Guide to ICT Policy in IST-Africa Partner Countries

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1. INTRODUCTION

The goal of this guide is to share the current status of National ICT policies in each of the current IST-Africa Partner Countries, identify what has been achieved to date and provide insight into what implementation challenges remain. This report reflects analysis of existing National ICT Policies for twelve of the IST-Africa Partner Countries including Botswana, Burundi, Cameroon, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Senegal, South Africa, Tanzania and Uganda.

Egypt indicated that their ICT Strategy 2007 - 2010 had been fully implemented and a revised strategy had been underway based on a consultation process during 2010 and 2011. The new Policy was not available in time to be included in this guide.

Partner Countries are at different stages of the evolution of implementing their National ICT Policies.

The National ICT of Botswana was finalised in 2007 and focuses on transforming the economy in line with their overall government policy of Vision 2016. It aims to position Botswana for sustained growth in the digital age and achieving social, economic, political and cultural transformation.

The National Policy in Burundi was formulated jointly by the government and UNDP in October 2000 and operationalised in 2004. Subsequently the government approached UNECA to work with them to develop and fund an ICT action plan for the period 2007 – 2011.

The National Policy in Cameroon was developed in September 2007, and was specifically designed within the context of supporting achieving the goals of the Poverty Reduction Strategy Paper published in 2003. In 2007, Cameroon only had the capacity to train 35 engineers and 300 technicians per year, which was seen as a significant barrier to achieving sustainable national socio-economic growth.

The 2006 ICT Policy of Kenya is based on the Economic Recovery Strategy for Wealth and Employment Creation (2003 - 2007) and four key guiding principles: infrastructure development; human resources development; stakeholder participation and appropriate policy and regulatory framework. The national vision is to achieve a prosperous ICT-driven Kenyan society.

The National ICT Policy in Lesotho was published in March 2005, with a 15-year target of creating knowledge based society fully integrated in the global economy by 2020. Subsequent Communications (2008) and Media (2009) policies build on the objectives of the ICT policy, whose rationale is to coordinate all stakeholders (public and private) and attract necessary investment.

The National ICT Policy (2007 – 2011) for Mauritius was published in September 2007, and focuses on transforming the ICT sector into the fifth economic pillar (joining manufacturing, sugar, tourism and financial services). The policy is very ambitious, positioning Mauritius as a regional hub for ICT, and leveraging ICT to support socio-economic growth through increased productivity and efficiency.

The National ICT Policy of Mozambique approved on 21 December 2000 focused on poverty reduction, providing citizens with access to global knowledge, raising the efficiency of governmental

institutions and their capacity to deliver public services, improving governance, positioning Mozambique as a producer of ICT and as a partner in the Global Information Society.

The National ICT Policy of Namibia has developed in 2004 and subsequently revised in September 2008. ICT is seen as a major potential contributor to national economic progress and the government has set the goal that ICT is the most important sector in the economic development of the country by 2030. The Ministry of ICT in Namibia was established in 2008.

The National ICT Policy of Senegal was given additional momentum in October 2004 by the commitment of the Prime Minister in the National Assembly to make ICT "*a powerful vehicle for accelerating economic growth and modernization of [the government] administration*". Under the Accelerated Growth Strategy of the National Program of Good Governance, ICT is an instrument to improve the productivity of public services, develop quality services and modern communications,

The National ICT Research & Development and Innovation Strategy for South Africa has the goal of creating "*an enabling framework for the advancement of ICT R&D and innovation, in a systemic fashion, within the context of the National R&D Strategy… which sets the agenda and framework for maximising the contribution of R&D and innovation in science and technology in South Africa*". Within the context of creating an inclusive information society by 2015, the policy acknowledges the role of human capital and the need for "*the right skills and competences [to] be at all levels*".

The National Information and Communications Technology Policy for Tanzania was published in March 2003. It was focused around the national vision that that "*Tanzania [will] become a hub of ICT Infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally*."

The Government of Uganda published the national Information Communication Technology Policy in July 2002, and this was subsequently updated in October 2003. ICT was identified as an important tool for modernisation and development at a national level, and an important contributor to both the National Poverty Eradication Action Plan (PEAP) and important sectoral plans such as the Plan for Modernisation of Agriculture (PMA). The Ugandan ICT Policy focused on capacity building and enabling socio-economic development through developing a national ICT business sector.

Some IST-Africa Partner Countries have subsequently identified potential shortcomings in their approach to the adoption and exploitation of ICT and are currently reviewing their ICT policies.

For example, Tanzania is currently revising their ICT policy through the TANZICT project to ensure it is properly aligned with national priorities focused on supporting poverty alleviation.

Botswana undertook a review of their existing STI policy during 2011. A new Research, Science, Technology and Innovation Policy has been approved by Cabinet and is scheduled to be presented to Parliament in the current Parliamentary session (Q1 2012).

Egypt's current ICT Policy (2007 – 2011) has been realised and in some areas target goals have been overachieved. The Government are currently drafting the ICT policy for the next five years.

2. POLICY ENVIRONMENT IN BOTWANA

2.1 Introduction

The Government of Botswana published a National ICT Policy in 2007 as a vehicle for change and assist in achieving Vision 2016 and other national development targets. It was envisioned that the Policy would position Botswana for sustained growth in the digital age and serve as a catalyst in achieving national social, economic, political and cultural transformation.

2.2 National ICT Policy for Botswana

The development of the National ICT Policy actively involved a wide range of participants from the public and private sectors, and civil society. A National Steering Committee and seven Task Forces, comprising of experts from around the country were established focusing on applying ICT in:

- Community Access & Development
- Government
- Learning
- Health
- Economic Development & Growth of the ICT Sector
- Infrastructure & Security
- Legislation & Policy

The National ICT Vision is that "Botwana will be a globally competitive, knowledge and information society where lasting improvement in social, economic and cultural development is achieved through effective use of ICT".

2.2.1 National ICT Goals and Objectives

National ICT Goals include

- Creation of an enabling environment for the growth of an ICT industry in the country
- Provision of universal service and access to information and communication facilities in the country
- Making Botswana a Regional ICT Hub so as to empower Batswana and to make the country's service sector globally competitive.

The National ICT Objectives are

- A culture of lifelong learning that maximises the potential within all citizens and accelerates innovation to develop knowledge based system
- Government services available electronically
- Increased economic diversification and foreign investment, including ICT enabled services based in Botswana
- Access to relevant, localised and understandable information for all citizens
- An ICT access point in every village

- Enhanced disease control and health care programmes
- An efficient and cost-effective ICT infrastructure in place
- A clear ICT legal framework in place

2.2.2 ICT Benchmarking and e-Readiness Assessments

Formal ICT Benchmarking and e-Readiness Assessments were conducted in June of 2004 to determine the current state of ICT diffusion in Botswana and the level of effort required to achieve the National ICT Vision, Goals and Objectives. The results of the Benchmarking and e-Readiness Assessments indicate that Botswana has good levels of technical infrastructure and supporting legislation in place, providing the country with a solid foundation for accelerating an integrated National ICT agenda. However, levels of ICT's in homes, communities and businesses are modest, as is the general use of ICT in healthcare, education and government.

A survey of the ICT market was finalised in November 2004, to support the e-Readiness Assessment, indicating annual ICT expenditure in Botswana of c. 1 Billion Pula (of which c.250 Million Pula was in the public sector). Based on this internal demand for ICT products and services, the National ICT Policy stresses the urgency for increased domestic development of specialised ICT skills, and the need for on-the-job training to build human resource capacity and ensure a career path for young graduates in Botswana's emerging ICT sector.

2.2.3 ICT Legal Framework and ICT Policy Development

The ICT Legal Framework provides a review of current legislation in Botswana and identifies appropriate policy actions that need to be taken to establish a trusted and secure e-Commerce, e-health, e-learning (Thuto Net) and e-Government environment. While a variety of training centres have been established to meet this skills gap, there is little standardization of training received. This problem is reinforced by the low number of privately owned computers.

The Policy was developed after an extensive consultation with over twelve hundred people representing a cross section of Botswana society. Each of the seven ICT Task Forces developed inter-related and inter-dependent programmes that provide a foundation for this Policy. All recommended programmes and projects are based on successful ICT initiatives around the world.

2.2.4 Policy Recommendations

The policy has a number of specific recommendations designed to support implementation.

2.2.4.1 Connecting Communities Programme

A key goal of the Connecting Communities Programme is to provide universal Internet access across the country, especially to those without access to a computer. Community Access Centres (CAC's) will be established across the country, situated where possible in existing public infrastructure (schools and libraries) to reduce cost and leverage investment. Each CAC will be

designed around the specific needs. The Centres will be designed to cater for everyone, including those with physical, mobility and learning disabilities.

All CAC users will be provided with access to a wide variety of on-line information sources including:

- Local and community information and services
- Information regarding jobs, health, education, livelihoods etc.
- Government information and services such as school registration, benefits, birth certificates, passport applications, livestock tracking etc.
- On-line learning
- Business information and services – especially for start-up and small businesses
- Information specifically tailored to the needs of children, senior citizens and young mothers
- Simplified links to communicate with family and friends abroad.

Those using the CAC facilities will be assisted by specially trained young adults from the Botswana Student Connection and Net Corps initiatives. Assistance will be provided in areas such as computer training, Internet training, e-Commerce training, technical assistance for small businesses, and website design. The goal is to support skills development and create entry-level and sustainable employment opportunities in the ICT sector – a key element of the National ICT Policy.

To stimulate ICT take-up and adoption, Government will develop incentives to reduce the overall cost of purchasing ICT's and provide tax benefits for companies in the ICT field – particularly new businesses or SME's. This will be supported by a promotion and awareness campaign targeting each segment of society (youth, young parents, consumers, businesses, senior citizens etc.).

2.2.4.2 Government-On-Line

The Government will introduce a major Service Delivery Reform Programme aimed at improving service quality, reducing red-tape and realising greater efficiencies in the public service. Government will simplify access and service delivery by developing a world-class e-Government Portal, designed around the needs of client groups, making government more transparent to citizens and business. The portal will incorporate a number of client-specific gateways – for citizens, businesses, public servants and visitors. As well as enabling users to access services from home or the offices, access will also be available via Community Access Centres, kiosks placed in shopping centres and strategically placed terminals located in Government offices. All information will be made available in both English and Setswana.

Early on-line services for citizens will include license applications, on-line payments, school registration, OMANG and passport applications. Early candidates for businesses include company registration, tax submissions, micro-credit applications and export advice. Visitors to Botswana will use the portal to access information and services such as tourism and investment opportunities.

The Government will improve service quality and internal efficiencies by reengineering and standardising business processes, rationalising organisational structures and introducing enterprise-

wide technologies such as finance, document management and customer relationship management solutions, coordinated in the context of a Federated Architecture Model for Government.

This initiative will provide a common Information Management/Information Technology (IM/IT) blueprint for Government promoting interoperability, reducing costs and facilitating sharing and reuse of information. The Federated Architecture Model will also provide for greater efficiencies within Government, providing the standards, guidelines and policies needed for full and secure information exchange between and among ministries and agencies.

A major Human Resource Development initiative to train government employees will teach technical skills and enhance customer service skills. All Government employees are to receive formal e-Government and Customer Service Training within one year of joining the public service.

2.2.4.3 Thuto Net

In order for Botswana to achieve the goal of a “knowledge-based society” as outlined in Vision 2016, Government will expose children to education in ICT, science and engineering.

The School Connectivity Initiative aims to achieve universal school connectivity. Essential infrastructure to be provided to schools by the Thuto Net Programme are electricity, computers and network services, telecommunication services, Internet connectivity and technical support.

Schools with more than 80 students will require broadband network access while narrowband delivery can be offered initially to schools with smaller populations via a central educational network building upon the existing Government Data Network (GDN). This infrastructure will support the Education Information System (EIS) functions currently being implemented. Wherever practical, dark fibre networks will be used in support of school connectivity to accommodate future needs.

All public libraries will also be provided with computers and high speed Internet connection.

The Computers for Schools (CFS) Programme will examine the feasibility of Government and private sector organisations “donating” surplus computers for use in schools and communities. School-based computer repair workshops can also be incorporated into the general curriculum to providing real world skills development and entry-level employment opportunities for students.

The Professional Development Programme will focus on training teachers and school administrators who will serve as ICT managers/coaches in their respective schools. Later phases of the Programme will seek to broaden the number of teachers and administrators with basic ICT skills and to integrate ICT’s into all aspects of the curriculum and educational management system.

Thuto Net recommends that ICT be introduced to school children at the earliest possible age and formalised into the general curriculum so that children acquire ICT skills throughout their academic development. It is recommended that the focus of the proposed second university in Botswana be centred on developing ICT-related skills and expertise, with world-leading programmes in science, technology, engineering and business at the core of the university’s subject offerings.

Generating new and additional ICT skills in the adult population is also an important component of the Thuto Net programme. There will be a range of initiatives aimed at training and job creation for those outside of the formal educational system – with a focus on the development of skills in adults. In addition to adult training and education offered at Community Access Centres, local businesses and private sector training organisations will be encouraged to offer greater levels of ICT training. Major employers and providers of distance learning will work with Government to examine the financial and ICT architecture needed to develop a national life-long-learning model for Botswana.

2.2.4.4 e - Health Botswana

This programme aims to provide better healthcare by transforming health systems and business practices through investment in and more comprehensive use of ICT. The e-Health Botswana Programme will be enabled through four major initiatives:

- **Building a Strong Foundation for e-Health**

An e-Health Council will be established to provide national leadership and sponsorship for e-Health projects and review legislation and policy to address privacy concerns relating to personal health information stored electronically. This initiative will also identify the necessary technical infrastructure, integration requirements and standards required to support e-Health Botswana

- **Enabling Clinicians to Deliver Excellent Patient Care**

Healthcare professionals will be provided with ICT-based tools and systems and accelerated implementation of the Electronic Patient Management System with associated investment in Professional Development and Change Management for health care specialists and a review of health-related curriculum in academic institutions.

e-Health Botswana will undertake a number of programmes including expanded use of radio and television healthcare messages and integration of a Health Portal into the e-Government site. A Tele health initiative will provide patients with access to nurses and later doctors via the telephone.

- **National Health Surveillance Network**

This will systematically identify emerging issues and monitor effectiveness of intervention strategies.

2.2.4.5 ICT and Economic Diversification

Botswana is currently extremely reliance on resource extraction. ICT offers the potential to diversify the economy and create significant employment growth through private sector development.

A primary thrust of the ICT and Economic Diversification programmes is to enhance operations at the International Financial Services Centre (IFSC) and support the development of Business Process Outsourcing (BPO). Although the economic upside is very high, challenges include lack of skilled workers, lack of call centre management expertise and inadequate physical infrastructure.

Traditional industries will also be strengthened through increased adoption of ICT. A Network of Agricultural Extension Agents will be strengthened to provide farmers across Botswana with timely information to assist with productivity, sales and marketing, distribution and disease prevention.

ICT has a lot to offer in developing tourism in Botswana, and a sophisticated National Tourism Portal is to be implemented with the goal of enhancing national tourism revenues.

The Student Connections programme will place specially trained students from university or community colleges in SMEs or non-profit organisations to assist with ICT adoption. In return, the students, who will be paid, will gain valuable job experience. A programme of specialised ICT training will be designed to develop local capacity by helping senior business people better understand how ICT can increase productivity, profitability and organisational effectiveness.

Helping SMEs become e-businesses is a key component of the National ICT Policy. The e-Government Portal will provide a special area tailored to the needs of SMEs including practical advice and tools for business start-up, company registration, developing an effective website, using the Internet as a business tool and a service to connect potential buyers and suppliers.

It is expected that these initiatives will result in growth opportunities for local suppliers of computers, software, Internet, installation and repair services, consulting support and training, thus creating significant potential for employment creation. It is anticipated that the injection of the National ICT Policy initiatives will significantly increase the size of Botswana's ICT sector. A monitoring and evaluation programme will be designed to measure economic growth and numbers of jobs created.

2.2.4.6 Connecting Botswana

Connecting Botswana outlines a series of multi-stakeholder initiatives involving government, the private sector and local communities, aimed at developing and strengthening Botswana's technical infrastructure so that it can support the various programmes and projects included in the ICT Policy.

A Major Infrastructure Enhancement Programme will be fast tracked, starting with an analysis of all ICT requirements from a deployment, quality and standards perspective. Requirements will then be assessed and appropriate technologies identified to create in an Architectural Blueprint for all proposed ICT initiatives. The analysis will also recommend infrastructure sustainability strategies to support, maintain and grow the ICT infrastructure beyond an initial five-year timeframe.

As part of telecommunications liberalisation, a review of the numerous consulting reports regarding competition will be consolidated into a clear and cohesive strategy. Coordination between telecommunications and technology agencies will be introduced and all ongoing projects and plans will be analysed to understand how they will contribute to implementation of the ICT Policy.

Broadband, Wireless and Satellite technologies will become increasingly important and enhanced infrastructure will be required to support more sophisticated and data-rich ICT applications in health, education and entertainment. An Advisory Body will advise on on-line security, Public Key Infrastructure, Open Source Software and standards development. A Security and Privacy Review will ensure that appropriate policies, procedures and international standards are put in place.

A comprehensive training programme is also recommended, with particular emphasis placed on the development of Network and Technical Support Skills such as network design, service acceptance, network management, hardware and software support techniques and customer service.

2.2.5 Implementation Strategy

Due to the scale of the work required to design and implement the programmes and projects recommended by the ICT Policy, two critical project management tools (Master Plan, Monitoring and Evaluation Framework) will be developed and world class project management methodologies used. The Master Plan (which will be used to manage all projects and programs) will contain project plans with timelines and work breakdown structures of all major initiatives. These will be implemented on a phased basis to ensure each project supports the others. The Monitoring & Evaluation Framework will measure outputs and outcomes of all major initiatives and contain key performance indicators of all initiatives measured against the Goals and Objectives of this Policy.

2.2.5.1 Fast-Track Initiatives

Listed below are fast-track initiatives that will be launched at the earliest opportunity:

- Approved Governance Structure for the design and deployment of the National ICT Policy
- Design of the Connecting Communities Programme and Community Access Centre Prototype
- Service Delivery Reform Programme for Government
- e-Government Portal Prototype and Request for Proposal
- Thuto Net Programme Design and Coordination
- Establishment of an e-Health Council
- Healthcare Portal Prototype and Request for Proposal
- Tourism Portal Prototype and Request for Proposal
- Design of the Agricultural Extension Agents Network
- Architecture Blueprint Initiative
- Infrastructure Deployment Office
- ICT Infrastructure Advisory Body
- Acceleration of Telecommunications Competition
- Development of e-Commerce Legislation
- ICT Promotion and Awareness Campaign

2.2.6 Investment

Wherever possible, individual ICT initiatives were allocated a provisional cost estimate by the Task Forces. A total funding estimate of 950M Pula was identified for the design and implementation of the National ICT Policy, not including the cost of all technologies and services. The exact cost of each project will only be known once the project has been designed in detail and, where appropriate, supporting business cases have been completed. There is already provision in the National Development Plan 9 for the Maitlamo projects, many of which will be conducted on a public-private-partnership basis, with most of the capital being provided by the private sector.

Costing estimates to support year one fast-track initiatives are expected to be in the region of 35 Million Pula. The Rationale for investment will be as follows:-

- Government services will be implemented by appropriate outsourcing and cost recovery initiatives. Public Private Partnerships will be encouraged to secure necessary investment
- Systems critical to national security will be owned and operated in-house

2.2.7 Maitlamo Governance Structure

2.2.7.1 Information Age Council

Implementation of the ICT Policy can only be achieved through cooperation and participation of all sectors represented by the Information Age Council. This will comprise the Minister for Communications, Science and Technology (MCST), as Chairperson, and eminent national and international ICT experts, to monitor, coordinate and champion ICT for national development. The terms of reference will include production of reports to Cabinet and its Committees.

MCST will be the secretariat of this Council with responsibility for strategy, standards, quality assurance, monitoring and evaluation. Implementing agencies supporting the Council will include:

- The ICT Legal Reform Taskforce
- The enhanced Department of Information Technology within the Ministry of Communications, Science and Technology

2.2.7.2 ICT Legal Reform Taskforce

The role of the ICT Legal Reform Task Force will be to coordinate and drive a project addressing capacity constraints that impede amendment of national laws to prepare for the cyber-economy. The project will actively cooperate with the various Ministries responsible for relevant legislation.

2.2.7.3 Enhanced Department of Information Technology (MCST)

The Department of Information Technology (DIT) in the Ministry of Communications, Science and Technology will be assigned necessary staff and resources to fulfil the following functions

- Manage national ICT projects
- Manage and monitor national ICT service levels .
- Procure services to support the office of e-Governance.
- Provide secretarial services to the Information Age Council

2.2.7.4 e - Governance Structure

The e-Governance initiative will be coordinated by MCST in close cooperation with the Public Service Reforms Unit (PSRU) in the Office of the President. It is proposed that he Government ICT Steering Committee will be chaired by the Chief Controller of e-Governance, a senior officer in MCST. Each ministry will be given the resources and responsibility for implementing own IT programme, supported by MCST and PSRU in the Office of the President and the ministerial Performance Improvement Coordinators (PIC).

2.2.8 Summary

The 2007 National ICT Policy builds on Vision 2016 to provide key strategies essential to achieving Botswana;s national development targets. The goal is to secure a key position in the global information society. A primary focus of the Policy is the development of ICT related skills in children and young adults. Online information on employment, community development, healthcare, education and government services are key Policy recommendations. eCommerce will enable local companies to compete in the global marketplace.

The National ICT Policy requires all key stakeholders (including public sector, industry and civil society) to collaborate and the policy itself involved a consultation process with a cross section of over 1,000 individuals representing all segments of society and all parts of the country. The ICT Policy has resulted in recommendations for necessary ICT related legislative change and the National ICT Policy should be considered in the context of other current polices of the Government.

2.3 Conclusions

The Government of Botswana has developed a comprehensive ICT Policy, which when fully implemented will significantly impact the socio-economic development of the country. There is a clear openness to collaboration with all key stakeholders, which is likely to have a significant, positive impact on rolling out initiatives.

Botswana undertook a review of their existing STI policy during 2011 and a new Research, Science, Technology and Innovation Policy has been approved by Cabinet and is scheduled to be presented to Parliament in the current Parliamentary session (Q1 2012).

2.3.1 Progress to date in implementing the ICT Policy

Botswana is a middle income country, which means that it does not enjoy the level of external support (whether budgetary or technical) provided to most developing countries. This means that is reliant on leveraging its own resources or contracting experts to help implement national policies.

Botswana undertook a review of their existing STI policy during 2011. A new Research, Science, Technology and Innovation Policy has been approved by Cabinet and is scheduled to be presented to Parliament in the current Parliamentary session (Q1 2012)

The tables below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 5.79 in 2008 and 5.83 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has declined slightly from 2008 to 2010 (Index Score out of 10: 3.72 in December 2008 and 3.53 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.97 in December 2008 and 4.26 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved slightly from 2008 to 2010 (Index Score out of 10: 2.70 in December 2008 and 2.75 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has declined slightly from 2008 to 2010 (Index Score out of 10:4.44 in December 2008 and 4.35 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved from 2008 to 2011 (Index Score out of 1: 0.3647 in 2008 and 0.4186 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.23 in 2008 and 0.44 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

3. POLICY ENVIRONMENT IN BURUNDI

3.1 Introduction

Information and Communication Technologies open up new horizons for Burundi by providing an accelerator for development as a horizontal enabler. ICT, which is considered to increase the potential for jobs and income development, is among the priorities of NEPAD to structure and develop other sectors such as education, health, trade and public administration.

The introduction of ICT is not simply a technical issue as it also has implications and benefits for societal development. The appropriate use of Information and Communication Technologies can contribute to a better management of crises, conflicts, peace management and national reconciliation.

The World Summit on Information Society facilitated the development of a Vision and to define a Strategic Action Plan of concerted development to concretize this vision and to build this new Information Society.

3.2 National ICT Policy in Burundi

Conscious of the potential ICT can facilitate, the Government of Burundi committed to a policy encouraging the integration of the use of the ICT in all spheres of society. Important measures of reforms and investment have been adopted and have been achieved in the ICT domain that constitutes, in the modern economy, the potential for increased creation of jobs.

From Independence to 1979, the telecommunications sector was governed by the Decree of 1971 and had successive modifications:

- Creation of the National Telecommunications Office (ONATEL), by Decree N°100/146 of 08/11/1979 with the statute of a public establishment for industrial and commercial activities, enjoying technical and financial management;
- Enactment of the Law on Telecommunications, by the Decree - law N°1 /011 of September 4, 1997 carrying organic arrangements for telecommunications;
- Harmonization statutes of the ONATEL with the codes of public and private societies by the Decree N° 100/165 of September 5, 1997;
- Enactment of law N°1/002 of 06/03/1996 carrying the code of the public and private societies;
- Creation of the Agency of the Regulation and the Control of the Telecommunications (ARCT) in 1997 to play the role of referee and regulator in order to create the favorable conditions of a faithful and dynamic competition between the different operators.

Today, as a result of liberalization, the actors of the telecommunications sector are classified into three categories:

- Two fixed line telephony operators: ONATEL and LEO (private);

- Mobile telephony Operators: ONAMOB, and the three private entities - LEO, AFRICELL and ECONET
- Suppliers of Internet services (LEO, CBINET, USAN, ONATEL) and others actors (cyber cafés, distributors, call centers).

In relation to the Internet, in 2007 the numbers of Internet subscribers were estimated to be about 2,000 with a value of 20.000. Internet access is predominantly accessible through public point of access in cyber cafés in the capital.

The computer infrastructure in Burundi is still evolving with a low rate of computerization and automation of services to date. The more advanced sectors that leverage networking are banking and insurance companies.

ICT contributes extensively to improve media production techniques and access to information for Burundian journalists.

3.3 Current ICT Legal Framework

ICT falls under the remit of the Ministry responsible for Telecommunications in Burundi.

On 27 October 2000, the Government of Burundi in cooperation with UNDP set up a project focused on "Support to the setting up of a National Strategy in ICT". With financial support from UNDP, the Government of Burundi led several activities in relation to the use of ICT in the service of the socioeconomic development and the Good Governance under the responsibility of the National Committee.

Apart from the telecommunications laws outlined in section 2.2, other legal structures that regulate ICT include:

- In May 2000, Order N°580/391/2000 set up a structure for the coordination and follow-up of ICT. This order lead to the nomination of the National Committee responsible for the coordination and the follow-up of ICT under Ministerial Order N°580/392/2000 on 31 May 2000;
- In January 2001 the National Committee was expanded from 5 members to 11 Members under the Ministerial order 580/…/2001 of January 23, 2001.
- On 9 December 2002, Ministerial Order N°580/932/2002 nominated the members of the Structural Technical Committee for ICT.
- On 21 November 2003, under Order N°580/499/2003, the Minister of Communications nominated the members of the News Commission responsible for coordination and follow-up of ICT

3.4 Conclusion

The Government aims to mobilize all necessary resources to encourage the setting up of the basis infrastructures and for the realization of structuring projects focused on the development of sectoral

national contents to added Value (Education, Health, Trade, Industry, Finance, Transport, Culture, Tourism, Sports, Leisure, Diaspora, Cyber, Government, Tele-medicine, etc…)

2.3.2 Progress to date in implementing the ICT Policy

Most developing countries are dependent to a considerable degree on external assistance to help them avoid the mistakes made elsewhere, thus conserving scarce resources.

The Government of Burundi has led several activities in relation to the use of ICT in the service of the socioeconomic development and Good Governance under the responsibility of the National Committee.

The World Bank supported the National Backbone system to link the provinces and the design phase commenced in early 2008. UNESCO undertook a survey of Higher Education institutions in 2008.

