
INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICTs) FOR AFRICA'S DEVELOPMENT¹

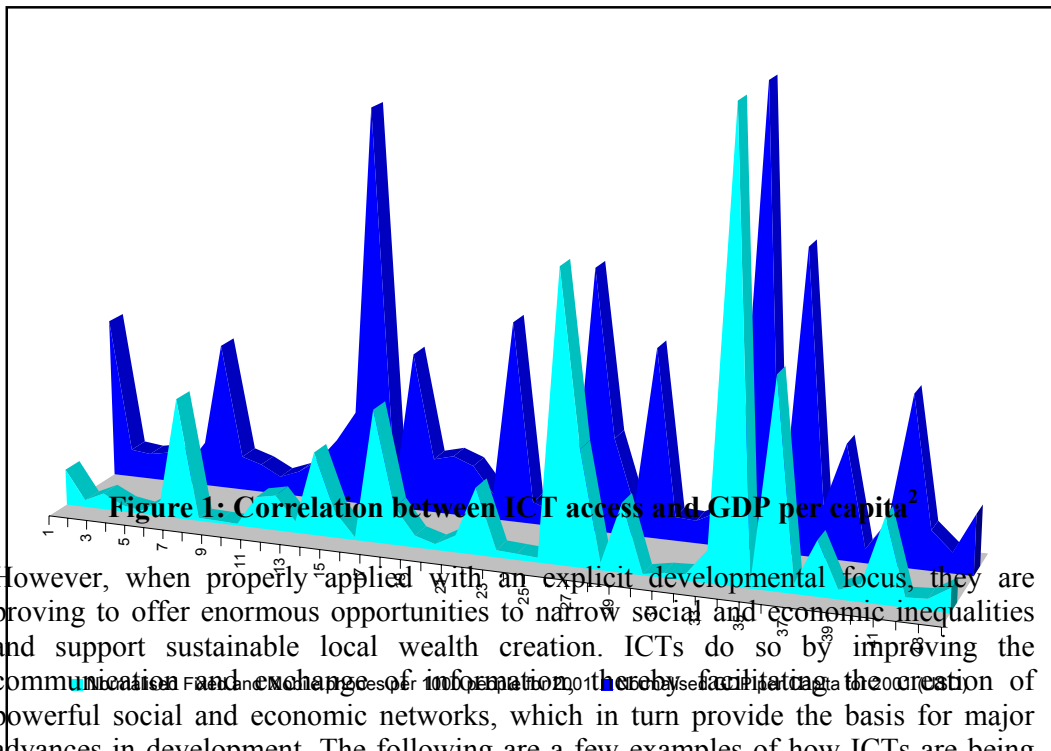
1. ICT AND HUMAN DEVELOPMENT – THE INDISPUTABLE LINK

Earlier this year, the United Nations Development Programme (UNDP) published the Human Development Report 2003 which provides an indication of progress towards meeting the internationally agreed upon Millennium Development Goals (MDGs). The report revealed that, at current rates, Sub-Saharan Africa is likely to meet most MDGs sometime between 2100 and 2200 as opposed to the targeted 2015. With regard to the goals relating to poverty and sanitation, there has actually been a reversal indicating that the situation is in fact worsening.

As this bleak picture unfolds, a greater emphasis is being placed on harnessing ICTs to leapfrog traditional stages of development and uplift Africa onto the global economic scene. Indeed, mounting empirical evidence does lend support to the argument that ICTs are a powerful tool in the quest for Africa's development. The strong correlation between ICT access and Gross Domestic Product (GDP) per capita (as illustrated in Figure 1) is undeniable even for African countries.

There is still insufficient evidence to define the nature of the causal relationship, and it is indeed true that ICT can be a cause, a consequence and a manifestation of economic growth. It is therefore important to be wary of the temptation to romanticise ICT as a panacea for the developing world's problems. It is much more prudent to realise that ICTs are merely tools; and no single technology tool in isolation can solve the problem of poverty which has multiple causes and is complex and multidimensional.

¹ This paper was prepared by Matthew Chetty (CSIR) for the NEPAD Ministerial Conference on Science and Technology for Development.



However, when properly applied with an explicit developmental focus, they are proving to offer enormous opportunities to narrow social and economic inequalities and support sustainable local wealth creation. ICTs do so by improving the communication and exchange of information, thereby facilitating the creation of powerful social and economic networks, which in turn provide the basis for major advances in development. The following are a few examples of how ICTs are being leveraged to improve food security, improve health conditions, promote environmental sustainability and enhance social integration.

Herb Gathering and Cultivation in India

A UK NGO, Womankind Worldwide, discovered that the inhabitants of the Thandari village, in Pondicherry, India, had considerable knowledge of the local herbs. A telecentre was established in the village and, with connectivity support from the Foundation for Occupational Development (FOOD), villagers used it to learn how to package and market the herbs that they found in the surrounding countryside. The telecentre service was also instrumental in sensitising the villagers to the value of their knowledge and in stimulating them towards using it as a means of obtaining their livelihood.

Herbal Remedies

In another village in India, where the villagers possess considerable knowledge about herbal remedies that can be derived from the herbs in their area, a telecentre initiative is being used to help villagers build a database of such (indigenous) remedies, by recording the characteristics of the plant, methods for collecting the herbs, techniques for preparing the remedy, applicability and dosages. The database is seen as a valuable resource as:

- It can be used by anyone
- It is a means for recording indigenous knowledge, which is held in many cases by old people, and which can therefore be recorded before it is lost.

