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Progress Report on NICI Implementation; Evaluation of the Impact of NICI

in Africa: The Scan-ICT Project.

Background

There is a consensus that Information and Communication Technologies (ICTs) are providing developing countries a window of opportunity to leap-frog the industrialization stage and transform their economies into information and knowledge economies and to enable them compete in the global market[1]. There is also wider recognition that the penetration and utilization of ICTs in the various sectors of the national economy will help Africa combat development challenges such as improving education and health care, improving governance, building an economy capable of creating new job opportunities and feeding its population, increasing its competitive advantages in the global market and ensuring sustainable development through poverty alleviation projects. The national information and communication strategies and policies can provide the framework and guidance for harnessing the utilization of ICTs to overcome these difficulties.

The exponential growth and exchange of information and knowledge has brought about tremendous changes in social, cultural, economic and political life of the people, especially in the developed world and in new emerging economies of Asia and Latin America (North Korea, Taiwan, Malaysia, Singapore, Brazil, etc). The situation in Africa, however, is different. According to a recent publication from the International Telecommunication Union (ITU), "Half the world's inhabitants have yet to make their first basic telephone call...The majority of the more than 6 billion people who inhabit our planet have been completely shut out of the digital revolution and the promise it holds."[2] To bridge the digital divide, a number of international initiatives, such as ITU's Valletta Action Plan Programs and the G8 Digital Opportunities Task Force are coming out from various directions aiming at creating digital opportunities.

Recognizing the role of ICTs to facilitate socio-economic development and integration of the continent into the information age and the globalization process, the Economic Commission for Africa (ECA) launched in May 1996 the African Information Society Initiative (AISI)[3] which was adopted the same year by the OAU Summit of Heads of State and Government. AISI is a framework which aims at assisting member States accelerate transition to a new economy - a new economy based on information and knowledge. AISI is also an African digital agenda focusing on harnessing the new opportunities given by ICTs to facilitate Africa's inclusion in the digital revolution and benefit from it.

AISI calls for the preparation and implementation of national information and communication infrastructure[4] (NICI) plans in all African countries and the pursuit of priority strategies, programs and projects which can assist in the sustainable build up of an information society in member States. NICI includes more than just the physical infrastructure and the equipment which are used to host, process, transmit or display data, text, voice and image. Also, it concerns regulations, enabling environment and procedures

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[1] Developing National Information and Communication Infrastructure in Africa. – Paper presented by ECA at the African Summit in Washington DC, USA.- February 2000.
[2] ITU Action Plan to Bridge the Digital Divide
[3] African Information Society Initiative: An Action Framework to build Africa's Information and Communication Infrastructure, Addis Ababa, May 1996 (http://www.uneca.org/aisi)
[4] AISI adopted the term "National information and communication infrastructure (NICI)" policies and plans to emphasize the importance of the communication sector in such plans. However, the concept is very close to that of national information infrastructure (NII).

which may lead to the development of NICI activities and content. NICI encompasses also development of human resources – public and private sector, civil society – which develop the infrastructure, create applications and value added services, develop training programs and train students and users, acquire and sell equipment as well as provide Internet and other ICT services. Finally it is to be noted that the developers, administrators, users and the population at large are an integral part of the NICI process and should be involved in its development since the beginning.

The impact from new information and communication technologies is no longer confined to the communications and information sectors. It has become a pervasive mass technology with a much wider scope of influence, affecting virtually all sectors of society. Thus, development of NICI plans will enable African countries and funding partners to have in hand a framework which will guide them throughout the process of program planning and project development and implementation. It will also enable coordination between various stakeholders and funding agencies and will prevent duplication of activities which is unavoidable whenever there is no NICI development plan in a country. The NICI Plan constitutes also an evaluation tool for decision makers as it encompasses criteria for follow up and monitoring.

As part of the implementation strategies of AISI, a partnership mechanism was created and put in place embracing regional and international development agencies and bilateral organizations – Partners for Information and Communication Technologies in Africa (PICTA) – http://www.bellanet.org/partners/picta- . The International Development Research Centre (IDRC) of Canada, through its Acacia-Communities and information society in Africa- program (http://www.idrc.ca/acacia), has supported the development of national ICT strategies and policies in a number of African countries, namely, in Mozambique, Senegal, South Africa and Uganda. The European Union has recently provided a grant to ECA to support NICI development efforts in selected African countries.

NICI development must be seen as an on-going process[5] through the planning, implementation and regular evaluation of programs and pilot projects developed according to the needs and priorities of each country.