Follow on activities include the launch of a optical fibre project, plans to provide computers in the Higher Education system, a policy for free changes when importing ICT equipment and the development of partners in ICT Networking (such as participation in the IST-Africa Initiative).

Despite the liberalisation of ICT, Burundi still faces a number of challenges in relation to the ICT adoption. Investment in ICT for Higher Education is planned during 2012 – 2013 to include development of a common telecommunications infrastructure, interconnection of workstations and development of software to manage Bachelor and Master Programmes.

The strategic objectives outlined below constitute the key axes on which the Government chose to concentrate efforts in view to realize its vision:

- Objective 1: Reinforce the capacities of the Human Resources
- Objective 2: Improve the legal and authorized environment
- Objective 3: Promote and to reinforce the development of the basis infrastructures
- Objective 4: Promote Good Governance
- Objective 5: Promote and to encourage the private investment
- Objective 6: Promote the development of the contents and applications.

Yearly indicators will measure the degree of achievement of these objectives.

The Government is committed to make of the production and use of the ICT a national priority.

The tables below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
Dimensions	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 3.86 in 2008 and 4.03 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 2.63 in December 2008 and 2.67 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011) The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 1.95 in December 2008 and 2.16 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 2.92 in December 2008 and 3.10 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

	Political & Regulatory Environment	e-Government Development	ICT Usage
Dimensions	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10: 2.94 in December 2008 and 3.09 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved from 2008 to 2011 (Index Score out of 1: 0.1788 in 2008 and 0.2288 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	Unfortunately, no data is available on Burundi, but nationally ICT Usage is generally at a low level, **Source:** ITU Measuring Information Society Report 2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

4. POLICY ENVIRONMENT IN CAMEROON

4.1 Introduction

The Government of Cameroon has developed a National Policy for the Development of Information and Communication Technologies (September 2007) which is seen as a key enabler to achieving the goals of the 2003 Poverty Reduction Strategy Paper (PSRP).

4.2 National ICT Policy for Cameroon

The Government of Cameroon has given special attention to the potential impact of ICT on achieving the goals of the 2003 Poverty Reduction Strategy Paper. The Introduction to the ICT policy notes that ICT "*is not an end in itself for Cameroon, but a powerful tool to help increase productivity, competitiveness stimulate growth, create employment opportunities and as such improve the wellbeing of Cameroonians*". ICT will be used "*to build a people-centred, inclusive and development oriented information society, where its citizens can create, access, utilise and share information and knowledge in a bid to achieve sustainable social and economic growth, which is one of the preconditions for poverty reduction and hence improvement of life of Cameroonians*". As far back as November 2004, the President of the Republic focused on the need for wide spread Internet access.

A national survey (Scan ICT) carried out in 2006 by the Ministry of Posts and Telecommunications found that telephony services were only available in 30% of the country, with fixed line penetration of 0.7% and mobile penetration of 15%. The survey found that less than 7% of organisations had a computer, less than 27% of government services were available on the Internet and national Internet penetration was only 0.16%. This is despite access to an under utilised fibre optic backbone along the Chad-Cameroon pipeline, a landing point at Douala of the South African Telecommunication 3 (SAT3) submarine cable, which has a 2.5 Gbit capacity, and a developed education system.

Over the last number of years, there have been a number of national initiatives focused on stimulating the use of ICT as a development tool to alleviate poverty and other challenges

- Government action plan for an information and knowledge-based society by Ministry of Scientific Research and Innovation
- Implementation of ICT development programme by Ministry of Higher Education
- Creation of multimedia resource centres at secondary and high schools by Ministry of Secondary Education
- Liberalisation of audiovisual sector by Ministry of Communications
- Implementation of National Governance Programme by Prime Ministers' Office
- Use of ICTs to manage State Personnel by Ministry of Public Service and Administrative Reform
- Computerisation of National Identity Card by Delegation of National Security

- Computerisation of Electoral Process by Ministry of Territorial Administration and Decentralisation

External initiatives include

- Definition of National Information and Communication Plan (NICI Plan) by UNECA
- UNDP Initiative on ICT Policy in Cameroon within the framework of the Second Tokyo International Conference for African Development (TICAD II)
- ITU Support for formulation of MINPOSTEL Sector Strategy
- UNESCO Support to development of community and rural radios

Due to insufficient consultation and coordination amongst stakeholders involved in these sectoral and ministry initiatives, the National Agency for Information and Communication Technologies (ANTIC) was tasked with formulating a National Policy for the Development of ICT, which implements "*some provisions of the Constitution, the Investment Code, education sector laws, major guidelines of the PRSP and honour commitments made by Cameroon with regards to global poverty reduction efforts (Millennium Development Goals, Education for All, Tunis Agenda for the Information Society, etc.)*" It aims to provide

- A comprehensive framework for ICT development in line with national objectives
- A consultation and action framework for collaboration by the public sector (government) with the private sector, civil society and development partners
- A framework for coordinating government action and external support, notably from the Digital Solidarity Fund

4.2.1 Current ICT Legal Framework in Cameroon

While as of September 2007, regulation of the Internet sector was still under preparation, the legal and regulatory framework for the audiovisual sector (including broadcasting) and the Telecommunications Sector is quite developed with laws in place addressing telecommunications regulation (Law No 98/14 14 July 1998 and Law No 2005/13 29 December 2005) and establishment of Cameroon Telecommunications Corporation (CAMTEL) (Decree No 98/198 8 September 1998), institution of minimum service in telecommunications sector (Law No 2001/10 23 July 2001), and modalities for operation of telecommunication networks (Decree No 2001/830/PM 19 September 2001) and provision of telecommunication services (Decree No 2001/831/PM 19 September 2001). However, mobile telephone services and Internet access are not considered in this legislation and the government considered the regulatory environment for use of ICTs in business to be weak, with the need to better protect IP, freedom of access to information, legal recognition of electronic signatures, EDI and legality of contracts or transactions concluded on the Web.

While individual Ministries are responsible for different aspects of development, deployment and exploitation of ICTs (e.g. Ministry of Communications, Ministry of Trade, National Agency for Information and Communication Technologies – ANTIC, Ministry of Posts and Telecommunications

and Telecommunications Regulatory Board, National Centre for the Development of Computer Services), the Presidency of the Republic defines and sets guidelines for National ICT policy (ANTIC reports to President), the Prime Ministers' Office is responsible for monitoring implementation of the ICT policy and the National Assembly has a legislative responsibility, responsible for voting ICT related laws.

Established in 2002 (Decree No 2002/92 8 April 2002) the ANTIC is responsible for harmonising technical standards, providing design and development expertise to government ministries, coordinating establishment and monitoring of public sector Internet, Intranet and Extranet sites, contributing to technical training of trainers for universities, colleges, secondary and primary schools, and training of public sector personnel.

4.2.2 Current Infrastructural Environment

The National Policy identifies some specific challenges at an infrastructural level in Cameroon that impact on wider adoption of ICT. The capacities and quality of links between Yaounde and Douala cannot fulfill the requirements of the public operator (CAMTEL) and those of other operators and service providers and the networks are generally saturated in the large cities. While ADSL and Wireless LAN technology is deployed to some degree, primarily in Yaounde and Douala, 80% of the national public transmission network (which is based on analogue technology) is obsolete, which makes it impossible to introduce internet services on such links and also leads to serious maintenance problems, as spare parts are not available. In addition, most of the public digital exchanges that do exist are first generation and cannot support new services. This clearly creates enormous barriers to new market entrants leveraging existing infrastructure, which has become international good practice to avoid duplication of investment in equipment and encourage service providers to focus on quality of service and maximum population coverage.

While mobile telephony penetration (provided by two private operators) has expanded to 15% market penetration from almost 0% in 2004, there are some practical constraints that must be addressed. There is currently inadequate mobile coverage of the country, service quality is not sufficient in places, service quality is not sufficient in some places and costs associated with communications, handsets and terminals are often too high. In part this is blamed on the current duopoly, which does not give rise to sufficient competition.

Sometimes there is a lack of transmission capacity (particularly outside the large cities), the 900 Mhz band is currently saturated and not properly managed, leading to pressure from operators to assign the 1800 Mhz band, which in turn requires specifications to be revised. The inadequacy of the public infrastructure, has led to the emergence of many national private operators providing government and business users a series of alternative telecommunication solutions including VOIP, VSAT and VPN. Most commercial banks have private data exchange networks and the Ministry of Higher Education manages an inter-university networking linking 16 university sites across the country. However, as there is little or no coordination in the construction of these networks,

interconnection and exchange of information between these networks is not assured, which raises systemic risk from a national perspective, as well as running the risk of expending scarce resources on potentially duplicate infrastructure and providing little incentive to share networks.

As at September 2007, there was no Internet Exchange Point (IXP) in Cameroon, meaning that national traffic had to connect via international hops to reach its final destination within the country, wasting valuable, expensive international bandwidth. Putting an IXP in place will slash network delays by eliminating the need for satellite hops in routing domestic-bound traffic, which should result in increased use of domestic Internet services. The government position is that as domestic bandwidth is always cheaper than international bandwidth, the business cases for domestic Internet enterprises could improve dramatically with the introduction of an IXP – not just for ISPs (Internet Service Providers), but more importantly for eBanking, eCommerce, eGovernment, content hosting, web services etc.

There are currently very large digital disparities between urban areas (primarily Douala and Yaounde) and rural areas, 15% of the country has limited or no communications coverage, despite the use of satellite relays and the country is primarily currently an ICT products consumer. Most local suppliers of ICT products and services are branches of foreign firms. As of September 2007, Cameroon had no data banks of information systems that could be consulted by citizens or enterprises (with the notable exceptions of the Integrated System for the Management of Public Finances (SIGEFI) and the Integrated System for the Computerised Management of State Personnel and Salaries (SIGIPES)), and there is a lack of clear vision in relation to how equipment investment can support necessary change.

4.2.3 Current Level of ICT Human Resources

The National ICT Policy recognizes the critical role that human resources play in an Information and Knowledge Based Economy. "*Human resources constitute the primary capital in the race among countries and nations to play a dominant role in the global scientific, cultural, economic and political scene*" [2.3 Human Resources, p28]. The Policy recognizes that primary and higher education does not provide adequate ICT training, with less than 5% of university students digital literate (i.e. able to use a computer for basic desktop applications such as word processing or using the Internet for structured research). This clearly has negative implications for people leaving school and university and entering the workforce, particularly in the case of business or government organizations, as this presents a clear skills gap between the requirements of such organizations and candidates.

While a variety of training centres have been established to meet this skills gap, there is little standardization of the training received, leaving the issue of how employers are supposed to evaluate the benefits of candidates who have undertaken specific training. This problem is reinforced by the low number of privately owned computers.

A key problem area is the lack of available lecturers in high education institutions to train technicians and engineers in certain ICT fields (including computer science, networks,

telecommunications and electronics). As of September 2007, Cameroon only had the capacity to train about 35 engineers and 300 technicians per year, which clearly has serious negative implications for sustaining wide-scale ICT development and deployment.

Once employed, in most cases there is little or no in-service training provided, which increases the risk of available skills sets going out of date quickly. A related problem is lack of career path, where individuals recruited for specific ICT tasks have little opportunity for retraining or reassignment to another technical area, let alone general management, thus making it more attractive to leave the country for opportunities abroad once qualified.

4.2.4 Current Level of ICT Adoption

Key results of the SCAN ICT survey carried out by MINPOSTEL in 2006 are as follows:

- With only 174,000 fixed telephone lines in Cameroon, only 51.6% of enterprises have a fixed telephone line with only 5% having more than 3 lines
- The costs of fixed and especially mobile phone calls are still relatively high
- With the cost of a computer equivalent to annual per capita income, low fixed line penetration and the very high costs of Internet Connectively, these constitutes major barriers to ICT adoption and Internet access for the population of Cameroon
- Universal television and radio access has not yet been achieved, with only 62.3% of households having a radio and 26% having a television
- Internet costs are too high relative to national average income
- The proportion of the workforce having access to computers is very low with only 33.8% of institutions having computers, and 6.2% having more than one computer
- Only 9.2% of institutions have Internet access with 10.8% having a website
- There are wide disparities (geographical, income & educational) in access to ICT

In the context of education (primary and secondary schools, colleges, universities and research institutions), the sector has a great role to play in developing and deploying ICT, as well as leveraging ICT to improve efficiency and impact at a national level.

Initiatives that have been put in place include

- A commitment to roll out ICT training progressively in schools, colleges & universities
- An inter-ministerial committee has been established on the use of ICT in education
- Development Partners are supporting development of ICT (e.g. Canadian cooperation, French cooperation, Islamic Development Bank)
- 16 multimedia resource centres with Internet access are being established in schools
- All higher education and research institutes are being connected to the Internet
- A Computerised Educational Management Information System (EMIS) put in place

- A virtual library (inter-university documentary resource centre) is being established to improve the quality of distance learning educational services being provided

Cooperation and partnership activities to date have focused on the following areas

- Capacity building for institutions and human resource development
- Sharing of experiences and international good practices
- Technical and financial support for project execution
- Contribution to preparation of international declarations, conventions and treaties

However significant challenges in the educational system remain, including

- High dropout rate (44% of students do not finish primary school, and less than 4% enter higher education)
- Computer/student ratios are very low (5% of students use ICT in the learning process), partly due to high hardware costs and lack of ICT training for lecturers
- Research centres & institutes are not well equipped with ICTs
- Most websites are static, often with out of date content and lack of any interactivity
- No interactive training materials have been developed or deployed in education

As a result, the education sector may not be able to provide the level of adequate training required for Cameroon to be competitive in the emerging global knowledge society.

There is also a clear requirement in the health and social welfare sector to exploit ICT. However, due to lack of ICT infrastructure, many eHealth applications have not been completed to date. These include electronic health files, electronic health cards, telemedicine etc. ICT will also facilitate the management of district, provincial and referral hospitals, and facilitate modernization of the national health and social welfare system.

Where ICT is used in business, most applications are centred around commercial (purchases and marketing), management (administrative and financial) and production duties. As of September 2007, limited use is made of electronic transactions. Banking applications focus around accessing bank account details via Internet and mobile banking and fund transfer, although the number of citizens holding bank accounts is small. The Post Office (CAMPOST) has failed to keep up to date with the use of email and SMS for example, losing ground to other players in the financial sector. eCommerce is limited due to the low take-up of credit cards in Cameroon. eAgriculture which could be a serious area for innovation is very weak, with limited data available on the web and almost no commodities data which could be of considerable value to farmers for example. ICT take-up in the agricultural sector is seriously constrained by lack of ICT infrastructure outside urban areas.

While Cameroon has significant potential to take advantage of its bilingual people (English and French) and relatively high literacy rate, this has not been actioned by the public or private sector to date. As of September 2007, the legal framework in Cameroon still needs legislation dealing with cyber crimes, and the security services and justice system need the facilities and qualified

personnel to deal with ICT related offences. In the public sector, the financial functions (taxation, customs, treasury etc) have the highest adoption of ICT.

Certain data on individuals, natural resources etc is increasingly being stored in data centres located outside the country. This requires attention to be paid to how such data is protected under national legislation, especially as it relates to

- Population Management (Civil status, national identity card, electroral register, population census, DNA mapping)
- National Resource Management (data on satellite maps, geographical information systems, data from scientific, technical and economic studies
- Territorial Management (Digitised mapping, Geographical Information Systems, government communications, control of borders)
- Justice (register of case files)

While the culture and leisure sector offers enormous scope to leverage ICT for digital preservation and promotion, Cameroon has limited visibility on the Internet to date. Few libraries, archives, museums and other national cultural institutions have digital records.

In summary, access constraints (e.g. high costs of services and equipment, disparities between rural and urban infrastructure, lack of competition) have slowed adoption in the public and private sector as well as by civil society. Considerable investment is required in education to ensure the country can be competitive in the global knowledge economy. Lack of data and infrastructure in rural areas are putting serious constraints on the export potential of the agricultural sector, which is of great national importance. The low take-up of electronic payment facilities has slowed the adoption of eCommerce, and many citizens do not enjoy access to the eGovernment services actually offered by the government.

4.2.5 Political Support and ICT Policy Priorities

The National ICT Policy states that "*The mainstreaming of Cameroon in the emerging world information and knowledge society stands as a national priority and a major challenge for the country's future. Accordingly, the Government intends to use Information and Communication Technologies as one of the enablers to transform the country into an information and knowledge based society in which individuals, communities, corporate bodies and administrative services make full use of the Internet and other ICT services to facilitate and accelerate the socio economic development of the country*." [p40]

The Government aims to create "an appropriate environment for the development of the Internet and other information and communication technologies in Cameroon" by

- Extending access to ICT to all sectors, social segments and regions of the country
- Developing ICT infrastructure through the installation of a reliable, high capacity telecommunications backbone infrastructure which will enable not only nationwide coverage but

all speed up integration of ICT in social and economic development by transforming the country into an information and knowledge based society

- Promoting innovative and indigenous ICT usage to render national enterprises and the country more productive and competitive
- Building national capacities to produce and distribute ICT products and services in the economic and cultural sectors

These aspirations require establishing an appropriate environment for infrastructural, legal, regulatory, institutional and human development to foster national ICT adoption. It will also require right of access to information, transparency, fairness and accountability based on

- Reduction of all types of disparities (equality and equity) – universal access strategy
- Respect for rights and freedoms – ensure ICTs not used against individual rights
- Liberalisation of offer – encourage development of private sector enterprise
- Efficient and well coordinated partnership – support Public-Private-Partnerships
- Accountability (transparent and efficient management)
- Enhanced de-concentrated/decentralised management
- Cost control – avoid waste of scarce resources and combat corruption

Based on Cameroon's current level of development, priority areas for developing of ICT are

- ***Developing Human Resources***

Cameroon current has an enormous ICT skills gap and acute skills shortage, with less than 10% of working population in professional positions in the public or private sector. With 60% of the population under 25 years, training youth is critical to transforming the country.

The government strategy is to develop ICT awareness programmes, provide ICT equipment to training institutions, develop ICT training programmes for teachers of ICT, promote setting up pertinent training courses for ICT specialists needed in industry and increase opportunities for continuing training in the area of ICT.

- ***Improving the Legal, Regulatory and Institutional Framework***

Current legislation requires periodic review, to address the convergence of technologies and information services in telecommunication, information management broadcasting, and their impact on the delivery of social and economic products and services for society. The goal is to put in place a dynamic and flexible legal, regulatory and institutional framework that strengthens competition, guarantees continued protection for human rights and ensure the principles of universal access and service are reinforced.

The government strategy is to adapt national legal and regulatory framework to make it consistent with the laws, regulations, technical standards and international and national commitments, based on technology neutrality and promoting market convergence. Management of frequency spectrum

must be improved, arbitration mechanisms for resolving conflicts between operators and regulators must be established, and there is the need for constant consultation between various institutions actors in the sector.

- ***Enhancing the Rule of Law and Sovereignty***

ICT has a key role to play in preserving sovereignty and reinforcing the spirit of citizenship.

The government strategy is to develop an information system that includes information on data on civil status, police records and citizen identification, ensure nationwide computerisation of judicial processes, promote computerisation of the electoral process, encourage electronic surveillance of public places and highways, promote relevant use of ICT within the police, justice and defence forces, reinforce the human & material resources of the police to combat cyber crime and establish Geographic Information Systems (GIS).

- ***Developing Telecommunication Infrastructure***

The current national ICT infrastructure is virtually obsolete. Certain quantitative objectives have been set by MINPOSTEL as part of the telecommunications development strategy

- Raise fixed (1%) & mobile phone (12%) teledensities to 30% & 50% respectively by 2015
- Achieve 100% radio and television coverage
- Raise Internet usage from less than 1% today to 40% by 2015
- Install modern communications equipment in about 20,000 villages

The government strategy is to establish a reliable, high capacity telecommunications backbone infrastructure that links all administrative headquarters, provide support for connecting rural, under server or remote areas, develop community access, extend national coverage of public and private postal services, share common infrastructure and sites, involve communities, local and regional authorities in setting up and maintaining access networks and seek alternative technologies for the development of networks.

- ***Developing Networks and the Internet***

The available network infrastructure to support the Internet is relatively inadequate and inappropriate for ensuring real expansion of Internet services, having been constructed independently without broad-based consultations, which may lead to incompatible technologies and thus hinder network interoperability.

The government strategy is to put appropriate legislation in place to regulate the provision of Internet services, establish an Internet Exchange Point (IXP), establish a common network for government departments and services and ensure Internet governance.

- ***Using ICTs to Develop Social Sectors***

ICT usage in the public and private sectors in Cameroon is relatively low, which is partly related to poor understanding of the potential benefits of leveraging ICT and the relatively low level of ICT usage in the country. This slows the modernisation of society in Cameroon.

The government strategy is to provide ICT training for teachers and health professionals, promote innovative forms of teaching and learning (eLearning, TeleMedicine) and high capacity, reliable and cheap connection for all schools, universities and research institutions, provide support to ICT RTD and monitoring scientific and technological evolution, promote training of women, the disabled and vulnerable groups in aptitudes, skills and competences in the economy and knowledge-based society, sensitise consumers to their rights and duties, train the police & justice system employees on knowledge-based society challenges and encourage Cameroonians to adopt ICT in their daily activities.

- ***Modernising the Public Sector***

A major priority of government is modernising public administration, which is heavily reliant on leveraging ICT to increase internal efficiency and improve relations with other sectors.

The government strategy is to provide ICT equipment to government services, develop online eGovernment services, train government workers on the use of ICT, develop telecommunications networks at all level of administration, develop information systems for collecting and disseminating government data, build on and generalise existing success stories, increase the number of public access points and develop digital archives.

- ***Developing an ICT Industrial and Services Sector***

The goals of promoting creativity and innovation in industry are essentially three fold

- Ensure the sustainable development of Cameroon
- Focus Cameroon's development to an Information & Knowledge Based Society
- Transform the economy of Cameroon from a natural resource base economy to an information and knowledge based economy

The government strategy is to formulate an industrialisation plan based on technological development, ensure a balanced national development plan (roads, energy, health, universal access to telecommunications), create ICT development poles, partner with the private sector and other stakeholders to simulate growth of the ICT sector, and encourage protection of IPR to promote investment in the sector.

- ***Promoting a Competitive Economic Sector***

The opportunities offered by ICT for financial and human resource management should be exploited by enterprises to enhance productivity and competitiveness.

The government strategy is to provide support services to Enterprises and raise ICT awareness, provide incentives for adopting ICTs (tax reduction, financial support to SMEs), provide support for human resource development, promote eCommerce and use ICT to systematically collect, store and disseminate information on agriculture, livestock, fishery tourism etc. to facilitate access to full, updated and detailed knowledge by SMEs, especially those located in rural and under serviced areas.

- ***Valorising and Promoting Scientific, Cultural and Economic Heritage of the Country***

The goals are to use ICT to promote the nation's cultural values internationally, position Cameroon among the leaders in this new economy (where social and cultural diversities are major factors for promoting wealth, innovation and creativity) and encourage the computerisation of Cameroon's languages and cultural heritage.

The government strategy is to formulate a short, medium and long term policy for collecting, storing, developing and disseminating Cameroon's cultural heritage through education and communication, encourage the use of ICTs to promote various aspects of the nation's culture, and strengthen the capacities of libraries, museums and other cultural institutions to enable them fully play their role as content providers.

- ***Intensifying Cooperation and Establishing Partnerships***

The government is convinced that through cooperation and partnerships with the private sector, civil society, development partners that it can achieve its ICT policy goals.

The government strategy is to ensure Cameroon is actively involved in sub-regional, regional and international forums on ICT related issues, develops cooperation ties with all national and international institutions dealing with ICT issues, develop cooperation between various national players in the ICT sector, promote periodic meetings between ICT stakeholders, and participate actively in setting up regional and sub-regional projects.

- ***Controlling Costs and Financing***

Implementing this policy requires significant financial resources, thus necessitating mobilisation of finances from all existing and potential funding agencies.

The government strategy is to seek membership of the World Digital Solidarity Fund, organise consultation with development partners, establish effective partnerships between the public and private sectors and civil society, encourage an integrated approach to financing high capacity telecommunications infrastructure using HIPC funds, and use PIB resources to finance implementation of each institution's ICT master plan.

4.3 Conclusions

The Government of Cameroon has developed a comprehensive ICT Policy, which when fully implemented will significantly impact the socio-economic development of the country. There is a

clear openness to collaboration with the private sector and development partnerships, which is likely to have a significant, positive impact on rolling out initiatives.

It also seems clear that addressing some problems at a cross-border level would offer significant advantages including potential cost savings when rolling out solutions at a national level. This is particularly the case for countries addressing common problems.

4.3.1 Progress to date in implementing the ICT Policy

Most developing or middle income countries are dependent to a considerable degree on external assistance to help them avoid the mistakes made elsewhere, thus conserving scarce resources.

Following the Prime Ministerial decree No. 209/CAB/PM of August 21, 2009, a Steering Committee was created with the Minister of Post and Telecommunications as Chairperson, assisted by the General Manager of the National Agency for Information and Communication Technologies (ANTIC)[1].

The aim of this Committee was to monitor and evaluate the implementation of the ICT Policy in Cameroon. In order to accomplish its mission, a Technical Unit was created under this committee with the following objectives:

- To develop the plan of implementation of ICT projects in Cameroon Public Administration;
- To prepare reports on the national ICT strategy implementation for the Committee's validation;
- To coordinate programs, projects or operations implementation and ensure their consistency;
- To initiate and / or participate in any scoping studies of the ICT sector;
- To establish and manage the different databases in the context of monitoring and evaluation of the strategy in public administration;
- To monitor the implementation of programs and projects adopted by the Committee and to report;
- To perform any other task entrusted to it by the Committee.

The Technical Unit of the Committee reviewed a document elaborated in September 2009, by ANTIC comprising projects/programs identified in 2009 in ministries and public agencies as well as newly identified projects/programs under the following seven (07) pillars:

- Capacity building;
- Improvement of the legal, regulatory and institutional framework;
- Strengthening the rule of law and sovereignty;
- ICT infrastructure development;
- Development of social sectors through the use of ICT;

[1] http://www.antic.cm/images/stories/data/IMG/pdf/Arrete_%20n209_portant_creation_organisation_et_fonctionnement_du_comite_strategie_TIC.pdf

- Modernization of public service;
- The development of an ICT industrial and service[2]

Cameroon is at the starting point of the implementation of the National ICT Policy.

From initial observations, execution of some projects is difficult due to unavailable funding amongst other challenges.

Despite the fact that disbursement problems vary greatly between the technical and financial partners, between different sectors, and from one project to the other, some general constraints were identified. These are

- The lack of a common prioritization of development goals by the Cameroonian government and the technical and financial partners, as well as the resulting weak political ownership of some projects;
- The capacity and skill level within the Cameroonian government, especially with respect to staff responsible for project management and procurement procedures;
- A lack of functioning bodies facilitating access to information and cooperation between the different ministries[3].

The status of adopted ongoing projects and the action plan for implementation for programs/projects for 2011 was presented to the Committee in December 2010.

The tables below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 3.86 in 2008 and 4.03 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 2.93 in 2008 and 3.04 in 2011), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011)	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.23 in 2008 and 3.48 in 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 1.85 in 2008 and 2.43 in 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources: UN: United Nations, ITU: International Telecommunication Union, WEF: World Economic Forum

[2] http://www.antic.cm/images/stories/data/Plan_de_Mise_en_oeuvre.pdf
[3] http://www.minepat.gov.cm/index.php?option=com_docman&task=cat_view&gid=63&Itemid=37

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment index has improved slightly from 2008 to 2011 (Index Score out of 10: 3.19 in 2008 and 3.21 in 2011), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The e-government development index has considerably improved as from 2008 to 2012 (Index Score out of 1: 0.2734 in 2008 and 0.3070 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT is still quite timid with only a slight improvement from 2008 to 2010 (ICT Development sub-index (use) Score out of 10: 0.12 in 2008 and 0.16 in 2010, **Source:** ITU Measuring Information Society Report 2011

Data sources: UN: United Nations, ITU: International Telecommunication Union, WEF: World Economic Forum

5. POLICY ENVIRONMENT IN KENYA

5.1 Introduction

The vision of the Ministry of Information and Communication is a prosperous ICT-driven Kenyan society. The Mission of the Ministry of Information and Communication is to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services.