² Sources: World Bank, ITU Yearbook of Statistics, UNDP Human Development Report 2003
African countries presented in alphabetical order; Figures are normalised for clearer presentation

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- It is a good way of preserving and protecting such indigenous knowledge from foreigners who attempt to patent the crucial ingredients of indigenous bio-resources in their own country.³

Community radio: The next step

In December 2002, grassroots communities in Africa had the opportunity to share stories on the communities coping with HIV-AIDS through an Internet-based programme swap. The story swap was one of the World Association of Community Broadcasters' (AMARC) exchange projects set up to enable community radio stations to share experiences and learn from each other. Isolated Maasai communities in Northern Tanzania had an opportunity to talk openly about the stigma and discrimination against HIV-AIDS-infected people. The discussion was significant for a community whose knowledge about the disease is largely based on hearsay and has led to the alienation of HIV positive people. The broadcast of a Ugandan businessman whose life was changed by the disease puts a human face to the disease, helping to raise awareness among others. Discussions such as the one on HIV-AIDS open up the communities' thinking and facilitate social change.⁴

Telemedicine in Less Developed Countries (LDCs)

In Mozambique, the International Communication Union (ITU) helped the government establish a network between central hospitals in two of the country's biggest cities, Maputo, and Beira. This link allows doctors in each city to consult with each other and share medical records to ensure that patients in their respective cities get the best possible care. The hospital in Beira now has instant access to radiologists located in the capital city, which has significantly improved patient care. Similar telemedicine projects with which ITU is involved are currently under way in Senegal, Uganda and Ukraine.⁵

Environmentally friendly e-commerce shantytown style

In an effort to protect the environment while creating jobs for the residents of a deprived shantytown, the Wikyo Akala Project, launched in February 2001, uses discarded rubber tires to make sandals, thus providing new job opportunities for the more than 500,000 inhabitants of Korogocho, a shantytown outside Nairobi, Kenya. The non-profit project melds together many important elements of sustainability, including education, human resource development and environmental protection. The key component to the Wikyo Akala Project is its Ecosandals.com Web portal, which has proved to be widely popular throughout African and abroad. As a sustainable and community-based project that engages the youth of Korogocho in productive income generating activities while fostering the recycling of environmental waste, Ecosandals.com is helping to reform and modernize the social and economic structures of this marginalized community.⁶

Women and ICTs

³ MSSRF, 1999

⁴ <http://africa.amarc.org>

⁵ http://www.itu.int/newsarchive/wtdc2002/Internet_Health.html

⁶ <http://www.ecosandals.com>

Women in Somalia could not attend that nation's peace talks. Instead, they learned of developments via the Horn of Africa Regional Women's Knowledge Network (HAWKNET) on the web, and through this source they became 'virtual participants' in the event. They then passed on their knowledge through their communities, and their reports were more timely and trusted than those broadcast on the state media.⁷

ICTs and human rights - Kubatana: Making voices heard

In Zimbabwe, the Kubatana Project's website, Kubatana.net, is providing a web presence to 230 Zimbabwean civil and community-based organizations. Kubatana.net has become an important means for disseminating accurate, up-to-date information about the country, both locally and internationally. The project also carries information about important legislation, the latest news, advertisements for public meetings and is also used to distribute information about a range of civil society issues.⁸

USAID/ Guatemala Mission

In an effort to preserve traditional norms of Mayans, USAID is helping Mayan communities in Guatemala develop the skills that are necessary to use ICTs to preserve their culture. In one project, school children equipped with digital cameras and tape recorders visit remote villages to collect and document stories and insights. The students then compile their findings and publish them in books.⁹ A similar project, the African Cultural Conservation Fund's (ACCF) project, is being run in Mali with support from Georgetown University and the World Bank.¹⁰

2. STATUS AND TRENDS OF ICTs IN AFRICA

Significant progress has been made in the last decade in the development of the African ICT sector.

A number of African countries have embarked on policy reforms that have introduced competition and improved policy and regulatory frameworks. Since 1990, approximately 40 countries

“Of the approximately 816 million people in Africa in 2001, it is estimated that:

- 1 in 4 have a radio (205m),
- 1 in 13 have a TV (62m),
- 1 in 35 have a mobile phone (24m),
- 1 in 40 have a fixed line (20m),
- 1 in 130 have a PC (5.9m),
- 1 in 60 use the Internet (5m), and
- 1 in 400 have pay TV (2m)”

⁷ Hall, J

⁸ <http://www.Kubatana.net>

⁹ <http://www.usaid.gov/gt/>

¹⁰ <http://www.theculturebank.org>

have embarked on programmes to separate postal functions from telecommunications. Over 20 have privatised their state-owned national telephone companies. 30 have liberalised their markets and opened up to private cellular services, and over 20 have revised their regulatory frameworks to facilitate more effective private investment.¹¹

With regard to the broadcasting sector, it is estimated that over 60 percent of the African population are reached by existing radio transmitting networks. Following liberalisation of the sector in many countries, a number of commercial radio stations are being established. Satellite-based broadcasting services have in particular seen major activity in the past few years. In 1995, a South African company, M-Net, launched the world's first digital, direct-to-home subscriber satellite service called DSTV. In 2002, the South African public broadcaster SABC launched Channel Africa, a satellite-based news and entertainment channel aimed at the continent.

