



# Building an Information Society - the case of Rwanda

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## Policy Goal

To use information and communications technology (ICT) to accelerate socio-economic development without leaving the poor and those in remote places behind. Infrastructure development remains the biggest obstacle and must be pursued with private investors and service providers to achieve universal access, especially in rural areas. Human resource capacity must be developed. The regulatory environment for e-commerce and other uses must be put in place and governments should create incentives to promote private sector investment in the ICT industry as this will form the growth engine.

## Overview

In many large halls and factories worldwide, tens or hundreds of workers are toiling, but they are often sitting in front of flickering screens and not in front of throbbing machinery. The industrial revolution, which transformed the world over the last three centuries, has given way to the information revolution, whose impact and effect is likely to be even larger. Information is a key factor of globalization, the rollback of economic, trade, cultural and other barriers between countries and regions, and countries that are not equipped with relevant skills and resources are likely to be left behind in an increasingly competitive world.

Nations, such as many in Africa, which are just starting out on their development or recovering from disaster, have a choice. At one extreme they could follow the traditional development path from agriculture through several stages to manufacturing, which developed countries followed over 1,000 years or so. At the other extreme they can seek the fast track and try to catch up with those countries that are embracing the information revolution and aiming to be among the frontrunners in an increasingly competitive world. For many developing countries, especially in Africa, their national strategy on Information and Communications Technology (ICT) is essential. They will not be able to keep the world out as trade and economic barriers crumble, but they will have to make great strides if they want to remain competitive and to share in the benefits of globalization.

ICT is increasingly becoming an unavoidable and central part of people's lives. E-commerce, for instance, has become a significant component of global economic activities and gives many firms a competitive advantage. In the United States, 'business-to-business' transactions constitute 16 per cent of all commercial transactions between enterprises, and worldwide the market increased 16-fold over four years from \$226 billion in 2000 to \$3,775 billion in 2004 and it continues to grow. In the European Union, Internet transactions within the countries reached US\$430 billion in 2001. The world's e-business was thought to be worth \$1.7 trillion in 2004.

Outsourcing has been a key trend of globalization. It means that work and business opportunities move away from major economies and the resulting trade links form the driver of global information economy. "E-government" applications are transforming the way governments interact with their citizens and private sector companies and are increasing governments' capacity, efficiency and effectiveness. Personal computers (PCs) and laptops are becoming common with some countries aiming to have one per school child and new technology, including more portable devices such as mobile phones and personal digital assistants, are reaching deeper into remote and rural areas and providing critical information on health, education, agriculture and business.

The critical importance of national ICT strategies was stressed during the first phase of the World Summit on the Information Society (WSIS) in December 2003 in Geneva. The Plan of Action adopted during the summit emphasizes the importance of developing and implementing comprehensive, forward-looking and sustainable national strategies to bring about an inclusive "information society" of which all members can take their parts in the information revolution. Governments need to take a proactive role to bring together the players, create the right environment and supervise the provision of infrastructure before their people will be able to access ICT at the right price and availability.

## The Challenge facing Africa

Africa has much to gain from the ICT revolution, but the challenges are daunting: i) Existing telecommunication

regulatory frameworks are not conducive to the development of extensive and reliable telecommunication infrastructure in many African States. This means that most of their people will not have access to basic telephone services, the first entry point to the information society; ii) Not many people are aware of the potential implications and impacts of the information society on their lives, nor are they equipped with capacity to take advantage of information they receive; iii) Most ICT initiatives in support of socio-economic development in Africa have been stand-alone programmes and pilot projects, but have not been based in any framework, including one linked to the overall socio-economic development frameworks of the member States; and iv) The private sector has not been recognized as an engine to drive socio-economic development through ICT with great potential to create more jobs and markets. Very few ICT policy interventions and incentives were implemented to boost the private sector.