The 2006 ICT Policy of Kenya is based on the Economic Recovery Strategy for Wealth and Employment Creation (2003 - 2007) and the following four guiding principles:
- infrastructure development
- human resources development
- stakeholder participation and
- appropriate policy and regulatory framework

By June 2004, there were 260,000 fixed telephone line subscribers (teledensity of 0.75 per hundrend inhabitants - world average is 19) compared with 3 million cellular mobile subscribers (teledensity of 9.75 - world average of 21), and 73 registered ISPs (of which 15 are active), and by June 2005, 1 million Internet Users and 1000 cyber cafees and telephone bureaus. There were also 16 operational television stations (accessible by 60% of the population), 24 FM radio stations (accessible by 90% of the population) and 11,500 public telephones (by 2003).

5.2 ICT Policy for Kenya

Key challenges in harnessing ICT for economic growth and poverty reduction include lack of a comprehensive policy and regulatory framework, inadequate infrastructure and insufficient skilled human resources.

While ICT issues are considered to some degree in current legislation (Science and Technology Act, Cap. 250 of 1977, Kenya Broadcasting Corporation Act of 1988, Kenya Communications Act of 1998), issues related to convergence, eCommerce and eGovernment are not adequate considered. A comprehensive policy, legal and regulatory framework is required to: support ICT development, investment and application; promote competition; ensure affordability and national access; address privacy, eSecurty, ICT legislation, cyber crimes, ethical and moral conduct, copyright, IPR and piracy; support ICT R&D and develop an institutional framework for policy development and review.

ICT Infrastructure will focus on support infrastructure, software development, promotion of local manufacturing and assembly and incentives to provide ICT infrastructure.

Human Resource Development will focus on promoting ICT across the entire educational system (including training teachers), framework to evaluate and certify ICT training programmes, mechanism to attract and retain skilled personnel, establish networks to share training resources and strategies to support research and innovation.

In relation to eLearning, it is necessary to provide affordable infrastructure and eLearning platforms, promote content development suitable for the entire educational system, create awareness of ICT as an educational tool, facilitate sharing of eLearning resources, promote centres of excellence, exploit export market opportunities and integrate eLearning resources with existing resources.

Universal Access requires provision of adequate resources to the ICT sector, developing required ICT infrastructure, creating incentives for service provision in rural and other under-served areas, establishing a Universal Service Fund, raising public awareness and developing knowledge sharing grassroots level networks.

The ICT Policy foresees an important role for ICT Leadership and Public-Private-Partnerships (to provide oversight and mobilise resources), eSecurity, improving service delivery to citizens and business through eGovernment and the need for a conducive policy framework and adequate legilation to support eCommerce.

A major challenge is the lack of local content, which requires developing content in local languages, rallying all stakeholders (including development partners) and identifying, selecting and capturing information and knowledge available in various formats.

Gender and youth aspects include cost effective access to appropriate ICT, ensuring participation of women in all ICT policy formulation and implementation, and ensuring ICT policies are geared towards meeting their specific developmental needs.

5.2.1 Information Technology

IT has contributed to changing the global economic and social landscape, by creating jobs, raising productivity, increasing incomes and opportunities for increase trade and human development. Kenya wishes to reduce the rural/urban digital divide and develop all economic sectors.

The broad policy objectives of the IT policy include: social and economic empowerment (addressing gender, youth, special needs, rural and urban and disadvantaged groups, general literacy); fostering tourism and protecting Kenyan social values, culture and environment; improve health care and reduce poverty; use eGovernment to improve public service delivery and reduce corruption; improve quality of teaching and learning; promote entrepreneurship in digital economy and investment in IT related products, services and infrastructure; improve security and promote labour, health, social welfare, sports, culture, water and natural resources; and development of sectoral IT policies and strategies (e.g. eEducation, eWater, eHealth, eAgriculture).

The policy proposes to adopt a number of specific strategies to achieve these objectives.

The IT Infrastructure strategy is focused on providing sufficient reliable and secure internet capacity for education and business nationwide, encouraging public and private utility providers (including power, water, railway etc) to share rights of way and multi-purpose access to public building to develop the national infrastructure required. The government will also support the development of the local software industry.

The eCommerce strategy is focused on enacting appropriate legislation, riasing public awareness and promoting international collaboration to develop an equitable framework for eCommerce.

The eGovernment Services strategy is focused on empowering citizens by improving collaboration between government agencies and timely delivery of government services, reducing transaction costs through electronic provision of products and services and a forum to support citizen participation in government activities.

The eLearning strategy is focused on promoting the development of eLearning resources, mobilising resources through Public-Private-Partnerships, develop an integrated eLearning curriculum to support ICT in education, promote distance education and virtual institutions, establish a national ICT centre of excellence, provide affordable infrastructure, promote content development for primary, secondary and tertiery education, raise awareness and facilitate sharing of eLearning resources, export Kenyan education programmes and integrate eLearning resources with existing resources.

The IT in Health Services strategy is focused on providing IT facilities in all public health facilities and training to medical staff, establish standards and norms in the healthcare system, develop legislation governing telemedicine and health information and establish national IT resource centres in the healthcare system.

The Local Content strategy is focused on increasing the relevance of IT content for local consumption by supporting local development of applications and content, use of local languages, content preserving local knowledge and culture, promote electronic publishing, and encourage the development and management of information and knowledge resources as a national heritage.

The Fiscal Measures strategy is focused on stimulating investment and growth in the IT sector by promoting favourable fiscal policies, duty free zones and incubation centres and budgetary provision to spur the growth of ICT.

IT standards for quality assurance will be linked to national and international standards.

Human Resource Development will be supported by integrating IT in the curriculum for all levels of education, establishing networks for sharing educational resources, establishing ICT Centres of Excellence, supporting IT training for decision makers and community and civil society leaders, supporting IT skill adoption by the underprivileged and enhancing capacity for IT R&D.

Environmental issues are focused around regulations for recycling and disposal facilities.

5.2.2 Telecommunications

Key policy objectives for telecommunications include upgrading the infrastructure to position Kenya as a regional hub, enhance public service delivery (with an emphasis on health and educational institutions), promote R&D, innovation and manufacturing activities, and pay special attention to marginalised rural and urban areas.

Key strategies to achieve the telecommunication policy objectives include market liberalisation, network and service unbundling and sharing of infrastructure, technology-neutral licensing to ensure innovative service delivery, restructure Telkom Kenya, establish universal access mechanisms, promote Public-Private Partnerships, collaborate with other countries to support regional infrastructure, address the needs of the disadvantaged in developing networks, and require that physical infrastructure providers make provision for future installation of ICT facilities.

Specific targets set to be achieved by 2015 include: improve fixed-line tele-density in rural areas from 0.33 lines to 5 lines per 100 inhabitants and in urban areas from 1.97 lines to 20 lines per 1100 inhabitants; increase number of mobile subscribers from 4 million to 10 million; expand international internet bandwidth from 69Mbps to 1 Gbps; provide affordable internet access to all secondary schools and universities by 2010 and primary schools by 2015; establish internet access nodes at all district headquarters by 2010.

Licensed telecoms organisations will have at least 30% Kenyan equity ownership and the government will support small scale operators.

Operators and service providers will be licensed under the following market segments:

- Facility based public fixed telecommunications providers (including Local access regional telecommunication operators, Long-distance telecommunication operators, International telecommunication operators, and Local loop operators)

- Land mobile radio-communications services (including Cellular mobile telephone service providers, Public radio paging service providers, Commercial trunked radio communication network operators, Private radio paging networks, Private radio trunking networks and Private two-way radio networks)

- Fixed and mobile satellite services (including Public commercial satellite uplink/downlink gateway services, Private VSAT network operator, Commercial VSAT network operator, Global mobile personal communications via satellite, (GMPCS) gateway services operator, Satellite based paging network and services, GMPCS landing rights, Interactive VSAT terminal (station licence), VSAT terminal for radio determination and related services, VSAT terminal for space research and related services, and VSAT for amateur satellite services.)

- Enhanced facility-based communications network and services (Public data network operators, Private fixed telecommunication networks, Broadcast signal distributors and Cable Television networks)

- Other facility based providers (such as Kenya Power and Lighting Company, Kenya Pipeline Company, Kenya Railways can lease capacity to licensed operators);

- Internet facilities and services (including Internet service providers, Internet gateway and backbone services and Internet exchange point services)

- Resale services (including Bandwidth/lease circuit resale service providers, National payphone service providers and National telecommunication access bureau including cyber cafes)

- Value Added Services (VAS) (including Premium rate service providers, Audio text service providers, Store and forward service providers, Electronic data interchange service providers, Credit card validation platform services providers and Number portability service providers)

- Telecommunication dealers and contractors licences

- Telecommunications Technical Personnel Licence based on capacities and qualifications

To facilitate access to affordable Internet services, broadband access technology deployment will be encouraged. Telecoms operators owning the local loop and cable TV network operators will be licensed to provide Broadband services and satellite network service providers will be licensed to provide access to rural and under-served areas. In addition, the ISM frequency bands (2.4 GHz, 5.7GHz) will be opened up for public wireless data communication and broadband provision.

Sharing and co-location of ICT facilities by licensed operators will be promoted, and the government will facilitate rights of way and clearance, support cooperative R&D involving research institutions, development of regional ICT projects and collaborate with public and private sector stakeholders to develop infrastructure. Use of standards based equipment and services will be encouraged, multimedia services such as VOIP will be allowed. Security will be a priority and service providers will be required to provide disaster prediction, monitoring and early warning facilities and assist law enforcement in executing legal intercept.

5.2.3 Universal Access

The government is committed to universal service availability nationwide. Policy objectives include: ensuring all citizens have access to ICT services; basic ICT services are made available at an affordable price; promoting availability of widespread access to internet services; and ensure relevant education and training programmes maximize opportunities afforded by ICT to improve the quality of their lives and to enhance their work prospects.

5.2.4 Institutional Framework for Policy Implementation

Key stakeholders involved in developing the ICT sector include government, development partners, civil society, investors and operators and consumers/users.

The government will develop, implement and coordinate policy, regulate and license, resolve and settle disputes, and provide an enabling environment for sectoral investment. The National Communications Secretariat (NCS) established under the Kenya Communications Act (1998) will continue to advise government on ICT sectoral policy, while the sector will be regulated by the CCK and disputes heard and settled by the Communications Appeals Tribunal.

Development partners will provide financial, material and technical assistance and build capacity. Civil society will inform the policy process by contributing in relation to ICT access, eEducation, poverty reduction and eGovernance. Investors, operators and service providers will participate in provision of universal service/access, operate with integrity and good governance, provide quality and sustainable service to consumers, and keep up to date with regional and international ICT

developments. Consumers and users will ensure universal access and affordable ICT services, quality of service and continually review government policies. The government will encourage the formation of national ICT professional bodies to foster professional ethics, standards and human resource development.

5.3 Conclusions

Most developing or middle income countries are dependent to some degree or another on external assistance to help them avoid the mistakes made elsewhere, thus conserving limited resources.

5.3.1 Progress to Date in Implementing the ICT Policy

This section provides an overview of the progress in relation to the implementation of the National ICT Policy in Kenya. This will look at progress in relation to the strategies identified.

The Government of Kenya has developed a comprehensive ICT Policy, which when fully implemented will significantly impact on the socio-economic development of the country. There is a clear commitment to strategic engagement and cooperation with all key stakeholders and the principle of Public-Private Partnerships (PPPs) to implement necessary infrastructure.

Information Technology Infrastructure

Kenya now has three major submarine cables namely, SEACOM with capacity of 1.2 terabytes, the East African marine System (TEAMS) with a capacity of 1.3 terabytes and East African Submarine Systems (EASSy) cable with capacity of 1.3 terabytes. In addition Kenya is enjoying an expanded backbone ICT infrastructure

eGovernment Services

The eGovernment strategy paper has been developed and put in place. The e-Government Strategy is designed to achieve pre-determined set of goals and objectives, which are: better and efficient delivery of Government information and services to the citizens, promote productivity among public servants, encourage participation of citizens in Government and empower all Kenyans in line with development priorities outlined in the Kenya Vision 2030.

eLearning Strategy

Kenya e-Learning Centre (KeLC) was conceived in response to the expressed need for a coordinating mechanism for e-Learning promotion and development in the public sector. As a coordinating mechanism, KeLC builds synergies between s stakeholders to promote consensus and collaboration on issues of concern in eLearning.

IT in Health

Kenya has a Strategic Plan for Health Information Systems (HIS) covering the period 2009 to 2014. The strategic plan also brings along a HIS policy to guide its implementation. The two documents attempt to deliberately address the aspirations of the National Health Strategic Plan II, the Health Sector Monitoring and Evaluation Framework and the country's Vision 2030. There has also been a

lot of research in ehealth. One such innovation was fetedrecently held African Forum on science, Technology and Innovation.

Local Content

In order to develop local content, the government is awarding grants through the Kenya ICT board to Kenya citizens and companies under the *Tandaa Digital Content Grant*

Regulatory and Legal Developments

Kenya communication amendment act (2009), regulates the information and communications sector, and also enables Communications Commission of Kenya to enforce specific regulations to encourage fair competition. There are at least 20 regulations relating to issues such as universal access, tariffs, interconnectivity, fair competition, broadcasting, consumer protection, dispute resolution and others.

Human Resource Development

Kenya has developed strategies to support research and innovation leading to innovations in applications of ICT. These strategies have resulted in cutting edge innovations addressing societal challenges. Below are examples of innovations feted during the 2012 African Forum on Science, Technology and Innovation.

- M-shamba innovation is an application that informs people where to get the best agricultural products and gives farmers timely information on when to plant and the best practices on agriculture.
- 3G remote camera which is able to detect the presence of an intruder in ones house or property then sends live video to the homeowner.
- Car tracking and security system, which uses a mobile phone to track and deliver actual geographical position of any vehicle when stolen. The system accurately indicates the actual location, speed at which the vehicle is going and its travel direction.
- Olalashe - Mobile Application (location aware distress alerting mobile application)

The table below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development ICT related skills has improved slightly from 2008 to 2010 (with the ICT Skill index score on 10 as follows:4.96 in 2008 and 5.01 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved from 2008 to 2010 (Index Score out of 10: 3.35 in December 2008 and 3.60 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.75 in December 2008 and 4.11 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.63 in December 2008 and 2.77 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has declined slightly from 2008 to 2010 (Index Score out of 10: 3.74 in December 2008 and 3.58 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved from 2008 to 2011 (Index Score out of 1: 0.3474 in 2008 and 0.4212 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT nationally has made significant advances from 2008 to 2010, albeit from a very low base (ICT Development Sub-Index (use) Score out of 10: 0.29 in 2008 and 1.05 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

The Kenya ICT policy is currently under review. The review of the ICT Policy is inspired by first, the need to bring it into tandem with the constitutional and Vision 2030 objective of transforming Kenya into a leading information and knowledge economic hub in the region. The review is meant to provide the pro-active policy and regulatory framework that is not only in tandem with contemporary technological realities and dynamics but also guide the orderly development of the ICT sector in such a way as to ensure maximum developmental impact for the benefit of all Kenyans.

6. POLICY ENVIRONMENT IN THE KINGDOM OF LESOTHO

5.4 Introduction

The Government of Lesotho has developed policies to address Information Communication Technologies (ICT), Science, Technology & Innovation (STI), Media and Communications.

While each of these will be briefly considered, the primary focus will be on analysis of the ICT Policy (published 4 March 2005) and the Science and Technology Policy 2006 – 2011.

5.5 ICT Policy for Lesotho

There are serious challenges to be faced in Lesotho, with low GDP, a low level of digital literacy, only 8% of the population having a telephone and access to electricity, and less than 1% of the population owning a computer or enjoying Internet access.

Developed by the Ministry of Communications, Science and Technology, the national ICT Policy[4] is focused on facilitating the full integration of Lesotho in the global Information Society and Knowledge Economy. The Vision "*is to create a knowledge-based society fully integrated in the global economy by 2020*", and leverage ICT to achieve national development goals[5], reduce the digital divide, promote gender equality, protect the environment, and improve food security and the standard of living of all Basotho.

The rationale for Lesotho's ICT Policy is based on the need to

- Create an ICT development roadmap to attract and mobilise necessary investment
- Coordinate the efforts of all key stakeholders (Government, Business, Education, Civil Society) to ensure a shared vision for the ICT sector, avoid fragmentation of resources and maximise utilisation of scarce resources
- Ensure Lesotho is a dynamic member of the global Knowledge Economy and Information Society
- Guide the delivery and creation of electronic information across all sectors to provide all stakeholders with the tools and resources need to participate in the global Information Society
- Stimulate development of national infrastructure required to support national delivery of ICT services, providing universal access to information & knowledge
- Develop a transparent, effective legal and regulatory environment that promotes investment in the ICT sector and embraces technological innovation
- Channel delivery of ICT services and applications to achieve national development goals (e.g. food security, poverty reduction, healthy population & stable democracy)
- Develop the human capacity required to drive and sustain an information society

[4] Superseding the 1999 Lesotho Telecommunications Policy

[5] Lesotho Vision 2020 Policy Document and Poverty Reduction Strategy Paper

5.5.1 Guiding Principles, Goals and Objectives

Lesotho's Roadmap to the Information Society is based on a number of guiding principles, including the need for high level of political commitment and proactive leadership if the necessary investment required to achieve policy goals and strategies is to be secured. Clearly good governance and a commitment to freedom of the press, freedom of information and an independent media are part of that commitment. It is worth noting that these principles are supported by the Media Policy (19 August 2009) and Communications Policy 2008, which builds on the Telecommunications policy of 1999 and 2005 ICT Policy.

There is a commitment to leveraging Public-Private Partnerships (PPP) as a primary vehicle for implementation of ICT policy and a legislative environment that addresses technology convergence in a technology neutral way and encourages societal ICT adoption. An additional important consideration is a commitment to close alignment with the development goals of the Poverty Reduction Strategy[6] & National Vision for Lesotho 2020.

There is also a clear recognition of the interdependence of investment in national infrastructure (including power and roads) to facilitate universal access to ICT, and the need to ensure the delivery of eSkills (to facilitate use of ICTs) and relevant content to meet the requirements of all members of society in Lesotho (including women, youth, the disabled, elderly and the disenfranchised). This is complemented by recognition of the need to benchmark and align with regional and global policies and good practices, while supporting societal adoption through public awareness campaigns and establishment of coordination.

The Government of Lesotho clearly recognises the potential transformational impact that active engagement with the Information Society & global Knowledge Economy has to offer, the necessity of national stakeholder coordination to support implementation of that goal and the requirement for necessary changes to provide a supportive regulatory environment.

The overall ICT Policy Goals are to

- Increase wealth creation and improve quality of life through adoption and use of ICT
- Promote ICT literacy and affordable, universal access to ICT products and services
- Coordinate national ICT implementation & development of human resource capacity
- Develop standard, practices and guidelines to support ICT deployment & exploitation
- Provide mechanisms for empowering local participation in the ICT sector

The overall ICT Policy Objectives are to

- Achieve buy-in by all stakeholders of the importance of ICT for national development
- Facilitate deployment of national broadband backbone to enable ICT service delivery

[6] The ICT Policy for Tanzania is currently being redeveloped to ensure ICT supports Poverty Reduction, which is the primary driver of government policy in the country.

- Mobilise resources and establish financing mechanisms to realise ICT policy goals
- Promote development of local ICT products & services, access to public domain data
- Strengthen existing ICT institutional, legal and regulatory framework
- Promote collaboration and coordination at national, regional and international levels

5.5.2 Strategies and Role of Different Stakeholders

Eight key strategies have been defined to drive development of the Information Society and Knowledge Economy in Lesotho. The policy states[7] that "G*overnment, as a leader, in collaboration with other stakeholders, is committed to the following overall strategies*

1. *Establishing legal and institutional mechanisms to ensure the successful implementation of the ICT policy*
2. *Providing leadership in ICT development*
3. *Investing in ICT education and human resource development*
4. *Encouraging the production and wide distribution of local multi-media content*
5. *Promoting the growth of the private sector*
6. *Ensuring universal access to ICTs*
7. *Guiding infrastructure expansion need to support the delivery of ICTs*
8. *Promoting regional and international cooperation*"

The roles of each key stakeholder are then briefly defined.

Government's role is defined as providing "*the vision and policy with a legal and regulatory framework that will guide the activities of all stakeholders".* However, it is acknowledged that government "*must also play a key role in channelling resources to invest in supporting infrastructures for ICTs in partnership with national and regional businesses and development partners*".

The Regulator is responsible for monitoring "*market demand and supply capacity of service providers and shall intervene to correct imbalances or market distortions in favour of users*". While the Regulator (whose mandate is limited to regulation of Telecommunications, Information and Communication Technologies, Broadcasting, Radio frequency and Postal Services) is accountable to the Ministry of Communications, Science and Technology, it has statutory independence to ensure impartiality, flexibility and transparency.

The Private Sector (Business and Industry) is responsible for developing and expanding ICT infrastructure and providing ICT services and products. It is also called upon to improve product and services quality to ensure global competitiveness (as this is key to attracting Foreign Inward Investment as well as achieving export sales which is critical for the Lesotho economy). The Private

[7] ICT Policy for Lesotho, Section 2.6 Strategies p20 - 23

Sector is also seen as having a key role supporting the government in achieving wider digital literacy and development of ICT human resource capacity.

The Education Sector is responsible for including ICT literacy as part of core curricula in schools and universities, and levering ICT to both improve access to and improve quality of available education in Lesotho so as to develop an ICT literate society capable of producing local ICT products and services.

Civil Society has the role of identifying societal needs for ICT products and services, improving access to these products and services and promoting ICT adoption in Lesotho.

Finally International Organisations and Development Partners have been identified as having a key supporting role, working with the Government of Lesotho to secure necessary financial and technical support for ICT projects and programmes. The government will promote technology transfer and become actively involved in ICT4Dev international forums.

5.5.3 Strategic Framework

Ten cross cutting catalysts were selected by the Ministry of Communications, Science and Technology to ensure ICT policy achieves the Government's broader development goals:

- ICT and Supporting Infrastructure
- Education and Human Resource Development
- Enabling Legal and Regulatory Framework
- Rapid Delivery of ICT Services
- E-Government
- E-Commerce
- Health
- Agriculture and Food Security
- Tourism, the Environment and Natural Resources
- Gender and Youth

5.5.4 ICT and Supporting Infrastructure

Clearly significant investment in infrastructure in Lesotho is required to maximise the socio-economic benefits of ICT and telecommunication services (including Internet, mobile, distance learning, telemedicine) and broadcasting (including digital television and radio). Current coverage in terms of electrical power for example is geographically limited.

The objectives for supporting infrastructural development include promoting deployment of universally accessible advanced communications networks and infrastructure sharing by network operators to maximise impact of scarce resources, increase competition to lower prices and increase consumer choice and create a favourable investment climate for private sector investment in developing ICT infrastructures.

The strategies for implementing development of ICT and Infrastructure include adopting a technology neutral approach to building advanced, robust communications networks, promoting public-private partnerships for infrastructural deployment, encourage digital adoption by the public sector and establish broadband connectivity between business centres of Lesotho and the rest of the world and expand the national grid and road networks to support the deployment of ICT infrastructure nationwide.

The Action Owners include the Ministry of Communications, Science and Technology, Ministry of Energy, Ministry of Transport, regulatory bodies and private sector. Key initiatives include establishing a Universal Service fund to promote expansion of ICT infrastructure in underserved areas and an environment that attracts both domestic and foreign investment in enabling infrastructure, free choice of technology to deliver ICT services and products and partnerships with ICT service providers to ensure ICT services are not restricted due to geography, income, income level or disability.

5.5.5 Education and Human Resource Development

Investment in ICT oriented education (at all levels) and human resource development is essential for Lesotho to achieve its development goals. This will be achieved in partnership with the private sector, focusing on training and creating an environment conducive to ICT job creation. Current training and equipment costs are high and there are few qualified ICT professionals. Educators have limited digital literacy skills which makes rolling out ICT training and leveraging ICT to improve the quality and accessibility of education difficult. Government policy is to support the private sector to deliver on the job training and re-training programmes, and leverage ICTs to facilitate education and life-long learning in both the formal educational system as well as in vocational institutions.

The objectives for effective education and human resource development include facilitating the deployment, utilisation and exploitation of ICTs within the educational system to support teaching and learning at all levels, improve access to educational training, research resources and facilities, promote distance, virtual and blended learning and facilitate programmes that improve job skills in the public and private sectors. A key challenge is then retaining a critical mass of ICT professionals to manage innovation in the country.

Strategies for achieving these objectives include promotion of distance learning, training and virtual learning systems to compliment and supplement campus-based education and training systems, encourage educational institutions to invest in computers and internet access for management and teaching purposes, develop ICT curricula for all levels of the educational system and encourage collaboration between local and international educational institutions. Encouraging public and private sector apprenticeship programs, internships and work-study programmes, programmes for enhancing ICT skills within the existing workforce in education, business and government, improving access to education for people with disabilities and establishing & enforcing ICT certification standards are key.

The Action Owners are the Ministry of Education and Training and the private sector. Key initiatives include provisioning distance learning applications to ensure academic and training programmes are available nationally, integrate ICT in mainstream educational curricula and literacy programmes to provide equitable access for students at all levels and in particular the disabled, youth and women, promote twinning of international with national training institutions in Lesotho to enhance skills transfer, working with the private sector to develop programmes to improve and upgrade technical skills of existing staff and promote collaboration between industry and training institutions to build human resources capacity.

5.5.6 Enabling Legal and Regulatory Framework

A thriving ICT sector requires an enabling legal and regulatory framework that fosters investment, supports businesses making a profit while looking after the consumer interests. An independent regulator (as established under the Lesotho telecommunications Authority Act of 2000) that is transparent and consistent in its dealings and accountable is key. However, with greater convergence of technologies, new legislation is required.

The objectives for developing an enabling regulatory framework include promoting a fully competitive market that protects IP and copyright, private, data protection and online security without undue restrictions on public access to information, making it more attractive to do business in Lesotho by reducing economic and non-economic costs and promoting investment & innovation focused on improving access, affordability and quality of services.

Strategies to achieve these goals include promoting universal access to ICT services, putting in place a cost effective, accountable, transparent legal and regulatory framework that recognises converged technologies & promotes adoption of international good practice.

The Action Owner is the Ministry of Communications, Science and Technology which will enact new legislation to expand the functions of the Lesotho Telecommunications Authority to include regulatory oversight of the ICT sector, facilitate a competitive environment for the ICT sector and if required the establishment of a multi-utility regulatory body for the water, transport, energy and ICT sectors. As well as taking into account protection of individual privacy, online security, IPR and copyrights, the legislation will transfer oversight of a Universal Service Fund (USF) from the regulator to the Ministry of Communications, Science and Technology, where it will be established as an independent advisory body responsible to the MCST. Key responsibilities include developing working definitions of universal access, setting targets and timelines for achieving universal access goals and developing regulations to establish and operate a USF to support ICT infrastructure expansion, local content development and access to ICT services and training.

5.5.7 Rapid Delivery of ICT Services

Rapid diffusion of ICT services is necessary to bridge the digital divide between Lesotho and the rest of the world. The ICT Policy promotes a multi-channel distribution system available throughout the country, thus providing consumer choice. The government is committed to ensuring a variety of

distribution channels (including telecommunications, radio & television) are universally available for accessing ICT services on demand, while protecting freedom of expression, right to information and access to independent media.