While progress with regard to the expansion of the traditional telecommunications sector has been relatively modest, there have been substantial gains in terms of modernisation of fixed networks. The proliferation and penetration of mobile networks and services on the African continent in the last decade is undoubtedly the biggest and most visible Africa ICT success story. Mobile subscribers have now surpassed fixed-line users in most countries, exposing the pent-up demand for basic voice services.

The number of Internet users and the amount of international bandwidth are still growing strongly across the continent. As of mid-2002, the number of dialup Internet subscribers was close to 1.7 million, a 20 percent increase from mid-2001, mainly bolstered by growth in a few countries such as Nigeria. North Africa and South Africa account for about 1.2 million, leaving about 500,000 for the remaining 49 Sub-Saharan African countries.

Despite encouraging developments on a number of fronts that reflect the growing belief amongst Africans in the enormous potential of ICT as a key driver for social and economic development, there is growing concern that African countries are not progressing rapidly enough in terms of overcoming the digital divide.

Indeed, the digital divide is at its most pronounced in Africa persisting at a number of levels and dimensions such as between Africa and the developed world, between countries within Africa, between urban and rural areas within countries, and between various economic and social sectors (including gender).

“One third of the world population has never made a telephone call. Seventy percent of the world’s poor live in rural and remote areas, where access to information and communication technologies, even to a telephone, is often scarce. Most of the information exchanged over global networks such as the Internet is in English, the language of less than ten percent of the world’s population.”

Digital Opportunities Task Force

¹¹ OleKambainei and Ampah Sintim-Misa, Info-communication for Development in Africa

The bulk of telecommunications infrastructure does not extend beyond the largest cities and therefore does not reach the majority of the population. In many cases, as much as 50 percent of available lines are concentrated in the capital cities; where only about 10 percent of the population live.

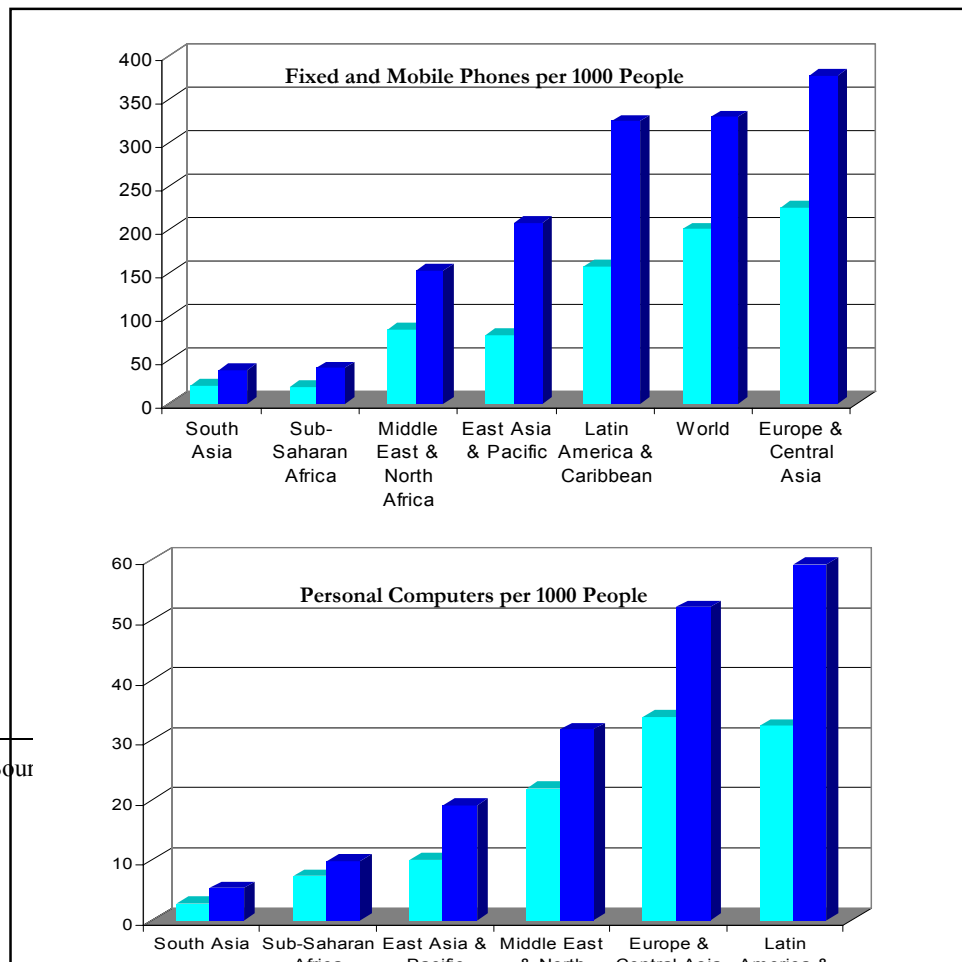
In all aspects of ICT access and usage, Africa lags behind the world averages quite considerably as indicated in Figure 2. Unsatisfactory progress relative to the developed world has resulted in a widening of the digital divide.

Of the estimated 21 million fixed lines across Africa, North Africa has 11.4 million and South Africa has another 5 million lines, indicating a total of only 4.6 million lines for the rest of the continent. Thus, while Sub-Saharan Africa contains about 10 percent of the world's population, it accounts for only 0.2 percent of the world's 1 billion telephone lines. The penetration of telephone lines on the sub-continent is about 5 times worse than the average low-income country.

