obstacles to building an inclusive information society.
- Support current efforts within various sectors to examine political, economic and cultural challenges, as well as the challenges that an information society poses for Senegal.

As a starting point in this endeavour, it was deemed essential to assess information currently available on ICTs, in order to provide researchers a basis for selecting original and relevant research topics. Olivier Sagna carried out this assessment through a meticulous survey of the available literature. After examining numerous documents—particularly the grey literature—Sagna, who also plays a key role in OSIRIS, provided a description of the current state of knowledge regarding the role of new technologies in the Senegalese society and in the country’s economy. Sagna outlined the history of ICTs, starting with the first use of the telegraph in 1859, and proceeding through the remarkable expansion of telephony—particularly cellular telephones—and the current Internet boom. He then examined the development of the main institutional and governmental programmes that made all of this possible.

Research provides the general public with an important window on certain issues connected with the development of ICTs. To support this process, a decision was made to publish a monthly supplement in the widely read newspaper *Sud Quotidien*. This work was performed by Malick Rokhy Ba and Bassirou Ndiaye, under the supervision of Abdou Latif Coulibaly.

Based on available resources, a decision was also made to include the participation of young researchers. Two students were selected, and received a subsidy for their research on ICTs. One of them studied ICTs in the informal sector, while the other worked on the use of ICTs in Senegal's educational system.

This first phase of the project received official review at a meeting held in Dakar on 31 January and 1 February 2000 to examine the work. The revised documents then served as a framework for completing the research. Olivier Sagna's study, presented during the working phase, was published by UNRISD.<sup>2</sup>

The meeting on 16–17 July 2001 was organized in order to examine the results of the work. It brought together researchers, communication professionals, decision makers, and representatives of the private sector and of civil society. The meeting gave the approximately 40 participants an opportunity to discuss the role of new information and communication technologies (NICTs) in Senegal's development.

## Opening ceremony

The opening ceremony for the 16–17 July meeting was chaired by Abdoulaye Baldé, Secretary General of the office of the President of the Republic.

In his opening address, Mkandawire remarked that this meeting represented the culmination of research begun almost two years earlier. The project has given some 10 researchers, from different disciplines, the opportunity to study the role of NICTs in Senegal's development and consider the challenges and the importance of the development of these technologies.

Mkandawire observed that the choice made by UNRISD to examine the influence of new technologies on social development in Senegal was well justified by the spirit of openness seen both in the government and in society, as a whole, toward these new technologies. Accordingly, UNRISD relied upon the competence and knowledge of Senegalese researchers, and the results obtained exceeded all expectations. The diversity of issues examined in the research is impressive, and the analyses are rigorous and probing.

Mkandawire pointed out that the relation between NICTs and social development represents a field of research as yet little explored. Thus, the work carried out by the Senegalese team represents a pioneering effort. In Mkandawire's opinion, it constitutes one of the first major sources of knowledge in this field—not only within Senegal, but internationally.

Finally, Mkandawire thanked the Secretary General of the Office of the President of Senegal and the Government of the Netherlands for providing financial support for the project, as well as the Council for the Development of Social Science Research in Africa (CODESRIA) for its support in holding the meeting, and Momar-Coumba Diop for co-ordinating the research.

In his address that opened the workshop, Baldé thanked UNRISD for its initiative in studying the role played by NICTs in social development in Senegal and, in particular, for giving the researchers broad latitude in deciding what subjects to study and how to address them.

Baldé emphasized that the high quality of the research reflects local expertise and reinforces the government's efforts to encourage Africans to take responsibility for issues that affect the continent.

NICTs should receive particular attention in this connection, since they provide decision makers, researchers and the people of Africa a door to a world of dreams, encouraging them to rekindle their passion, and reintroducing within the system of social values the culture of risk and the taste for challenge.

Finally, Baldé reaffirmed the government's interest in the work emerging from this workshop, which will help lay the foundation for a more socially based and equitable use of new technology in the development of African countries.

Following the opening ceremony, plenary sessions were devoted to the researchers' presentations. The presentations were followed by comments by designated speakers, and then by general discussion.

## Presentation and discussion of researchers' reports

### *Session 1: NICTs and economic development*

#### Researchers' presentations

The plenary sessions began with presentations by Abdoulaye Ndiaye,<sup>3</sup> Philippe Barry and Hamidou Diop,<sup>4</sup> followed by Gaye Daffé and Mamadou Dansokho.<sup>5</sup> This first session was chaired by Amadou Top, who has followed this research since it began. Momar-Coumba Diop began by recapitulating the history of the research, explaining the objectives of the meeting and discussing the anticipated results. He asked that, in commenting on the material presented, people focus on aspects that could be improved, with a view to eventual publication. He encouraged frank and constructive criticism, following this with talk of "adversarial" criticism of the papers presented.

Abdoulaye Ndiaye presented the results of a survey of small and medium-sized enterprises and industries (SMEs/SMIs) in different sectors. Data were gathered from 79 enterprises distributed as follows: industrial sector: 25%; service sector: 53%; and trade sector: 22%.

Since Barry and Diop carried out similar work with large enterprises, Abdoulaye Ndiaye chose to focus on the service sector, where there is a large number of enterprises specializing in ICT services.

Abdoulaye Ndiaye explained that the survey essentially covered small enterprises: 72% have fewer than 50 employees, 69% have fewer than five management-level personnel and 68% have sales of less than 1 billion CFA francs. He added that most of the heads of these enterprises are Senegalese citizens. The majority of the entrepreneurs are over 40 years of age (78%) and have university, engineering, or other degrees.

Half of the enterprises in the sample are export-oriented. This is particularly true in the case of service and trade enterprises (67% and 53% respectively). The region covered by the West African Economic and Monetary Union (WAEMU) is the largest export market for these enterprises (64%). Most of them import finished products or inputs (78%). The imports are primarily from France (57%) and, to a lesser extent, from the WAEMU region (20%). According to Abdoulaye Ndiaye, these data show the openness of the Senegalese economy and its strong dependence on foreign markets.

He believes that in the current climate of globalization, the promotion of ICTs offers great opportunities. Senegal could benefit in a number of ways from electronic commerce. To achieve this, however, the enterprises in question must meet international standards and demands in terms of delivery time, quality, etc. If they wish to meet the demands of a highly competitive international market, they need to devote greater effort to training, in order to establish a more flexible and diversified labour force.

According to Abdoulaye Ndiaye, establishing a place for Senegalese business within the world economy, through subcontracting in the field of ICT, could make it possible for businesses to make use of electronic commerce. Developing collaborations with partners with experience using management models based on electronic commerce would allow Senegalese enterprises to become familiar with the procedures, technologies and quality standards involved in conducting business electronically.

If Senegalese businesses fail to take such action, the economy as a whole could suffer dramatically (with failure of sensitive industries, brain drain, lost opportunities, etc.).

Analysing the degree of appropriation of new technologies, the author notes that the level of computerization in small and medium-sized enterprises and industries is generally low. (Only 19% of enterprises have networked computers.) There are very few networks in the country that make it possible to connect different sections of a single enterprise.

In conclusion, Abdoulaye Ndiaye expressed his opinion that Senegalese businesses need to deal with two major deficiencies: they must reduce the digital technology gap in order to assume a more important role on the international scene and adapt their management models to the competitive demands imposed by the emergence of ICTs.