### Policy approaches

A key answer to the above challenges is to tackle ICT development in a systematic and concerted manner, and the structure many African States are turning to is known as National Information and Communication Infrastructure (NICI) plans and strategies. These have been driven by the African Information Society Initiative (AISI), a regional framework for Africa's quest to bridge the digital divide that originated from a resolution of the 22nd meeting of ECA's Conference of African Ministers of Social and Economic Planning in 1996. The same year the Summit of Heads of State and Government of the former Organization of African Unity (now the African Union) adopted AISI and the leading developed countries supported it as Africa's major ICT initiative.

Led by ECA, AISI has supported the creation of NICIs as frameworks for the sustainable development of the information society in Africa. NICI plans and policies provide an integrated set of decisions, guidelines, laws, regulations and other mechanisms, which are geared to directing and shaping the production, acquisition and use of ICTs in society, based on national needs and development priorities. Governments play a central role in creating an enabling policy and legislative framework to promote an integrated national information and communication infrastructure. But all stakeholders should be involved in the preparation of NICI plans and policies through intensive consultative processes that will ensure their commitment and participation in creating the energy to drive what could amount to a process of national transformation.

The national development agendas form the bedrock of the NICI plans which may also have specific links to development goals such as the Millennium Development Goals and Poverty Reduction Strategies. Special areas that are also critical for the implementation of the plans include: infrastructure; an enabling legislative

and regulatory environment; the capacity to develop national information resources; the application of ICTs in social and economic sectors; human resource development; and steps to move towards an "information economy". The case of Rwanda is highlighted below as it gives insights into ways in which Africa countries can and are moving forward with the ICT revolution.

### ECA's contribution

ECA, as a leader of the AISI initiative, has been assisting many UN member States in Africa to formulate and implement National Information and Communication Infrastructure (NICI) policies and plans. These countries include Cameroon, Comoros, Democratic Republic of the Congo, The Gambia, Ghana, Malawi, Mali, Morocco, Niger, Nigeria, Rwanda, Tanzania, Sierra Leone and Swaziland. Furthermore, some member States, such as Gambia, Ghana, Rwanda and Uganda, have been assisted in formulating and implementing Sectoral Information and Communication Infrastructure (SICI) policies and plans in the area of e-government and health. ECA also works with the Regional Economic Communities (RECs) such as the East African Community, the Economic Community of West African States, the Common Market for Eastern and Southern Africa and l'Union du Maghreb Arabe (UMA) to harmonize ICT policies and plans at the subregional level.

### Building an information society - case study Rwanda

In 1994, while the rest of the world was in the middle of the information revolution, Rwanda fell into darkness. Genocide led quickly to the deaths of over a million men, women and children in about 100 days, leaving the country in ruins. Basic infrastructure such as roads, water, telecommunications and electricity was in disrepair. Agriculture had ceased and society was in shock. Not only did so many lose their lives, but the country also lost much of its administrative and technical human resource capabilities. In reconstructing the country, the leaders of Rwanda turned to information and communications technology (ICT) as a key tool

#### **NICI Development: The Rwanda Information Society Initiative**

At the end of the genocide there were at most a handful of operational phone lines. Telephone lines were quickly set up and by 1996, just two years after the genocide, there were about 1,000 lines. With the support of ECA and through the AISI, the country began formulating and developing a comprehensive ICT-led Integrated Socio-Economic Development Framework for Rwanda, followed by an ICT-led Integrated Socio-economic Policy (2001-2005), in November 1998.

The Rwandan Cabinet in early 2000 policy adopted a policy known as the National Information and Communication Infrastructure (NICI) plan, based on eight

pillars [see diagram]. The NICI Policy and framework document provided the basis for introducing and integrating ICTs into the Rwanda economy and society. The following are examples of how the policy is being implemented:

New structures for ICT: As recommended in the NICI plan, Rwanda created the Rwanda Information Technology Authority (RITA) and the National Information Technology Commission (NITC) specifically to support the implementation of the policy and plan. NITC is chaired by the Prime Minister and comprises members from the Cabinet, Ministers and representatives from the private sector, academia and civil society. It is the highest body for formulating and implementing policy and in charge of developing the Rwandan "information society". NITC reports to the Cabinet and the National Assembly and is mandated to advise the Government on all matters relating to policies, strategies and plans for deploying, exploiting and developing ICTs in Rwanda. RITA is to be "the national ICT implementation and coordination body under NITC", according to the NICI policy, and is also formed as a statutory and autonomous national agency.