Efforts Made to Develop ICT strategies in Africa

Since the launch of AISI in May 1996 many governments in the continent have recognized the importance of integrating ICTs in the national development endeavor. This is evident from the recommendation (number 9) of the Ninth Meeting of the Conference of African Ministers of Finance whereby the Ministers of member States urged the development of ICT as an integral component of national and regional development agendas[6]. This can be ascribed to the continued efforts made by ECA and partners to increase the awareness of high-level government officials. President Paul Kagame of Rwanda, has personally championed the NICI development process and the government of Rwanda has just published a document on "An Integrated ICT-led Socio-Economic Development Policy and Plan for Rwanda 2001-2005" (http://www.uneca.org/aisi/nici) President Alpha Omar Konare of Mali has also developed an ICT vision (http://www.anais.org) for his country

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[5] The process of developing National Information and Communications Infrastructure (NICI) Policies, Plans and Strategies in Africa. - Paper presented by ECA at the First African Development Forum, Addis Ababa, Ethiopia from 24-28 October 1999

[6] Ministerial Statement of the Thirty-fourth session of the Commission/Twenty-fifth meeting of the Conference of Ministers/Ninth Meeting of the Conference of African Ministers of Finance, Algiers, Algeria, 10 May 2001.

and the West African sub-region. These could be used as a model for the kind of involvement and commitment needed for the process from the top most level of government. These exemplary roles need to be replicated everywhere in the continent.

From what observed from the Rwandan process, government's commitment and devotion to push the process forward emanates from the strong beliefs and convictions that:

- The application and utilization of ICTs can speed up socio-economic development endeavors and enable leap-frog certain stages of industrialization and build ICT led economies;

- No country in the world can afford being left behind in the digital revolution and the globalization process.

- The effort to meet development challenges such as poverty eradication, economic recovery, human resource development, etc. can be enhanced through exploitation of the opportunities provided by the new technologies;

- The future is oriented towards building an information and knowledge economy whereby ICT products and services constitute a considerable part of national income and create job opportunities for the workforce;

- National efforts to harness new information technologies for development are part of the endeavors being made to bridge the digital divide at regional and global level.

As a result of this conviction, a considerable number of African governments have setup institutions to co-ordinate activities related to the formulation of ICT strategies and policies including legal and regulatory structures, e.g., the National Computer Board of Mauritius, the National Information Technology Development unit under the Federal Ministry of Science and Technology in Nigeria, and the Rwandan Information Technology Authority (RITA). To discharge their responsibilities, these institutions are developing guidelines and work programs and are closely working together with stakeholders (the government, civil society, the private sector, professional organizations, research and training institutions, etc.) so as to reach a consensus on the needs, priorities and actions required for countries to be part of the global information society.

Progress Report on NICI Activities in Africa

The integration of Africa in the information age and the globalization process, though slow, is on the move. A number of regional and global initiatives are mushrooming from different directions: AISI, RINAF, the G8's Digital Opportunity, UN ICT Task Force, the New African Initiative, the African Connection, the African Internet Initiative, Leyland, Francophonie, etc., to facilitate the digital inclusion of the continent. The following section will give a brief account of the achievements obtained in the continent with regard to ICT policies and regulations, development of the info-structure, Infrastructure, Internet connectivity, and human resource development.

National Level ICT Strategies

Although following different approaches, about twenty-eight African countries are engaged in developing national ICT policies and strategies. However, whatever the approach a country may follow, the NICI development process consists of the following steps[7]:

- Needs assessment;

- Sensitization and high level policy workshop;

- Preparation of NICI plans;

- Validation workshop (including more sensitization);

- Preparation of policy;

- Discussions on policy coordination and implementation organs;

- Policy implementation

In all cases, it should be noted that the NICI development process cannot be finalized in a short time but goes beyond several months or years after the first policy workshop is held. Preparation of plans for Senegal and Rwanda took more than 18 months each. The NICI development process is underway in the following 28 countries, namely: Benin, Burkina Faso, Burundi, Cape Verde, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Malawi, Mauritania, Mauritius Mali, Morocco, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Seychelles, Sudan, Swaziland, Tanzania, Tunisia, Uganda and Zambia.

Out of the countries indicated above, about fifteen countries have already completed the process of developing their ICT plans and strategies and are either in the process of validation or mobilizing funds for the implementation of various ICT programs and projects. This category includes: Benin, Burkina Faso, Cameroon, Cap Verde, Ghana, Cote d'Ivoire, Mauritania, Mauritius, Tunisia, Egypt, Rwanda, Senegal, South Africa, Mozambique and Uganda.

Countries such as Angola, Ethiopia, Kenya and Malawi are at the earlier stage of development. Whereas the NICI development process will start before the end of the year in the Central Africa Republic[8], Djibouti and Swaziland; whereas, the process may start next year in the Democratic Republic of Congo, Eritrea, Equatorial Guinea, Liberia, Sierra Leone, Somalia and Togo.