The presentation by Barry and Diop dealt with the use of the Internet in medium-sized and large industries in Senegal. Their work shows that although industrial enterprises are relatively advanced in appropriating the Internet as a tool—taking advantage of email—the impact of the technology on their operations is still small, overall, for a number of reasons, including:

- the absence of e-commerce, despite the fact that it offers major opportunities both for domestic commerce and for foreign trade;
- the absence of “Senegalese” online content that could be useful for industrial enterprises carrying out their activities; and
- low-level use of the Internet by government, private sector organizations and other partners of industrial enterprises.

Despite these limitations, surveys show that the Internet as a channel of information and communication is indispensable for the activities of 67% of industrial enterprises with connections to the Internet. Of these, 24% consider it a very important tool, 43% consider it important, 22% not very important and 11% unimportant.

To take maximum advantage of the Internet in the current context of trade globalization, at least two needs must be addressed:

- training personnel in computer skills and use of the Internet (already provided in 50% of the industrial enterprises with connections); and
- creating jobs associated with computer technology and the Internet (already a fact in 43% of connected industrial enterprises).

Moreover, there is a tendency for so-called professionalized telematics to develop among industrial enterprises, banks and a variety of tertiary-sector enterprises. Barry and Diop have ascertained that 54% of industrial enterprises connected to the Internet use online banking services. Other services are provided, via telematic networks, to 13% of connected industrial enterprises. This use of telematics helps improve the performance of enterprises by providing them easier access to information and allowing them to implement new management and data processing methods.

Various obstacles, however, stand in the way of widespread access to the Internet by management staff at industrial enterprises:

- the high cost of connection;
- the significant risk of personnel using the Internet for non-professional purposes; and
- the still-low level of need for the Internet in most of the functions carried out by management.

Cost is a major obstacle to generalized access for employees in the case of 20% of the connected industrial enterprises. In 24%, generalized access is considered premature.

The fact remains that the opportunities offered by the Internet have not yet been addressed seriously. In 78% of connected industrial enterprises, the benefits mentioned in interviews only include lowering the cost of telephone calls, faxes and courier service, and locating professional and general information.

Despite its potential, the risks associated with Internet use should not be ignored. Indeed, 43% of connected industrial enterprises believe that Internet use could disrupt their functioning for at least two reasons:

- transmission of computer viruses against which the enterprises have no weapon except to separate their connection to the Internet from the workstations devoted to accounting and production tasks;
- violation of the confidentiality of certain information. To prevent this, Internet access in industrial enterprises is limited, and outgoing electronic messages are checked by a company official at the end of each work day.

Barry and Diop emphasize that the Internet is not yet integrated enough in the functioning of enterprises to allow them to adapt to technological changes, create and consolidate trade alliances, develop new products and services designed to conquer new markets, or carry out important transactions.

It is up to the state to stimulate the use of the Internet in various ways, for instance, by developing its own online activities and making administrative forms and various business and citizens' services available online.

The presentation by Daffé and Dansokho analysed the challenges represented by ICTs for the development of the Senegalese economy. They showed that in sub-Saharan Africa, Senegal is a pioneer in the use of NICTs. Nevertheless, despite renewed growth and the influx of capital as a result of the devaluation of the CFA franc in 1994, the country has been slow to take advantage of its enormous potential in the area of NICTs and to work toward becoming a service economy, as the Bretton Woods institutions encourage.

The Senegalese economy has a problem with stagnation, though there has been a revitalization of economic growth since the devaluation of the CFA franc. In the 1994–2000 period, the transportation and telecommunication subsector was one of the fastest growing and most stable, exceeded only by construction, public works and vegetable oil production.

The development of information and communication services is closely connected with the geostrategic and economic role that the country played in the expansion of French colonialism in Africa. It is with the launching of the data packet transmission network (SENPAC) by the National Telecommunications Corporation (SONATEL), in 1988, that Senegal entered the NICT era. Having opted for planned telecommunication development, the state launched an ambitious programme of investment in the sector.

Analysing strategies for developing ICTs, Daffé and Dansokho described their evolution as being punctuated by two major reforms, those of 1983 and 1996, which were designed to modernize the national telecommunication network and liberalize the sector.

Senegal's communication infrastructure and tools give it access to the most advanced technologies in the world. Despite a series of rate reductions by SONATEL, however, and the elimination of duties on computer equipment, the cost of NICTs remains high for both enterprises and individual citizens.

Telephone access expanded considerably during the past decade, with the proliferation of trunk lines, an explosion of telecenters and a love affair with cellular telephones. Similarly, Internet access has expanded, with the creation of numerous cybercafés and an increasing number of Internet service providers.

Application of NICTs in the education and health sectors constitutes an economic and scientific challenge. It is in the university context that projects for the use of these technologies in distance learning programmes offer the most interesting possibilities for the future. The interest shown in telemedicine is due to the attractiveness of interconnecting hospitals by transmitting images in real time and facilitating professional communication regarding treatments.

Telecommunication services have advanced strongly since 1987. With an average rise of 16% annually, the increase in the value added of telecommunication services is clearly greater than either the 6.3% rise in the gross domestic product (GDP) or the 7% rise in the tertiary sector.

An analysis of the interdependence of telecommunications and other areas of the economy by means of input-output tables (IOTs)<sup>6</sup> provides a broader view of the impact of NICTs on the economy. The study uses a simplified version of the 1996 IOT, which breaks the economy down into 29 production categories (and a corresponding number of products). For the sake of the analysis, only data regarding categories that use telecommunication services or data regarding products used for the production of such services were taken into account.

Interactions between telecommunications and the rest of the economy are manifest at two levels: use of telecommunication services by other areas of the economy, and the consumption of the products of those areas by the telecommunication area. In the former case, the authors ascertained that telecommunication services are inputs for all categories of production, with the exception of livestock and forestry. In the other

direction, however, the production of telecommunication services uses the products of only 11 categories of activity.<sup>7</sup>

These findings make clear the absence of a local industry dedicated to telecommunications and to information technology materials and equipment, in the face of growing and ever more universal demand for these technologies and services.

The wager on investment in NTICs poses problems in terms of the conditions for the economy's appropriation of applications and tools. These constraints exist on the supply side as well as on the demand side.

In summary, Daffé and Dansokho believe that since the Fifth Economic and Social Development Plan (1977–1980), the state has chosen the option of making telecommunications one of the priority sectors in the economy. With the Ninth Plan (1996–2001), the objective of promoting a service economy makes the spread of NICTs an “absolute necessity for development.” Relying on a public provider model since the 1980s, the government has undertaken massive investment in telecommunication infrastructure.

Though this investment has made possible a major transfer of technology to Senegal, and has made it possible to build the foundation for disseminating and applying NICTs in numerous areas, it has not yet overcome all of the problems involved in appropriating technology. Furthermore, the investments that have been carried out have done more to reinforce the country's technological dependency than to unleash the economic growth that was expected from the development of telecommunication infrastructure.

## Discussion

Commenting on these presentations, Top first emphasized the fact that they provide significant data on the use of NICTs in enterprises, without, however, deepening the thinking on the environment in which enterprises must deal with the new technologies. Studies have not put sufficient emphasis on defining the context in which enterprises appropriate NICTs. Moreover, the studies have not examined the role of the state as a model NICT user.