Poverty clearly will impede take up and utilisation of ICT services, thus creating the need for ICT delivery systems, services and applications that will address developmental challenges. Objectives for ensuring rapid delivery of services include accelerated provision of appropriate, affordable, cost-effective and equitable access to ICT services across the country, access to ICT services over a variety of platforms (telecoms, Internet, radio, TV), encouraging local content development and improved quality of media information, while supporting the involvement of entrepreneurs in provision of ICT services.

Strategies to achieve these objectives include promotion of communications services take up across the country, supporting existing community radio stations and providing incentives for establishing new ones, incentivising local entrepreneurs to own and operate public ICT telecentres, encourage public-private partnerships in the provision of community based ICT services and initiatives, use the Post Offices, National Library of Lesotho and other public venues to provide public access to e-Services and applications nationwide and facilitate the planning, designing and development of national digital radio and TV networks.

The Action Owners include the Ministry of Communications, Science and Technology, relevant stakeholders in the ICT sector and the private sector. Key initiatives include rolling out public access points for Internet and other ICT services by 2010 in all post offices and in the future in the National Library, establishing a three-tiered system of broadcasting (public, commercial, community), using a universal service fund to facilitate rapid delivery of ICT services to the public, and special incentives to support ICT access for disadvantaged groups such as the poor, disabled, the elderly, youth and women. The Media Council will be established to provide guidance on professional and ethical standards, serve as an Ombudsman) to investigate and resolve complaints concerning published/broadcast news and promote and protect the right to information, freedom of expression and independence.

5.5.8 E-Government

Leveraging ICT to deliver government information and services to the public in Lesotho (eGovernment) will be instrumental in realising the principles of good governance articulated in the National Vision of Lesotho, while reducing associated costs. eGovernment can be delivered via Wide Area Networks, kiosks, Internet, and fixed and mobile networks.

Objectives include improving quality, accessibility and cost effective provision of government services and information, achieving digital literacy throughout the civil service, facilitate online transactions by government, encourage informations haring, transparency and accountability in all government processes, and improve and broaden public participation in civic and Government affairs (also known as eDemocracy & eParticipation). [In this regard, it is worth noting that the

Parliament of Lesotho is a Partner in the Africa4All Parliamentary Initiative funded under EuropeAid, focused on supporting eParticipation in collaboration with National Parliaments in Namibia, Kenya, Uganda and Tanzania.]

Strategies to achieve these objectives include developing standard formats for computerising government information and services (such as applications for passports, birth certificates and licenses), standards for hardware and software within Government, encourage intra-communication between Government agencies and with the public, and identify citizens content requirements and mechanisms to deliver it in user-friendly formats

While no specific Action Owners are identified, it is clear there is broad government ownership of the need to use ICTs to improve government administration, procedures, processes and service delivery by implementing training programmes to improve the basic computer and ICt literacy skills of civil and public servants, launch eGovernment initiatives of the most demanded services (e.g. application forms, license information, registrations of birth, deaths, marriages and voter registration forms) require all government agencies to research citizens requirements and barriers to adoption, connect all government agencies to the Internet, with a public website and access to mail and Internet for all employees.

5.5.9 E-Commerce

e-Commerce is perceived to have enormous potential for rollout in Lesotho, as it reduces barriers to entry for SMMEs, lowers overheads and marketing costs and enables local business to access international markets. However, successful integration of eCommerce requires a level of trust and confidence by businesses and consumers, and thus cyberlaws.

Objectives include encouraging new business development in the area by promoting greater awareness in the private and private sectors, protecting the interests of all participants in e-commerce and developing a conducive climate to facilitate global competitiveness of the private sector and a transparent, stable and effective legal and fiscal operating environment to promote online commercial transactions.

Strategies to achieve these objectives include developing cyber laws to government electronic commerce and trade at national, regional and international levels, develop an e-commerce friendly culture in the country, promote affordable access to ICT products and services and educate all stakeholders in the nature, benefits and risks of e-commerce.

No specific Action Owners are identified but it is clear that public and private sector involvement is expected to enact new laws that address prevention of computer crimes, protect privacy, IPR and copyrights, and provide security for online transactions., work with business and consumer groups to develop a consumer protection framework for e-Commerce and incentives for businesses implementing electronic solutions.

5.5.10 Health

A "*healthy and well-developed human resource base*" is central to the Lesotho Vision 2020, and ICTs have a key role to play in this regard by distributing health and disease prevention information to the public and assisting health case professionals by improving health care administration and management and accessibility to medical research, information sharing and training through online education programs.

The government is committed to ICT strategies and initiatives that will save lives, strengthen heal institutions, and improve access to and reduce cost of health care services. Objectives include building a health network to enable institutions and individuals to exchange electronic records, share information and delivery quality services in urban and rural areas, improve health care facility performance by deploying Health Management Information Systems (HMIS), ensure an efficient, standardised process for recording patient data, empower health professionals and increase public access to health information.

Strategies to achieve these objectives include ensuring all health care centres have access to appropriate, cost effective ICT infrastructure (including HMIS), create a national wide electronic information network for health professionals, incorporate ICT training in the core curricula for health care professionals, promote telemedicine applications to improve access to and lower costs of delivery of health care services in rural and remote areas. It is also essential to develop a code of conduct for use of HMIS and safeguard patient privacy.

The proposed Action Owners are responsible Ministries. All patient records, health administration and management processes must be computerised, a website will be established to increase public access to health information and health professionals, ICT training programs will be established for health care professionals and collaboration with the private sector will focus on cost effective means of connecting all health centres.

5.5.11 Agriculture and Food Security

ICT has enormous potential to increase efficiencies within the agricultural sector and improve food security by improving information flows between farmers, consumers and agriculturalists. This offers the potential to increase market access for farmers, respond to consumer needs and through better practices, increase crop yields and profitability.

Applications of eAgriculture range from crop planning, monitoring and forecasting, and livestock registration, marking and information systems (LRMIS), which can prevent theft and also be used to control disease by tracking and locating livestock around the country.

Food security and increased agricultural productivity are key challenges highlighted in the Lesotho Vision 2020. Objectives include improving productivity, protecting livestock investment, preventing the spread of disease, access to accurate market data for farmers (thus allowing them to make better selling and planning decisions) and monitoring of utilisation of natural resources in agricultural production.

Strategies to achieve these goals include computerising all agricultural management records, providing online access to relevant data (techniques, weather forecasting, pricing and market information) to national & district level stakeholders, developing & maintaining a national GIS system to monitor agricultural land use & manage national resources.

The proposed Action Owners are relevant Ministries in collaboration with the business community and civil society. Measures to be taken include deploying LRMIS, promoting greater use of ICT by farmers and encouraging agriculturalists to leverage the Internet.

5.5.12 Tourism, the Environment and Natural Resources

ICT is a key enabler for important economic growth sectors such as Tourism, facilitating lower cost transactions, service delivery, marketing and promotion. Objectives include facilitating growth y connecting existing and potential tourism centres, market Lesotho as a niche tourism destination, promote cross-sectoral collaboration between environmentalists and tourism operators to protect Lesotho's natural resources and environment.

Strategies to achieve these objectives include encouraging development of websites by tourism service providers to support electronic transactions, marketing and promotion and increase accessibility of information on natural resources and regional weather.

The proposed Action Owners are relevant Ministries in collaboration with the business community. The work required is clear, and has been achieved in other African countries.

5.5.13 Gender and Youth

Developing digital literacy amongst youth and women are essential for economic development in Lesotho. Developing ICT Training programmes for youth has the potential to provide the necessary skills required to drive economic development in Lesotho, whether participants later go into business, education, the public service or software development.

Objectives include leveraging ICT to promote gender equality in education, employment and land use, considering requirements of both men and women when designing ICT training programmes and increasing access to ICTs for youth and women in rural areas.

Strategies to achieve these objectives include developing ICT training for - and promoting affordable access to ICT and the use of Internet and eCommerce by youth and women. Specific topics to be addressed include health and food security and equitable access at schools to ICT education, training and literacy.

The proposed Action Owner is the Ministry responsible for Gender, Youth, Sport and Recreation, who in coordination with Civil Society and the Business community will design pilot projects to expose youth and women to business opportunities made possible by ICT, work with the Ministry of Education to ensure equal access to ICT education and establish fora for youth and women to articulate their content needs as well as perceived barriers to accessing ICTs and related services.

5.5.14 Institutional Framework for Policy Implementation

Chapter 4 of the ICT Policy focuses on specific recommendations related to the role, function and responsibilities of the Ministry of Communications, Science and Technology and the Regulator to facilitate successful implementation of the ICT Policy.

The Ministry of Communications, Science and Technology is tasked with representing the Government of Lesotho in regional and international fora focused on ICT related issues, whether through membership of regional or international organisations, implementation of regional, continental and global initiatives of which Lesotho is a member, working in partnership with international organisations (particularly in the areas of technology transfer and promoting capacity building) and dissemination of international ICT4D good practices.

Within the Ministry of Communications, Science and Technology, the ICT Department is nominated as the lead implementing body of the ICT Policy and initiatives in Lesotho. As well as promoting ICT take up of ICT services and products, rollout of eGovernment services and the exploitation of ICT for educational purposes and ICT human resource capacity building at a national level, the ICT department is also responsible for strategic planning, resource mobilisation and monitoring and evaluation (standards and indicators).

Finally, the Minister of Communications, Science and Technology will broaden the scope of the Lesotho Telecommunications Authority to include responsibility over the ICT sector. Accountable to the Minister of Communications, Science and Technology, the Authority reports to Parliament through the Minister. The Authority is mandated to regulate the ICT sector for the public good, and specifically to contribute towards development of the social goals of ICT policy, including provision of universal service and universal access.

Key functions of the Regulator include

- Regulation and Licensing (Licensing, review of licenses/fees, encourage investment)
- Universal Access/Service (develop indicators of ICT access, service obligations)
- Ownership & Control (encourage local participation in facilities, networks & services)
- Competition (promote fair competition, monitor policy compliance)
- Standards (type approval of equipment, technical/quality standards and guidelines)
- Educating Consumers, growing the industry and recruiting & retaining qualified staff

The Authority must balance the requirements of ensuring a level playing field for all licensees (transparency, fairness and accountability in all its activities), stimulating ICT innovation with a view to providing advanced ICT services, and effectively managing common national resources (e.g. frequencies & numbering schemes).

5.6 Conclusions

The Government of Lesotho has developed a comprehensive ICT Policy, which when fully implemented will significantly impact on the socio-economic development of the country. There are clearly areas of overlap between the cross-cutting catalysts, whereby collaboration with the private sector on common policy measures, instrument and initiatives would have a very significant, positive impact on rolling out parallel initiatives more quickly.

It also seems clear that addressing some problems at a cross-border level would offer significant advantages including potential cost savings when rolling out solutions at a national level. This is particularly the case for countries addressing common problems.

5.6.1 Progress in Implementing the ICT Policy to date

Most developing or middle-income countries are dependent to at least some degree on external assistance to help them avoid the mistakes made elsewhere, thus conserving limited resources.

This section provides an overview of the progress and challenges identified to date in relation to the implementation of the National ICT Policy in Lesotho. This will look at progress in relation to each of the main goals in turn.

- ***Increase wealth creation and improve quality of life through adoption and use of ICT***

Due to an incomplete legal framework, the achievement of this goal is still a work in progress. It should however be noted that job creation to a thousand low income people is evident countrywide since the private mobile operators licenses them to sell recharge vouchers and also operate mobile pay phones or public phones with intention of making profits. Lesotho has over 8000 payphones in 2010. (One should note that the population of Lesotho is about 2million) This is because since 2005 teledensity has increased significantly as outlined below [*LCA 2008/2009 report*]

	TELEDENSITY	
	2005	2009
Fixed line	1.80%	2.00%
Mobile	10%	32.00%
TOTAL	11.80%	34.00%

- ***Promote ICT literacy and affordable, universal access to ICT products and services***

The Ministry of Education and tertiary institutions now provide results via the web and mobile network. This means that results are readily available to the community at large.

Passport applicants can now check the status of their applications via mobile phones. The project has an impact on cutting travel costs incurred by people who merely want to enquire about the status of their application.

There has not been much progress in relation to the use and development of online shopping. Most shops however are now connected to the banks and the need to move around with cash is slowly diminishing.

- ***Promote effective regulation of the sector by establishing rules and regulations that promote competition, protect and educate the consumer, create a level playing field among operators and service providers and encourage local and foreign investment in the ICT sector.***

The Legal Framework[8] LCA Report 2008/2009 outlines the achievements in regard to the legal framework and some measures taken by Lesotho to ensure and attract investment in ICT.

Communications policy and legislative review

The new Lesotho Communications Policy 2008 was completed and adopted by Cabinet. The policy process is part of the Communications policy and legislative review aimed at aligning the policy and legal framework with technological developments and the dynamic regulatory environment.

The new policy establishes the framework for regulation of the telecommunications, broadcasting, and postal sectors. It provides the foundation for the adoption of the new legislation, the Communications Act, which will repeal the Lesotho Telecommunications Authority Act 2000 (as amended), and the Post Office Act of 1979.

The Policy builds upon the foundation established by the Lesotho Telecommunications Policy of 1999. It recognises that the telecommunications, broadcasting, and postal sub-sectors are at different stages of development and reform. For instance, even though the 1999 Telecommunications Policy began the process of restructuring the Lesotho Telecommunications Corporation (LTC), the state broadcaster, Lesotho National Broadcasting Service (LNBS) and the Post Office have not been restructured.

While the Policy draws on international best practices, it is designed to reflect Lesotho's unique conditions, such as her being a developing country with a small population whose density is low outside the capital, Maseru, and has limited resources. The country's mountainous terrain and the fact that it is surrounded on all sides by one country, presents additional challenges. Recognizing these conditions, the Policy seeks to adopt a concrete and achievable regulatory framework for the sector. The draft Communications Bill is being processed towards its enactment. In the meantime, the Authority is already working on a draft subsidiary legislation, which will be finalised following promulgation of the new Act.

During the reporting period, the Lesotho Communications Act was amended. The main object of the amendment was to make provision for the intervention of the Minister, in substantial, exceptional and compelling circumstances where public interest could be endangered or prejudiced by the continued utilization of a licence.

[8] www.lca.org.ls

Universal Access strategy

The objective of the universal access strategy is the development and expansion of communications services, including broadcasting services, in the unserved and under-served areas deemed to be of low economic viability by service providers. Following the approval of the Strategy and Fund Guidelines, the Universal Access Fund Committee (UAFC) was established and a legislative framework developed.

Licensing

To date, the Authority has issued licences to two major network operators, sound broadcasting licences, data communications, television broadcasting, Internet Service Provision, two-way radios, telemetry stations, amateur radios and radio pagers. Customer Premises Equipment and telebureaus licensing categories were de-listed in 2007.

The market consists of two major network operators, namely, Econet Telecom Lesotho (ETL) and Vodacom Lesotho (VCL) both providing converged communications services. The change in the number of major network operators, from three in the last reporting period to the present two, is an outcome of consolidation of operations by Telecom Lesotho (TL) and its mobile subsidiary, Econet Ezi-Cel Lesotho (EEL), which resulted in one new company. This new company has been named Econet Telecom Lesotho (ETL) (PTY) LTD.

Internet Cafès

Noting the importance of Internet cafès in the provision of access to the Internet, the Authority, during the reporting year, has started collecting statistics on the number and growth of Internet cafes around the country. The study has found that nationally, there are 24 existing Internet cafès. Maseru, the capital, has nine Internet cafés, followed by Leribe (Maputsoe and Hlotse) and Mafeteng towns with three Internet cafés each. Butha-Buthe, Mohale's Hoek and Qacha's Nek towns had two Internet cafés each. Mokhotlong town had only one Internet café. There were no Internet cafés in Quthing and Thaba-Tseka

Broadcasting

The Lesotho Communications Policy 2008 recognises the need for Lesotho to take steps to migrate to digital broadcasting. Therefore Regional roadmap and communication strategy for digital broadcasting migration were discussed and adopted.

Other developments in the sub-sector include the launch of satellite digital transmission of Radio Lesotho, Ultimate FM and Lesotho Television on Multi choice – Digital Satellite Television (DSTV) network.

Of significance in 2009 was the suspension of the broadcasting license of Harvest FM for its infringement of Condition 15 of its sound broadcasting license and Rule 20 of the Lesotho Telecommunications Authority (Broadcasting) Rules 2004.

The broadcasting sub-sector having reached sufficient development and capacity, the Authority has started implementing Part II of the LCA Broadcasting Rules that require compliance in keeping records. In this regard, the Authority directed broadcasters to submit quarterly programme schedules and their annual audited financial statements.

The Authority's application for membership in Commonwealth Broadcasting Association (CBA) was approved. Founded in 1945, CBA is a representative body for public service broadcasters throughout the Commonwealth.

- ***Increase ICT literacy levels in the country***

Our Higher Educational Institution have made ICT literacy course compulsory. They teach all students, Typing, Spreadsheets, PowerPoint and the Internet. The number of high schools with computer laboratory is gradually increasing. This shows that ICT literacy levels are acceptable. Some private primary schools (few though) have Computer Laboratories installed for basic computing suitable for children.

Use of mobile devices in the form of cell phones seems to be understood countrywide. Literacy is largely on texting (Short Message Services) and receiving and making of voice calls. One can say that if all mobile phones in circulation could be distributed amongst each family household, one can conclude that in 2010 every household in Lesotho will have a cell phone.

Internet access is still available to more or less 1% of the population. In 2010 however there has been a phenomenal increase in the use of 3G compliant mobile phones to access social network websites such as the Facebook and Twitter.

Use of VoIP through Skype, Google Talk and others has also seen growth in 2009/2010.

- ***Coordinate national ICT implementation & development of human resource capacity***

Formal ICT training in tertiary institutions and workshops for different government sectors assist in this regard and most employees understand the ICT components of their tasks.

- ***Develop standard, practices and guidelines to support ICT deployment & exploitation***

LCA was established and restructured, One of the main ICT powerhouse, a telecoms company, Econet Telecomm Lesotho, was restructured include the postal services.

- ***Provide mechanisms for empowering local participation in the ICT sector***

Lots of training by both NGOs and private companies still continues throughout the country to empower Basotho on how to make the profitable use of ICT.

- ***Liberalization of the communications sector following end of Telecom Lesotho's exclusivity rights in February 2007" by LCA***

This was an attempt to encourage foreign and local investment in ICT Sector.

The Lesotho Telecommunications Authority (LTA), now the Lesotho Communications Authority (LCA) was set up as the first step towards liberalization; promotion of competition and provision of universal access and services in the sector. At that stage, the then parastatal Lesotho Telecommunications Corporation (LTC) ceased to assume regulatory functions in addition to being a communications service provider. Since its establishment, the Authority has continued to adapt to the international resolutions for ICT development to facilitate access to communications services, both nationally and globally. To this end, there has been a significant growth in the penetration of communications services countrywide, especially in the mobile industry. The sector has realised amongst others, the phased liberalisation of the market, increase in the number of players and subscribers, increased coverage and wider choice of communication services which contribute towards bridging the digital divide. Currently, the Authority is participating in the EASSy project which is one vehicle for the SADC countries to bridge the digital divide through the introduction of cheaper, high capacity broadband connectivity.

There is full competition in the communication market since a competition in services that were within the exclusive domain of Telecom Lesotho were introduced as well as services based on converged technologies. This will enable infrastructure development for various services open for competition. The overall objective being to enable the consumer to obtain communications services at affordable prices while ensuring that the growth of the industry is realized.

This ICT vision anticipates that by 2015 Lesotho will have successfully developed and deployed ICTs that:

- Respond to national needs and priorities.
- Reduce inequalities between the sexes, and decrease the digital divide between urban and rural areas and the haves and have-nots.
- Improve governance and deepen democracy.
- Develop the human capacity needed to drive and sustain an information economy.
- Support its economic activities at home and throughout the world.

The Ministry of Communications, Science and Technology has put in place an integrated wide area network which is the foundation for a ministry-wide email application and portal. This greatly increases the productivity within individual ministries.

The **Lesotho Government Data Network** (**LGDN**) implemented in 2008/2009 is a good example of enhancing e-Government infrastructure. The LDGN entails the fibre optic cable connection between government offices throughout the country. This network enables civil servants to communicate with each via email, VoIP and otherwise. This government data 'super highway' has now made it easy to yet another achievement, that is, the operation of government business (procurement, payroll, document management, accountability etc) software called the Integrated Financial Management Information System (IFMIS). The LGDN and IFMIS have been the government's largest spending in implementing the ICT policy in 2008-2009. The LGDN is still underutilized since there are more

applications that are still under development; aimed at service delivery and communication between government and its clients. In conclusion, the government of Lesotho under the Ministry of Communications, Science and Technology has really made large strides in contributing to the 2015 goals with these infrastructural developments.

The main problem in implementing the ICT solutions that could enhance the economy, improve tourism, sell products and services and also improve livelihoods of Basotho was lack of ICT/telecommunications infrastructure. This was a concern of the Minister when launching the ICT policy in 2005. In 2008/2009, the issue of infrastructure is not as worrying as in 2005. Now the Mobile Network coverage spreads over 75% of the area where villages are throughout the country. The Lesotho National Broadcasting Services infrastructure also play a vital role in addressing this issue since nearly all villages now receive radio broadcast.

In summary the infrastructure problem has been largely addressed and what is still lacking behind are ICT innovative solutions that will help address some of the goals of the Lesotho ICT Policy of 2005.

Access to telecommunications services in Lesotho is approximately 3% of the population for fixed line and just over 20% of the population for mobile. Internet access is still nascent, with only 2% of residents subscribing to Internet services, with additional access at Internet cafes, primarily in Maseru. Efforts to expand the network further are at an advanced stage through the utilisation of the proposed Universal Access Fund (UAF). It is believed that utilisation of the UAF will assist in overcoming challenges that include difficult terrain.

In relation to overall infrastructure, the country intends to adopt a technology neutral approach in selecting appropriate, scalable technology needed to build robust communications networks. Secondly, there will be encouragement to expand the national electricity grid in order to support the deployment of ICT infrastructure.

The Ministry of Education and Training is ahead of the rest of the public sector in Lesotho, particularly in implementing an effective education management and information system (EMIS). The EMIS also assumes the form of a geographic information system (GIS) in which all schools and education institutions have been plotted by the ministry. The ministry also has a wireless area network (WAN), which connects to remote sites, and a local area network (LAN), which has been active for eight years. Every workstation in the ministry has Internet access, and there is also a dedicated Web site in addition to the Lesotho Government Web site. Policy implementation in education includes a few initiatives in the form of pilot projects in the schooling and tertiary sectors

The tables below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 3.86 in 2008 and 4.03 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 3.02 in December 2008 and 3.14 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has improved slightly from 2008 to 2010 (Index Score out of 10: 3.34 in December 2008 and 3.41 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has declined from 2008 to 2010 (Index Score out of 10: 2.60 in December 2008 and 2.16 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10:3.44 in December 2008 and 3.69 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has declined slightly from 2008 to 2011 (Index Score out of 1: 0.3805 in 2008 and 0.3501 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	Unfortunately, no data is available on Lesotho, but nationally ICT Usage (especially outside Maseru), is generally at a low level, **Source:** ITU Measuring Information Society Report 2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

7. POLICY ENVIRONMENT IN MAURITIUS

7.1 Introduction

The Government of Mauritius has developed a National ICT Policy 2007 – 2011, published in September 2007 by the Ministry of Information Technology & Telecommunications.

The National ICT Policy 2007 – 2011 is focused on transforming the ICT sector into the fifth pillar of the Mauritian economy, positioning Mauritius as a regional hub for ICT and levering ICT investments to move towards becoming an Information Society & Knowledge Economy.

7.2 National ICT Policy for Mauritius

The Government of Mauritius has since independence, moved from a low-income mono-crop economy to a middle-income country with a more diversified structure, reliant on four main economic pillars (manufacturing, sugar, tourism and financial services). However, with the emergence of new low-cost competitor countries and confronted with the economic challenges of the 21st Century, the Government wishes to make ICT a fifth economic pillar. Implementation of the ICT Policy is dependent on the National ICT Strategic Plan (NICTSP), which sets out the different programmes and projects to be initiated.

The broad objectives of the National ICT Policy include providing a framework that will enable ICT to contribute towards achieving national development goals, position Mauritius as a regional ICT centre of excellence and knowledge hub, develop export markets for ICT Services and Business Process Outsourcing (BPO)/IT Enabled Services (ITES), ensure the ICT infrastructure and capacity is secure and utilised effectively, are internationally competitive and complaint with regional and international standards, enhance the exploitation of ICT to increase national productivity and efficiency, and transform Mauritius into an Information Society where everyone has equitable, affordable access to ICTs.

The main areas of intervention required to achieve these objectives include

- Strengthen the legal and regulatory framework
- Develop ICT infrastructure
- Leveraging ICT to enhance productivity & efficiency across all economic sectors
- ICT in Education
- Developing a culture of Cyber Security
- Accelerating eGovernment
- Harnessing ICT for Social Development
- ICT Leadership in the region
- Boosting ICT exports

7.2.1 Strengthen the Legal and Regulatory Framework

With the focus on transforming the ICT sector into the economy's fifth pillar, a reliable, trusted legal and institutional framework for the ICT sector is required which is aligned with the needs of the Information Society and Knowledge Economy, harmonised with international norms, takes account of emerging technology developments (especially convergence) and promotes ICT uptake in business, government and society in general.

Changes that need to be made include resolving variances between the Electronic Transaction Act 2000 (ETA) and the UNCITRAL Model Law for eCommerce adopted in 2005, and changing legislative and institutions in relation to the Data Protection Act 2004 to allow Mauritius to be recognised by the European Community as a "third country" whose data protection provisions are complaint with EU norms.

It is necessary to enact appropriate legislation against spamming and appropriate legislation and policy interventions to protect children from the dangers of the Internet. A review of the National Computer Board, Central Information Systems Division, Central Informatics Bureau and ICT Authority is required to clearly establish unambiguous and coherent role allocation to these different organisations. Finally regulatory changes must take account of convergence and make for a fair, trusted and transparent regulatory regime.

7.2.2 Developing ICT Infrastructure

Availability of a robust telecommunications network, an affordable broadband access network and leveraging emerging technologies is required to underpin sustainable growth and rollout new services in the ICT sector.

Key measures to be implemented include a National Broadband Policy that promotes accelerated take-up of broadband as an instrument of economic development, an enabling framework to deploy broadband nationwide to encourage decentralisation of the ICT and IT enabled services industry, development of local content and facilitates broadband access.

Government will prioritise development of high-speed communications infrastructure, ensure availability and reliability of broadband connectivity through monitoring and setting up a quality of services framework, and support development of broadband-enabled open and interoperable benchmarked eServices

The Regulatory will promote competition and ensure more affordable Internet connection prices and promote competition between telecommunication operators. Telecommunications reforms will be implemented by the Regulator so as to deploy a converged Licensing model and provide flexible, market-oriented spectrum license rights catering for both the technical and market convergence aspects of this sector.

7.2.3 Leveraging ICT to Enhance Productivity & Efficiency

While ICT has enormous potential to increase economic productivity and efficiency in Mauritius, supporting ICT adoption and exploitation by SMEs (particularly in relation to eBusiness) is particularly important to improve national competitiveness.

The government will implement a number of policy objectives aimed at supporting SME driven exports of ICT products and services, leveraging electronic channels to sustain global competitiveness and capacity building by raising awareness of benefits of ICT.

7.2.4 ICT in Education

ICT has enormous potential to improve learning methods and overall quality of education, offer greater accessibility and mobility and support wider access to lifelong learning.

The government will implement a number of policy objectives aimed at improving the quality of education for science and technology and introduce new learning methods at both primary and secondary level schools, improve the infrastructure available in schools as well as the use of eLearning techniques, and train teachers to use ICT in the teaching process.