Considerable progress has been made in the formulation of broad base ICT policies aiming at reforming the telecommunications sector, setting up regulatory and legal frameworks for implementing the liberalization and privatization process. With the exception of few countries, the attempt that is being made to develop national ICT policies and strategies in Africa is promising.

Telecommunication Infrastructure

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[7] Terms of Reference for Developing NICI in Africa.- by ECA and IDRC, Addis Ababa, 1999. (http://www.uneca.org/aisi/nici)
[8] The Central African Republic has been selected as one of the countries which will benefit from ECA/EU cooperation for NICI development activities.

Telecommunication forms an integral part of the infrastructure requirements for national strategies and economic growth in all the sectors of the national economy. Access to basic telecommunication services is regarded as a basic right. However, accessibility and affordability of basic ICT services in the continent is hampered by low level of development and limited coverage of the infrastructure. Major challenges to governments in Africa, will be in formulating and implementing strategies that will help to expand and modernize the infrastructure and facilitate equitable and affordable access to telecommunication services.

Substantial progress has been made in the development of telecommunication infrastructure and liberalization in southern Africa. As a result of the move taken towards privatization the participation of the private sector has been increased and improvement is being seen in the area of regulation. For instance, Mozambique achieved 90 % digitization of its telephone infrastructure while Swaziland is building an optical fiber backbone that provides an alternative to the existing digital microwave systems. Considerable progress has also been registered in Angola, Botswana, Mauritius, Namibia, South Africa, in increasing the fixed telephone density to 5.7 % from 3.7% in 1998[9].

Recognizing the unavailability of the local capital investment for developing the telecommunication infrastructure, most African countries have instituted legal and institutional policies targeting at reforming the telecommunication sector through liberalization. This paved the way for the integration of big telecom corporations in the African telecom market and forming strategic business partnership with national telecom operators, especially in the provision of mobile telephone and data services. The rate of development of the mobile phone service outpaced the rate of subscription of the fixed line. Out of the 800 million mobile users in the world 15 million are in Africa (includes some 9.6 million users in South Africa)[10].

Most countries have now more than one operator in the mobile industry (see annex 2). Table 2 indicates the current status of subscription to mobile services (July 2001):

Total subscribers	15,400,000
Total analogue Network	450,000
Total GSM Network	14,850,000
12 moths % growth	135%
Pre-paid	4,900,000
% pre-paid	26.67%
Forecast end 2003	33,927,000

Source: Latest African Mobile and Telecom News

Table 2. Status of mobile subscribers in Africa

The introduction of foreign telecom operator has increased the flow of foreign direct investment and improved the quality and quantity of services improved more than before. In the bid document submitted to provide telecom services to Nigeria, MTN South Africa promised to install 200,000 lines in the first of its commencement of operation while Zimbabwe's Econet indicated that it will connect 500,000 customers by the end of 2001. Nitel, the Nigerian national operator, is scheduled to be privatized in September 2001.

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[9] ECA's Inter-governmental Committee of Experts (ICE) meeting for Southern Africa, Lusaka, 3-6 April 2001
[10] Mobile Stats Snapshot (August 2001)

With the aim to expand its infrastructure, Seychelles has deregulated its fixed 100% to enable full competition and expand the infrastructure.

A number of African countries have also embarked on universal service strategies to expand the telecommunication infrastructure to the rural and disadvantaged areas. South Africa is imposing rollout targets in the license of the private telecom operators to cover certain areas within a given period of time. Another mechanism being used is establishing Universal Service Fund (USF) and impose on telecom operators to contribute certain percentage of their profit towards this fund which is going to be invested in the expansion of the infrastructure to commercially unattractive and under served areas.

Expansion of the telecommunication infrastructure in the remote areas has been hindered by lack of electricity, and this has always been overlooked. The continent is enjoying 67% of the total solar power received on earth, yet this has not been exploited widely.

Internet Connectivity

Considerable efforts have been directed towards increasing connectivity to the Internet. Today, no country in Africa is without access to the Internet, although much of it is centered in capital cities and secondary towns. There are now about 38 countries with 1000 or more dialup subscribers, 19 countries with more than 5000 and 11 countries with more than 20,000 subscribers – Algeria, Botswana, Egypt, Kenya, Mauritius, Morocco, Nigeria, South Africa, Tanzania, and Zimbabwe (Mike Jensen May 2001). The picture is changing for the better, for instance, Ethiopia which is known for its monopolistic policy has recently upgraded its Internet capacity. Consequently, it is expected that the current 4000 customer base will expand to include 14,000 new subscribers. The modernization process also brought about a new digital data network services and increased the Point of Presence (POP) to other regions of the country. Now, major towns of all regions in Ethiopia are enjoying the benefits of the Internet.