Finally, Top highlighted the problem of distinguishing between technologies and the uses to which they are put. There often is a tendency to emphasize technology and infrastructure, though in reality usage is as important as the technology itself. It is essential to give greater attention to how the participating actors implement particular NICTs.

Matar Seck believes that the presentations make it clear that NICTs are a useful element in the country's economic development. They show the challenges connected with rapid and efficient access to reliable information in a climate of increased competition among economic agents. On average, only 6% of Senegalese enterprises have long-distance access to networks. This weakness is related to sociocultural factors (illiteracy, absence of a computer culture, lack of knowledge about NICTs), as well as economic factors (poor electrical networks and telephone equipment, monopolistic operation of infrastructure and high cost of equipment).

To improve the appropriation of new technologies and increase their impact on the functioning of enterprises, Matar Seck proposes exploring a number of paths, including the following:

- create an information technology oversight office;
- improve communications and related infrastructure in order to reduce costs;
- improve the regulatory framework;
- promote e-commerce;
- strengthen human resources; and
- improve employment possibilities.

Pape Touty Sow commented on the digital technology gap mentioned in various presentations. This gap translates to the technological marginalization of the Southern countries. In his view, it is indispensable to consider the economic and social content of the gap, rather than reducing it to its technological dimensions.

He added that the presentations make clear the potential of new technology for the Southern countries, but fail to make clear the risks involved. The risks are associated with the fact that NICTs reproduce the old economic model, of which one essential feature is countries' outward orientation. The surveys show that 75% of trade is foreign trade, which depends essentially (95%) on imports. This tendency is reinforced by the fact that nearly 74% of the enterprises surveyed concentrate on the opportunities offered by foreign markets.

In addition to the technology gap, there is a geographic gap that divides cities and rural areas. Among other differences, there is a great concentration of computer equipment in the country's large cities, which contain the main users of NICTs. This reproduces the current economic model, in which Dakar has 90% of enterprises, 75% of value added and 70% of jobs.

A similar situation exists in that the economy is a two-track economy, one fast and one slow. NICTs are used primarily by modern enterprises, while the "popular" economy is left behind. In this connection, Pape Touty Sow remarked that the sample did not take micro-enterprises and those enterprises classified as part of the informal economy into account. In social terms, he points out that the jobs created are in small and medium-sized enterprises and industries, and that job creation is primarily taking place at the management level.

He mentioned another gap introduced by NICTs: between enterprises and their environment. The Barry and Diop study shows the absence of an environment that would favour the appropriation of NICTs by enterprises.

It remains true that NICTs represent a formidable opportunity for the development of Senegalese business. The technology in question is relatively accessible, and obstacles are minor, unlike the situation that prevailed in the case in the industrial revolution. It must be added that they reduce, and even eliminate, some constraints (spatial, unit size, etc.). Because of their flexibility, the new technologies seem perfectly adapted to the needs of micro-enterprises (varied content, uses relevant to all markets, etc.).

Pape Touty Sow emphasized that one of the major challenges that faces the actors involved relates to the creation of alternative development strategies, since the new technologies make it possible to break away from the current model of economic functioning. Taking this path assumes, first of all, political will (a commitment to develop national capacity and create an environment where the state is positioned as a model NICT user).

The other important priority is to adopt an approach that is simultaneously local, national and subregional. This would make it possible to identify needs and demands at these different scales, with a view to building endogenous platforms to capture shares of the foreign market. This requires partnerships and networking.

More sustained attention should be given to identifying the immediate needs to be met. A number of experiments in progress in the field show that it is possible to build a culturally adapted platform that is economically effective, financially profitable and socially beneficial.

Top felt that these different commentaries contributed not only to examining more deeply different ways of thinking suggested in the presentations, but also to broadening the field of research by taking into account elements that are more specifically linked to usage.

In his view, the NICT phenomenon must not be reduced to looking only in one direction—outward—with businesses' notion of opportunities limited to the foreign market. It is clear that no enterprise can create an advantageous position in the world market without succeeding first in the domestic market, developing at the domestic level the capacities that allow it to create an international presence.

The Daffé and Dansokho study also demonstrates that one must be suspicious of mirages, in terms of job creation in telecommunication services. In analysing the saturation of telecenters, the study does not take sufficient account of the economic environment in which the saturation occurred. This environment is largely

shaped by the SONATEL monopoly. It follows that telecenters cannot truly develop, because the conditions for profitability are absent.

Another question brought up in the comments relates to the organizational aspect of NICTs. The great difficulty encountered by enterprises lies not in adapting new technologies to their environment, but in creating the organizational conditions for efficient appropriation of NICTs. The organizational framework of the enterprises and their profit model do not seem adapted to the efficient use of NICTs.

After stressing the interest of the Daffé and Dansokho study, Mkwandawire stated that the statistical data provided in the study establish an inverse relation between GDP growth and growth of the value added of the telecommunication subsector. Two hypotheses may explain this. First, the state may have overinvested in the telecommunication sector, as is the case in some countries. Second, the explanation may lie in the ever increasing weight of the informal sector, in consequence of which Senegal has experienced a “Baol-Baolization” of the economy associated with the fact that the service sector—in particular, trade—is thriving, a situation that works to the detriment of production.

Ibrahima Thioub deplored the fact that the surveys interviewed only heads of enterprises. This choice is based on the notion that the new technologies are neutral from the point of view of power relationships within enterprises. This introduces a bias in the surveys that makes it impossible to appreciate the diversity of points of view that actually exists.

He also found that the studies fail to take into account the totality of the technological chain, looking only at NICTs as finished products. What is our ability to act on NICTs before they become a consumable product? This question brings up the problem of the mastery of NICTs and the need to construct a scientific and technological foundation for local innovation to promote new technologies. In conclusion, he noted that NICTs contribute to revealing economic distortions as well as the unequal relationships between different poles of development, but noted that they can obscure these distortions and inequalities if enterprises have access to the same equipment regardless of where they are located.

In the course of the general discussion that followed the commentary, a number of speakers opined that the presentations showed an absence of insight concerning the role of the state in promoting NICTs. Without the modernization of the state, the establishment of a regulatory framework and proper funding mechanisms, it is difficult to develop NICTs. Thus, it would be advisable for continuing research to address the relationship of the state to NICTs.

Another important need is to develop human resources and create the conditions for mastery of modern technologies. This requires adapting training curricula so that they respond to the need for improving the economy’s competitiveness. It is also important to identify the domestic capacities needed to promote the use of NICTs in the different sectors of the economy.

In response to the audience’s questions, Abdoulaye Ndiaye emphasized that the new technologies have great potential, but that they also carry risks. In today’s context of infatuation with these technologies, each actor claims his identity (whether this be rural producers, informal sector operators, émigrés, etc.). This identity claim constitutes a source of wealth in the use of NICTs.

In Ndiaye’s view, the discussion on the presentations and commentaries drew the researchers’ attention toward different aspects of NICTs, in relation to their use in the economic sector. Moving forward in research and innovation is essential if the developing countries are to avoid being simply consumers of products conceived elsewhere, aggravating the technology gap.

Barry questioned the distinction between the formal and informal sectors in regard to use of new technologies. In his view, the division is between producers and users of NICTs, the former being part of the Internet culture, while the latter live outside the world of new technology. The main challenge for enterprises is to promote an Internet culture. In addition, there is the problem of Senegalese content, which largely fails to attract the interest of heads of local enterprises. These problems affect the state, of course, but also affect business and professional organizations.