Of the estimated 5-8 million Internet users in Africa, only about 1.5 - 2.5 million users are outside of North and South Africa; this implies about 1 user for every 250 to 400 people. This compares with a world average of 1 user for every 15 people, and a North American and European average of 1 user for every 2 persons.

As illustrated in Figure 2, the average growth for Sub-Saharan Africa in number of fixed and mobile telephones per 1000 people is 5.4 per year compared to a world average of 32 per year and an average of 92 per year for high income countries. This observation is even more alarming for the growth in number of personal computers and number of Internet users.

Figure 2: ICT Indicators for 1998 and 2001¹²



¹² Sour

A contributing factor to these bleak statistics is the high cost of access relative to per capita income in Africa. The cost of renting a telephone connection on the African continent averages about 20 percent of GDP per capita compared to a world average of 9 percent and an average of only 1 percent in high-income countries.

The average total cost of using a local dialup Internet account for 20 hours a month in Africa is about USD 60 per month (usage fees and local call telephone time included, but not telephone line rental). According to the organisation for Economic Cooperation and Development, 20 hours of Internet access in the United States cost USD 22 per month in 2000, including telephone charges. Although European costs were higher (USD 33 in Germany and USD 39 across the European Union), these countries have per capita incomes of at least ten times the average African monthly salary. In fact, the average African monthly salary is less than USD 60.¹³

3. AFRICAN ICT FOR DEVELOPMENT INITIATIVES

As a contribution to the global effort, many initiatives have been carried out to help mobilise, focus and coordinate action by developing a strategic approach to harnessing the benefits of ICT for sustainable development. The following is a non-comprehensive list of such initiatives.

Digital Opportunity Task Force

The Dot Force was created under the Okinawa Charter on the Global Information Society, by the G8 Leaders at the Kyushu-Okinawa Summit in July 2000. Through a nine-point action plan – the Genoa Plan of Action – and several implementation teams, the Dot Force has created a number of processes in each of the priority areas of the Genoa Action Plan. A number of projects have been or are in the process of being implemented in areas such as networks of expertise on access and connectivity, human capacity building, local content, and national regional e-strategies.

United Nations ICT Task Force

The UN ICT Task Force is a United Nations endeavour that aims at fully incorporating representatives from public and private sectors, non-profit organisations, and civil society as equal members. The Task Force's membership includes some of the world's most prominent business leaders as full-fledged members whose decision-making powers is equal to that of the representation of governments and multilateral organisations. Each member offers a unique perspective and expertise from his or her respective field. Through this system of collective input, the Task Force has already achieved a common understanding on priorities and tasks, as well as on the most effective modalities for achieving the goals set out in its mandate.

The African Connection and the Ministerial Oversight Committee

¹³ Mike Jensen, The Current Status of ICT in Africa

In 1998, African Ministers responsible for communications developed the ‘African Connection’ initiative. This programme is an African-driven effort aimed at making Africa a full member of the global information and knowledge society through accelerated development of country, regional and continental information infrastructure and applications in the social and productive sectors. The African Connection is supervised by the Ministerial Oversight Committee of African Ministers of Communications.

The African Telecommunications Union (ATU)

The African Telecommunications Union, a reconstitution of the Pan-African Telecommunications Union (PATU) by the African Ministers of Communications, is the de facto African regional telecommunications counterpart of the ITU. ATU, which also reports to the Ministerial Oversight Committee, serves as the organ for the systematic pursuit of telecommunications development in Africa.

The African Advisory Group on ICT (AAG-ICT)

In the area of mobilising Africa’s global expertise at the cutting edge for Africa’s ICT Development, the African Advisory Group on ICT has played (and continues to play) a critical quiet role. The AAG-ICT is a group of 12 eminent African ICT experts from around the world who meet behind closed doors on an average of twice a year to provide confidential high-level advice to African Ministers of Information and Communications on strategic, policy and regulatory issues, with no holds barred.

The UN-ECA and the African Information Society Initiative (AISI)

The AISI was adopted by the Conference of Ministers in 1996 and it seeks to harness information and knowledge for Africa’s development. The initiative has set a framework within which national stakeholders, as active and central payers, set their own course of action and implement projects based on their priorities and development goals. The role of the Economic Commission for Africa (ECA) is to coordinate the work of AISI.

Global Business Dialogue on e-Commerce

Since its creation in January 1999, GBDe has represented a major step forward in the establishment of a comprehensive approach to electronic commerce issues, both by delivering a wealth of information through its databases and by connecting and coordinating major stakeholders in the field. The GBDe Steering Committee is divided into three regional hubs (Americas, Asia/Oceania, Europe/Africa) and focuses on eight key areas: consumer confidence, cyber security, convergence, digital bridges, e-government, intellectual property rights, trade and taxation. It has become a significant tool and a leading private sector voice on e-commerce policy and e-commerce related areas.

Global Information Infrastructure Commission

The GIIC Commission is a non-governmental initiative that, with the support of leaders from developed and developing countries, aims at fostering private sector leadership and enhanced private-public sector cooperation in the creation of an

improved information infrastructure. Key focuses for the Commission until now have been education, health-care and e-Government. Projects have been launched in these areas, drawing on the expertise of participating GIIC companies, and with the goal of providing a blueprint of strategies for other ICT stakeholders in the private or public sector.