The number of Internet Service Providers (ISPs) is also increasing with most countries having more than one actor. Southern Africa is leading the pace of growth. South Africa has licensed more than 100 ISPs and it has a customer base of 1.82 million users As part of the move to promote universal and affordable access to the Internet, 19 countries setup special area codes for ISPs to allow user call at local call charges for all call made to the Internet regardless of distance. These include: Benin, Burkina Faso, Cape Verde, Ethiopia, Gabon, Malawi, Mali, Mauritius, Mauritania, Morocco, Namibia, Niger, Senegal, Seychelles, South Africa, Chad, Togo, Tunisia, and Zimbabwe.

Mostly the Internet services provided in countries where the PTO is the sole provider is inadequate and inferior in quality. Due to the absence of competition, there is low and limited bandwidth, low capacity of the modems to handle incoming and outgoing traffic and connect to international gateways. Higher connection fee and long waiting list also characterize these countries.

The African ICT infrastructure has also been reinforced by the use of Very Small Aperture Terminal (VSAT) systems. Although national telecommunication authorities do not welcome it in most countries in Africa, some countries such as Ghana, Mozambique, Democratic Republic of Congo, Nigeria, South Africa, Tanzania, etc., have allowed the use of VSAT to facilitate two-way satellite-based Internet services by special

arrangements with companies in US and Europe. This is believed to overcome the limitations of existing telecommunication infrastructure.

Content

The proliferation of information content on the Internet is increasing in an incredible speed, but the share of Africa is insignificant. The presence of African content on the Internet is a recent phenomenon and it is mainly characterized by web sites containing tourism information with little or no effort to keep them updated. It has been four years since the tourism site for Ethiopia has been developed, (http://www.tourehtiopia.net) but nothing has been changed on the web site since then. The Internet presence of African countries is increasing. Countries such as Tunisia, South Africa, Botswana, Senegal, Morocco, Mauritius, Seychelles, Egypt have commendable government and public services web sites. Nevertheless, in the framework of the NICI process, more effort is needed to develop applications like e-government, e-commerce, national databases, etc., along with the skilled manpower required for the generation, organization and dissemination of information and knowledge. The generation and dissemination of indigenous knowledge in Africa has not received the attention it deserves. There is a big amount of knowledge which is unregistered but has been transmitted by word of mouth through generations, for instance, knowledge related to traditional medical practices and farming techniques. Therefore, there is a strong need for designing and implementing systems and procedures for collecting, formatting, organizing and disseminating indigenous knowledge in every walk of life of rural communities in Africa.

Additional work is needed in Africa to adequately address the production of national content and make it available on the Internet. Africa should have some content to contribute to the world, and this must receive due attention through the NICI process. It is also important to address issues related to regulation of intellectual property rights whereby the rights of information content producers are safeguarded and respected. Since government information systems and national statistical offices as well as municipalities are engaged in collecting and storing data on citizens, it is necessary and vital to recognize the need to formulate guidelines and regulations concerning the collection, processing and transferring of personal records.

At the regional level further work has been underway in collecting and compiling information on ICTs. Using data from existing sources such as ITU publications, the BMI Techknowledge handbook, government reports, etc., ECA has compiled a compendium of NICI Country Profiles (October 1999) which is regularly updated on-line (http://www.uneca.org/aisi/nici) The objective of this exercise is to show the status of the penetration and use of ICTs in ECA member States in the areas of telecommunication, broadcasting, Internet connectivity, ICT training, etc. This data is believed to be an input for decision makers in planning future ICT investment endeavors.

ECA has also compiled another publication called "Africa Content on the Internet" (http://www.uneca.org/nici/africacontent.html). Apart from these, substantial efforts have been exerted to develop web sites for making information available for users at various levels. This includes http://www.bellanet.org/aisi, http://www.uneca.org/aisi/adf, http://www.uneca.org/aknf Moreover, the ECA web site is being used as a portal for links to other sites. The newly established Information Technology Centre for Africa (ITCA)

http://www.uneca.org/itca has started developing portals on e-commerce, ICT policy and regulation, regional integration and health.

Telecommunication Regulations

Progress in regulatory front is also encouraging. Independent regulatory bodies have been established in Botswana, Cameroon, Cape Verde, Chad, Comoros, Cote d'Ivoire, Egypt, Ethiopia, Gambia, Ghana, Guinea-Bissau, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Senegal, Seychelles, South Africa, Sudan, Uganda, Tanzania and Zambia. Annex 1 provides information on the progress made in terms of regulation. At a sub-regional levels the Southern Africa Development Co-operation (SADC) has created an organ called Telecommunication Regulatory Association of Southern Africa (TRASA). TRASA has established sub-groups that are working on harmonization of key issues of regulation such as human resources development. So far TRASA has completed guidelines on inter-connection, tariff, and Radio Frequency plans. Its various sub-groups are working on Universal Services, human resources development and numbering guidelines. West African countries have also developed similar institution called West African Telecommunication Regulators Association (WATRA).