Daffé considered it essential to carefully examine the problem of current economic policy. He believed that the desire to promote a service economy poses a danger. This choice is the origin of the gap between the development of services and the production of goods. While the state encouraged industrial investment in the late 1970s, it renounced this production-based industrial policy in the context of the structural adjustment programmes that followed. The development of a service economy has been reinforced by the reforms of 1983–1986, which led to major investment in telecommunications, to the detriment of other sectors (in particular, the industrial sector). This state of affairs tends to increase the dualistic character of the economy. Expansion in telecommunications has been accompanied by industrial decline.

Daffé concluded that the issue of the state's role brings up a central question regarding the need for industrial and technology policy. Thinking must go beyond simple appropriation of technologies and creation of local content. An ambitious and coherent policy to promote technological development must be conceived and implemented.

Pape Touty Sow considered content and use to be crucial challenges. He felt it indispensable to establish a solid launch pad at the local and national levels, in order to be successful in foreign markets. In terms of use, he proposed favouring local approaches, consisting of supporting a response to immediate needs through a locally adapted form of supply.

## ***Session 2: Integration of NICTs in the communication and education sectors***

### **Researchers' presentations**

This session, in which four papers were presented, was chaired by Félicia Oyekenmi, representing CODESRIA.

Coulibaly's paper<sup>8</sup> analysed the process of NICT appropriation by media personnel. The professional press in Senegal, he noted, has come into being gradually. Almost all of the major publications have been created by private investments of citizens with no political party commitments. This allows for the independence of journalists and press enterprises.

Coulibaly recalled that for more than 30 years (1962–1992), there was only one periodical (the government newspaper). Between 1992 and 1998, four dailies with national readerships were established. Thus ended the state monopoly of the print media. The proliferation of the press and its openness to all actors on the national stage have contributed in a major way to the strengthening of democracy. Today, the daily press produces between 60,000 and 150,000 copies of various publications for a total population of approximately eight million people. An average of one out of 10 Senegalese reads a newspaper each day. According to Coulibaly, the advantage that the Senegalese press has over the press in other African countries is the level of education of media workers, and the level of organization of press enterprises.

He underlined the fact that online journalism is becoming an increasingly important sector of the print media. There is a considerable pool of potential readers for this, particularly in countries to which Senegalese have emigrated. Despite the development of a press distinguished by its professionalism and quality, freedom of the press and journalistic practice still must deal with a legal reality that takes the teeth out of the principle of a free press.

In terms of integrating the new technologies in the environment of press enterprises, Coulibaly stated that journalists' access to fax is still very limited. He added that the use of email is restricted to management, and that only around half of the individuals surveyed use the Internet. On the other hand, the survey shows massive use of cellular telephones by media workers.

Coulibaly concluded that media workers overall make very little use of new technologies. One explanation, he says, is the economic constraints of the environment in which the media exist.

Saidou Dia's presentation<sup>9</sup> dealt with the cultural and political challenges of new communication and information dissemination technologies in Senegal. The study recalls that the explosive development of radio broadcasting occurred in a favourable environment, allowing it to rapidly become the most popular information and communication medium, as well as the cultural expression with which the country's various populations feel most aligned.

Initially at the service of the colonial administration, radio has progressively assumed a set of "missions" relating to various political, economic and cultural challenges that have dominated the country's social and political evolution.

At the start, it was the need to consolidate colonization that gave radio its place at the heart of France's overseas military-administrative apparatus, making use, as it did, of the strategic power of short wave transmission. Later, the importance of political independence and the need for "national development" reinforced the pre-eminent role of radio, which was jeopardized neither by the spectacular development of an independent written press (overly elitist), nor by the later penetration of national television (too urban and outward-looking).

In the early 1990s, the emergence of so-called short-range radio (non-commercial, community and associative stations) heralded a major break in the radio tradition and the national information system. With FM transmission, these new stations provided improved broadcast quality and listening, and the medium took a step in its evolution to greater professionalism.

The appearance of these stations on the media landscape brought increased competition and ended the state monopoly. The systematic use of the country's native languages—rehabilitated in their natural role of supporters, conveyors and disseminators of information for listeners with little command of French—along with the use of new communication technologies (telephone, computers, etc.) allowed these stations to create a more user-friendly form of communication and contributed to the "democratization" of radio communication.

Beyond these changes, popular enthusiasm for "short-range" radio stations reflected the emergence of a "new paradigm of alternative communication" that restores people's desire to appropriate a technology for disseminating information and culture for which they feel an increasing affinity. These stations have greatly contributed to a growing sense of "active citizenship," particularly when major political choices are being made.

However, according to Dia, these radio stations will have to deal with the weakness of radio journalism and their characteristic tendency to become standardized. They will also have to address the evident deficiencies in the quality of programming. Dealing with these issues is all the more imperative in a world of Internet and satellite broadcasting (cf. the WorldSpace prototype), as a growing number of radio stations apply a global perspective and explore new opportunities in the desire to conquer increasingly supranational "virtual communities."

The presentation by Abdourahmane Ndiaye<sup>10</sup> dealt with the integration of ICTs in Senegalese higher education. He found that the extreme youth of the Senegalese population (70% of which is under 30 years of age) leads to harsh trade-offs in terms of educational offerings. With a teaching corps well under 5% of the total population, Senegal has not yet reached the threshold of having 5% of its population receive higher education, and the capacity of existing facilities is already saturated. In a context of exploding demand and rationing of educational opportunity, the problem of appropriating ICTs is ever more acute.

In the current state of affairs, students enrolled in ICT courses represent a mere 3% of students in institutions of higher education. Along with the small number of students, there is a widespread problem in the universities, in terms of appropriation of NICTs, given the current importance, challenges and opportunities in the production, transmission and dissemination of knowledge. Moreover, the development of ICTs poses, among other important questions, the challenge of preparing teachers to change in major ways. The "new teacher" must master a new scientific environment, and must be psychologically ready for a change of role, while strengthening and updating his/her academic knowledge. To measure the capacity of Dakar's Cheikh Anta Diop University (UCAD) to innovate and adapt, Abdourahmane Ndiaye evaluated recent teaching

experiments connected with ICTs, and evaluated the capacity of the university community to appropriate NICTs as a means of teaching and research.

Ndiaye relied on use of the “grey literature” available within and outside the university. This documentary research was complemented by a survey in higher education and research institutions, as well as of associate researchers themselves. It included a sample of 130 associate researchers, researchers and administrators. The survey considers ICT projects currently under way, examining needs for computer equipment and supplies and looking at the share of budget allocated to equipment and to training associate researchers and researchers.

ICTs entered the school system in 1964 with radio for schools (via the method of the Centre for Applied Linguistics of Dakar). However, it was only with the creation of the department of computer engineering at the Ecole normale supérieure universitaire de technologie (formerly the Institut universitaire de technologie) that teaching and research on ICTs became a reality at UCAD. The objective of officials at the time was to increase budgetary efficiency by creating a university-level degree programme in technology, so as to train programmers/analysts on the one hand, and, on the other, to make the desire for a computer sciences programme at UCAD a reality.