Infrastructure Development: Over the past few years, telephone density in Rwanda has been increasing at a rapid rate. The telecommunications infrastructure is modern and consists of a fully digital backbone with microwave links to major cities from Kigali. Telephone company Rwandatel has introduced Wireless Local Loop (WLL) and has modernized its switching capability to provide a variety of services such as Voice over Internet Protocol (VOIP). A communications fibre network is currently being built to span the entire country, carrying telephone, Internet and television. Towards the end of 2005 over 25 Government buildings, representing most of the Government buildings in Kigali, will be connected directly to each other and onto the fibre network. Government operations in all the towns between Kigali, Gitarama and Butare will be also connected, reaching more than half the country's population and offering them data transfer speeds of up to 2Mbps. Very often, it is far too expensive to lay fibre-optic cables to link cities across the large distances in African countries. However, Rwanda is small with high population density, and is the exception rather than the rule when it comes to geography.

ICTs and the Communities: There is also an ambitious programme of rural connectivity, which aims to provide telecommunication access to all major rural administrative and commercial centres. Already more than 250 VSAT satellite terminals across the country have been deployed. Rwandatel has established telecentres which enhance community access by providing telephone, fax and e-mail services. A new private company is providing fixed telephony over VSAT satellite mainly in remote areas and this should have been a vital service in promoting rural connectivity. A Universal Access Fund has been set up, supported from two sources: 2.5 per

cent of Rwandatel's annual revenue, and a percentage allocated from the Government's annual budget. The Government of Rwanda aims to decrease the distance one has to travel to access a phone line from 15 kilometres to 3 kilometres within five years. In addition, the Government has decided that all ICT equipment, including electrical equipment, generators and solar panels, is exempt from import taxes.

Transforming Government administration and services: In 1997 a very common feature in Rwandan public institutions was the use of stand-alone computers. The introduction of e-Government in Rwanda was implemented as part of the overall NICI Plan. Between 2003-2004 the e-government programme provided systems that enhanced internal capabilities and information dissemination. This included office automation, e-mail, web access, data communications and management support. Initial successes led to many other activities such as the adoption of online electronic transactions, which came sooner than originally planned. For example, Rwanda Revenue Authority is implementing online tax filing and the National Tender Board has developed an online e-procurement system.

There was hardly any use of Local Area Networks (LAN) and only one ministry had a network extending connections beyond the headquarters main building. Today most ministries have local area networks spanning entire buildings and others connected to Wide Area Networks (WANs). The Ministries of Finance, Justice and Local Administration already have WANs to the provinces using ISDN and leased lines. A Documentation Centre and a Document Management System are largely operational and feature Government records and provide directories of Government legal and legislative documents and other records of public significance,

Politicians are receiving ICT skills and resources. For example the whole of the Rwandan Parliament is networked, Members of Parliament (MPs) can access the Internet from any corner of the compound and every MP has a laptop.

The drive for ICT-centred education: There are too few adequately trained and experienced analysts, software and hardware engineers, systems and network managers and this limits ICT development compared to the demand for this skills for implementing the NICI plan. Consequently, the Kigali Institute of Science and Technology and Management (KIST) has established various ICT-oriented centres including Centre for Innovations and Technology Transfer (CITT), Centre for Technology and Business Incubation (CTBI) and Information and Communication Technology Service Centre. KIST now trains more than 3,000 students, which include secondary school teachers who are learning how to pass on computer skills to the next generation. Ex-soldiers are trained to assemble computers. Thirty secondary schools and KIST are already connected to the national network. Soon over 400 secondary schools in Rwanda

will gain access to high speed (300k+) Internet access and phone service. The Government aims to provide an email address and access to the Internet within two years to 90% of secondary school students. Given the low level of electrification in the country, there are plans to install solar power systems to power PCs. According to Rwanda's Minister of Education, Science and Technology, Prof. Romain Murenzi: "We do not have a lot of mineral resources. So we believe that investing in education, from primary to higher education is going to be key. If Rwanda wants to be a hub in the region of technology education it is the only way to go".