Impacts Created by National Strategies

Since the launch of AISI in May 1996, a number of ICT programs and projects have been implemented in member States to leverage development. Although organizations such as the International Telecommunication Union (ITU) have attempted to exhibit and disseminate information on the growth of the telecommunication sector, a mechanism to measure the impact created by ICTs in the continent is lacking. A number of regional; and international institutions such as the ECA, UNDP, the World Bank, IDRC and ITU are collaborating in e-readiness assessments and longitudinal scanning of ICT growth and utilization in Africa.

The Scan-ICT Project

With the view to develop Africa's capacity in collecting analyzing and organizing data on the penetration and utilization of ICTs to development and to make the data available for decision making concerning ICT investments, the European Commission, ECA, IDRC, and the Norwegian Agency for Development (NORAD) have embarked on the Scan-ICT project. The first 12 months of the 3 years project are devoted to the pilot phase whereby the suggested framework for the baseline study is tested and refined as appropriate. Six African countries[11] have been selected and sponsored to undertake baseline studies by employing indicators reflecting AISI thematic areas, namely, infrastructure, content development, sectoral applications such as education, health, e-commerce. The preliminary baselines will be restricted to one or two of the thematic areas mentioned above but later will expand to cover all. The real evaluation of the impact created by the NICI development process will be addressed by the Scan process.

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[11] Ghana, Senegal, Morocco, Ethiopia, Uganda, and Mozambique

Commerce and Trade

The impact of the Internet technology is more visible in the commercial sector than any of the other sectors. Business organizations are exploiting the opportunities given by this technology in order to sell their products and services online. The proliferation of e-commerce applications has also brought about significant changes on the global market place. In spite of the low level penetration and application of ICTs in the commercial sector of Africa, few innovative ICT applications have been developed in the continent[12]. Examples of innovative use of ICTs include but not limited:

- In Ethiopia, a young entrepreneur has set up the first e-commerce web-site of the country selling sheep and gifts to Ethiopian emigrants living in the USA and in other countries for delivery in Addis Ababa and its neighborhoods.

- In Senegal, over 10 000 small businesses have emerged to provide public telephone services since the national telecom operator opened up the public telephone market. Many of them provide Internet access and other PC-based business services.

- In the small village of Malicounda Oulof, 100 km from Dakar, rural women are using the only phone booth which exists in the village to sell pounded groundnut to shops located in Dakar and in other towns. In addition, the rural women of Malicounda use the same phone booths to order fish from the town of Mbour located at the sea shore, 10 km from Malicounda. This phone booth enables them to sell several hundreds of kilograms of groundnut every month, hence getting necessary income to support their respective families.

- In Togo, the world's first Internet-based call center is being set up to provide globally competitive telephone support services for companies with customers in North America.

- Mauritius has set up a trade facilitation environment in order to replace manual processes and physical handling of paper by electronic submission of trade related documents.

- Tunisia has started using virtual money, the "e-dinar" for national payments.

- Craft makers around Africa are selling their wares all over the world via the Web through an NGO called PEOPLink

- In Tanzania, women selling food items for the workforce in construction sites are using mobile phones to communicate with their base station to replenish stock of food stuffs and also to order fish from the sea shore and other raw food stuffs from groceries and supermarkets.

- In Ghana, bicycles are used by boys to distribute email printouts from telecentres to people leaving at the outskirts of Accra.

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[12] The African Development Forum '99: A Strategy to Accelerate African Development Through the Increased use of Information and Communication Technologies (ECA, March 2000)

- In Mozambique, Telemedicine applications are being used to provide health services to people leaving in remote areas.

- Trade Point Egypt (http://www.tpegypt.gov.eg) and Senegal (http://www.tpsnet.org) are showcasing what ICT can do for the governments and the business community in the continent.

Human Resource Development

Recognizing the importance of developing an ICT workforce that meets the demands of the evolving ICT sector, most of the universities and colleges in Africa have redesigned their IT curriculums to address new developments in the area of information and communication technologies. During the last decade, the continent has witnessed a proliferation of new educational institutions, ICT colleges and computer training centers, aiming at offering courses in various aspects of the IT industry, needless to mention the alarming increase of online learning resources. Although the advent of these institutions increased the availability of learning opportunities, the efforts made to set standards for subject matter coverage, qualification and experience of instructors, learning tools, course duration and type of credential award has been minimal. With the view to create basic awareness and literacy on the values and uses of the new information and communication technologies, considerable number of countries in Africa are introducing IT curriculum in secondary schools. This is believed to lay the ground for the development of an IT literate mass with the culture of not only using information but also actively participating in the generation of new contents.