According to Abdourahmane Ndiaye, the initiative for all of these programmes originated abroad. Thus, the way in which the computer engineering department was created demonstrates UCAD’s lack of ability to assume a leadership role in promoting ICTs in higher education.

Since the mid-1990s, the development of ICTs (particularly the Internet) has been so rapid that confusion between ICTs and the Internet has occurred. Interest in ICTs is reflected in the emergence of various projects, the creation of specialized entities and the acquisition of equipment. These funding programmes and initiatives offer a framework that allows the entities and associate researchers to gain better mastery of ICTs. However, projects to promote ICTs, and the entities created for this purpose, are not always familiar to the associate researchers. In fact, 79% of associate researchers at UCAD are unfamiliar with the Commission université réseaux d’information (CURI).

UCAD remains poorly equipped with ICTs, despite collaborative efforts by members of the university community. Beyond insufficient equipment, Abdourahmane Ndiaye found that the equipment available is in poor condition. The equipment has mostly been obtained through foreign funding (64% of the equipment). This situation poses a problem for reasons relating to the specific nature of the projects and their lack of overall coherence. Given these constraints, some of the entities (50%) within UCAD are attempting to organize themselves and define plans for institutional development based on their own budgets, while the others (47%) continue to depend exclusively on foreign support.

Teachers gain access to ICTs through universities (62.1% of respondents) or by subscribing to SAES (Syndicat autonome des enseignants du supérieur) and Francophonie cafes. While the level of access is particularly high among professors (100%) and lecturers and assistant professors (approximately 70%), it is low among teaching assistants (38.6%). Overall, 88% of associate researchers say that they have access to ICTs (overhead projectors, radio broadcasting, graphic tablet, telephone, fax, etc.) for their teaching and research.

Teaching staff and researchers at UCAD believe that the use of ICTs requires training, or at least an introduction to the technology. The majority of the teaching staff (79%) is willing to undergo training, as long as the institution provides it. This strong motivation contrasts with the low level of knowledge among associate researchers regarding projects under way and the opportunities they may offer. With regard to evaluating innovative teaching experiments that use ICTs, teachers, in the vast majority of cases, believe that these experiments cannot be evaluated objectively in their current stage of implementation.

Finally, Abdourahmane Ndiaye noted that low levels of access to ICTs and the Internet is typical at UCAD. A number of factors are responsible for this, including a low budget for investment, the fact that this budget has been frozen since 1994 and the disparate strategies adopted. The remedy, according to Ndiaye, is to put available resources into a collective fund to achieve economies of scale.

While Abdourahmane Ndiaye's paper dealt with the promotion of NICTs at the university level, Serigne Mbacké Seck's paper<sup>11</sup> dealt with introducing these technologies into secondary teaching. He showed that NICTs, which have been present in Senegal since the nineteenth century, played an important role in the country's economic, social and cultural development. Indeed, these technologies have greatly contributed to driving the current dynamic of various sectors of activity.

The education sector, for instance, benefited early on from ICTs, as a part of experimentation carried out in the wake of independence (in particular, between 1960 and 1992) through scholastic radio and television, the Logo project and the Projet d'introduction de l'informatique dans le système éducatif (PIISE). These experiments, though to a certain extent conclusive, have not been generalized to the entire educational system for lack of human and financial resources, as well as lack of political resolve.

The increasingly massive, but not always organized, introduction of ICTs in the educational system provokes enormous upheavals that affect all types of activities and actors. Seventy public institutions are connected to the Internet and are associated primarily with the two large national networks (World and GEEP), which include close to 88% of existing entities, thanks to support from foreign partners. The number of computers is estimated to be 2,500, which translates to a computer-student ratio ranging from 1:20 (at the Lycée Mariama Bâ de Gorée and the Lycée technique Cheikh Ahmadou Bamba de Diourbel) to 1:2,000 (at the Lycée des parcelles assainies).

In terms of land-line telephones and fax, these are hardly used in teaching, since they are mostly reserved for administrative use. Use of the portable telephone, on the other hand, has undergone an explosion in many schools. Its impact on the educational system, however, is very small.

NICTs are effective teaching aids, allowing good visualization of content, and facilitating comprehension and assimilation of course material. More than 80% of respondents considered computers an important, or indeed indispensable, tool for success. They call for more NICTs in the educational system, even though many of these respondents are not, themselves, computer initiates.

In conclusion, Serigne Mbacké Seck emphasized that NICTs can contribute effectively to resolving structural and organizational problems in the education sector. More specifically, new technologies can help solve problems of documentation, develop distance learning, and introduce new teaching and learning methods that give learners a greater amount of responsibility.

## Discussion

Fatoumata Sow's comments emphasized the need to look more deeply at types of radio stations, and to think about the conditions that each type requires to benefit from new technologies.

Based on a close reading of the evolution of radio, she found that the issue of democratization is a particularly acute one today. Senegal is not a model country in terms of democratization of information access, in her opinion, especially as regards radio. There is a real problem of access to broadcast frequencies. It is difficult for citizens and organized groups to obtain authorization to broadcast. She considered the licensing system extremely politicized, with access to the airwaves difficult for groups that do not have the same party loyalty as the leading political class. Thus, citizens are limited in their ability to make use of the opportunities offered by radio. Among West African countries, Senegal has one of the smallest number of private and community radio stations.

Overall, the country's political and economic environment creates serious constraints on access to broadcast frequencies. The first difficulty in creating a radio station is that of access to the appropriate officials in the government. Added to that are the economic problems associated with the high taxes on necessary equipment.

Fatoumata Sow urged her research colleagues to give more sustained attention to the challenges associated with citizens' access to knowledge. Grassroots communities have enormous needs—social, economic, cultural, etc. In her opinion, current tools (in particular, radio and radio in combination with NICTs) are inadequate to satisfactorily address the needs and demands of communities. There has been little

experimentation using the potential of NICTs to facilitate people's access to the market and develop local production capacity.

Despite the proliferation of so-called short-range radio stations, the problem of a voice for Senegal's diverse populations remains unaddressed. The interactive nature of these stations provides a channel for listeners to express themselves, but what motivates the listeners is primarily the political or therapeutic ("release valve") aspect.

Commenting on Dia's presentation, Alymana Bathily pointed out that the study was based more on the history of Senegalese radio than on the application of NICTs in the press. He suggested that thinking should be reoriented to address NICTs as they are used today. He remarked that the challenges vary with the actors, because actors have their own individual concerns and interests. A number of crucial questions call for investigation. What are the broadcasters' objectives? What new technologies are most valued? How do stations use the technologies? How do stations appropriate new technologies? What types of stations are likely to succeed in their appropriation of NICTs?

In relation to Coulibaly's paper, Bathily remarked that the finding that communication professionals have a low rate of appropriation of NICTs may seem surprising. He recalled that the Senegalese print media, in particular the private press, which came into being in the early 1980s, was a child of the Macintosh. It was the computer that made it possible for privately owned newspapers, such as *Sud Quotidien* and *WalFadjri*, to go into business.

The study shows that more than 20 years after the emergence of the private press, the level of appropriation of new technologies remains low among communication workers. The study would have been more meaningful if certain hypotheses regarding the low degree of mastery of technologies had been formulated at the start. This would have made it possible to define indicators for testing hypotheses (degree of organization of press enterprises, educational level of managers, access to financing, etc.).