4. REGIONAL ICT POLICY INITIATIVES

The role of ICTs for regional integration and cooperation has gained considerable attention. As a result, Regional Economic Communities (RECs) are taking a leading role in regional consultations and studies such as harmonization of policies, regulatory frameworks, infrastructure etc. as in some of the examples below.

Economic Community for Central Africa States (CEMAC)

A workshop on ICT for regional integration was organized by the Economic Community of Central African States (CEMAC) in September 2002 in Yaounde. The workshop adopted the Yaounde Declaration which recommended key decisions, including harmonization of the ICT sector in the CEMAC countries, sharing of resources and the creation of the Central African countries Association of Regulators (ARAC). The CEMAC Heads of State will adopt the Declaration in December 2002.

Economic Community for Western Africa States (ECOWAS)

In order to facilitate the harmonization of national sectoral policies, the ECOWAS Council of Ministers established an ECOWAS Consultative Regulatory Committee for Telecommunications to ensure the consistent and coordinated regulation of telecommunications within the Community. A West African Association of Regulators (WATRA) was officially established in June 2002. A study on harmonization of West African telecommunication regulations is underway¹⁴.

Southern African Development Community – (SADC)

Countries of the Southern African Development Community (SADC) are a step ahead from the other regions. Several studies on ICT have been undertaken and meetings and workshops organized. A Protocol on Transport, Communications and Meteorology and a Declaration on Information and Communications Technology were adopted by SADC. Southern Africa Transport and Communications Commission was created. The SADC Region was also the first one to establish an association of regulators (TRASA)¹⁵.

The UEMOA ICT initiatives

The UEMOA Council of Ministers adopted in 2001 a recommendation on a programme of action for improving ICT infrastructure and services in UEMOA. This recommendation aims at harmonizing the regulatory frameworks, the creation of a committee of regulators, and a forum of operators and service providers, the promotion of new ICTs, and liberalization of the national telecom markets. The West

¹⁴ <http://www.ecowas.int/>

¹⁵ <http://www.sadc.int/>

African Development Bank (BOAD) is expected to undertake a study in developing a fiber optic regional network¹⁶.

The ADF III ICT Focus Group on Regional Integration¹⁷

During the third edition of the African Development Forum (ADF) on Regional Integration, held in March 2002, the ICT Focus Group met to explore the role of ICTs in Regional Integration. A portal on regional integration was also launched during this event¹⁸. Since its existence, the ADF has registered significant impact and rapidly gained recognition as an effective forum for informed dialogue and consensus building on urgent development issues of relevance to Africa, and for agreeing on implementation priorities and strategies at national, sub-regional and regional levels. ADF 1999¹⁹ focused on ways to accelerate the information revolution in Africa. A considerable amount of technical information was prepared during ADF '99 and is still being used and referred to by member States and experts doing studies on Africa.

5. NEPAD AND ICT

NEPAD has identified infrastructure and especially ICT development as a priority action area in order to promote suitable conditions on the African continent for sustainable development. The NEPAD objectives and actions with regard to bridging the digital divide are as follows.²⁰

Objectives:

- To double teledensity to two lines per 100 people by 2005, with an adequate level of access for households;
- To lower the cost and improve reliability of services;
- To achieve e-readiness for all countries in Africa;
- To develop and produce a pool of ICT-proficient youth and students from which Africa can draw trainee ICT engineers, programmers and software developers;
- To develop local content software, based especially on Africa's cultural legacy.

Actions:

- Work with regional agencies such as the African Telecommunications Union and African Connection to design model policy and legislation for telecommunications reform, protocols and e-readiness assessments templates;
- Work with regional agencies to build regulatory capacity;
- Establish a network of training and research institutions to build high-level manpower;
- Promote and accelerate existing projects to connect schools and youth centres;
- Work with development finance institutions in Africa, multi-lateral initiatives (G-8 DotForce, UN Task Force) and bilateral donors to establish finance mechanisms to mitigate and reduce sector risks.

¹⁶ <http://www.uemoa.int/>

¹⁷ <http://www.uneca.org/adfiii/>

¹⁸ www.uneca.org/itca/ariportal

¹⁹ <http://www.uneca.org/adf99/>

²⁰ NEPAD document, October 2001

The NEPAD e-Africa Commission

NEPAD has established the e-Africa Commission which is the special task team responsible for the ICT sector. The e-Africa Commission will be responsible for developing policies and strategies and projects at the continental level as well as managing the structured development of the ICT sector in the context of NEPAD. The Commission is chaired by His Excellency President Alpha Oumar Konare, former Head of State of the Republic of Mali and an ardent advocate of ICT for development in Africa.