Recommendations

Efforts made so far to enable countries recognize the need to undertake measures towards telecommunication reforms are commendable. In addition, there is a need for:

Increasing Awareness

- Sensitizing those countries who did not start the reform process;

- Consultation missions to those countries who have developed their plans but need to further work on the establishment of legal and regulatory institutions;

Policy

- Instituting policy measures to support and promote the leading role of the private sector in improving the information and communication infrastructure;

- Ensuring that the regulatory institutions put in place are politically independent and applies the rule of the game indiscriminately and equitably to all the actors in the market;

Mobilizing Funds

- Ensuring that the mechanisms and strategies employed to raise funds for promoting universal access are adhered to and funds are allocated for intended purposes;

- Mobilizing the required funds to kick start the NICI development process in countries where the reform process has not yet started and to support the implementation of ICT projects in those countries which are about to implement their NICI plans and policies;

Regional Co-operation

- Organizing sub-regional and regional workshops aiming at exchange of information between NICI focal persons and experts on problems encountered and remedies used along the process of NICI;

- Enhancing the role of ECA Sub-regional Development Centers (SRDCs) by strengthening their human and institutional capacity with regular support of expertise from the headquarters or elsewhere as appropriate;

- Encouraging countries to form alliances towards formulating strategies to establish regional communication backbone;

Content Development

- National ICT strategies need to address policies and strategies aiming at developing capacity to gather, process, organize and disseminate local or indigenous knowledge;

- Encouraging countries to develop and maintain web sites to enhance exchange of experiences pertinent to policies, strategies, regulatory frameworks and structures, etc.

- Continuously updating the NICI web site (http://www.uneca.org/aisi/nici), and provide as much qualitative information as possible.

Conclusion

The NICI development process is one of the mechanisms developed to facilitate the entry of the continent into the global information society. Adhesion of decision makers and all stakeholders to the information society concept is essential for the success of the NICI development process. Moreover, effort that is being made to improve the ICT infrastructure must be accompanied by the development of policies and strategies exploiting the renewable energy sources, the solar energy, which are extremely cost effective and appropriate to satisfy the energy requirements of the continent.

Regional and international ICT initiatives aiming at bridging the digital divide call for the need to revisit and reorient the national information and communication strategies to fit

into wider regional and international frameworks such as the AISI and the G8 digital opportunities. The joint meeting of the African Technical Advisory Committee (ATAC) and the African representatives[13] to the dot force that took place on 12 May 2001 addressed this issue and put forward recommendations[14] reflecting Africa's contribution to the various ICT initiatives including the G8 DOT Force, World Economic Forum and the UN ICT Task Force.

All the above efforts culminated with the UN ECOSOC Panel discussion that was held in New York in May 2001, on "Africa and the Digital Divide" which recommended the use of the AISI framework as Africa's digital agenda to harness digital opportunities for the inclusion of the continent in the global digital revolution, and the launching for a UN Special Initiative for Africa. It is expected that with such an initiative, the whole continent will benefit from opportunities provided by the digital revolution.

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[13] Egypt, Senegal, South Africa, Tanzania
14 Africa's common position for digital inclusion (ECA, May 2001)

Annex 1: Africa Policy Makers and Regulators

COUNTRY	REGULATORY BODY	REGULATORY BODY INDEPENDENT?	YEAR ESTABLISHED
Algeria	Ministere des Postes et Telecommunications	N	1983
Angola	Angolan National Institute of Telecommunications	Y	1999
Benin	Ministry of Culture and Communications	N	
Botswana	Botswana Telecommunications Authority	Y	1996
Burkina Faso	Autorité de régulation	N	1999
Burundi	Telecommunication Regulation and Control Agency	Y	1997
Cameroon	Agence de Régulation des Télécommunication	Y	1999
Cape Verde	General Directorate of Communications	Y	1991
Central African Republic	Agence de Régulation des telecommunications	Y	1996
Chad	Office Tchadien de Régulation des Telecommunications	Y	1998
Comoros	Study and Planning Office (BEP) of the Telecommunications Directorate	N	1997
Congo	Office National des Postes et Télécommunications (ONPT)	N	
Côte d'Ivoire	Agence des Telecommunications de Côte d'Ivoire	Y	1995
Djibouti	Office des Postes et Telecommunications	N	
DRC	Ministère des Postes et Télécommunications	N	
Egypt	Telecommunications Regulatory Authority	Y	1998
Equatorial Guinea	Directorate of Posts and Telecommunications	N	
Eritrea	Communications Department	Y	1996
Ethiopia	Ethiopian Telecommunications Agency	Y	1996
Gabon	Agence de régulation des télécoms (under formation in 2000)	N	2000
Gambia	Gamtel	N	
Ghana	National Communications Authority	Y	1996
Guinea	Direction Nationale des Postes et des Telecommunications of the Ministry of Communications	N	1995
Guinea-Bissau	Ministry of Transport and Telecommunications	N	
Kenya	Communications Commission of Kenya	Y	1999
Lesotho	Ministry of Transport and Communications	N	
Liberia	Ministry of Post and Telecommunications	N	
Libya	General Post and Telecom Company	N	1978
Madagascar	Office Malgache des Etudes et de Regulation des Telecommunications	Y	1984
Malawi	Malawi Communications Regulatory Authority	Y	1997
Mali	Comité de régulation des télécommunications	Y	1999
			2000