7.2.5 Developing a Culture of Cyber Security

Information security is increasingly important in an era of rapid technological development and diffusion of IP-based solutions, to protect both consumers and critical infrastructure. The aim of improving information security at a societal level is to prevent disruption to business, government and society, protect against attacks on information and services, maintain trust and safeguard continuing functions amid a variety of potential disruptions.

The government will implement a National Information Security Strategy (NISS) as recommended by Action Line C5 of the WSIS Geneva Action Plan, to establish a national culture of cyber security in Mauritius, and build wider social trust and confidence in ICTs.

To achieve this goal, the government will

- Formulate a National Information Security Strategy to instil a culture of cyber security
- Promote adoption of Information Security standards at national level & mandatory information assurance compliance by operators of critical information infrastructure
- Establish a rapid response team as a first contact point for internet security problems
- Implement measures to protect the confidentiality and privacy of citizens
- Increase national level of awareness of information security threats & good practices
- Promote information security capacity building to increase number of professionals

7.2.6 Accelerating eGovernment

While a considerable number of eGovernment services have been rolled out, eGovernance must be seen not only as a convenience, but also as a compelling reason for communities to adopt ICT in their lives and grow the domestic ICT industry in Mauritius.

The government will implement a number of policy measures including delivery of eGovernment applications through mobile and digital TV as well as Internet channels as part of Anytime, Anywhere, Anyhow service delivery, business process reengineering to increase efficient service delivery to business and citizens and increased use of electronic document management in the public sector, enhance information sharing and communications within and across ministries and departments, introduce policies and procedures to safeguard privacy of citizen data and encourage the use of smart cards and biometrics in eGovernment applications and gradually replace the current national ID card.

7.2.7 Harnessing ICT for Social Development

Harnessing ICT for social development involves ensuring most of the population have adequate access to ICT, are IT literate, can develop local content and have access to local information online and can use. The government wishes to transform Mauritius into a people centred, inclusive and development-oriented Information Society, where all can achieve their full potential. This requires definition of ICT policies for Social Development.

The government will increase ICT integration in society, by providing ICT access to all communities including those geographically or economically isolated. Financing options will be provided for low-income individuals to purchase a computer with broadband Internet access and the penetration of PCs in Primary schools will also be increased. The government will increase access to ICTs through existing Public Internet Access Points (PIAPS) in post offices and explore different funding models to achieve sustainability.

Local content development will be encouraged through the Community Empowerment Programme, with Community Web Portals developed to help build the Information Society by raising awareness of the benefits of ICT for sharing information and providing services. ICT Training will be used to increase the employability of the unemployed, under-employed and vulnerable sections of society, and entrepreneurship in the ICT sector encouraged. To reduce the digital divide, youth will be encouraged to set up computer clubs and online fora.

To promote take up of higher ICT qualifications, the Universal ICT Education Programme (UIEP) will be enhanced through promoting industry recognition of the IC3 Certificate, with trainees successfully securing this qualification being offered places on higher IT courses.

7.2.8 ICT Leadership in the Region

The government aspires to regional ICT leadership by developing local enterprises and attracting foreign inward investment by ICT companies and educational institutions. To become a regional ICT hub, the government recognises the need to build symbiotic partnerships with other countries of the region to establish a win-win value proposition. The strategy is to identify a few niche areas in which Mauritius can demonstrate leadership.

Key drivers to attract ICT sectoral investment include availability of skilled talent, high quality infrastructure and a supportive government (the current ICT policy is focused on human resources and incentives). Policy measures to be implemented include

- Special training programmes to increase employability of young people in the ICT sector (especially BPO and Call Centres)
- Joint sponsorship by government and industry of applied ICT research in universities
- Establish a Regional Centre of Excellence focused on high-end technology research
- Enhance entrepreneurship development in universities and capacity building in SMEs, and promote Mauritian Business Incubation expertise at a regional level
- Review and consolidate ICT Incubator Scheme to promote entrepreneurial culture

7.2.9 Boosting ICT Exports

Mauritius is at a disadvantage to other countries in relation to attracting offshore activities (e.g. BPO and Call Centres), as it does not have the level of track record of other countries. However, it has enormous potential and is investing in necessary infrastructure and training. The ICT sector is growing quickly, but as the local market is small, exporting is the only answer to achieving sustainable growth. This goal requires clear policies for success.

The government will implement the following actions

- Promote export of ICT products and services to regional and international markets, with an Export Development Fund established to enlarge the market for ICT exports.
- Develop a branding strategy for ICT exports to attract the top ICT names to Mauritius
- Participate in selected international ICT trade fairs and exhibitions to promote Mauritius as a world-class, outsourcing destination for ICT & BPO, gateway to Africa
- ICT Export Facilitation Services targeting inwards investment and export sales, including gathering up to date market intelligence
- Introduction of specific schemes to encourage creation of export oriented ICT SMEs

7.3 Conclusions

The Government of Mauritius has developed a very focused ICT Policy, which when fully implemented has the potential to significantly impact on national socio-economic development. The Government is open to taking a partnership approach in certain areas of its strategy, which could facilitate collaboration with other IST-Africa Partner Countries.

7.3.1 Progress to date in implementing the ICT Policy

Mauritius is a middle-income country, which means that it does not enjoy the level of external support (whether budgetary or technical) provided to most developing countries. This means that is reliant on leveraging its own resources or contracting experts to help implement national policies.

In line with its vision to transform Mauritius into a Cyber Island and make of ICT as an important engine of economic growth, the Mauritian Government has consolidated bases for a strong ICT sector and has launched the National ICT Strategic Plan (NICTSP – www.nictsp.mu) which includes 124 programmes to be implemented over the period 2007-2011. Published in September 2007 by the Ministry of ICT, the National ICT Policy 2007 – 2011 is focused on transforming the ICT sector into a major pillar of the Mauritian economy, positioning Mauritius as a regional hub for ICT and levering ICT investments to move towards becoming an Information Society & Knowledge Economy. The vision and targets of the NICTSP are for the ICT sector to reach GDP contribution of 7% by 2011 from export of ICT services amounting to MRU Rs. 22.8 billion (1 USD approx Mru Rs 33) and employment of Mauritians in ICT increasing from 16,000 to 20,000.

Contributing 6.7% to 2011 GDP, ICT has become the third pillar of the Mauritian economy, after Financial Services and Tourism.

The NICTSP 2007-2011 is currently under a midterm review by a consultant in collaboration with all stakeholders of the ICT sector in Mauritius, which is chaired by the National Computer Board and the Ministry of Information and Communication Technology.

Progress in relation to the main policy priorities are summarised below:

Strengthening the Legal and Regulatory Framework

With the focus on transforming the ICT sector into a major pillar of the economy, a reliable, trusted legal and institutional framework for the ICT sector is required which is aligned with the needs of the Information Society and Knowledge Economy, harmonised with international norms, takes account of emerging technology developments (especially convergence) and promotes ICT uptake in business, government and society in general. Various pieces of legislation such as the Computer Misuse and Cybercrime Act, the Information and Communication Technologies Act, the Electronic Transactions Act, the Independent Broadcasting Act, the Copyright Act, the Postal Services Act, and the Data Protection Act. Recently, the Electronic Transactions Act has been amended in order to enable a secure electronic transactions operating environment and to facilitate the implementation of Public Key Infrastructure (PKI). Likewise, the Data Protection Act 2004 is currently in a consultation stage for amendments with the main purpose of making data protection provisions compliant with other countries. New legislation such as the Anti-Spam and the Child Online Safety Protection Bill is in the process of being finalised. All these legislative elements serve to consolidate the sector and to position Mauritius as a safe and secure destination for ICT/BPO investments.

Developing ICT Infrastructure

Availability of a robust telecommunications network, an affordable broadband access network and leveraging emerging technologies is required to underpin sustainable growth and rollout new services in the ICT sector. The government has recently launched the National Broadband Policy document that comprise various policy measures ranging from measures to promote competition,

innovation, research and development in broadband technologies, adoption, availability, improving government services and health care through broadband, spectrum policy and other policy measures. From a high-end telecommunication infrastructure perspective, the country is well-connected on the SAFE and LION fibre optic cables. The total international bandwidth capacity has increased up to nearly 10 Gbps in 2011 and this is therefore serving as a boost to the various ICT related activities such as ITES-BPO, international voice traffic, and Internet access among others. The Government's intention is to maintain this trend of bandwidth capacity growth. The Mauritius Telecom and the private company EMTEL has recently invested further to extend the LION cable to Kenya where the country will be connected through other submarine cables like EASSY and SEACOM.

Leveraging ICT to Enhance Productivity & Efficiency

While ICT has enormous potential to increase economic productivity and efficiency in Mauritius, supporting ICT adoption and exploitation by SMEs (particularly in relation to eBusiness) is particularly important to improve national competitiveness. For SMEs to upgrade their operations and concentrate on their core activities, a large bulk of the IT processing can be conducted off-site, in a cloud computing topology, thus enabling them savings on hardware, software, resource persons and maintenance. The 'cloud computing' model will be enhanced to cater for the hosting of web sites of SMEs and eventually grafting e-commerce components, which are essential for SMEs to expand their markets beyond the traditional limited avenues.

ICT in Education

In line with the Government's vision to transform Mauritius into a world class quality education and knowledge hub, there is a need for the inclusion of ICT in all aspects of the education process. The primary schools follow an ICT Syllabus from STD I to VI and each pupil has an exposure to ICT of 75 minutes per week. It is to note that all students from Form I to Form III take ICT as a subject, whereby the contents of Internet and Computing Core Certification (IC3) are integrated in their syllabus. From Forms IV to VI Computer Studies and Computer Science are taken as an option. As per Statistics Mauritius, the students to computer ratio in secondary schools have declined from 22 in 2010 to 21 in 2011, implying that on an average one PC is shared between 21 students in 2011. Likewise, in primary schools, the students to computer ratio has dropped from 27 in 2010 to 26 in 2011, implying that a computer is shared among 26 primary school students in 2011. In 2011, the number of schools with ICT assisted instructions was 231 in primary schools (out of 305 primary schools) and 155 in secondary schools (out of 185 secondary schools), implying that teachers are continuously being trained in ICT technologies. There is a need to increase the number of dynamic websites in schools to promote e-learning as statistics shows that out of 185 secondary schools in 2011, only 53 of them have a website.

Developing a Culture of Cyber Security

Information security is increasingly important in an era of rapid technological development and diffusion of IP-based solutions, to protect both consumers and critical infrastructure. A computer emergency response Team (CERT-MU) has been set up in May 2008 and is fully functional and working towards the promotion of the information security culture at national level and handling information security incidents for the entire cyber community. A National Information Security Strategy to promote the information security culture at the national level was proposed in the NICTSP 2007-2011, where a number of information security projects were identified such as the setting up of the CERT-MU, Anti-Spam and Child Safety Action Plan, etc.. Priority projects have been implemented while others are ongoing such as the implementation of information security management system (ISMS) based on ISO 27001. The Critical information Infrastructure Framework Policy document has been prepared and will be rolled out for implementation by this year. To set up a secure infrastructure for electronic transactions (e-business and e-government), a Public Key Infrastructure (PKI) is being implemented by the ICTA and will be operational by this year. To sensitise community at large on the issues of information security, the CERT-MU organise on a regular basis workshops, seminars and capacity building programmes.

Accelerating eGovernment

The Government has put an e-Register system in place, which provides for the issuance of mobile alerts to parents in case of absences or lateness of their wards from secondary schools. Other mobile applications (such as for appointments for vehicle examination) have been developed. Furthermore, the Government is planning to develop additional mobile applications as part of the implementation of the e-health and e-education plans. Comprehensive business process re-engineering has been carried out in priority sectors like health, education, work permits, registration of movable and immovable properties. These reviewed processes are being implemented as part of the sector specific e-Government Master plans. Moreover, an e-Government Strategy is being developed to ensure that processes are re-engineered across Government for the benefit of customers. Some major information systems that facilitate information sharing have been put in place at Ministries and Departments like for e.g., the Crime Occurrence Tracking System at the Police Department, the Immigration and Border Control System at the Passport and Immigration Office. The Government has embarked on the project for the replacement of the current ID card by a smart ID card. This follows the successful completion of the design of the smart ID card.

Harnessing ICT for Social Development

Harnessing ICT for social development involves ensuring most of the population have adequate access to ICT, are IT literate, can develop local content and have access to local information online and can use. The proportion of Households with computer for Mauritius reached nearly 38% in 2010/2011 from 30% in 2008 (as per SM, Census 2011 and CMPHS 2010). To enhance digital literacy, the NCB (UIEP) train citizens/students on Internet and Computing Core Certification (IC3) course. Till date, the NCB has received more than 157,600 applications for the IC3 course out of

which 140,150 participants have already completed the training. - The National Computer has launched the UIEP Phase II whereby more than 3000 online professional IT and non–IT courses are being made available at very interesting prices to all those who complete the IC3 or already have a recognised certificate in IT in January 2010. As at date, 601 participants have registered for the different course packages and are already following their respective courses online. In order to reduce the digital divide, the government embarked on the setting up of computer clubs. The first phase of the project comprised the setting up of 150 Computer Clubs, as at date a total of 131 have been set up in 52 in Social Welfare Centres, 76 Community Centres and 3 in Day Care Centres. 19 Computer Clubs are left to be set up by end of May 2012. Likewise, a further 23 computer clubs in Youth Centres and 17 in women centres have been set up and operational. Thus, presently, there are 171 computer clubs operational in Mauritius. Access to ICTs has been provided through Public Internet Access Points (PIAPs) in post offices to democratise access for the whole community. 100 post offices are equipped with PIAPs; 95 in Mauritius and 5 in Rodrigues. Furthermore, the Community Web Portal has been developed with the view to encourage the development of local content and creativity. As at date, content for 79 villages has been uploaded onto the Community Web Portal under the Community Empowerment Programme. The CWP will be launched in 2012.

ICT Leadership in the Region

The government aspires to regional ICT leadership by developing local enterprises and attracting foreign inward investment by ICT companies and educational institutions. To become a regional ICT hub, the government recognises the need to build symbiotic partnerships with other countries of the region to establish a win-win value proposition. To increase the employability of young people in the ICT sector (including the BPO and Call Centre segments) and to meet the demand of the industry in terms of qualified manpower; the government has embarked on the setting up of the ICT Academy. Besides encouraging leading companies such as Ceridian, Hinduja Group, Infosys, etc..to do business in Mauritius, local companies such as for e.g. State Informatics Limited has thrived on the highly competitive local and international markets of integrated solutions, to become a leading ICT service provider in Mauritius and among the major ICT companies in the African region, serving government and private organisations alike. In collaboration with industry associations, the NCB organize regional events such as ProIT with a view for IT Solution providers to showcase their products, services, emerging technologies and solutions in a commercially motivating environment. Other international events such as the ICT BPO Conference, ITU workshop on Indicators have recently being organised in Mauritius.

Boosting ICT Exports

Mauritius is at a disadvantage to other countries in relation to attracting offshore activities (e.g. BPO and Call Centres), as it does not have the level of track record of other countries. However, it has enormous potential and is investing in necessary infrastructure and training. The National Computer Board recently launched the ‘Mauritius ICT Export Portal’ with the aims, on one hand, of providing updated information and market intelligence to Mauritian ICT companies looking to expand their

export markets (sellers of ICT products and services) and, on another hand, to help potential clients and outsourcers looking to do business with ICT Companies in Mauritius. The efforts of promoting Mauritius as a reliable offshoring location for IT and ITES services are being pursued with the participation of Mauritius at the largest relevant event in France, namely SECA. Mauritius will enhance the promotion of the ICT Sector in other promising markets.

Towards i-Mauritius

To continue with the ICT development a new strategy for the period 2011-2014 branded as "Towards i-Mauritius" has been developed, and is one of the three activities undertaken under the Competitiveness and Public Sector Efficiency (CPSE) program, which aims to sustain growth and employment, while helping Mauritius to address the impact of the global recession. A National Broadband Policy 2012 – 2020(NBP2012) setting out a strategic vision for a broadband Intelligent Mauritius, and establishing national goals regarding broadband while elaborating specific policies to achieve those goals within the overarching National ICT Strategic Plan (NICTSP) 2011-2014 context has been launched.

The tables below summarise a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 6.71in 2008 and 6.85 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has declined marginally from 2008 to 2010 (Index Score out of 10: 4.07 in December 2008 and 4.03 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has improved from 2008 to 2010 (Index Score out of 10: 4.34 in December 2008 and 4.48 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.68 in December 2008 and 3.20 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10: 4.62 in December 2008 and 4.85 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has declined slightly from 2008 to 2011 (Index Score out of 1: 0.5086 in 2008 and 0.5066 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT nationally has made significant progress from 2008 to 2010 (ICT Development Sub-Index (use) Score out of 10: 1.19 in 2008 and 1.91 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

8. POLICY ENVIRONMENT IN MOZAMBIQUE

8.1 Introduction

Approved by Ministerial resolution no 28/2000 on 12 December 2000, the National ICT Policy of Mozambique focused on poverty reduction, providing citizens with access to global knowledge, raising the efficiency of governmental institutions and their capacity to deliver public services, improving governance, positioning Mozambique as a producer of ICT and as a partner in the Global Information Society.

8.2 National ICT Policy for Mozambique

Recognising that most African countries including Mozambique have low tele-density, computer usage and Internet access, the Policy aims to provide a framework that focuses on six priority areas to support socio-economic development: Education; Development of Human Resources; Health, Universal Access: Infrastructure: and Governance.

Other related issues that should ideally be considered within these six priority areas include: Agriculture; Natural Resources; Environment; Tourism; eCommerce; Business Protection; Public Protection; Academic Institutions and Research Network: Women and Youth: Culture and Art: Social Communication and the Press.

In 2000, a national survey found that over 50% of ICT equipment was located in the Capital, Maputo, while 71% of the population lived in the countryside. There was a similar disparity between illiteracy levels (1997), with urban rates less than half of rural rates (33% versus 72%) and low life expectancy (average 42 years). Internet access rose from one ISP and less than 100 users in 1995 to 10 ISPs and over 10,000 users in 1999 accordingly to local statistics.

8.2.1 Specific Objectives and Roles of Key Stakeholders

The specific objectives of the policy are
(a) to raise the national level of ICT knowledge to support sustainable national development
(b) to contribute to the eradication of absolute poverty and improve quality of life for all citizens
(c) to provide citizens with universal access, particularly in the areas of education, science and technology, health, cuture and entertainment
(d) to leverage the use of ICT and teaching of ICT in national education
(e) to support ict training across all of society, including in particular women, youth and children
(f) to strengthen the capacity of the public and private sectors
(g) to become a net producer of ICT products and services
(h) to support the adoption of ICT in industry, business and investment

When discussing the role of government, the policy identifies some key constraints (a) the lack of a culture of using ICTs and (b) limited available human, technical and financial resources (both in the public and private sectors) to stimulate the sector. The government aims to address these issues

through approving necessary legislation as a matter of priority, adopt a national Implementation Strategy and provide the necessary resources to develop a national infrastructure to support ICT adoption, promote use of ICT in State institutions, incentivise investment in national infrastructure and support production of national content and engagement with key stakeholders to support wider society adoption of ICTs.

When discussing the role of the private sector, the policy identifies the role they need to play in stimulating economic growth, participating in developing a national ICT infrastructure, leveraging the Information Society to realise new business opportunities, promoting wider adoption of ICTs by SMEs, strive to be competitive in a global marketplace, support ICT education and the use of ICT for socio-economic development, and develop projects that will support national production of ICT products and services.

When discussing the role of the higher education and research institutes, the policy recognises the major role they need to plan to improve the use of ICT for teaching, learning, research, production process and provision of services. The policy mandates such institutions to collaborate with all key stakeholders to expand the use of ICTs, emphasise the teaching of ICT in science and technology curricula, leverage ICT to increase access to higher education, demonstrate leadership in testing new technologies and providing guidance to the public and private sector and society in general, build internal multi-disciplinary ICT research team capacity to implement projects, produce solutions aligned with national development challenges and systematically publish and disseminate results and build sustainable links with relevant universities and research institutions outside Mozambique.

When discussing the role of Civil Society, the policy recognises they have an important role to play in the socio-economic development of Mozambique. Key challenges facing civil society include low access to schools, weak infrastructure and weak coordination between different stakeholders. The policy mandates civil society to coordinate with government and other key stakeholders in the areas of exploiting ICT to disseminate information and knowledge, carrying out community programmes and development programmes and incorporate ICT components in community development programmes and in programmes developed with international organisations and other countries.

When discussing the role of development cooperation agencies, they are requested to provide financial and technical support to the formulation of the ICT policy and its implementation strategy, mobilise support from other partners in the six priority areas to support socio-economic development: Education; Development of Human Resources; Health, Universal Access: Infrastructure: and Governance: facilitate relationship building between national and international universities and research institutions, support technology transfer to help retain qualified technical people in Mozambique and support the participation of Mozambique in international forums focused on the use of ICTs for Development.

8.2.2 Challenges and Opportunities

The policy then analyses challenges and ICT related opportunities in each of six priority areas.

Key challenges in education include the relatively high illiteracy rate in Mozambique, an inadequate school network, limited available financial and technical resources and insufficient materials available to teachers and pupils. Opportunities provided by ICTs include administrative support systems, the SchoolNet programmes - which supports sharing resources between teachers, pupils and parents, distance learning and internet based delivery of study and support materials for teachers and pupils. The government plans to create incentives and develop teaching of ICTs across the entire education system, generalise the use of Internet in schools, promote competitions and national exhibitions of ICTs for young scientists and progressively provide schools with equipment necessary to access and master ICTs.

Key challenges in the development of human resources include a limited supply of well qualified ICT professionals, poor quality of available national ICT training, no hardware or software industry to stimulate training and specialisation in these areas and the absence of certified ICT training and evaluation. To address these challenges, the government plans to define professional profiles for ICTs, standardise the functioning of ICT training centres, encourage the adoption of universally-recognised certification of ICT professionals, create centres of excellence for ICT training and application of ICT solutions, formally recognise ICT professionals, define ICT training programmes for government managers and community leaders, promote ICT related competitions and prizes, promote the use of distance learning and prioritise high quality ICT training as a way to develop the ICT sector.

Key challenges in the health sector include isolation of much of the population from health centres, low life expectancy, high infant and maternal mortality during childbirth and the rapid spread of HIV/AIDS and other epidemics. Opportunities provided by ICT include modernising health service administration, leveraging telemedicine to provide access to experienced specialists, supporting higher standards through knowledge sharing and an electronic health network, public dissemination of preventative health information, routing of clinical data to laboratories and searching of clinical archives and transmission of images, creation go pharmaceutical networks to confirm availability of medical supplies, and computerisation of blood banks and public clinical consultancies. The government will in collaboration with partners leverage ICT to administrate health services, extend telemedicine to all central and provincial hospitals, establish an electronic health network and disseminate preventative health information and ICT healthcare success stories and establish a national network of state pharmacies.

Universal access (not just in terms of telephony but also electricity) is without doubt the most significant difficulty facing Mozambique, with a population of 17 million, 70% of whom live in rural areas (mostly along a 3,000 kilometre coastline). The government in collaboration with partners aims to promote universal access, and create a universal service fund towards which operators and users will contribute, provide incentives to provide services in traditionally not-profitable geographic areas, create national network of public access points and price points to access internet services that area affordable to those with low incomes, abolish import taxes for ICT equipment required for

universal access, extend the network to more users by measure that will reduce telephony access tariffs, provide local phone call access to ISPs, establish a community tariff for electricity supply and telecoms services provided to universal access points and exploit other modern technologies appropriate for Mozambique.

National Support Infrastructure for ICTs can complement the development of road and rail traffic corridors linking Mozambique with countries of the hinterland. National Support Infrastructure will be prioritised where there is a potential for economic development, where it can increase economic competitiveness at a regional level, attract foreign investment and reinforce the national private sector. The government in collaboration with partners proposes to make the following interventions: put a legal framework in place to ensure balanced and equitable ICT development infrastructure; design a modern telecoms backbone; modernise the national electricity supply infrastructure to address both rural and urban needs; create a road network that will contribute to community development, particularly in rural areas; promote adoption of digital radio and television; encourage private sector participation in developing telecoms, electrical and road infrastructure; and attract foreign direct investment.

Key Governance Challenges being addressed in Mozambique include slow, inefficient public bureaucracy and high costs, "silo government", lack of centralised databases and the generally low level of ICT education of most managers in the public sector. The policy recognises the importance of disseminating and leveraging both national and international good practices, and will collaborate with partners to introduce ICT into public service delivery, plan basic ICT training for all managers and members of assemblies, municipal authorities and community leaders, establish a network to connect central and provincial departments, make it mandatory for all state organisation to have a web presence providing citizens with access to necessary information, documents and forms, encourage the use of e-mail and internet to complement face to face contact with citizens, gradually introduce electronic voting and create electronic support systems for decision making processes.

8.2.3 Strategic Sectors

The ICT Policy also addresses a number of key sectors, including Agriculture and Natural Resources, the Environment and Tourism, Public Protection, eCommerce and Business Protection, a National Network of Academic and Research Institutions, Women and Youth, Culture and Art, and Social Communication.

Agriculture and Natural Resources challenges include lack of databases about national agricultural potential, lack of weather forecasting to prevent natural resources and lack of a system addressing wild animal migration. ICT Adoption opportunities include disseminating techniques for land conversation and preservation, sharing resources on wild animals at risk, leveraging GIS technology and creating a national network linked to regional networks to exchange experiences. The government with its partners will establish a support programme for rural communities focused on agricultural techniques and management of natural resources, leverage tele-centres to provide ICT training to agriculturalist and rural populations and encourage them to adopt eCommerce, adopt

GIS, create wildlife control systems in national parks and reserves and set up models for community management of natural resources.

In the Environment and Tourism sectors, ICT will be used to conserve the environment, create a knowledge base focused on deforestation and environmental degradation and promote tourism.

In the area of Public Protection, the government with its partners will guarantee protection of personal data, address misuse of the internet, stimulate production and dissemination of local content and work closely with civil society.

eCommerce is not without its challenges (e.g. application of customs duties and other taxes, standardisation of digital signatures and how to address fraudulent contracts over the Internet, weak national infrastructure to support wider adoption). However, the government with its partners will undertake necessary education, support adoption of eCommerce by SMEs, change commercial legislation to accommodate eCommerce, update Intellectual Property law, support creation of relevant associations and establish insurance mechanisms for Internet transactions.

One of the key challenges facing research institutions is the need for up to date scientific literature and poor sharing of research and bibliographic information. The establishment of a NREN (National Research and Educational Network) to support this goal was seen as critical, and has now been established.

Women and youth were both identified as traditionally marginalised sectors of society and ICT was seen as having an important role to play in reversing this situation. The government with its partners aims to include a gender perspective in future ICT development projects and programmes, promote the use of ICT to eliminate inequalities, establish special programmes for young women and youth, promote use of ICT to support business opportunities and encourage civil society to leverage the Internet to support women and youth.

ICT can be an invaluable tool to conserve and promote national culture and art and international cooperation. The government will cooperate with its partners to promote the adoption of ICT alongside traditional methods, the adoption of electronic networks between cultural institutions, combat piracy, protect IPR and promote Internet based access to national and international heritage content to achieve artistic and cultural exchanges.

The government in collaboration with the media and other partners planned to promote integration of traditional media with ICT, develop a culture of free expression and greater nationally relevant media content, encourage all media to leverage the Internet, promote cooperation between multinational media, public and private information agencies and telecommunications industries, provide ICT training and encourage publication of content by community organisations.

8.2.4 Key Challenges

One of the key challenges associated with financing the introduction of ICT include limited national financial resources, insufficient knowledge about the potential impact of ICT on competitiveness and

the lack of a national ICT programme based on consensus and support of key stakeholders who need to participate in the national development plan. To address these weaknesses, the government in cooperation with partners will focus on integrating ICT programmes into the national development plan, mobile resources to finance this programme, provide incentives and a favourable environment to invest in ICT, target investment to address the most needy and disenfranchised, to use the national telecoms infrastructure as a backbone for the development of ICT and direct investment so that Mozambique is a producer - not just a consumer of ICTs.