Several speakers in the general discussion brought up questions about the current dynamics of the new technologies sector. More than anything, it is the convergence of radio, television and the other technologies that gives rise to a new dynamic. The studies have shown how this dynamic leads to a change in perspective, highlighting the need for renewed thinking concerning the appropriation of new technologies. Criticism of current practice at radio and television stations should provide a framework for understanding the changes needed in the media and in their modes of functioning.

A number of speakers deplored the reticence of national authorities to liberalize access to broadcast frequencies. The country is currently in the grip of a de facto national television monopoly that the government wishes to maintain.

On the question of education, those commenting observed a clear lag between schools and society as a whole. The educational system is not yet able to address current needs for acquiring and disseminating knowledge. This suggests an urgent need for reforming the educational system to eliminate obstacles to the real integration of new technologies in the educational system. It is clear that this will require major transformations, because the appropriation of NICTs requires a change in both the procurement process and in how knowledge is transmitted within the educational system.

Commenting on the difficulties involved in integrating NICTs in the educational system, one participant remarked that we are witnessing a teaching method that seeks to provide information, rather than one that creates the ability to deal with information. Teachers experience their relationship to NICTs in terms of a competition, one in which they are the losers.

Theoretically, NICTs have great potential, but their use may generate problems when this occurs in an unfavourable environment.

The reluctance of government to liberalize access to broadcasting is related to the fact that radio played a crucial role in creating the hegemony of the ruling class in the early days of independence. There was a development plan that promoted communication via radio as a part of an effort to revitalize rural communities.

Other participants emphasized the fact that while there are many projects to support UCAD, there has been little visible impact. Evaluation of these projects should examine existing obstacles, implications for teaching and research strategies, and lessons to be learned.

In the education and press sectors, the introduction of NICTs appears to help correct the dynamics of unequal development characteristic of the Senegalese economy. The introduction of NICTs in the educational system promotes access to knowledge and information.

Nevertheless, the problem of managing certain risks inherent in the development of NICTs must not be overlooked. In the view of teachers, NICTs and distance learning projects risk marginalizing local teachers, while benefiting the virtual universities located in other parts of the world.

An examination of the use of new technologies shows that the tendency is to view them exclusively as tools for optimizing foreign potential (securing jobs abroad, selling to foreign markets, etc.). In the university teaching sector, the development of NICTs contributes to the brain drain from Southern to Northern countries.

According to Sheila Bunwaree, the problem highlighted by Fatoumata Sow is important. What education are we speaking of, and to whom is it directed? These two questions must guide thinking concerning the contribution of new technologies, if we are to provide all people a chance to educate themselves. These questions open new perspectives and call for adopting a more appropriate research agenda that takes into account the experience of informal education using new technologies.

Bunwaree also emphasized the importance of the gender question. When we speak of groups that are marginalized in terms of their appropriation of NICTs, we are referring primarily to women. This implies numerous and complex mechanisms that remain to be studied.

### ***Session 3: NICTs, development and the democratization process***

#### **Researchers' presentations**

This session was chaired by Maréma Touré. Before the papers were presented, Momar-Coumba Diop spoke, attempting to refocus the discussion and stimulate the participants to engage in a deeper examination of the papers. He explained that questions about the SONATEL charter and the role of the state were dealt with in various papers. He also remarked that the question of technology use is broadly addressed in some of the papers, and that the presentations in this session would illustrate that. He stressed the importance of the surveys carried out at enterprises by Abdoulaye Ndiaye and by the Barry-Diop team. Their results are original, he said. The first Barry-Diop report ran to 100 pages, but not all of the networks were considered. Thus, the authors should go further and fine-tune their results. Finally, he expressed the opinion that comments should deal more precisely with the substance of presentations, in order to help the researchers improve their work.

Abdou Salam Fall's paper (which, due to the author's absence, was not presented) deals with identifying the impact of new technologies in enhancing the networking capacities of NGOs in Senegal. The author begins with the fact that in today's environment of reduced funding for development aid, NGO officials increasingly resort to NICTs to consolidate their relationships with partners in other countries and to make their organizations more widely known. The major concern driving these NGOs, in this context, is to increase their visibility and bring greater attention to their activities.

NICTs allow them a new style of social marketing, in which they emphasize the value added of the services they offer. The adoption of NICTs should support the existing professionalism of NGOs without, however, inducing them to renounce their own identity or replace mobilization of the citizenry with a technocratic or commercial approach based on serving all comers.

The foregoing observations concern only NGOs of one type, those with a public interest charter and international orientation, while being based in Senegal and active at the regional level. This type of NGO

works in relatively new areas: HIV/AIDS, social and inter-cultural communication, training of social workers, institutional assessment, creation of knowledge, etc.

The approach adopted by these NGOs, as well as their management model, can have a positive influence on organizations with which they have partnership relations.

The emergence of distinct areas of competence helps to decentralize systems by which NGOs relate to each other, as well as to other actors involved in development. The persistence of this trend could lead, in time, to a system of partnership based on horizontal relationship and networking.

The existence of circumscribed areas of competence entails a risk that weaker NGOs will be dependent on an elite of NGOs whose mission is not to function as a central structure, but rather to facilitate networking. The diversity of areas of competence seems to be a trump card that allows central entities to specialize in advocacy and lobbying, leaving certain of their members in charge of creating relationships between NGOs and other actors in the development process.

Abdou Salam Fall's research indicates that for a second type of NGO, the dissemination of new technologies is determined from the bottom up, responding to demand from various quarters (young people, women, etc.). To satisfy the demand, NGOs made efforts to innovate, proposing non-exclusive and local services: cyberyouth, cyber-rural, community telecenters, mediacenters, computer camps, etc. This effort to make NICTs accessible to less wealthy strata of the society resonates with certain development partners whose support facilitates planned initiatives to help disadvantaged sectors of the population.

The third type of NGO subscribes to a survival strategy as an individual organization or engages in a process of adapting to ongoing change. The use of email has made exchanges between NGOs more fluid. Nevertheless, it requires that the servers and routers be organized, a process that poses problems at some NGOs. The risk of excluding those that do not have modern communication tools is mitigated by the existence of local relay systems that use other means to get information to NGOs that lack electronic capabilities.

According to Fall, there is a final type of NGO whose behaviour is based on imitation (acquiring equipment in the absence of any competence that might allow it to be used productively).

In terms of the social and political dialogue, Fall remarks on the increased participation of different actors. This participation takes the form of the networking of NGOs, radio stations, diplomatic missions and international organizations. The use of new technologies in this context has helped drive important innovations in the image of "Nit-Net," which is one of several human rights NGOs.

The paper presented by Moussa Paye<sup>12</sup> sets out to evaluate the share played by NICT use in the positive unfolding of the democratic process currently under way in Senegal. The author writes that the Senegalese state inherited a telecommunication system created by the colonial administration. The system was grouped with the postal system under the Ministry of Information. In 1985, a reform of the sector placed national and international telecommunications within the purview of the national telecommunication company SONATEL. Policy makers seem to have perceived at that time the strategic importance of a communication company based on NICTs.

Paye also claims that the Senegalese state—which had previously used these technologies only to store statistical data for the purpose of managing public funds, managing payroll, tax collection and police surveillance of populations—was suddenly confronted in the second half of the 1990s with demands for establishing unfettered access to information. This new environment was reinforced by the globalization process, which offers multiple opportunities and promotes general dissemination of the notion that the people may aspire to democracy and freedom of expression.