COUNTRY	REGULATORY BODY	REGULATORY BODY INDEPENDENT?	YEAR ESTABLISHED
Mauritania	Office des Postes et Telecommunications	N	
Mauritius	Mauritius Telecommunications Authority	Y	1998
Morocco	Agence Nationale de Réglementation des Télécommunications	Y	1997
Mozambique	Instituto Nacional des Communicacoes de Mozambique	Y	1993
Namibia	Namibian Communication Commission	Y	1992
Niger	Direction de la Réglementation des Postes et Télécommunications of the Ministère de la Communication et de la Culture	N	1996
Nigeria	Nigeria Communications Commission	Y	1992
Rwanda	Ministry of Telecommunications	N	1993
Sao Tome and Principe	Ministerio do Equipamento Social e Ambiente	N	
Senegal	Direction des Etudes et de la Réglementation des Postes et des Telecommunications	N	1984
Seychelles	Ministry of Information Technology and Communications (MITC)	N	
Sierra Leone	Ministry of Communications	N	
Somalia			
South Africa	Independent Communications Authority of South Africa	Y	2000
Sudan	National Telecommunications Council	Y	1994
Swaziland	Swaziland Posts and Telecommunications Corporation	N	
Tanzania	Tanzania Communications Commission	Y	1994
Togo	Ministère de l'Equipement des Mines, des Transports et des Postes et Télécommunications	N	
Tunisia	Ministry of Communications	N	
Uganda	Uganda Communications Commission	Y	
Zambia	Communications Authority of Zambia	Y	1998
Zimbabwe	Zimbabwe Posts and Telecommunications Corporation	N	1994

Source: Economic Commission for Africa (ECA, 2001)

Annex 2: Cellular Operators in Africa

Country	Standard	Startup	Operator	Notes
Algeria	NMT-900	12/89	Algerian PTT	
Algeria	GSM900	2/99	Algerian PTT	
Angola	GSM 900	2001	Unitel	Operated by Portugal Telecom, with local partners
Angola	AMPS-800	2/94	Angola Telecom	Luanda, then nationwide
Botswana	GSM900	6/1998	Vista cellular (consortium of France Telecom & local partners)	
Botswana	GSM900	6/1998	Mascom Wireless	
Burkina Faso	GSM900	12/96	Onatel	
Burundi	AMPS800	9/93	Telecel-Burundi	
Cameroon	GSM900	1994	Dirtel	
Cameroon	GSM 900	1999	Societe Camerounaise de Mobiles (SCM).	
Cape Verde	GSM 900	1998	Cabo Verde Telecom	
Central African Republic	AMPS800	1995	TELECEL-CAR	Bangui
Congo	GSM900	1/99	Congolese Wireless	
Congo (DR)	GSM900		Congolaise Wireless	
Cote d'Ivoire	GSM900	03/96	Comstar	
Cote d'Ivoire	GSM900	10/96	Loteny Telecom	
Cote d'Ivoire	GSM900	8/96	Societe Ivoirenne de Mobiles	
Djibouti	GSM	1997	undecided	
Egypt	GSM900		ClickGsm	Cairo, Luxor, Alexandria, Aswan
Egypt	MATS	5/87	Arab Republic of Egypt Nat'l Telecom. Org.	
Egypt	GSM900	12/98	Mirsfone	
Egypt	GSM900	10/96	MobiNil	
Ethiopia	GSM900	07/98	Ethiopian Telecoms Auth	Addis Ababa and towns like Nazereth and Sodere
Gabon	AMPS	1986	unknown	
Gambia, The	TACS	1994	unknown	
Ghana	AMPS	1/94	CelTel Ghana	nationwide