International Cooperation in the area of ICT is part of Mozambique's foreign policy and supports regional integration efforts to achieve sustainable development in Africa. Mozambique is coordinator of the transport and communication sector of SADC (Southern African Development Community). While key ICT challenges to be overcome include weak communication coverage and high costs, the ICT policy acknowledges the potential positive impact of ICT in accelerating regional economic integration, reducing development differences between countries and supporting wider engagement. Mozambique proposes to actively participate in international and regional bodies including ITU and SATCC (Southern African Transport and Communications Commission, regional initiatives including the Virtual African University and African Development Forum (ADF), sign regional and international level conventions offering mutual advantages in the areas of ICT, leverage participation in bodies such as ISO and UN agencies to increase support for national and regional ICT initiatives, encourage stakeholder engagement and promote dissemination of international and regional ICT good practices for adaptation in Mozambique

An Implementation Strategy will establish specific objectives, methodology and phased approach and address monitoring and evaluation and participation by all key stakeholders. Objectives identified include improving quality of life and eradicating absolute poverty, accelerating development of human resources and combating illiteracy, increase efficiency of public and private institutions, improve public governance, create a business and legal environment that supports ICT adoption and production and positioning Mozambique as an active, competitive partner in both the Global Information Society and World Economy. The implementation process will be based on active engagement with all key stakeholders, ensuring their perspectives are incorporated and they feel empowered to participation in the execution of the implementation plan. All actors must incorporate ICT into project and programme activities and the responsibilities of all stakeholders, responsible parties for execution and sources of funding must be identifiable. Short term actions were planned for 2001 - 2002, medium term actions 2003- 2004 and long term after 2004, to ensure these are incorporated into the Five Year Programme of the Government (2000 - 2004).

8.3 Conclusions

Priority factors in the Implementation Strategy are based on the priorities of the ICT Policy including

- Education (SchoolNet, distance learning, train the ICT trainers, virtual libraries and school administration)

- Health (Health Information Network, telemedicine, hospital administration and pharmaceutical network)
- Human Resource Development (establish ICT training institutions based on international standards, basic ICT training for managers, career paths and professional qualifications for ICT specialists)
- Universal Access (tele-centres and new points of community access, creation of ICT Parks and promotion of take-up)
- Infrastructure (redesign to assist convergence and integration of voice, video and data, rural access, strengthen radio and television)
- Governance (Network all central and provincial government bodies, internet presence for ministries and other state agencies, centralised databases for personnel, public accounts, patrimony and legislation)

Other priorities of the ICT Policy include

- Agriculture and Natural Resources (Internet dissemination of agricultural techniques, community management of natural resources, tagging of animal migration in nature reserves)
- Environment and Tourism (GIS for weather and environment monitoring and tourism applications)
- Public Protection (adoption of legal measures against abuses and violation of rights on Internet and other electronic media)
- Network of Academic and Research Institutes (Virtual University, online bibliographical and documentation centres)
- Special incentives to integrate women and youth into the adoption of ICT
- Art and Culture (networking cultural institutions, electronic promotion of cultural tourism, including selling Mozambican art)
- Social Communication (Internet content production, Internet presence for key media)

8.3.1 Progress to Date in Implementing the ICT Policy

Most developing or middle income countries are dependent to one degree or another on external assistance to help them avoid the mistakes made elsewhere, thus conserving limited resources.

The tables below summarise a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 2.61 in 2008 and 2.77 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 2.91 in December 2008 and 3.29 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has improved significantly from 2008 to 2010 (Index Score out of 10: 3.39 in December 2008 and 4.49 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10:1.91 in December 2008 and 2.08 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011)	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10:3.59 in December 2008 and 3.65 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved slightly from 2008 to 2011 (Index Score out of 1: 0.2559 in 2008 and 0.2786 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.05 in 2008 and 0.19 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

9. POLICY ENVIRONMENT IN THE REPUBLIC OF NAMIBIA

9.1 Introduction

The Government of Namibia has developed an Information Technology Policy, as well as policies for Telecommunications and Broadcasting. These three policies have also been combined into an overarching policy document aligned with national, regional, continental and global developments in the Information and Communications Technology (ICT) sector

While these three policies will be briefly considered, the primary focus will be on analysis of the ICT Policy (published 18 September 2008), which builds on the 2004 ICT Policy.

9.2 Information Technology Policy for Namibia

The Government of Namibia sees the adoption and exploitation of ICT as instrumental to the creation of sustainable growth and development, "*a prerequisite for economic progress and a major potential contributor to economic progress*". The key perceived benefits include

- The access & availability of information that will assist [Namibians] in their daily lives
- Increased competitiveness of business and commerce in the global market place
- The establishment of an environment conducive to the development of Namibian-based ICT access & service providers that are competitive players on international markets, and … create opportunities for employment and economic diversification.

Based on extensive consultation with stakeholders and in depth research into international trends, the Information Technology Policy reflects the stipulation in the Namibian Government's Vision 2030 document that "*ICT must be the most important sector in the economic development of the country by 2030. Core to the achievement of this Vision is a demand driven need to transform Namibia into a knowledge based economy".* The Information Technology Policy supports Vision 2030 and National Development Plans. The Communications & Electronic Transaction Bills were designed to implement this policy. Establishment of the Ministry of Information and Communication Technology reinforces this.

The IT Policy is focused on computer hardware and software and networks needed to provide wire based and wireless access and support for communications networks including the Internet, which is seen as playing a pivotal role in the convergence between computing, communications and broadcasting and the convergence of ICT.

The Government of Namibia recognises the need to be part of the global Information Society and Knowledge Economy. Growth in the ICT sector is a national imperative,, with longer term growth only possible through a demand driven approach based on education and training supporting by an environment conducive to development and growth of local industry. ICT is seen as contributing to five important economic roles

- Economic Growth
- Industrial Development
- Poverty Eradication
- Equal Opportunity
- Regional Coordination

9.2.1 IT Literacy and Skills Development Policy Goals

Namibia aims to develop globally competitive, quality human capital in IT and related disciplines through both formal and information education.

The national Education Policy aims to

- Produce ICT literate citizens and broaden access to quality educational services
- Produce people capable of working in or participating in the Information Society and Knowledge Economy
- Leverage ICT to benefit all learners & teachers across all levels of education
- Improve efficiency of educational administration and management at every level
- Establish standards based and benchmarked approach to using ICT in education

The Government also funds facilities to access ICT through integrated Multi=Purposes Regional Community parks, including Multi-Purpose Community Centres (MPCCs), Community Learning Development Centres (CDLs), Youth Centres, Community Skills Development Centres 9COSDECS), Vocational Training Centres (VTCs), Libraries and Teacher Resource Centres (TRCs). This is complemented by the Community Education for Youth programme which also provides public access to ICTs.

9.2.2 Enabling Framework for IT Development

A key guiding principle is a fully liberalised information technology sector, characterised by

1. *Increased access, particularly to the Internet*
2. *Improved IT Literacy and skills development*
3. *Competition and Open Markets*
4. *Transparency in decision making and development*
5. *The Promotion of user's influence in developing the IT sector*
6. *Protecting the Rights of Consumers*
7. *Fair and Transparent industry practices designed to growth the ICT sector*

The roles of each key stakeholder are then briefly defined.

The Government through the Ministry of ICT is responsible for government ICT policy development (including eGovernment) and the legal framework for the ICT industry, all IT related legislation and providing input into other legislation that may affect the IT sector.

The Ministry of ICT shares responsibility with line Ministries for line ministry specific ICT policy development, government ICT procurement policy and practices and ICT standards. While an Act of Parliament establishes an autonomous Regulatory Authority, the Minister of ICT appoints the Board of the Regulatory Authority.

The Regulator operates independently from the Ministry of ICT with a Board of Commissioners appointed in accordance with the State Owned Enterprises Governance Act (2006). The Regulatory Authority regulates and licenses IT providers such as Internet Service Providers (ISPs) and data network operators, and is responsible for regulating content and abuse (e.g. spamming), creation & distribution of viruses, worms, Trojans etc.

The Private Sector (Business and Industry) is responsible for building and maintaining IT systems and infrastructure and providing efficient, affordable IT services & products. The Private Sector is encouraged to assume responsibility for development of the IT industry.

Consumers decide which products and services are required and the role of the Education Sector is not discussed. However, the IT Policy specifically acknowledges the need to establish adequate institutional capacity to assist in implementation of this Policy, and the important role that (NGOs) and Public Private Partnerships (PPPs) can play in this process.

9.2.3 Policies for IT Industry

The Government of Namibia favours a free market and open unfettered access to products and services, and will create an equitable, fair, just and competitive market environment. All service providers will conform to international technical and quality standards to ensure efficient, reliable services. The Government promotes professional standards and ethical practices in the Namibian ICT industry through a self-regulating IT Industry Standards Body established by the ICT industry, with the process overseen by the Regulator.

Foreign inward investment in the Namibian ICT industry is welcomed, with acquisition of ICT skills a priority, facilitated by relaxing work permit restrictions for foreign ICT specialists. However, the clear government priority is to develop the capacity of local industry through cooperation between foreign and local firms (e.g. joint ventures, strategic alliances).

The Government recognises the contribution made by entrepreneurs & SMEs to economic growth and job creation and will channel social responsibility projects where possible.

9.2.4 Policies for the Use of Information Technology

Electronic Transactions and eCommerce are essential mechanisms for interaction between individuals and commercial enterprises. The Government will ensure Namibia has an appropriate legal framework to provide the underlying trust, confidence and legal certainty to deal with cyber crime, privacy laws (data protection, data monitoring and interference), laws for electronic government services, recognition of secure electronic signatures, IPR, digital contracting, formation and validity of contracts, retention of records and EDI.

Information Security, privacy and national security is seen as a shared responsibility between government, individuals and corporate citizens. The government promotes legislation for data protection, information security, protection of privacy and lawful interception of telecommuncations, which should comply with international standards. Government will only intercept and monitor information when lawfully authorised in the interest of national security and prevention of serious offences.ICT and telecommunications licensees must protect subscriber privacy and comply with international standards.

Namibian law will be amended to support Fair Use and Creative Commons Licensing. Fair use allows reproduction and other uses of copyrighted works under certain conditions for purposes such as criticism, comment, news reporting, teaching and research. The goal is to promote media pluralisation and achieve low transaction costs for accessing information.

A Top Level Domain for Namibia (.na) will be administered by a not for profit central institution established or recognised by an Act of Parliament. All ICT sector stakeholders (government, ICT industry and users) must be involved in administering .na domains.

9.2.5 Policies for Government Use of IT

The government promotes the use of electronic interaction between government, citizens and business as well as improving efficiency of internal operations to enhance public service delivery and democratic participation. Government services will be accessed free through Information Kiosks at integrated Multi-Purpose Regional Community Parks.

The government is committed to providing reliable, real-time, secure two way interactive connection with its constituents and within the government to increase access to government information, improve quality and safety of information and reduce costs.

The government promotes sharing of information and infrastructure between government ministries, regional and local authorities for planning, coordination and development, with the additional benefit of reducing the cost of service delivery.

The government supports all operating system platforms. The criteria for selecting software solutions will remain the improvement of efficiency, effectiveness and economy of service delivery by government to its clients. Where the advantages of FLOSS (Open Source) and licensed software are comparable, FLOSS will be selected for new projects. Whenever FLOSS is not implemented, the implementation of licensed software must be justified. The government promotes access to Open Source and proprietary operating systems in schools. The benefits of FLOSS are usually skills development and lower costs.

It is important that the Regulatory Authority develops a comprehensive policy for disposal of waste from the Communications and ICT sector. Retailers and suppliers will provide instruction and facilities for safe disposal of ICT waste. In this context donation or subsidisation of dated ICT technology will be carefully reviewed to avoid a situation where technology with a short life cycle is

dumped in Namibia. Similarly, the Regulatory Authority will develop a comprehensive policy for safe levels of emissions from ICT equipment based on international standards or good practices.

Finally, the procurement of ICT goods and services is based on the following principles

- Policy, strategy and demand driven
- Fair and transparent processes
- Emphasis on open standards and total cost of ownership (including maintenance)
- Promotion of skills transfer to Namibian citizens when awarding tenders
- Promotion of minimum 20% contract value to >51% Namibian owned SMEs

9.2.6 Government Funding and Incentives for ICT

The government will stimulate the development of ICT skills capacity in Namibia by establishing ICT Centres of Excellence at centres of further learning, and allocate funds towards development of centres (study centres and laboratories) at tertiary level. Where possible, government will form partnerships with industry to develop ICT skills in Namibia.

IT training will be incorporated into all parts of the educational curricula from primary school level, ICT learning institutions will be established in smaller towns to increase access to training and a major emphasis will be placed on ICT education at all levels of education.

Tax incentives will be offered for ICT skills development by the private sector as developing ICT related skills will contribute to a national imperative, developing the ICT industry.

The government will also provide incentives to the private sector to encourage local technology development and will assist in funding ICT projects and programmes that will contribute to ICT access and skills development. The Government aims to exempt PC equipment from import duties to stimulate the market for bundled PC and telecommunications services through access to funds from the USF. The aim of this policy is to provide these services to underserved community projects, Multi-Purposes Community Centres, schools, Community Learning Development Centres and similar institutions.

9.3 Conclusions

The Government of Namibia has developed an outcome oriented IT Policy, which when fully implemented will significantly impact on national socio-economic development. It also seems clear that addressing some problems at a cross-border level would offer significant advantages including potential cost savings when rolling out solutions at a national level. This is particularly the case for countries addressing common problems.

9.3.1 Progress to Date in Implementing the ICT Policy

Namibia is a middle-income country, which means that it does not enjoy the level of external support (whether budgetary or technical) provided to most developing countries. This means that is reliant on leveraging its own resources or contracting experts to help implement national policies.

The following Acts have been implemented:

- The Communications Act, Act 8 of 2009 was adopted and published in November 2009
- Cabinet endorsed a four year ICT policy implementation plan that includes the costs of implementation (Cab Dec. No.17th/15.09.09/006)
- New regulatory authority (Communications Regulatory Authority of Namibia) board has been appointed in February 2 010 in terms of the Communications Act of 2009.
- A draft Bill on Electronic Transactions and Communications have been endorsed by cabinet for submission to parliament (Cab Dec. No.17th /23.11.10/012). The proposed law regulates e-transactions, legal recognition of e-transactions, and cyber security matters

The table below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

	Human Resource Development	**ICT Infrastructure Development**	**Institutional Development or Government readiness**
Dimensions	The development of national ICT related skills capacity improved marginally from 2008 to 2010 (ICT Skill Index Score out of 10: 5.44 in 2008 and 5.46 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has declined from 2008 to 2010 (Index Score out of 10: 3.44 in December 2008 and 3.58 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011 The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.39 in December 2008 and 2.70 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has improved strongly from 2008 to 2010 (Index Score out of 10: 3.22 in December 2008 and 4.02 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

	Political & Regulatory Environment	e-Government Development	ICT Usage
Dimensions	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10:4.74 in December 2008 and 4.82 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved from 2008 to 2011 (Index Score out of 1: 0.3445 in 2008 and 0.3937 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.18 in 2008 and 0.49 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

10. POLICY ENVIRONMENT IN SENEGAL

10.1 Introduction

The Government of Senegal has developed a National Policy on ICT, Science and Technology Policy, Accelerated Growth Strategy, National Program of Good Governance (PNBG) and the Poverty Reduction Strategy Document (PSRP) (of which ICT is a part).

While each of these documents will be briefly considered in context, the primary focus is on the National Policy on ICT and the Science and Technology Strategy.

10.2 National ICT Policy for Senegal

10.2.1 E-Senegal Vision

Beside the ICT implementation strategy by the State, there is a vision for Senegal who appropriates these new tools at all levels and aims to:

- put the citizens and businesses within the concerns of the government;
- allow access for all citizens to information;
- meet the performance needs of the State and the needs of information for decision makers.

To implement this vision, it needs a transition in two areas:

1. Government to e-government transition: this first transition is to harness ICT in the central operation of the Authority in order to improve efficiency, give relevant dashboards to state officials and provide online access to quality public services to citizens.
2. Citizen of the e-citizen transition: this second transition is to democratize the new technologies within the public and businesses to enable them not only to enjoy the benefits they offer but also facilitate their access to public services put in line by the state. The Telecommunications Regulatory Agency (TRA) was established to be the lever of the second transition.

Five strategic axes have been identified:

1. Infrastructures & Information System
2. ICT policy
3. Regulatory & Legal Framework
4. Promotion of investments
5. ICT & Teleservices as cluster growth

10.2.2 Legal framework:

Following the adoption by the Parliament, the President of the Republic enacted the first legislation relating to Senegalese information society. These are:

- Law No. 2008-08 on Electronic Transactions

- Law No. 2008-12 on the Protection of Personal Data
- Law No. 2008-11 on Cybercrime
- Law No. 2008-10 on the Orientation Law on the Information Society
- Draft Decree on Electronic Communications made for the implementation of law no. 2008-08 of January 25 2008 on Electronic Transactions
- Draft Decree on the implementation of law no. 2008-12, dated January 25 2008 on the protection of personal data
- Draft Decree on electronic commerce made for the implementation of law no. 2008-08 of January 25 2008 on electronic transactions
- Draft Decree on the electronic certification made for the implementation of law no. 2008-08 of January 25 2008 on electronic transactions

10.2.3 ICT Policy

The Government of Senegal has given special attention to the potential impact of ICT on Economic and Social development in Senegal, since the election of Mr Abdoulaye Wade as Head of State on 19 March 2000 of Senegal, March 19, 2000. This position was reaffirmed during an ICT policy statement made at the National Assembly on 20 October 2004 by Prime Minister Macky Sall. "*The Government intends to make ICT a powerful vehicle for accelerating economic growth and modernization of our administration*".

Since 2000, the government has taken the following legal and institutional measures

- Defining a national strategy for ICT development
- Adoption of new Telecommunications Code
- Establishment of the Regulatory Agency of Telecommunications (ARTP)
- Creation of the Agency for State Information (ADIE)
- Creation of a department responsible for promoting ICT
- Full Liberalization of the telecommunications sector

Under the National Program of Good Governance (PNBG), ICT is identified as an instrument to improve productivity of public services, develop quality services and modern communications. Under the Accelerated Growth Strategy (SCA), ICT is a priority cluster.

The four priorities of the PRSP are:

- Doubling and better distributing per capita income by 2015;
- Extend access to basic social services by accelerating the development of basic infrastructure to enhance human capital by 2010;
- To eradicate all forms of exclusion and achieving gender equality especially in the levels of primary and secondary education by 2015.

- Development of and better exploitation of ICT to achieve socio-economic impact

10.2.4 Current Status of Telecommunications Sector

The objective of the Letter of Sector Policy (2004 – 2008) published in January 2005 is to outline the government's strategy for development of the telecommunications sector, six years after the liberalisation of mobile services in Senegal in 1998. The telecommunications sector had contributed 3% to national GDP in 2003, over 100 billion was invested on fixed and mobile networks between 2000 and 2003, 1,000 of 14,200 villages were connected to the fixed telephone network, there was strong mobile phone subscriber growth and 22,000 indirect jobs were created in tele-centres, cyber cafes and phone card distributors.

However, the telecommunications sector in Senegal was perceived to have insufficient mobile competition and weak regulation and the perception of an unequal playing field for operators and service providers, low penetration of fixed, mobile and Internet, insufficient investment to finance a Universal Service and lower than expected job creation.

To response to the challenges and opportunities offered by the Information Society, and position Senegal as a preferred destination for ICT investment, the government set itself a leadership goal in ECOWAS[9], by increasing telecommunications competition, and deploying state of the art technology to deliver urban and rural universal service. This requires a development fund universal service to support investments in rural areas.

The major priorities set by the government to be achieved by 2008 include

- Tripled the number of telephone subscribers from 1 million (2003) to 3 million
- Increase the sector's contribution to GDP,
- Dramatically improve rural service by connecting 9 500 villages, with fixed and mobile networks covering all villages nationwide by 2010
- Democratizing the Internet, consider it as part of universal service (phone + internet).

To achieve these objectives, the government established the Ministry of Telecommunications, ICT and Transport, with the Agency for Regulation of Telecommunications (ART) managing regulation and competition.

The opening of telecom markets to competition will mean the end of the exclusive rights of Sonatel. Thus the state will be the ultimate guarantor of the new rules governing the sector. And the texts of new applications of telecommunications code will be adopted and the ART will make the upgrade of all matters relating to interconnection.

[9] Economic Community of West African States (ECOWAS) - Benin, Burkina Faso, Cabo Verde, Cote D'Ivoire, Gambia, Ghana, Guinee, Guinee Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo

In the context of further liberalization of the sector increased, the state provides a first step in choosing an operator who will have a blanket license allowing it to operate in all segments of the telecommunications market.

10.2.5 Reforms and Public Policies

As part of building sustainable growth and poverty reduction, the Government of Senegal has established, through the DSRP-II 2006-2010, six (06) lines of priority actions in the ICT sector to achieve the strategic goal "to accelerate the development of online services in urban and rural:

1. Promoting private investment and allowing the proliferation of public access to telephones and the Internet.
2. Support Program teleservice businesses in urban and rural.
3. Program to support community radio
4. Development and implementation of training programs tailored to the needs of ICT industries.
5. Market development of teleservices.
6. Initiation and training of all actors of economic life to ICT.

The evolution of indicators and progress of these reforms and public policies will be published in the DRSP review.

10.2.6 ICT Constraints over the Period 2006-2010

Constraints identified to date include:

- Low level of education and equipment for households and individuals in Senegal;
- Difficult access to finance for enterprises in the ICT sector outside Telecom Operators;
- Virtual absence of research and development of the ICT sector;
- Inadequacy of the framework of implementation of Public Private Partnership (PPP) in the ICT sector;
- Lack of support and promotion of local expertise;
- Absence of forward-looking approach in training;
- insufficiency in the energy supply at national level.

10.3 Conclusions

Overall, the reforms and policies implemented in the ICT sector, through the achievements of programs and projects have led to significant advances. However, despite the efforts, the sector requires a strengthening of ongoing initiatives, including:

- a guarantee of increased domestic demand for online services, both public and private (particularly large companies) to provide alternative markets for ICT companies;
- promoting a "culture" of ICT for all actors of economic life;

- supporting young project business service industries in Senegal through the establishment of funds for investment and innovation and the implementation of the ICT incubator;
- a generalization of the proposed Community Multimedia Centers throughout the territory;
- promoting public-private partnership to stimulate the local private sector.

10.3.1 Progress to date in implementing the ICT Policy

Most developing or middle income countries are dependent to one degree or another on external assistance to help them avoid the mistakes made elsewhere, thus conserving limited resources.

The new strategy and priorities actions of ICT have been defined in the Document of Social Economic Policy (DSEP), which will be for Senegal the reference document in term of the economic and social development for the next four years.

Despite the favourable policy indicators, a good ICT infrastructure and a fairly consistent role in the development of ICT, Senegal has not yet a structured, integrated policy regarding ICT. There was no official national strategy on the adoption and use of ICT to solve problems of economic and social development. It still puts the emphasis on a sectoral approach. The education sector seems to be making progress in integrating ICT in education system. Progress have also been made in the public sector with the development of information systems like for example the Automated Solutions for Trade and Transport efficiency (Single Window, E-Customs, E-Payment, E-Logistic, E-Services) [10].

The tables below summarise a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

[10] http://www.gainde2000.sn/

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved from 2008 to 2010 (ICT Skill Index Score out of 10: 2.66 in 2008 and 3.02 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has declined slightly from 2008 to 2010 (Index Score out of 10: 3.67 in December 2008 and 3.61 in December 2010, WEF Global Information Technology Reports 2008-2009 &2010-2011)	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.95 in December 2008 and 4.61 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.40 in December 2008 and 2.94 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10:3.59 in December 2008 and 3.77 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved slightly from 2008 to 2011 (Index Score out of 1: 0.2531 in 2008 and 0.2673 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.38 in 2008 and 0.65 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

11. POLICY ENVIRONMENT IN THE REPUBLIC OF SOUTH AFRICA

11.1 Introduction

The Government of South Africa has developed a number of policies related to ICT, Science, Technology and Innovation (STI). This document will initially focus on the South African ICT Research and Development and Innovation Strategy, and later consider some of the broader policies focused on ICT adoption and eSkills, which is a critical issue for the South African Government as it continues to try to attract foreign inward investment.

The South African ICT sector is the largest on the African continent. As an increasingly important contributor to South Africa's GDP, the country's ICT and electronics sector is both sophisticated and developing. The country has a network that is 99% digital and includes the latest in fixed-line, wireless and satellite communications, making it the most developed telecommunications network on the continent. South Africa's IT industry is characterized by technology leadership, particularly in the field of electronic banking services. South African companies are among world leaders in pre-payment, revenue management and fraud prevention systems, and in the manufacture of set-top boxes, all exported successfully to the rest of the world. Several international corporates, recognized as leaders in the IT sector, operate subsidiaries from South Africa, including IBM, Unisys, Microsoft, Intel, Systems Application Protocol (SAP), Dell, Novell, Cisco and Compaq.

The industry includes hardware, software, networking and related professional products and services. South Africa's ICT and electronics sectors are expected to continue showing strong growth in the future. Testing and piloting systems and applications are growing businesses in South Africa, with the diversity of the local market, first world know-how in business and a developing country environment making it an ideal test lab for new innovations.

11.2 ICT R&D and Innovation Strategy for South Africa

The 1996 White Paper on Science and Technology identified ICT as one of the technology missions that needed prioritisation for development. In 2004, informed by the White Paper and the 2002 National Research and Development Strategy, the DST embarked on the process to develop a comprehensive ICT R&D and Innovation Strategy. The ICT RDI Strategy was adopted 2007. The purpose of the South African ICT R&D&I strategy is to create an enabling national system for the advancement of ICT R&D and innovation, within the context of the broader National R&D strategy. It aims to improve economic competitiveness and the quality of life for South Africans. The 2015 ICT vision is as follows:

"South Africa is an inclusive information society where ICT-based innovation flourishes. Entrepreneurs from historically disadvantaged population groups, rural communities and the knowledge-intensive industry benefit and contribute to the well-being and quality of life of our citizens. South Africa has a strong national ICT brand that captures the vibrancy of an industry and research community striving for excellence, characterised by innovative approaches to local and

global challenges, and recognised for its contribution to the economic growth and well-being of our people and region."

In line with this vision the key ICT R&D&I strategic objectives are:

- To develop focused and strengthened ICT research activities to achieve world-class research competencies in identified key S&T areas;
- To build a strong and robust ICT innovation environment, with an indigenous ICT sector that is competitive and growing; and
- To build advanced human capital (ICT skills base) for research and industry, as well as the proliferation of ICT in other sectors of the economy.

The Government of South Africa is focused on creating "*an inclusive information society [by 2015] where ICT-based innovation flourishes*". The purpose of the ICT Research & Development (R&D) and Innovation Strategy "*is to create an enabling framework for the advancement of ICT R&D and innovation, in a systematic fashion, within the context of the National R&D Strategy… which sets the agenda and framework for maximising the contribution of R&D and innovation in science and technology in South Africa*".

The policy acknowledges the role of human capital in the ICT sector, and the need for "*the right skills and competences [to] be in place at all levels*". The strategy document also acknowledges the importance of foreign R&D, and the correlation between countries being able to tap into foreign knowledge because they have made necessary national investment. The document also acknowledges that skilled labour shortages can constrain growth, and that there is a clear need to provide sufficient public and private investment for research.