The mandate of the e-Africa Commission is as follows:

1. The e-Africa Commission will develop a broad NEPAD ICT strategy and comprehensive action plan, covering the necessary policy/legal/regulatory, logistical, physical and socio-economic infrastructure needed, with the objective of:
 - Accelerating the development of Africa inter-country, intra-country and global connectivity, and
 - Promoting conditions for Africa to be an equal and active participant in the Global Information Society.
2. The e-Africa Commission shall serve as the primary advisory body to the Heads of State and Government Implementation Committee (HSGIC) of NEPAD, on the development and implementation of an effective NEPAD ICT programme in Africa. It shall advise and assist the HSGIC in all matters relating to the implementation of NEPAD ICT programmes and recommend action.
3. The e-Africa Commission shall undertake the following functions:
 - a. Develop a comprehensive NEPAD ICT strategy which takes cognisance of, reviews and rationalizes existing projects and initiatives;
 - b. Develop and implement new projects and initiatives to add value to existing ones;
 - c. Recommend the policy, legal regulatory and commercial environment that is conducive to the implementation of the strategy;
 - d. Recommend specific policies on the development of the African society;
 - e. Identify projects with immediate benefits, demonstrate the value of ICT, and elicit sustained commitment of all stakeholders;
 - f. Collate information of best practises and experiences in the key elements of the ICT programme for benchmarking and development of guidelines;
 - g. Promote the e-Africa initiative to citizens, civil society, corporations and governments of Africa and create avenues for their participation
 - h. Promote e-awareness amongst the citizens of Africa;
 - i. Support the implementation of other NEPAD programmes through the application of ICTs.

The e-Africa Commission will conduct its work through creating and fostering partnerships between governments, business and civil society. The partnership created by the Commission for the purpose of fulfilling the objectives of the NEPAD ICT

Programme is known as **Information Society Partnership for Africa's Development (ISPAD)**. Projects will be accomplished by bringing together skills, resources, capabilities and other contributions of partners who are members of ISPAD.

5. THE NEPAD S&T AGENDA FOR ICT

It is critically important for Africa to define its own vision for putting ICT tools into the service of development. In the absence of such a vision, there is the danger of Africans aspiring to external developments and benchmarks. This situation is problematic on a number of inter-related fronts and is likely to result in the following undesirable situation:

- Africans will be relegated to always being followers and the employment of ICT will not achieve the leapfrogging effects so desperately required resulting in widening of existing socio-economic disparities;
- Africa will not proactively leverage its differentiator of a strong heritage in cultural diversity; in fact there is a real danger of culture adapting to suit technological developments instead of the other way around;
- Africans will be relegated to being largely consumers of technology instead of becoming producers in a globalised world;
- The trend of merely importing technology solutions will perpetuate. In the developmental arena this is problematic as self-development is required to ensure success and sustainability indicating the strong need for African solutions to African problems;
- The self-confidence and self-esteem of the African people will continue to be undermined.

ICTs must therefore enjoy high priority on an African Science and Technology for Development agenda. Important to note is that technology cannot be sustainable without continuous research and development activity at the cutting edge. This strategic capacity is seriously lacking in Africa, hamstringing the continent's ability not only to custom tailor generic technological innovations to meet its specific needs, but also to join the global community of research and development.²¹

In contemplating an appropriate science and technology agenda for ICT and Africa's development, the following are important considerations:

There is a dire need for coordination and synergy of African ICT efforts.

²¹ Dr. Joseph Okpaku, Background on ICT for Development in Africa, 2003

One of the unintended consequences of the greater appreciation of the role of ICT in development is the emergence of a growing number of initiatives. While this should be quite encouraging, the lack of coordination and integration of these initiatives is leading to much confusion and further fragmentation of precious resources. NEPAD provides an ideal platform for synergising African ICT efforts in order to provide greater clarity, avoid duplications and achieve critical mass in identified focus areas.

Africa's competitive strength and differentiation must be exploited.

There is general consensus that Africa's comparative advantage lies in its rich heritage and cultural diversity. Explicit attention must be given to using ICT tools to preserve, and promote Africa's heritage. It is important for Africans to use the large collection of audio-visual, multimedia tools that ICT avails to capture and communicate Africa's diverse history and culture. Another imperative in this regard is for the development of ICT solutions that sufficiently appreciate Africa's diversity. One example is the issue of language. It is unrealistic to expect ICT to make any significant inroads in empowering Africans towards development when 90 percent of existing content and applications are in the English language.

There is a need to build and nurture an appropriate African ICT capacity.

Perhaps the most commonly cited African challenge in the ICT domain is the lack of ICT expertise and capacity. In Africa's quest for strategic ICT capacity building, it is necessary to first assess the extent, scope and quality of the expertise Africa already has. In this respect African expertise that now resides outside of the continent cannot be overlooked. Harnessing Africa's global ICT expertise will help to bridge the handicap of a late start.

ICT must be integrated into developmental plans.

While it is clear that African leaders offer overwhelming support for the urgent incorporation and prioritisation of ICT into developmental plans, a greater degree of advocacy is required especially at local government and civil society levels. It is also important to take note of learning accrued indication that ICTs are most powerful as developmental tools when they implemented as part of larger integrated plans as opposed to in isolation.

Africa must have a voice in the global ICT arena.

Much of the discussion and decisions taken around ICT development and standardisation take place in global forums in the absence of African participation. Even when Africa is represented, it is mainly as an observer (either by stipulation or by choice). Because these decisions impact on Africans just as much as anywhere else in the world, it is important for Africa to develop a voice and ensure that its voice is loud enough to be heard at global ICT events.

An appropriate list of ICT indicators for purposes of monitoring and evaluation is required.

Following the argument that Africa must develop its own ICT vision, a system that stipulates and monitors progress towards reaching this vision is necessary.