Beyond freeing information from governmental control, the changes have brought together computer technology and telecommunications with radio, in order to create free and full access to information. Paye analyses the processes (technical and financial) that have led to the development of these NICTs. He examines the role that they play in the process of modernization of the state, viewed as one important aspect of the democratization of Senegalese society.

Freedom of information is not, from the outset, part of the design of the establishment, whose policy, in terms of official communications, remains cautious. Nevertheless, the emergence of private radio stations since 1994 has introduced an element of comparison and a dynamic of emulation among the different operators within the sector. The proliferation of private FM stations contributes to developing freedom of expression. According to Paye, the history of Senegal in the last few years demonstrates the continuous progress, in terms of democratization, that certain social forces have managed to achieve through the use of NICTs. The presidential election of March 2000 illustrates the central role that these technologies play in promoting the transparency and veracity of the electoral process.

Despite the enthusiasm that it provokes at the international level, one may ask whether the accumulated experiences of the Senegalese situation are applicable to other African societies. The difficulties that arose in the last presidential election in Côte d'Ivoire, despite heavy media coverage, show the limitations of NICTs in ensuring the transparency and veracity that are goals universally sought in the electoral process.

Another question is whether the democratic process as experienced in Senegal, with the role played by information technology, the Internet and mobile telephony, is irreversible. The answer to this must await the action of the new government, which seems to want to limit freedom of the press, while at the same time using television as a means of vastly enhancing its own image. One wonders whether this new tendency risks compromising the openness begun by the previous regime.

The presentation by Cheikh Guèye<sup>13</sup> dealt with evaluating the impact of NICTs on urban change. He found that the current widespread system of trade based on interactive and instantaneous communications puts "Northerners" and "Southerners" in a face-off. This suggests that the development of these technologies could, like the industrial revolution, favour some and exclude others.

The author believes that technology transfer is currently facilitated by various factors (greater movement of populations, development of trade, promotion and diversification of networks, etc.) Africa is not outside this movement, he says, but is increasingly a part of the networks and is using its identity and the means at its disposal to make this new meeting space its own.

According to Cheikh Guèye, the Mourides are a group emblematic of the current process of change. They are a social and religious movement that has developed into an international migrant phenomenon, and they occupy a significant position within the world economy. The group has become transnational and moved beyond its original sphere, while strengthening its local base through the urbanization of Touba, which is its unifying place, its place of return and belonging. Thus, globalization does not have to mean loss of a sense of place and identity.

NICTs are not only a means of integrating the Touba group with the rest of the country, but provide important leverage for internationalizing the group and strengthening its identity. Thus, the impact of NICTs represent a good filter through which to view social change in Senegal and to grasp the shape of cultural phenomena that can be both endogenous and universalist, like the Mouride brotherhood.

From the point of view of the new situation created by the use of NICTs, two Mouride groups occupy a special place, according to Guèye. The first is the merchants who use these technologies to enhance their activities (particularly the telephone, the computer and the Internet). The other is the Mouride *taalibes* in the *dahiras*, for whom NICTs make it possible to set their aims at the transnational and global levels.

The appropriation of NICTs by the Mourides contributes to making Touba a point of reference from all points of view, and a pole whose force of attraction undeniably reaches the international level. What gives the Mourides their strength is their capacity to adapt to the new constraints of globalization while preserving their umbilical link with the holy city of Touba.

Serigne Mansour Tall<sup>14</sup> examined the strategies, developed by emigrants, to appropriate NICTs. He begins with the fact that international population movements played an important role in Senegal's evolution over the recent decades. Emigration increased rapidly between 1980 and 1990, and its economic and social implications grew in significance. These migratory flows diversified in terms of their departure points and destinations, making complex the challenge of preserving relationships with families at home. As Senegalese

emigrated to countries with fewer links to Senegal, the need to find ways of maintaining long-distance relationships became more urgent.

Tall shows that the migratory pattern is structured around different focal points: the country of origin, the welcoming countries, and investment zones. In order to link and energize this network, émigrés must achieve a flow of information between the different points in the system, so that they can function through them almost continuously. In short, the émigrés have communication needs similar to those of other networked groups that evolve in situations of mobility and geographical distance.

Tall's research is based on surveys in west-central Senegal, focusing primarily on how emigrants have appropriated new technology and on the consequences that flow from this.

How do the émigrés appropriate NICTs? How do the new technologies provide for financial transfers without the physical movement of funds? What role do the émigrés play in the penetration of new technologies in certain disadvantaged sectors? What are the economic and social implications of this advance of NICTs?

Tall shows that the types of use made of the new technologies follow from a complex process of appropriation that can make a highly personal tool such as the cellular telephone into a collective instrument to bring a village out of its isolation and connect it with the world. The social aspect is the most important one in the process of appropriation of these technologies by the émigrés.

Examining the use of television, Tall observes that videotape makes it possible to live in a foreign country without being entirely cut off from social life at home. Family parties and ceremonial events are shared by émigrés via video. The importance of audiovisual media is heavily associated with the ease with which they can be used collectively and the simplicity of the messages (images and sound) that all can decode easily. In addition to these benefits, videos of family ceremonies function as electronic marriage brokers.

While video and telephone are successful communication tools for émigrés, the Internet is not. Most of this population is from rural areas and is often illiterate, or with little schooling, and its members have but vague familiarity with the Internet. Nevertheless, Tall states, the development of NICTs has provided new informal modes of financial transfer. Thus, for example, a rapid and effective system for sending savings back to Senegal has been created by Senegalese entrepreneurs in the United States (the Kara International Exchange).<sup>15</sup>

Tall concludes that the emergence of the new technologies and their appropriation by émigrés creates social reconfigurations in the migratory system and contributes to the emergence of new spatial approaches.

## Discussion

Jean Copans expressed his interest in this work, which provides an interesting starting point for studying Senegal. Khamathe Sène emphasized that the discussion was enriched by considering both new technologies and the social changes that flow from their use. According to him, studies show that in both urban and rural environments, there is a correlation between areas with potential for NICT use and areas of emigration (Dakar, Louga, eastern Sénégal, etc.).

He considered Tall's research methodologically innovative in its combination of different instruments, its use of participatory approaches (use of the active research and participatory planning method, or MARP), its village-based research with polarization diagrams, infrastructure diagrams, etc.

In his view, the papers presented provide important data, but the methodologies used are not always clear. He also pointed to a lack of co-ordination—observed in the field—between users' needs and services offered.

Thioub's comments emphasized the fact that the papers looked at a relatively common phenomenon, namely, the appropriation of a tool by actors who modify it by using it in a new way in order to meet their own needs. He said that the presentations analysed NICT use in a context of changing societies, but failed to focus on

their negative impacts (as a brake on change, as creating a new distribution of power relationships and as tokens and stakes in the power game).

These studies, carried out in convergent (urban and rural) areas, focus on migratory patterns and their links with new technologies. The studies tend to reveal a phenomenon in which there is increasing focus on the world beyond Senegal's borders.

Thiouf felt that some of the paradigms that serve as a basis for analysing conditions under which the Mouride brotherhood has emerged and developed should be re-examined. The separation of the history of the brotherhood into distinct phases—rural, urban and international—is not really to the point, in his view. Rather, the Mouride phenomenon per se begins with the urban phase. He added that the analysis showed, implicitly, the subdivision of the group into three different segments (merchants, literates and *marabouts*) with different strategies and different specific ways of using NICTs.