A number of key ICT domains have been identified as national priorities for South Africa

- high-performance computing; human language technologies; information security; open source software; software engineering and software architecture; mobile, wireless and satellite technologies; futureweb applications; geomatics and spatial technologies; and next generation networks and
- ICT application domains such as ICT for disability, education, health, service delivery, agriculture, manufacturing, resource-based industries and aerospace

The strategy aims to support early stage R&D in generic technologies with broad sectoral application (Type 1 R&D) and more mature technology with specific sectoral focus (Type 2 R&D). Key outcomes intended include

- Achieving global leadership in identified key scientific and technological domains
- Develop multi-disciplinary technologies, skills and methodologies to address areas of market neglect, especially to eradicate the digital divide
- An indigenous ICT sector that is developed, growing, innovative and competitive
- Smart proliferation of ICT within other sectors of the economy

eGovernment is acknowledged in the strategy as requiring good or excellent ICT infrastructure as well as a wide range of human skills, obviously including ICT skills. eGovernment is recognised as a priority to deliver information and services to citizens. ICT R&D has an important role to play in supporting rollout and adoption of eGovernment.

Other important related initiatives rolled out by the South African government include the SEDA Technologies Programme of the Department of Trade and Industry (DTI) which is focused on supporting the growth of globally competitive SMMEs, the ICT focused SoftstartBTI Incubator and the Eastern Cape Information Technology Initiative(ECITI).

Other key actors in ICT R&D and innovation identified in the strategy document include the Innovation Fund, science and technology parks (e.g. Innovation Hub, Pretoria and Cape Town IT Initiative - CITI) as well as local and international industry.

11.2.1 Current Status and Challenges in ICT R&D

The vision of the ICT R&D and Innovation Strategy is that by 2015:

"*South Africa is an inclusive information society where ICT-based innovation flourishes. Entrepreneurs from historically disadvantaged population groups, rural communities and the knowledge-intensive industry benefit and contribute to the well-being and quality of life of our citizens. South Africa has a strong national ICT brand that captures the vibrancy of an industry and research community striving for excellence, characterised by innovative approaches to local and global challenges, and recognised for its contribution to the economic growth and well-being of our people and the region*".

The appropriate mix of R&D, regulatory environment and wide scale adoption of ICT products and services will help create and enable a fully inclusive Information Society and globally competitive knowledge intensive economy. Achieving a Knowledge based South Africa and African Region will in turn help achieve the following goals

- Improved quality of life through innovative application of ICT
- A highly competitive economy based on pervasive integration of ICT into society
- A quantum leap improvement in the knowledge and skills levels through effective utilisation of ICT
- A vibrant, sustainable, innovative indigenous ICT industry with a strong export focus, which will attract investment from overseas-based multinational corporations

A number of key requirements were identified to achieve the vision of the ICT R&D strategy

- A healthy pipeline of human resources with advanced capabilities
- World-class, focused R&D activity with active local and international collaboration leading to internationally recognised leadership in key areas relevant to South Africa
- A strong South African ICT brand, focusing on innovative ICT solutions addressing the needs of the developing world

- A shift in orientation of the domestic ICT economy to give greater emphasis to development, production and export
- A market-driven approach addressing needs through innovative products, services and solutions and a mechanism addressing areas where market forces have failed
- Effective mechanisms for technology transfer, from knowledge generation through to productive implementation (including export)
- State of the Art research infrastructure (including organisational, regulatory, policy and other support infrastructure) and ready access by researchers to new technology and sufficient, affordable bandwidth

DST carried out a baseline study and benchmarked South Africa's ICT R&D performance and activities internationally. Workshops with ICT experts identified several clear trends.

In terms of ICT human resource development, South Africa is performing worse than most OECD countries based on population size, with 89% of ICT qualifications obtained in 2003 in South Africa at undergraduate level. While Masters and PhD graduates are required for their advanced skills, there is a requirement for healthy pipeline of school-leavers and graduates who are equipped to pursue postgraduate studies in ICT fields.

In terms of ICT publication rates and quality, the rate of ISI-listed publications per million of population is an order magnitude lower for South Africa (87 per annum) than for the UK (940 per annum) or Australia (1,110 per annum).South Africa's international standing in scientific research publications declined steadily from 1987 to 2000, especially in ICT fields such as computer science and mathematics.

Another key indicator used is Rated Researchers, as having sufficient numbers of rated researchers and clusters of rated researchers at specific institutions is required to drive research strategies. The current level of ICT rated researchers in South Africa is low [p27].

South Africa was scored joint lowest of 46 locations in a 2000 Wired Magazine survey of perceptions of different countries for innovation. Locations were rated based on

- Ability to train skilled workers or develop new technologies
- Presence of established companies and multinational corporations
- Entrepreneurial drive in population to start new ventures
- Availability of venture capital to help ensure ideas make it to market

South Africa applies for about the same number of patents at the European Patent Office (EPO) each year as Russia, New Zealand, Hungary, India and Hong Kong.

South Africa had a Networked Readiness Index Score of 0.33 in 2004 and a world rank of 34 (out of 104 countries), ranking above India. Digital Divide Indicators include

Table 1: Key ICT Parameters for South Africa (APC Website, 2005)

TV sets per 1 000 people	**152**	Number of mobile networks (Vodacom, MTN, Cell C)	**3**	Personal computers per 1 000 people	**68.5**
Radios per 1 000 people	**338**	Mobile phones (millions) (2004)	**20**	Internet users (thousands)	**3 068**
Telephone mainlines (millions) (2002)	**4.844**	Mobile phones per 1 000 people	**450**	Internet users per 1 000 people	**69**
Telephone mainlines per 1 000 people	**112**	Third-generation (3G) networks (introduced first by Vodacom then MTN)	**2**	Broadband (ADSL) users (thousands) (June 2005)	**67**
		3G customers (thousands) (June 2005)	**26.3**	Broadband (ADSL) users per 1 000 people	**1.5**

From a support structure perspective South Africa is quite well positioned, with the National System of Innovation (combined expenditure of R10 billion annually with public research institutions performing about 45% of total R&D undertaken), Meraka Institute, CSIR and other science councils bridging the gap between industry and universities and the Innovation Fund which is mandated to promote technological innovation through investing, and support for patenting and early technology commercialization activities.

The South African National Research and Education Network (SANReN) is of critical importance to the universities and major research institutions, just as science and technology parks and incubators are in developing technology and ICT clusters in distinct geographical locations (e.g. Innovation Hub in Tshwane, CITI in Cape Town).

Total investment in ICT R&D in 2004/2005 was 0.11% of GDP and 12.7% of total R&D expenditure, which does not compare well with other OECD countries. In 2000, 0nly 12.5% of South African manufacturing is focused on ICT manufacturing, compared with 25% in most OECD countries and more than 50% in Finland, Korea and Ireland.

Business expenditure on ICT R&D is generally low by international standards. The South African IT Industry Strategy (SAITIS) report found that 70% of respondents did not undertake expenditure in IT R&D, and half of the IT vendors did not undertake expenditure on IT R&D, and 29% spent less than R100,000 (SAITIS, 2000, P138).

The following table summarises the major SWOT elements for South Africa

STRENGTHS	▪ The CSIR, other science councils and the Meraka Institute, which can play an important bridging role between universities and industry ▪ The National System of Innovation (comprising organisations performing R&D in the pursuit of a common set of social and economic goals) ▪ Existing Science and Technology parks and incubators ▪ Progress in achieving demographic representation of graduates in ICT overall ▪ Good Mobile phone network coverage and take-up of cellular phones ▪ Exemplar ICT companies with significant foreign revenue ▪ The implementation of the FRASCATI survey to determine the national spend on R&D resources and infrastructure and the Oslo Innovation survey to provide information on the current state of R&D and Innovation ▪ The Johannesburg Stock Exchange ranks among the 10 largest in the world, indicating scope for financing ICT R&D and innovation.
WEAKNESSES	▪ The low number of people with ICT qualifications and the number of ICT researchers exacerbated by insufficient mid-level skills ▪ The rate and quality of South African ICT publications are low and have not kept pace with those of other countries, both developed and developing. Fields pertinent to ICT have a publication rate less than the South African average. ▪ South Africa scores very low in terms of how it is perceived as an attractive innovation destination. ▪ Lack of breakthrough innovations in ICTs. ▪ The tele-density for fixed phones is low by world standards, but this is not surprising given the poverty levels. ▪ South Africa has fallen well behind in Internet and broadband penetration. ▪ Network infrastructure for science councils and universities has not kept pace with international developments. ▪ There are no significant ICT test beds to support research and innovation in areas such as next generation wireless networks or Internet architecture; nor are there grid networks or infrastructural centres of competence. ▪ South Africa's Gross Domestic Expenditure on R&D is significantly below international benchmarks for countries within a similar economic category.

OPPORTUNITIES	▪ Scope through policies to increase graduation rates in science and engineering at Masters and PhD levels. ▪ Scope to achieve more equitable demographic representation at advanced degree levels. ▪ Scope to increase collaboration with the leading R&D countries, namely the USA, EU and Japan. This should be assisted by South Africa's trade relationships with these countries, for example the European - South African Science and Technology Advancement Programme. ▪ Scope to promote Open Access scholarly communication as an overt intervention regarding knowledge diffusion (needs policy intervention). ▪ Work through remedies for falling behind in Internet and broadband penetration. ▪ South Africa has to compete in R&D against Europe and elsewhere where significant investment is taking place in ICT infrastructure relevant to R&D. ▪ SANReN network is crucial for the universities and major research institutions. ▪ South Africa is under-provided with science/technology parks and needs to address this deficiency, possibly following the Innovation Hub precedence. ▪ With technology seen by the major international aid funding bodies as a key component of economic self-sufficiency, South Africa can focus on innovative ICT solutions addressing the needs of the developing world. For example, South Africa is probably the best-placed country to service the rest of Africa.
THREATS	▪ Stiff competition from numerous countries which are not only better placed than South Africa with regard to ICT R&D, but are highly committed at both government and private sector levels. ▪ World economic and political problems, forcing a re-think of all priorities.

11.2.2 ICT R&D and Innovation Strategy Objectives

The strategy is based on 3 strategic and 4 supporting objectives

- ***Focused world-class research at higher education institutions and R&D institutions to create recognised world-class research competencies in the country***

Strategies and actions supporting Strategic Objective 1 include identifying and supporting key technology domains that can be used in multiple application domains where global differentiation can be achieved, identify and support key application domains that contribute to improving quality of

life, establish focused national research centres at relevant institutions, create collaborative networks of researchers, industry and other stakeholders, support directed R&D projects addressing identified socio-economic needs, ensure regular renewal of focused research domains and conduct regular foresighting and roadmaps.

- ***Strong and robust innovation chain resulting in increased ICT patenting, improved digital divide indicators and vibrant high-tech ICT SMME industry***

Strategies and actions supporting Strategic Objective 2 include establishing national grand challenges to inspire researchers, identify and support large scale collaborative innovation projects building on local research, regularly update and review the national ICT Roadmap, expand national initiatives promoting co-investment by industry in ICT R&D projects, develop indicators to accurately assess the state of ICT R&D and innovation, support institutions at various points in the innovation chain, market R&D outputs and outcomes, set up an implementation framework for industry to use outputs of R&D & innovation and create mechanisms that facilitate cooperation between industry, research institutions and HEIs.

- ***Advanced human resource capacity in advanced ICT skills base (eSkills) to improve the absorptive capacity in ICT and thus enable focused research and innovation***

Strategies and actions supporting Strategic Objective 3 include implementing mechanisms allowing young people to pursue postgraduate qualifications under mentorship of experienced ICT professionals, creating advanced academic and entrepreneurial ICT skills development programmes aligned to the ICT R&D and Innovation Strategy, programmes to support mid-career retraining including post graduate studies by senior scientists and engineers, and that facilitate better cooperation between industry and academia and promote better gender and race representation in the population of skilled ICT people. Supporting career paths in research and innovation and establishing exchange mechanisms allowing young researchers to be exposed to the global research environment are critical actions required when trying to develop necessary human resource capacity.

To support these strategic objectives, the Strategy identifies four supporting objectives

- Effective research infrastructure supporting focused local/international collaboration
- Vibrant international cooperation creating strong R&D links with countries that lead world ICT R&D to accelerate the achievement of objectives 1 to 3
- ICT policy, institutional and other support at DST, its agencies and HEIs
- Resourcing the ICT R&D and innovation system to start approaching OECD levels for ICT GDP Expenditure on R&D (0.4% rather than 0.11% in 2004/2005

11.2.3 ICT R&D and Innovation Strategy Implementation

The Strategy clear states that achieving its vision relies on

- Implementing a set of nine interventions supporting the objectives (presented below)

- Setting national goals measured using key performance indicators (KPIs)
- Assigning responsibility to specific role-players for implementing key aspects

A number of specific interventions were identified to implement the strategy

- Advance human capital development programme to improve post graduate enrolment & completion rate in ICT by supporting researchers as employed students
- Critical mass research programme to support focus and critical mass R&D in identified technology and application domains, including support towards core grant proposals, funding, research chairs, networks and centres of excellence
- International ICT R&D collaboration programme supporting collaborative R&D projects, researcher mobility and science and technology networking
- Large innovation initiatives and grand challenges to stimulate broad cross-disciplinary collaboration among different stakeholders involved in the innovation pipeline and leverage the Innovation Fund and other instruments
- ICT R&D in industry programme to increase the current low levels of industry take-up of research results, through awareness raising, incentives, industry research collaboration support e.g. Technology and Human Resources for Industry Programme (THRIP), people mobility and increased intergovernmental collaboration
- ICT R&D and society programme to contribute to realisation of impact of ICT to improve quality of life and support an inclusive Information Society through e.g. a multidisciplinary research programme and young scientist and engineer programme
- R&D infrastructure programme supporting research through equipment grants
- Futures research, future technologies and strategy implementation and renewal support through ICT futures research, research in future and emerging technologies and providing effective support to implement ICT aspects of the NSI Strategy
- Funding the ICT R&D and Innovation Strategy to increase investment to 1.5% of GDP by 2012 and 1% of GDP by 2008

The budget for the ICT R&D and Innovation Strategy amounts to R176 million in 2007/8, R203 million in 2008/9 and R254 million in 2009/10. By far the largest budget (c.70%) each year is invested in Intervention 2 (Critical Mass Research Programme), with Intervention 1 (Advanced Human Capital Development Programme) far behind but growing from almost 11% in 2007/8 to 14% in 2009/10 and Intervention 6 (ICT R&D and Society Programme) which is focused on Information Society, market neglect and young scientist and engineer programme falling from 8.5% in 2007/8 to 6.5% in 2009/10. Intervention 7 (R&D Infrastructure Programme) is budgeted separately.

Key performance indicators (KPIs) identified to monitor progress include

- Human Resource Development Indicators (e.g. PhD graduate rate, ICT Full Time Equivalent researchers with PhDs, shorter term indicators – programme enrolments)
- Research Performance Indicators measured by % of global ICT publications and Relative Citation Index for ICT publications attributable to South Africa
- Innovation Performance measured through US/EU.SA ICT patent share and business expenditure on ICT R&D and Innovation (ICT BERD)

11.3 Conclusions

All key stakeholders including universities will be involved in implementing the strategy, complementing other initiatives addressing key skills supporting industrialisation of R&D. However, the Department of Science and Technology (DST) is responsible for oversight and coordination of implementation of the strategy (including monitoring and benchmarking). ICT R&D Strategy 2007 Interventions are envisaged to take place up to December 2011, with an international Strategic Review due during 2010, and the ICT R&D Strategy 2011 Interventions due to commence in April 2012, running through 2015.

Implementation of the ICT R&D Strategy is expected to yield key socio-economic benefits

- Improved quality of life, inclusive democracy, good governance and social stability, contributing to poverty eradication and achievement of social development goals
- Highly competitive economy based on ICT integration into all aspects of society
- Exponential improvement in knowledge and skills levels of South Africans
- Vibrant, sustainable and innovative indigenous ICT industry with export potential

This is a well considered and comprehensive strategic document focused on ICT R&D and Innovation. There are clear implications in this policy for interaction with other stakeholders, and indeed coordination with other policies related to eSkills and Human Resource Capacity building in particular, which involves liaison with other national departments, as well as Provincial government, SETAs and other public and private stakeholders.

11.3.1 Progress to Date in Implementing the ICT Policy

South Africa is a middle income country, which means that it does not enjoy the level of external support (whether budgetary or technical) provided to most developing countries. This means that is reliant on leveraging its own resources or contracting experts to help implement national policies.

The strategic interventions for implementation of the ICT R&D&I strategy include:

- The Advanced Human Capital Development Programme which aims to dramatically improve post-graduate enrolment and completion rate in ICT by supporting young researchers as students in employment.
- The Critical Mass Research Programme that supports focused and critical mass R&D in identified technology and application domains through an array of instruments that link established researchers and draw in new researchers including post-doctoral researchers and

international experts available in the NSI system. These include core grant proposal funding, research chairs, networks and centres of excellence, institutes etc.

- The International ICT R&D Collaboration Programme supports the objectives of the Strategy through collaboration via collaborative R&D projects, researcher mobility and science and technology networking.
- The Large Innovation Initiatives and Grand Challenges address the innovation chasm by stimulating broad collaboration across disciplines and amongst players in various stages of the innovation pipeline by leveraging the Innovation Fund and other instruments.
- The ICT R&D in Industry Programme addresses current low levels of investment in ICT R&D and low uptake by industry and other sectors of society of research results from academic and other research institutions. This will be done through awareness and advocacy, incentives, industry research collaboration support e.g. as in THRIP, and people mobility by building on the ICT R&D Roadmap programme and stimulating intergovernmental and parastatal collaboration.
- The ICT R&D and Society Programme contributes to the realisation of the benefits of ICT R&D for improved quality of life and in support of an inclusive information society through a multidisciplinary information society research programme, market neglect innovation and a Young Scientist & Engineer programme.
- The R&D Infrastructure Programme enables simulation, experimentation, collaboration and other research processes, implemented through a number of specific infrastructures, by supporting research groups through equipment grants as required.

The ICT RDI strategy implementation is managed by the Council for Scientific and Industrial Research (CSIR) Meraka Institute and implemented in collaboration with universities, science councils, business incubators, science/technology parks, industry and government. DST is responsible for oversight and co-ordination of the strategy, which runs from 2007 – 2016 in stages.

Key performance indicators for measuring effective implementation of the ICT RDI include:

- Human resource development indicators – will ultimately be measured through PhD graduation rate and ICT Full-Time Equivalent researchers with PhDs. Due to the lag that can be expected in these indicators, these measures are supplemented by the short-term indicators such as the enrolment of Bachelors, Honours, Masters and PhD levels as early indications of the effects of the ICT R&D and Innovation Strategy.
- Research performance indicators – is measured by the country's share in global ICT publications and the Relative Citation Index for ICT publications attributable to South Africa.
- Innovation performance – is measured through US/EU/South African ICT patent share and business expenditure on ICT R&D and Innovation.

The Department of Communications (DoC) is the custodian to the development and implementation of the National ICT Policy in South Africa. Its mandate which is derived from various legislations is: *"To create a vibrant ICT Sector that ensures that all South Africans have access to secure, affordable and accessible ICT services in order to achieve socio-economic development goals and*

support of the African Agenda and contribute to building a better world". Since 1994, the DoC has spearheaded the development and enactment of a number of legislations and regulations with an intention to transform the ICT sector by introducing competition, and by opening opportunities for the previously disadvantaged groups to participate in this sector. In the same period, there have been a number of institutional arrangements that have been introduced to independently regulate the industry, e.g. the Independent Communications Authority of South Africa. There are also institutions that have been created to advance the development of the Information Society in South Africa by funding infrastructure development and provision in areas that have been neglected by the dominant telecommunications companies; these institutions include the Universal Services and Access Agency of South Africa.

A key part of enabling implementation of the National ICT Policy is the development of skills, to leverage available supporting infrastructure and regulatory environment. Significant progress has been made in this regard in South Africa over recent years. To highlight the strategic importance of skills development the DoC tasked a Deputy Director General with responsibility for the development of a policy and implementation framework that aligned skills development with national priorities and sectoral requirements, and took account of the views of all stakeholders.

The IST-Africa Coordinator (IIMC, Ireland) has been actively involved in this process. Over an eighteen-month period during 2009 and 2010, IIMC was the primary author and co-creator of the South African National eSkills Plan of Action, on behalf of the Department of Communications. This involved analysing the MTSF (Medium Term Strategic Framework – the five year plan for the South African Government) and other relevant departmental and sectoral policies, engaging with key stakeholders from government, industry, research, civil society and the labour movement through a series of consultative one-on-one and working group meetings.

This consultative co-creation process concluded with IIMC designing and executing a three-day eSkills Summit (26 – 28 July 2010, Cape Town), that attracted active participation from 300 representatives of government, industry, research, civil society and labour. These key stakeholders validated the final policy document, through a participatory engagement process supported by facilitators and rapporteurs prior to its successful submission for Cabinet approval.

The DoC has recently convened a National ICT Policy Colloquium (18-19 April 2012), whose main purpose is to discuss the need to review Government's existing ICT policies in South Africa as well as to present recommendations and a way forward. The DoC is embarking on a comprehensive full policy review process of all documents post 1994, which will culminate in an integrated National ICT policy for South Africa. The Colloquium discussions will centre around Telecommunications Policy and Regulation; Broadcasting Policy and Regulation; Information Technology Policy and Regulation; Postal Policy and Regulation; ICT Manufacturing; ICT Sector Investment; Digitizing Government; Human Capital and Local Content.

The tables below summarise a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption.

These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
Dimensions	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 6.57 in 2008 and 6.61 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has declined slightly from 2008 to 2010 (Index Score out of 10: 4.07 in December 2008 and 3.86 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011 The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.83 in December 2008 and 3.25 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has declined slightly from 2008 to 2010 (Index Score out of 10: 3.99 in December 2008 and 3.72 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

	Political & Regulatory Environment	e-Government Development	ICT Usage
Dimensions	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10: 5.04 in December 2008 and 5.14 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has declined slightly from 2008 to 2011 (Index Score out of 1: 0.5115 in 2008 and 0.4869 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.50 in 2008 and 1.04 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

12. POLICY ENVIRONMENT IN THE REPUBLIC OF TANZANIA

12.1 Introduction

The Government of Tanzania has developed a National Information and Communications Technology Policy (published March 2003). This chapter will focus on analysis of this policy.

12.2 National ICT Policy for Tanzania

The Government of Tanzania recognises that ICT has lead to multiple convergences of content, computing telecommunications and broadcasting, as well as changes in both knowledge management and human resources development and the way business, education, knowledge sharing is conducted. ICT has also empowered citizens and communities by redefining governance, and facilitating eDemocracy and eParticipation.

However, the Digital Divide in Tanzania is exacerbated by low levels of human capital development, local content creation, ICT infrastructure and higher costs of participation. This policy was developed to address the significant risks identified by the government of further exclusion from the knowledge economy and social development. Its aim is to make it possible for "enabling sectors" such as telecommunications, information or broadcasting to collaborate to ensure that "enabled sectors" such as education, health, governance and agriculture can become further empowered through development and application of ICT.

This National ICT policy aims to deploy a broad-based national strategy that addresses the developmental agenda of Tanzania, and establish appropriate institutions so as to avoid previous duplication of effort, waste of scare resources and random adoption of different systems and standards. The National vision is that "*Tanzania [will] become a hub of ICT Infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally*."

The overall mission of the ICT Policy is "*To enhance nation-wide economic growth and social progress by encouraging beneficial ICT activities in all sectors through providing a conducive framework for investments in capacity building and in promoting multi-layered co-operation and knowledge sharing locally as well as globally*".

The ICT Policy must be considered in the context of the Tanzania Development Vision 2025, which is focused on ensuring a society with a high quality livelihood, peace, stability and unity, good governance, a well educated and learning society, and a strong and competitive economy capable of producing sustainable growth and shared benefits. Vision 2025 explicitly acknowledges that "*The new opportunities that ICT is opening up can be harnessed to meet the goals of the Vision*." These are briefly summarised below

- High Quality Livelihood
    - Service Sectors

- Availability of Universal Access

- Peace, Stability and Unity
  - Strategic ICT Leadership
  - Legal & Regulatory Framework (trust, security and values)
- Good Governance
  - Public Service (eGovernment)
  - ICT infrastructure (Effective use of unutilised ICT capacity and infrastructure)
- A Well-Educated and Learning Society
  - Human Capital (Gender issues and disadvantaged groups)
  - Local Content
- Strong, Competitive Economy Capable of Producing Sustainable Growth & Shared Benefits
  - Productive Sectors (Adverse effects of globalisation)
  - ICT Industry

12.2.1 Status of ICT in Tanzania

In March 2003, fixed and mobile tele-density countrywide was low, at 1.2 (i.e. 12 lines per 1000 people) and 8.1 respectively, with a tele-density of 5 fixed and 10 mobiles in the Capital City, Dar Es Salaam. 96% of the PSTN networks of fibre optic, microwave and satellite-links is digital, allowing the provision of new ICT enabled services. However, network coverage was limited to urban areas of the country.

Although Tanzania has a liberalised broadcasting sector, in March 2003 most of the programme content consisted of imported material and sports coverage, requiring action by both the regulator but also those operators active at either a local, national or regional level.

Nine companies were licensed by 2003 by the Tanzania Communications Commission (TCC) to provide public data communication services including Internet services. While there were sixteen licensed ISPs in Tanzania in March 2003 (10000 – 15000 dial up accounts as well as organisational users), none of their Points-of-Presence (PoPs) were connected to one another, thus utilising expensive international bandwidth connections for routing most local traffic. The lack of a national Internet Exchange Point (IXP) is a serious problem, especially considering the largely unsatisfied national demand for Internet access.

Tanzania has to import all computer hardware and most software, with limited use of open source software, and limited human capacity to support the ICT industry. This is explained in considerable part by the lack of computer laboratories and multimedia facilities in most public educational institutions and the even lower level of internet access. Even where there is Internet access, access speeds are low (32kbps - 512kbps), and the many cyber cafes are not currently viable as eLearning centres from an environmental or pricing perspective. An additional key contributing factor is that

there is a lack of training for teachers, thus resulting in slow take up of computer studies in primary and secondary schools. Where ICT is used in education, this is generally only in some schools and colleges in urban areas. Courses offered by various training courses lack standardised evaluation or certification. For all of these reasons, there is a shortage of well-qualified ICT professionals in Tanzania.

While in March 2003 there were many Tanzanian websites, most were in English, not regularly updated and mostly offering static advertising function. eBusiness and eCommerce are constrained by a lack of a national payment system, local credit cards and the necessary legislative framework. There is limited coordination of eGovernment initiatives. Most organisations make marginal use of ICT in daily operations, primarily for human capacity reasons. Job mobility in the ICT sector is very high.

On the positive side, those few websites in Kiswahili have given Tanzania a greater visibility across Africa, and in recent years, there has been a considerable improvement in key ICT statistical indicators resulting from government reforms (in the public service, legal sector, financial sector, parastatal, local government and poverty alleviation), telecoms market liberalisation (including international gateways in Dar es Salaam (TTCL) and Zanzibar (Zantel), partial privatisation of TTCL, emergence of entrepreneurs and official development assistance. Key government projects that have been rolled out include the Integrated Financial Management System (IFMS), the Personnel Control and Information System (PCIS), national TV Tanzania (TVT), the Tanzania Global Development Learning Network, a National Payments System and various governmental websites.

Tanzania by March 2003 had over 1000 Cyber Cafes, 16 Data service providers, four mobile operators (Celtel, Mobitel, Vodacom and Zantel) and 23 ISPs. The Communications Act and Broadcasting Services Act was enacted in 1993, the National Science and Technology Policy (1996), the National Telecommunications Policy (NTP) launched in 1997 and the Tanzania Development Vision 2025 in 1998.