Towards an Implementation Framework for an e-Africa Agenda²²

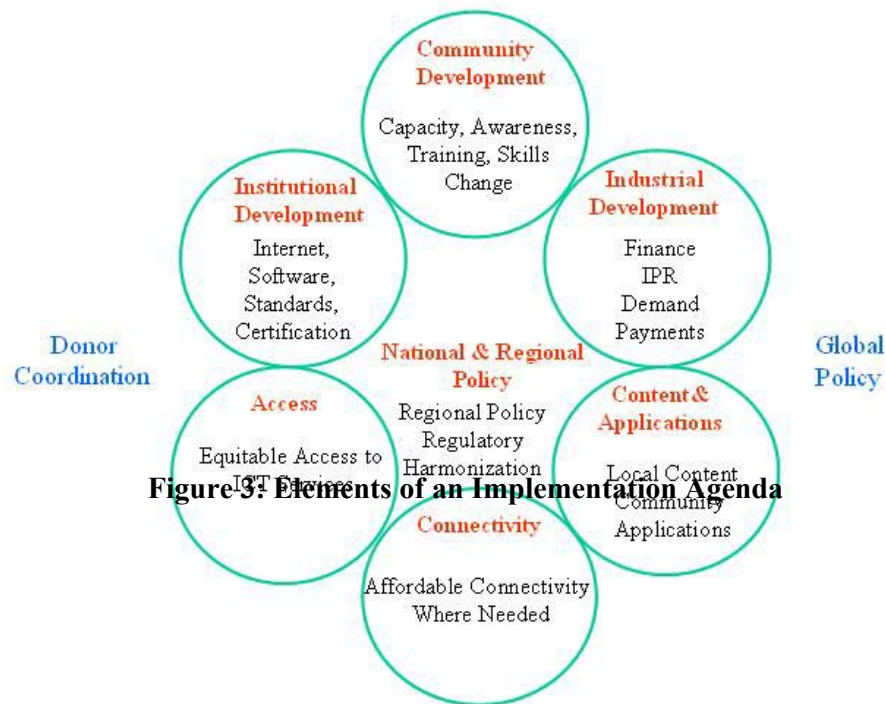


Figure 3: Elements of an Implementation Agenda

Global Policy

A lot of the standards activity and policy for a global network such as the Internet is developed globally by participation in several International forums. In the Internet community a number of these forums are relevant and includes ICANN (policy & coordination), IETF (IP standards), ITU (link level standards), Unicode (character representation standards), W3C (web standards) and others. There are also donor agencies that are supporting Africa's digital divide initiatives through mainstreaming ICT for development. Some initiatives are:

- Identification of important forums, maintaining contacts with organizers, disseminating such information to stakeholders and facilitating their participation.
- Coordinate country programs and donor programs to achieve optimum benefit for the region.
- Establish relations with various silicon valleys overseas and cyber villages for maximum technical exchange.
- Enhance African participation in global policy forums by assisting in reducing barriers.

Local/Regional Policy

Local and Regional policy has a compelling impact on acceleration of ICT and Internet advancement. Many countries are continuously evolving their national policies and strategies. Some initiatives are:

- Identification of important forums, maintaining contacts with organizers, disseminating such information to stakeholders and facilitating their participation.

²² Dr. Nii Narku Quaynor, Africa's Digital Rights

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- Networking and Software associations are critical to keeping abreast with developments in the industry. They also form an industry body that gives input to policy makers on proposals. These would be strengthened.
 - Coordinate the various country programs for effective regional harmonization and interconnections as necessary.
 - Establish relations with various silicon valleys and cyber villages in Africa for maximum technical exchange and networking.
 - An Observatory to study, track and report the progress made in ICT, Internet and software for Africa is to be developed. This effort would also evaluate the footprint of various interventions.

Enterprise

The private sector's role in diffusion of ICT and the Internet cannot be underestimated given the inter-relationship of economic and social developments in the e-Africa vision of creating a wise society in a decade. The unique role of the private sector in the creation of jobs for knowledge workers, developing infrastructure and infrastructure are key to building a sustainable development dynamic. Some Initiatives are:

- Finance and Credit facilities for ICT would be developed either through specific ICT development banks or through funds exercised through the existing development bank. Venture capital is scarce but is considered an alternative as wealth creation ventures mature.
- The creation of an environment that attracts foreign investment without excluding the indigenous from genuine participation in the ICT industry is paramount.
- Intellectual property laws and other property laws that secures investment and protects the creations of Africa and its partners must be developed.
- Create competition among providers by funding the demand side of ICT to stimulate the market.
- Ensure that electronic payments become acceptable practice in the society to fuel e-commerce development.
- Look to Incubators as a vehicle for initiating new enterprises that will keep Africa involved in ICT technology production activities, not only usage.
- Position the uniquely African assets, intellectual property, for competition in the global market.
- Consider the chambers of commerce and other business round tables as instruments for injecting ICT, Internet, and Software into commercial concerns.

Human Capital

In the vision of creating a wise society the quality and values of the human capital becomes a determinant of success. Activities that stimulate strengthen and organize the human resources for action is desired. Some initiatives are:

- Technical skills are on the critical path of Africa's entry into the ICT, Internet and software arena. The few such professionals are over used and practically inaccessible. This bottleneck must be quickly eliminated by a buildup of critical mass of highly specialized professionals with international quality skills.
- Support academic programs in computer network architectures and software development, in particular and computer science in general. These computer science programs would be engaged in collaborative networks to share teaching methods, faculty and exchange programs. Establish sufficient graduate programs

in computer science and networking to meet the needs of the continent in the stipulated timeframe.