Thiouf suggested that the paper on émigrés shows that the development model they chose tends to increase dependence of Senegalese society. Moreover, the use of NICTs creates the illusion that the computer can resolve all problems. In the particular case of land management in Touba, computerization can increase visibility, he said, but not resolve conflicts.

Finally, Thiouf remarked that NICTs can make it possible to escape control by the existing powers (the state, the society), turn outward, and construct a new relationship with the country's citizenry. However, there is a risk of further entrenching the culture of dependency that is reflected in the development of consumerism and in conspicuous consumption.

Alfred Inis Ndiaye commented that the presentations dealt with the behaviour of communities vis-à-vis NICTs, showing how these technologies are appropriated by the emigrant community and by the Mourides. He said that the argument developed deals primarily with the determining factors behind the adoption of new technologies—political, social and economic factors. However, the papers do not indicate whether there are alternatives to the adoption of NICTs. According to Ndiaye, the papers indicate that illiteracy and great poverty are obstacles to the appropriation of NICTs within the Mourides, and that the appropriation of NICTs is primarily a phenomenon of the Mouride elites (merchants, *marabouts* and émigrés).

Fatoumata Sow observed that the papers establish a link between new technologies and social dynamics, and that this provides a view of the impacts, modes of appropriation, effects (notably social reconfiguration), redistribution of power in the community, changes in relationships between men and women, development of women entrepreneurs, etc.

Bathily stressed the need to update Paye's study by considering the results of more recent research on the legislative elections of 2001 and the impact of NICTs. He recalled that Paye's conclusion emphasized the fact that NICTs have contributed to the transparency and reliability of the electoral process in Senegal. The association between access to information and the strengthening of democracy is interesting in that it supports one of the hypotheses of development theory—correlation between access to information and a society's level of democratization. On the other hand, the paper does not sufficiently emphasize the scope of the conclusion, and fails to make a rigorous analysis of the factors in play, based on a consistent methodological approach.

## Closing ceremony

Speaking at the closing ceremony, Touré pointed to the richness of the research and the usefulness of the discussion. Top emphasized that it is difficult to summarize such a rich discussion, marked by substantive contributions of high quality. He said that the research and discussion explored diverse aspects of a vast field that is rapidly changing. In passing, he noted that there is debate concerning the term ICT versus NICT, and that many researchers prefer "ICT" because the pace of change is so rapid.

The discussion, he said, confirmed the need to make a distinction between matters relating to technology itself and matters having to do with use of the technology. The discussion highlighted new uses. Here, as elsewhere, communities appropriate and use technologies to solve particular problems. The "Kara system,"

analysed in one of the papers, also exists among Haitians and Brazilians in the United States, who have carried it further, retailing a variety of commodities on the Internet.

He added that the combination of cellular telephone use and radio during the 2000 presidential election was internationally perceived as an innovation.

Finally, Top remarked that much emphasis has been placed on the development of individual technologies (computers, radio, telephone), while it is the convergence of technologies that has permitted qualitative leaps and led to uses not originally envisaged. He believes that these uses are essential for the future of ICTs in the developing countries. Today, he said, anyone can use a computer to provide information. The journalist's special role in this new reality should be regarded as his/her ability to analyse and document data and to put it in a rational context.

Following Top, Bunwaree commented that the principal interest of the papers is the connection that they establish between the problems of democratization, governance and citizenship. She found that the research did not sufficiently consider the sociological profile of the users of new technologies.

From her point of view, another essential issue that emerged from discussion is the role of education in national policy affecting new technology. Current debate on the initiative proposed by President Abdoulaye Wade to close the gap between Europe and Africa and to develop our continent (the "OMEGA Plan") should address the challenges posed by new technologies.

Finally, she emphasized that technology offers the opportunity to provide the continent and its researchers more visibility, and that their research has brought out new questions that should be on the research agenda for Senegal and for the continent as a whole.

## Abbreviations

ACACIA	International cooperation program of the IDRC
CFA	African Financial Community
CODESRIA	Council for the Development of Economic and Social Research in Africa
IDRC	International Development Research Center
CURI	Commission université-réseaux d'information
NICTs	New Information and Communication Technologies
NGO	Non-governmental organization
OSIRIS	Observatory on Information Systems, Networks and Information Highways in Senegal
CGS	Central government of Senegal
GDP	Gross domestic product
SME/SMI	Small and medium-sized enterprise/small and medium-sized industry
SENPAC	Data packet transmission network
SONATEL	National Telecommunications Corporation
IOT	Input-output table
ICTs	Information and communication technologies
UCAD	Université Cheikh Anta Diop de Dakar
WAEMU	West African Economic and Monetary Union
UNRISD	United Nations Research Institute for Social Development

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## Endnotes

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- <sup>1</sup> Bulletin analysing ICTs. **Batik** is a monthly electronic information letter.
- <sup>2</sup> Olivier Sagna, **Les technologies de l'information et de la communication et le développement social au Sénégal: Un état des lieux**, PP TS 1, UNRISD, Geneva, January 2001.
- <sup>3</sup> Abdoulaye Ndiaye, **Les entreprises sénégalaises face aux nouvelles technologies de l'information et de la communication**.
- <sup>4</sup> Philippe Barry and Hamidou Diop, **Impact d'Internet sur le fonctionnement des entreprises industrielles au Sénégal**.
- <sup>5</sup> Gaye Daffé and Mamadou Dansokho, **Les nouvelles technologies de l'information et de la communication: Enjeux et opportunités pour l'économie sénégalaise**.
- <sup>6</sup> The input-output table is an accounting framework that presents, in a coherent manner, the reciprocal transactions carried out by different categories of the economy in the course of a year.
- <sup>7</sup> The 11 areas are: Paper, publication and printing; Oil; Other chemical industries; Metallurgic and mechanical industries; Energy; Trade; Hotels, bars and restaurants; Transportation; Financial institutions and insurance companies; Real estate services and Business services.
- <sup>8</sup> Abdou Latif Coulibaly, **Processus d'intégration et d'appropriation des systèmes de communication médiatisée par ordinateur dans l'industrie médiatique du Sénégal**.
- <sup>9</sup> Saidou Dia, **De la radiodiffusion "de masse" aux radios "de proximité": Enjeux sociaux, culturels et économiques des nouvelles technologies de diffusion de l'information et de la culture au Sénégal**.
- <sup>10</sup> Abdourahmane Ndiaye, **NTIC et enseignement supérieur au Sénégal: Contraintes, défis et opportunités**.
- <sup>11</sup> Serigne Mbacké Seck, **Les NTIC et le système éducatif sénégalais**.
- <sup>12</sup> Moussa Paye, **Les nouvelles technologies de l'information et le processus démocratique au Sénégal**.
- <sup>13</sup> Cheikh Guèye, **Enjeux et rôle des NTIC dans les mutations urbaines: Le cas de Touba**.
- <sup>14</sup> Serigne Mansour Tall, **Les émigrés sénégalais face aux enjeux des NTIC**.
- <sup>15</sup> This is an informal money transfer system perfected by Senegalese immigrants living in the United States. The system is based on fax, and involves no use of the banking system.