## Challenges: what more needs to be done

Rwanda represents one of the most successful examples of NICI development. The political commitment at the highest level made it possible to allocate funds from the national budget for implementing the plan, ensure smooth coordination among ministries and introduce reforms and policy changes necessary to expand services and infrastructure to its citizens. However, challenges still remain for the country to achieve the target, that ICT should accelerate socio-economic development:

**Infrastructure development** still remains the biggest obstacle in ICT development. The infrastructure for Internet and e-economy services networks will have to be developed with a diverse array of investors and service providers if universal access to ICTs is to be seriously pursued. This is beginning to happen where operators are working to increase their investments in infrastructure and additional investments to communities, particularly in rural areas.

Despite efforts to build **human resource** capacity in Rwanda to meet the challenges of the information society, there is still a significant shortage of technical staff (computer scientists, engineers, programmers, systems analysts).

The **regulatory environment** for e-commerce is still not in place, and most companies have no prior experience with Value-Added Networks or Electronic Data Interchange, which help to create an environment where e-commerce is readily accepted. Rwanda is a predominantly cash-based economy and the movement towards electronic transactions will be a profound change for most people.

There are no incentives in place to promote **private sector investment** in the ICT industry and investment is hindered by an unwieldy system for imports and by low levels of understanding in the general population. The private sector is still developing and needs a great deal of encouragement if it is going to form the engine for future growth of the ICT industry. Rwanda's ICT programmes often compete with other sectors for limited Government and donor resources. Donor support is often directed to their own prioritized

sectors in areas such as poverty reduction, gender, education, good governance and agriculture. The upshot is that although the benefits of ICT at the micro-level are there, it is hard to scale up and make ICT much more widely available.

## Conclusion

ICT development in Rwanda illustrates how the right political vision and a coherent set of guidelines and strategies that are embedded in a national policy or framework can mean progress even if other enabling conditions are not fully in place. When political will and good management are present, satisfactory results can be achieved.

Rwanda is probably unique in that President Paul Kagame gives NICI his active support and the vision is to turn the Rwandan economy into a knowledge-based economy by the year 2020. Certain strategic interventions facilitated ICT development once the NICI plan was in place, including the offer of tax breaks to technology investors and attracting and directing foreign aid to good use for the plan.

ECA is giving assistance to Rwanda for the second NICI process (NICI-2010 Plan). According to President Paul Kagame: "The first NICI Plan (2001-2005) laid the foundation for the development of Rwanda's information society and economy. It focused on the development of human resource capacity, infrastructure, and the use of ICTs to support key sectors of the economy. The second phase (2006-2010) will lay emphasis on developing Rwanda's production capacity in ICTs as an economic sector, while at the same time emphasizing its use to develop other sectors of the economy"

## Further reading

Esselaar, P et al, 2001, Status and development priorities for Rwanda's ICT sector, Swedish International Development Cooperation Agency (SIDA), Department for Research Cooperation (SAREC), November 2001.

UNECA, 2003, Policies and plans on the information society: status and impact, UNECA, Addis Ababa, Ethiopia.

UNECA/Government of Rwanda, 2003, Rwanda national information and communication infrastructure: policies, strategies and plans, UNECA, Addis Ababa, Ethiopia.

### Internet Resources:

Rwanda's NICI: See [www.uneca.org/aisi/rwandaictplan.htm](http://www.uneca.org/aisi/rwandaictplan.htm) also [www.uneca.org/aisi/nici/country\\_profiles/rwanda/Rwanpap1.htm](http://www.uneca.org/aisi/nici/country_profiles/rwanda/Rwanpap1.htm)

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For more on ECA's work on ICTs, please visit <http://www.uneca.org/aisi>