- Coordinate R&D centres in networks & software fields with interest in the more applied aspects of computing science and engineering. The new subject areas of next generation Internet, biotechnology, new materials, genetic programming and artificial intelligence may be rewarding topics for initial exploration.
- Universal Internet Access services to bring the benefits to more of the people in Africa early on.
- Devise rural Internet solutions that can be readily deployed in rural communities at affordable prices.
- Change Management to assist the communities being impacted by the changes ICT and Internet bring.

Institutions

Many of the necessary institutions that support ICT absorption have not been constructed in many African societies. Yet institutional memory is paramount for sustainable systems especially, in the newer technology fields. Some initiatives include:

- Networking & Software associations
- Institutions for Internet in Africa to be supported and groups for ccTLD (AFTLD), for African ICANN (AfriCANN), for African network Information Centre (Address Registry AfriNIC), African Network Operators Group (technology transfer organization AfNOG) and other trade associations including African ISP Associations (AfriSPA) be enabled.
- Institutions for Software Development and Associations are essential for promoting Africa's participation in the industry.
- Collaborate on software incubators with e-Africa business program.
- Collaborate on software research with e-Africa Institution, Research & Space Communication Program.
- Standards & certification programs.

Infrastructure

The Internet and software require a variety of infrastructures to operate and Africa would prefer to participate in the development of these. Some Initiatives include:

- Manufacturing of hardware/software products to meet local needs creating possibilities for innovative products that may compete globally.
- Promote national Internet exchanges & regional inter-exchange carrier development to retain continental traffic completely terrestrial with minimum transit outside of Africa.
- Collaborate with e-Africa Infrastructure program to establish terrestrial and International bandwidth needs of Internet services for the next decade.
- Bulk purchase of International bandwidth to reduce costs of Internet connectivity to the international backbone.

Info-structure

There are a few information structures required to make the Internet function globally and these must be developed to become competitive. Some of the initiatives include:

- Develop the country code Top Level Domain name (ccTLD) Registries in Africa to serve the local Internet community completely and ensure that capital flight which occurs as a result of residents using global (international) generic Top Level Domain Names (gTLDs) do not occur.
- E-Africa Commission should request the Top Level Domain “.Africa” be delegated and operate dotAfrica TLD for its purpose.
- Support AfriNIC Address Registry, a private non-profit organization being established to allocate Internet numbers to the African community.
- Promote the establishment of Uniform Domain-Name Dispute-Resolution Policy (UDRP) service providers for Internet domain name disputes in Africa.
- Support the operation of a Root Server in Africa as part of the e-Africa’s desire to participate in all aspects of the Internets operation.
- Internet and software Laws are lagging behind the advancement in usage of these services which needs to be corrected.

Content and Applications

The principal contact of majority of the community to Internet and software is through access to content and execution of applications. The e-Africa commission has initiatives to address these and includes:

- Promote new Internet applications, in particular how Internet telephony (VOIP) may reduce costs of access and also how to use Internet enabled solutions to participate in e-commerce and e-tourism to Africa’s advantage are goals.
- Software development of African games is a natural point of entry for Africa into the industry and should be utilized to gain some intellectual property for these creations.
- African languages must be available on the Internet and useable in software applications. Hence all the languages need to be registered and the corresponding alphabets properly included in Unicode. The e-Africa would prepare for the introduction of Internationalized Internet Domain Names.
- Educational software tools present another opportunity for African developed software from the adaptation and creation of instructional material through standalone software or the Internet. Learning aids based on ICT for all levels of education should be developed specifically for Africa.
- To digitize Africa’s folklore, music, art, culture and herbal medicine for preservation and protection of the Intellectual property. This database would become an asset in a knowledge society for economic purposes and for improved quality of life of Africans and people of African descent.
- Microprocessor applications and instrumentation for SMEs is also a potential for innovation in simple system, hardware and software, products peculiar to the needs of Africa and would be developed. Small VSLI Application Specific Integrated Circuits (ASIC) are of interest in solving unique system problems of the region. Design Centres and design entry are potential enterprises to be developed in support of ASIC applications.
- Methods of access to the internals of commonly available software is a must and consideration would be given to the merits of proprietary and open source tools as

vehicles to realizing the objective of enabling active development of software on the continent.

“In Africa, we have tried to address the issue of the cost of acquiring the tools and services of ICT. However, we have done so merely on the level of creating shopping lists and finding the money to buy. This is contrary to how others have addressed the challenge. To build its communications capacity to meet its need, China invested heavily in research and development, and with that in manufacturing. As a result, it was able to roll out more telecommunications lines per year than we have had throughout the continent, and is today, the world leader in the use of mobile phones. Now Chinese salesmen have joined the long line of American and European merchants who travel all over the Africa selling us every tiny bit of ICT tools and equipment.

India is another example. Despite having one of the highest poverty levels in the world, India has become a leading exporter of ICT technology and software.

I have argued that the only way to create affordable ICT access in Africa, and to expand its rollout massively, is to build our own industrial capacity in R&D and manufacturing in Africa. It is quite a simple proposition. We buy the equipment. If we shift these funds to manufacture them, we not only get what we need cheaper, in much greater quantity, and more attuned to our specific needs, we create industries in the process, with jobs, benefit and pride. “

Dr. Joseph Okpaku, Sr.

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in the African Development Agenda**