Ghana	GSM900	6/96	ScanCom Ltd.	
Ghana	GSM900	1996	Francis Walker Ghana Ltd.	
Ghana	TACS	5/92	Millicom Ghana	
Kenya	ETACS	1993	Kenya Posts & Telecoms Co.	
Kenya	GSM900	1998	Safaricom	
Kenya	GSM900	4/96	Kencell	
Lesotho	GSM900	12/95	Vodacom Lesotho Pty.	Maserv
Liberia	GSM900	3/99		
Libya	GSM		ORBIT	
Madagascar	AMPS	7/25/94	TELECEL-Madagascar	Antananarivo & other cities
Madagascar	GSM900	05/97	Sacel Madagascar S.A.	all
Madagascar	GSM900	11/97	Madacom	all
Madagascar	GSM900	03/98	SMM	
Malawi	GSM900	7/96	Telecom Networks Malawi	Blantyre/Limbe & Lilongwe
Mali	GSM900	1/98	---	----
Mauritius	ETACS	6/89	Emtel/Currimjee Jeewanjee Millicom	
Mauritius	GSM900	1/96	Cellplus Mobile Comms	
Morocco	GSM900	4/94	Itissalat Al-Maghrib S.A	Rabat, Casablanca
Morocco	NMT-450	1989	Office National des Postes et Telecom.	main cities and roads
Morocco	GSM 900	1999	Medi Telecom	
Mozambique	GSM900	6/97	Empresa Nacional de Telecomunicacoes de Mocambique (TDM)	Maputo, Matola and "Maputo Corridor"
Mozambique	GSM1800	8/98	Empresa Nacional de Telecomunicacoes de Mocambique (TDM)	
Namibia	GSM	4/27/95	Mobile Telecommunications Co. Ltd.	Windhoek/Rehobeth area
Nigeria	GSM	1995	EMIS Nigeria	Lagos
Nigeria	GSM900	7/99		Abuja, Port Harcourt, Aba, Onitsha
Nigeria	ETACS (800)	11/92	Mobile Telecom Services	
Nigeria	GSM	1995	International Wireless Inc./Comstar	Lagos, Abuja

Reunion	GSM	9/95	Societe Francaise du Radiotelephon	
Rwanda	GSM900	7/98	RwandaCell	
Senegal	GSM900	07/96	SONATEL	nationwide
Senegal	RC2000	4/92	SONATEL	83km radius of Dakar
Seychelles	GSM	11/95	Cable & Wireless (Seychelles) Ltd.	
South Africa	C-Netz	5/86	Vodacom	
South Africa	GSM900	6/1/94	Vodacom	nationwide
South Africa	GSM900	6/1/94	Mobile Telephone Networks	nationwide
South Africa	*GSM1800?*		3rd license may be issued son to Cell-C	nationwide
Sudan	GSM900	01/97	Daewoo & Sudatel	Khartoum & Port Sudan
Sudan	GSM900	1998	Mobitel	
Swaziland	GSM900	7/1998	MTN	nationwide
Tanzania	GSM900	12/95	Tritel	Dar es Salaam & other cities
Tanzania	GSM900	7/99	Vodacom Tanzania	
Tanzania	GSM900	2001	Celtel Tanzania	Part of MSI group and Tanzania Telecom.
Tanzania	GSM900	1998	Zanzibar Telecom	Zanzibar
Tanzania	TACS	10/94	MIC Tanzania Ltd.	Dar es Salaam & other cities
Tunisia	GSM900	end-96	Ministry of Communications	Tunis
Tunisia	GSM900	03/98	Tunisie Telecom	
Tunisia	NMT-450	4/85	Ministry of Communications	60% territory @ mid-95
Uganda	GSM 900	2001	Telecel Uganda	Operated by Telecel (Orascom) group and Ungandan Telecoms.
Uganda	GSM	5/95	Clovergem Celtel Ltd.	Kampala, Entebbe, Jinja
Uganda	GSM	7/98	MTN & partner	
Zaire	AMPS	1994	Express Communications	
Zaire	TACS	end-94	Trans Global Telecom	Kinshasa
Zaire	NAMPS	1986	TELECEL-Zaire	
Zambia	AMPS	1995	Zamtel	Lusaka only

Zambia	CDMA	late 96	Telecel-Zambia	Lusaka
Zambia	GSM900	unknown	Zamtel and partner	
Zimbabwe	GSM900	3/97	Telecel Zimbabwe (PVT) Ltd	Harare & Bulawyo
Zimbabwe	GSM900	1/97	NetOne	Harare & Bulawyo
Zimbabwe	GSM900	3/97	Econet	Local

Source: http://www.cellular.co.za/africa-cellsystems.html)