As of March 2003, the proposed Rural Telecommunication Development Fund has still not been developed, but since 2002, all taxes and duties on computers and peripherals were abolished, which served to stimulate the economy and the ICT sector

12.2.2 Policy Objectives, Challenges and Policy Statements

The broad objectives of the National ICT policy are to

- Provide a national framework that will enable ICT to contribute towards achieving national development goals
- Transform Tanzania into a knowledge-based society through the application of ICT

The policy articulates ten focus areas reflecting a number of important cross-cutting themes, currently being addressed by initiatives that are not adequately coordinated. Greater leadership is

required to ensure that political and executive responsibilities need to be assigned towards delivering this policy and identifying areas requiring priority funding.

Policy objectives pertaining to Strategic ICT leadership include

- Increase the use of ICT for equitable and sustainable socio-economic and cultural development of Tanzania
- Raise the level of awareness on the role and potential of ICT
- Create an authoritative national organisation to effect, coordinate and review the ICT policy
- Prioritise ICT investment in development assistance policies and programmes
- Enhance synergy, economies of scale and productivity in all ICT matters
- Create a favourable environment for cooperation and partnership in ICT among public and private sectors, civil society and between all stakeholders at local, national, regional and international levels
- Empower and facilitate Tanzania's participation in the Global Knowledge Society

Key policy challenges include

- Finding appropriate mechanisms for policy coordination
- Creating awareness among leaders and the public and political championing of ICT
- Promoting ICT to further productivity among the sectors that are key drivers of the national economy
- Prioritising of development assistance in ICT
- Developing ICT sector parameters and indicators
- Participation in global governance of ICT and the Internet
- Creation of an environment conducive for effective ICT deployment
- Addressing rural/urban imbalances
- Promotion of regional integration and international cooperation
- Promotion of more effective and increasingly broad-based national participation in international for a on Internet policy making and governance

Key Policy Statements include

- Since ICT is a powerful development facilitator, the Government will embrace ICT as an integral part of its development strategy and empower all citizens to use it to fight poverty, ignorance and disease so as to improve the quality of their lives
- The Government shall create the necessary enabling environment to facilitate the deployment, utilisation and exploitation of ICT in all sectors of life
- The Government shall annually allocate funds equivalent to a reasonable proportion of GDP for ICT deployment, diffusion and universal access

- The Government shall promote the creation of bilateral relations and cooperation with regional and international organisations that generate, process, store and disseminate ICT driven information, to expand and strengthen local ICT capacity
- The Government will promote the development and/or acquisition of flexible standard information processing methods and facilities and oversee their utilisation by all users of ICT in the national network in order to effect or ensure compatibility
- The Government will encourage public, private and community sector partnerships to jointly invest in ICT development

12.2.3 Policies for ICT Infrastructure

The requirements of ICT infrastructure are evolving with greater convergence, and must be aligned with the availability of other essential services like electricity supply. The policy notes that "*considered choices must be made with respect to the evolving technology options that permit leapfrogging into optimal deployment strategies for the particular time and location, allowing sustainability, innovativeness and responsive service standards*".

ICT Infrastructure related policy objectives include

- Foster efficient, inter-operable, reliable and sustainable national ICT infrastructure commensurate with grass-root needs, and compliant with regional and international standards, with increasing access while reducing cost
- Encourage regulatory organs to jointly investigate and respond to the challenges of convergence and newly emerging technologies, while drawing inputs from the general public and the key stakeholders
- Establish mechanisms and participate in addressing new international policy and technical issues raised by ICTs new technologies and services
- Foster the evolution of dynamic strategies that will address network security issues.
- Evolve regional Internet development policies and infrastructure
- Establish mechanisms that will result in least cost access to bandwidth for institutions or individuals in Tanzania
- Ensure all installed ICT infrastructure and capacity is utilized effectively and contributes to resilience and redundancy

ICT Infrastructure Policy Challenges include

- Build an adequate ICT infrastructure
- Address connectivity issues
- Developing appropriate software plans and strategies
- Promote convergence of voice, data, computing and video (for example multimedia services, VoIP)

- Mobilize strategic investments
- Compliance with regional and international ICT infrastructure standards
- Improve access to basic socio-economic and cultural services
- Meet universal access obligations

ICT Infrastructure Policy Statements include

- The Government will ensure that a reliable state of the art ICT infrastructure, of adequate capacity, high-speed and countrywide coverage is developed
- The Government will support, through incentives and directives, bona fide institutions actively involved in the development and application of ICT
- The Government will set up national IXPs and hierarchical IXPs, in collaboration with other countries as well as regional information and communications infrastructure
- The Government will encourage appropriate lending mechanisms that foster a dynamic climate for entrepreneurs to venture into ICT and related sectors
- The Government will encourage public and private sectors to explore various means of funding, including but not limited to loan finance, equity finance, incubation finance facilities, hire purchase finance, and grant finance for ICT development
- The Government will seek to ensure all installed ICT infrastructure is utilised effectively, and synchronized to contribute to national resilience and redundancy

12.2.4 Policies for ICT Industry

Private sector involvement is critical to the development of the ICT sector in Tazania. A key challenge is that most ICT firms focus on serving urban areas, while 80% of the population are in remote rural areas. Government support is required to encourage the private sector to address the needs of this rural market and to develop the capacity within Tanzania to design and manufacture ICT. Support such as mentoring, venture capital and fiscal incentives, as small-scale start-ups and artisan enterprises is required to establish a vibrant ICT sector. The education system needs to be oriented to emphasise entrepreneurial and professional skills as well as acquiring technical competence in ICT.

ICT Industry Policy Objectives include

- Create a conducive environment for a vibrant and sustainable ICT industry in Tanzania that is aligned to national priorities
- Contribute to efforts in making the country a competitive developer and producer of ICT products and services
- Build direct relationships with the manufacturers and designers of ICT resources.
- Promote ICT culture, general awareness and political e-readiness in Tanzania

- Provide accurate feedback to the Government on the impact of policies and measures that affect the ICT market, while informing and advising on future options
- Guide the Tanzanian market on the full range of available options in terms of sourcing, licensing, upgrading and sustaining of ICT investments
- Promote special package deals for micro-enterprises or for community organizations.
- Encourage multi-sectoral initiatives that apply ICT for poverty reduction, employment creation, and innovative entrepreneurship

ICT Industry Policy Challenges include

- Building capacity and culture for maintenance and after sales services
- Increasing capacity of ICT project management
- Improving availability and affordability of hardware and software solutions
- Making available appropriate financing and fiscal mechanisms for ICT entrepreneurs
- Promotion of ICT culture in Tanzania
- Encouraging the involvement of the private sector
- Development of local and open source software
- Development of local content
- Increasing in-sector networking and partnering
- Addressing issues related to intellectual property rights

ICT Industry Policy Statements include

- The Government will promote, encourage and support research and development activities in the areas of ICT and strengthen the national capability to develop research programs and projects in the ICT field
- The Government will nurture the emerging culture of innovation and entrepreneurship as an enabling environment to support growth of the ICT industry
- The Government will foster the growth and technological sophistication of the ICT industry in order to support the extensive and innovative application of ICT and the export of competitive ICT products and services
- The Government will encourage and support local institutions, in partnership with foreign owned multinational companies to establish production facilities, conduct research, and design as well as manufacture specialised ICT equipment locally

12.2.5 Policies for Developing ICT Human Resource Capacity

Tanzania is not the only country with insufficient numbers of skilled and experienced experts in ICT and in other professions that rely on ICT. Choices must be made between importing required skills or developing these domestically over time. Challenges include realigning educational and

vocational training pipelines to meet labour market needs and "*leveraging ICT to enhance education, including curriculum development, teaching methodologies, simulation laboratories, life-long learning and distance education and for teaching of not only ICT, but of all subjects and specialisations. If embraced appropriately and supported at all levels, these could transform the country's human capital*".

Human Resource Capacity Policy Objectives include

- Increase the size and quality of ICT-skilled human resource base in Tanzania.
- Expand and develop the teaching of ICT at all levels of the national system of formal and informal education and training
- Use ICT to improve the quality of delivery of education and training in all areas including distance learning, as well as to enhance the learning experience itself
- Expand and improve adult-education, life-long learning and both general and digital literacy programmes, notably for retraining and re-skilling the existing workforce
- Encourage and support ICT training for political decision-makers, community and civil society leaders, as well as private and public sector executives
- Give special attention to providing new learning and ICT access opportunities for women and youth, the disabled and disadvantaged, particularly disenfranchised and illiterate people, in order to address social inequities
- Develop and deploy a nationwide e-Education system that supports schools, higher education/training facilities across the country by interconnecting them with each other and with relevant knowledge centres, providing curriculum integration while also generating information to better shape policies, strategic plans and tactical decisions for developing education and vocational training in Tanzania
- To foster interest among scientists to conduct ICT research & development

Human Resource Capacity Policy Challenges include

- Boosting the number of dedicated and qualified ICT professionals
- Refining the educational system
- Developing appropriate attitudes, knowledge and skills for ICT initiatives
- Integration of educational and vocational training opportunities
- Creating appropriate employment and self-employment opportunities and developing multi-skilled operatives and hybrid managers
- Evaluation and certification of "standard" ICT courses
- Developing remuneration and incentives packages for ICT-skilled staff with focus on retention schemes for skilled workers and moving from "brain drain" to "brain gain"
- Creating opportunities for job enrichment, productivity, enhancement or wealth creation through ICT

- Creating conducive environment of research and development in ICT

Human Resource Capacity Policy Statements include

- The Government will promote and support the development of qualified personnel for efficient policy-making, regulation and management of information resources and services including the education, training and retraining of ICT managers, professionals and other operatives
- The Government will require the teaching of ICT at all levels of the national system of public and private education and training in order to increase the size and quality of ICT-skilled human resource base in the country
- The Government will encourage and support formal and informal sectors to adhere to acceptable standards of examination and certification of ICT training programmes
- The Government in collaboration with the private sector will develop and put in place appropriately designed schemes of service for different cadres of ICT personnel in order to secure their retention and encourage innovative behaviour
- ICT deployment is to be especially inclusive and to proactively take into account gender and disadvantages groups
- The Government will encourage activities relating to life long training processes both formal and informal

12.2.6 Policies for ICT Legal and Regulatory Framework

Globalisation and the pervasiveness of the Internet have given rise to new types of needs, rights and vulnerabilities. For secure electronic transactions to occur, an environment of trust must be created and sustained through the legal and regulatory apparatus. Cyber-criminals around the world are constantly seeking loopholes through which to perform illegal or illicit businesses. Any country that has inadequate cyber-law is essentially offering a safe-haven for cyber-criminals to act with impunity.

Tanzania needs to create and sustain a secure cyber-law environment, in addition to existing legislation, before any new developments can emerge in ICT related services.

Legal and regulatory framework Policy Objectives include

- Establish an enabling legal framework, aligned with Tanzania's constitutional provisions, legislative and regulatory environment, and consistent with regional and global best practices
- Ensure that Tanzania does not become a haven of cyber-crime

Legal and regulatory framework Policy Challenges include

- Mould the present legal framework and related institutional infrastructure, as it is not yet conducive to ICT development and application
- Address the inadequate regulatory capacity, especially in the face of convergence of networks and services

- Enacting specific and effective legislative instruments on privacy, security, cyber crimes, ethical and moral conduct, encryption, digital signatures, copyrights, intellectual property rights and fair trade practices
- Create capacity for research in ICT-related legal and regulatory issues

Legal and regulatory framework Policy Statements include

- The Government will review existing laws and regulations in order to repeal or adjust those that are not conducive to the healthy growth of the ICT industry and enact new ones that take account of issues associated with Internet Governance and the convergence of telecommunication, broadcasting and information systems
- The Government will set-up legal regulatory frameworks appropriate to the ICT sector taking into account that electronic transactions are susceptible to criminality
- The Government will have compelling interest in shielding contents inappropriate for minors or those that promote behaviour that might endanger minors and society.
- The Government will promote business in electronic form in a secure environment and establish a legal framework to provide guiding principles, rules and legislation
- The Government will regularly carry out a review of policies and/or legislation in order to foster introduction of new services and technological innovation that will add value to the providers and end-customer of ICT enabled services

12.2.7 Policies for Productive Sectors

Tanzania's GDP is heavily dependent on agricultural production, followed by mining and tourism. Key actors include both SMEs and a small number of multinationals. While each have their own ICT requirements, SMEs have not received much support to date.

Productive sector Policy Objectives include

- Contribute to the reduction of poverty and improve the quality of life of Tanzanians.
- Foster enterprise, entrepreneurship and innovativeness for sustainable socio-economic and cultural development
- Create a favourable climate for industry, business and investment to adopt ICT
- Develop and deploy a nationwide ICT system to support farmers, traders and extension workers in remote areas
- Ensure that private and public development plans and projects in all sectors incorporate appropriate ICT
- Avoid the adverse effects of globalisation, particularly the "hollowing-out" of local industries and tax revenues

Productive sector Policy Challenges include

- Coordination of trade links and e-markets

- Facilitation of resource allocation, and delivery
- Enhancement of productivity (especially in agriculture, industry and mining)
- Making available relevant information such as weather, and other climatic trends
- Developing better methods of management of land and water resources
- Our local industries working within the new global economy being exposed to the attendant risks of globalisation

Productive sector Policy Statements include

- The Government will encourage all productive sectors to incorporate ICT in their development plans
- The Government will encourage, promote and support the implementation of nation-wide ICT systems for rural development activities, agricultural, horticultural and livestock extension for farmers, career guidance for youth, technology guidance for rural enterprises, micro-level planning, etc. Communities and user groups or beneficiaries shall be actively encouraged to participate in all such activities
- The Government will take steps to move Tanzania's economy into line with the new global economy while minimising the adverse effects of globalisation on the local economy and tax revenues.

12.2.8 Policies for Service Sectors

The government believes that all public utilities and services in Tanzania can be significantly improved and expanded by embracing ICT, whether by strengthening information flows and decision making or improving service delivery channels for clients. The Service Sectors also include the educational and vocational training sector, which is clearly a cornerstone for development in all economic sectors in Tanzania.

Service Sector Policy Objectives include

- Establish an environment conducive for e-commerce transactions and competition
- Encourage more usage of ICT in financial services (banking, insurance, etc)
- Promote the use of ICT to enhance efficiency, effectiveness and continuity in the provision of services and basic utilities from both private and public sectors especially in billing and payment systems
- Develop and deploy a nationwide e-Health system that supports medical facilities in the under-served areas
- Develop and deploy a nationwide e-Tourism system
- Encourage cyber-café owners to diversify to build multiple revenue streams

Service Sector Policy Challenges include

- Developing and accessing market information
- Modernization of management systems and practices
- Introducing ICT supported access to health and nutrition services
- Taming the prevalence of HIV/AIDS and other infectious, communicable diseases
- Managing proactive health care systems for preventive and curative services
- Matching Management Information Systems and ICT in the financial institutions including banking, insurance and capital markets
- Introducing Management Information Systems and ICT in the education, training and tertiary academic sectors for all fields of study
- Developing Management Information Systems and ICT in providing topical support and extension services to peasant producers and communities in isolated rural areas
- Deployment of service quality improvement methodologies and standards
- Improving tourism marketing and management (domestic and international)
- Promotion of new postal communications services through the use of ICT

Service Sector Policy Statements include

- The Government will promote the use of ICT to enhance efficiency effectiveness and sustainability in the provision of services and basic utilities by supporting the development and deployment of nationwide e-health, e-tourism, e-education and e-commerce transactions
- The Government will promote, stimulate and encourage the use of ICT to improve the provision of safe, comfortable and seamless transport infrastructure and services, both countrywide and linking Tanzania to the rest of the world
- The Government will also use both formal and non-formal channels to disseminate information about the application and advantages to communities of the use of ICT
- The Government will work with the private sector, civil society and other partners to promote, stimulate and encourage the use of ICT, in combination with traditional methods, to preserve and add value to national artistic and cultural patrimony

12.2.9 Policies for Public Service

Since the mid-1990's, the public service of Tanzania has initiated a series of eGovernment measures to improve efficiency, effectiveness and customer-orientation. Key information including legislation, regulations, procedures, forms, maps, research papers, and numerous statistics is planned to be digitised to improve access by citizens, whether based on free or charged access. A key goal is to enhance the Government's own policy-making, monitoring and decision-support processes through access to authoritative, timely and accurate data.

As the country's biggest employer, the public sector's recruitment standards will necessarily influence the national labour market and the curricula of education and training institutions. It is hoped that if ICT competencies permeate the public sector's recruitment requirements, then the other sectors will also benefit from necessary national curricula changes.

Public Sector Policy Objectives include

- Help increase the productivity of both the public and private sectors, by achieving the Government's intention to be a model user of ICT
- Empower the public by building an e-Government platform that facilitates their relationship and interactions with the Government, and enhances the range and delivery of more effective public services at both central and local levels, while also generating accurate and timely information to better shape policies, strategic plans and tactical decisions for developing and enhancing the delivery of affordable public services
- Promote good corporate and public governance by furthering information sharing, transparency and accountability
- Enable public services to contribute in achieving poverty reduction targets, in accordance with priorities of the national Poverty Reduction Strategy Paper (PRSP)
- Enhance public participation

Public Sector Policy Challenges include

- Increasing productivity (efficiency, effectiveness and continuity) of the public service
- Creating an e-governance environment responsive to the needs of the citizens
- Improving accessibility and affordability of public services to all citizens
- Building efficient communications and knowledge sharing within the public service
- Setting up harmonised information banks with uniform, consistent, up to date, and secure data and management systems
- Increasing the ICT awareness, knowledge and skills of public servants
- Introducing operational processes and institutional structures that are amenable to ICT application and deployment
- The capture, preservation, and dissemination of relevant government records and archives, and their potential use as multimedia content of significant local relevance
- Establishing safeguards on data systems to protect the privacy of individuals whose personal data is held, and the confidentiality of information about entities and activities as relevant

Public Sector Policy Statements include

- The Government will be a model user of ICT by deploying ICT systems within the public administration itself to improve efficiency, reduce wastage of resources, enhance planning, raise the quality of services and access global resources

- The Government will support the application of ICT to promote good governance, transparency and accountability, and awareness of the implications of long-term ICT investment and total cost of ownership
- The Government will deploy ICT extensively to strengthen law enforcement, security and national defence capability
- The Government will deploy ICT to monitor and respond to environmental disasters and to collect and disseminate information on environmental problems
- The Government will review its operational processes and institutional structures with a view to making them amenable to ICT application and deployment

12.2.10 Policies for Local Content

A risk factor for the Government of Tanzania is that "*Developing countries are being invaded by foreign ideas and values that may undermine or overwhelm local cultural heritage and economic livelihood… [T]his foreign content must always be matched by the expression, collection and dissemination of local knowledge and content that is relevant to local situations. ICT needs to be a conveyor of locally relevant messages and information, providing opportunities for local people to interact and communicate with each other, expressing their own ideas, knowledge, heritage and culture in their own languages. Local content should also be perceived as a driver for local job and wealth creation*".

Local Content Policy Objectives include

- Support the local creation and development of ICT applications and multi-media content for productivity, as well as for social interactions, culture and entertainment
- Encourage the development of local content aimed at enhancing the understanding of prevailing topical issues and promoting tolerance of differing interpretations thereof
- Promote the use of schools in developing and sustaining local multi-media content
- Encourage the development of content for preserving the values, wisdom and acquired knowledge of our traditional communities and cultures
- Promote the development of local content to support e- activities

Local Content Policy Challenges include

- Building a national gateway as the focal point for locally generated content
- Repackaging traditions, cultures, indigenous knowledge, and traditional wisdom arts as potential multimedia content
- Availability of government-generated content (forms, procedural guidelines, etc)
- Promotion of electronic publishing of local materials
- Wider dissemination of materials held in libraries and archives
- Using the Kiswahili language for content creation

- Promotion of e-communities, and discussion groups
- Promotion of community participation in initiatives for compiling local content
- Popularity of inappropriate uses of ICT detrimental to our values, ethics and culture, for example viewing pornography on the Internet

Local Content Policy Statements include

- The Government will promote the use of the ICT for preserving and dissemination of indigenous knowledge and traditional cultures
- The Government will allow appropriate access to its archives and other information sources as a basis for developing local content
- The Government will encourage the wider use of Kiswahili in developing local content in order to promote local culture, attract local end users as well as the Tanzanian diaspora
- The Government will seek to discourage inappropriate use of ICT that is detrimental to our cultural values, ethics, mores, and morality such as viewing pornography

12.2.11 Policies for Universal Access

To ensure that the national ICT policy does not exacerbate the digital divide among the people of Tanzania, it must contain provision for bringing access to the more remote areas of the country and those under served in urban areas.

Many universal access initiatives are currently occurring across Tanzania, but each is quite independent and no focal point exists for sharing resources and experience. To further reduce isolation, such initiatives need to be able to stimulate grass roots networking among themselves and with counterpart projects in other countries. This will also enable the services that are being deployed to reach a broader audience and to be enriched by being exposed to additional technical experts. Therefore the National ICT Policy is placing specific emphasis on Universal Access.

Universal Access Policy Objectives include

- Promote literacy as a platform for digital competencies, awareness and empowerment, while building universal access and broad availability of opportunities
- Provide citizens with universal access to ICT to improve their productivity and to broaden their opportunities for knowledge sharing and for generating local content
- Provide special incentives for investors to deliver broadband connectivity to hitherto disenfranchised and isolated populations in the country
- Encourage the use of existing community access points by schools and other learning institutions as part of their curricula and facilitate the construction of such access points within, or in easy reach of, their premises
- Build awareness that investment in and through ICT in remote areas is a potent means of reducing the cost of rural-urban transactions

- Facilitate the creation of grass-roots networks for wealth-creation through trade, both within the country and internationally
- Operationalise the Rural Telecommunications Development Fund

Universal Access Policy Challenges include

- Increasing ICT capacity in terms of bandwidth and the penetration of services
- Leveraging of community access points for provision of smart services
- Improving coverage of functional utilities that go hand in hand with ICT
- Developing locally relevant content that attracts users & adds value to daily lives
- Providing affordable access to ICT
- Integrating ICT within lifestyles and cultures
- Bringing awareness of benefits of ICT access and training to the public
- Developing peer-to-peer networking and knowledge sharing at grassroots level
- Encouraging partnerships among public, private and community sectors at all levels in support of universal access initiatives
- Creating incentives for service providers to deploy services in rural and underserved areas as well as disadvantaged groups

Universal Access Policy Statements include

- The Government will strive to reduce the ICT access gap between rural and urban areas by activating the Rural Telecommunication Development Fund, offering special incentives to investors in rural ICT provisions, supporting construction of rural telecentres and involving local government authorities in ICT utilization & promotion
- The Government will continue to look into ways of reducing taxes on ICT related goods and services to make them affordable and accessible to more citizens
- The Government will encourage financial institutions to give particular support to investors in rural ICT services
- The Government will encourage and facilitate the optimal use of existing ICT capacity and infrastructure in order to extend affordable access nationally, and especially in rural and disadvantaged communities
- The Government will encourage allocation of extra capacity in telecommunication infrastructure to be used efficiently and economically for national development of ICT

12.3 Conclusions

Because of the multifaceted nature of ICT issues and the factors that impact on them, the implementation of this policy, and the consequent achievement of its goals and objectives will be the responsibility of the entire government at all levels and in all sectors, working in close partnership with the private sector and civil society. There is therefore a need for the active

participation and involvement of all individuals and national institutions, as well as strong support (both technical and financial) from development partners.

There is also a need of a strong commitment to effectively coordinate and harmonize efforts and activities undertaken by many institutions in different locations, ensure the ICT policy is updated regularly and that implementation strategies and plans are carried out efficiently. This commitment clearly exists as the 2003 National ICT Policy is currently being reviewed and revised to ensure it drives the core national Strategy of Tanzania - Poverty Reduction.

Action items are sufficiently ambitious and well defined, that implementing this strategy in its entirety is likely to have systemic impact on socio-economic growth in Tanzania.

12.3.1 Progress to date in implementing the ICT Policy

Most developing or middle income countries are dependent to one degree or another on external assistance (whether financial or technical) to help them avoid the mistakes made elsewhere, thus conserving limited resources.

The Government of Tanzania adopted the National ICT policy in 2003. The development of the policy was consultative involving all stakeholders and inter-ministerial discussions. Although there was no approved implementation strategy for the national ICT Policy adopted in 2003, there are however actions that have been taken by the government in view of the implementation of the policy document. The following actions are some of the implementation of the Policy of 2003.

ICT Infrastructure - One of the policy statements was that the Government will ensure that a reliable state of the art ICT infrastructure, of adequate capacity, high-speed and countrywide coverage is developed. Construction of the National ICT fibre optic backbone to connect all district headquarters is in progress. To date about 16 regions out of 26 Tanzanian regions have been connected and also about 6 neighbouring countries, which are land locked have been connected through Tanzania. The progress is on the way to ensure that local content and appropriate applications are running over the National ICT Broadband Backbone to benefit majority of Tanzanians.

Universal Access - In order to ensure ICT access to underserved areas the government has established the universal Communication Access Fund, which is now operational and the funds are contributed by the telecom operators in the form of levy. The Manager has already been appointed, and premises have been hired for this purposes.

Human Resource - ICT human resource is one of the focus areas identified in the Policy document whereby the main policy objective was to expand and increase the number of skilled ICT human resources. A number of steps have been taken include establishing a dedicated College of ICT at the University of Dar es Salaam for Training ICT professional at Masters and PhD levels. Furthermore intake of ICT trainees at various public and private institutions has increased. ICT related subjects have been introduced at primary and secondary school curriculum and ICT courses are mandatory for all college students. The University of Dodoma has been established with a

dedicated school of Informatics. The Government is also in the process of developing an appropriate scheme of service for ICT cadres.

Ministry Responsible for ICT – The government has created Ministry for Communication, Science and Technology with a dedicated director for ICT responsible for implementation of the ICT policy. This is an important milestone developing and using ICT for development.

ICT in Public service - The government has also established an e-Governance Agency by the Act of the Parliament of 2010 to spearhead the use of ICT in government service delivery through enhanced Government policy-making, monitoring and decision-support processes through access to authoritative, timely and accurate data.

Also all of government Ministries, Departments and Agencies have or are in a process of developing ICT strategies.

ICT in Service Sector - The use of ICT in the service sector is another focus area of the National ICT policy 2003. Since the adoption of the policy there have been positive developments in the adoption and diffusion of ICT in service sectors. The Ministry of education has developed a n ICT Policy for Basic Education and also installed ICT facilities in all teachers training colleges. All teacher trainees are taught ICT skill and are exposed to the use of ICT as a learning and teaching tool. The Ministry of Health has also developed an ICT strategy to guide the adoption and application of ICT in delivery and management of health services.

The table below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

Dimensions	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 3.32 in 2008 and 3.40 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 3.01 in December 2008 and 3.16 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.47 in December 2008 and 3.83 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011
		The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 1.96 in December 2008 and 2.48 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	

Data sources: UN: United Nations, ITU: International Telecommunication Union, WEF: World Economic Forum

Dimensions	Political & Regulatory Environment	e-Government Development	ICT Usage
	The Political & Regulatory Environment Index Score has improved slightly from 2008 to 2010 (Index Score out of 10: 3.81 in December 2008 and 3.90 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved slightly from 2008 to 2011 (Index Score out of 1: 0.2929 in 2008 and 0.3311 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT nationally has improved from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.31 in 2008 and 0.44 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

13. POLICY ENVIRONMENT IN THE REPUBLIC OF UGANDA

13.1 Introduction

The Government of Uganda has developed an Information Communication Technology Policy (July 2002, updated October 2003), and a Science, Technology and Innovation Policy (August 2009).

13.2 Information Communication Technology Policy for Uganda

The Government of Uganda sees ICT as an important tool for modernisation and development at a national level, and an important contributor to both the National Poverty Eradication Action Plan (PEAP) and important sectoral plans such as the Plan for Modernisation of Agriculture (PMA). The Ugandan ICT Policy has three areas of focus

- Information as a resource for development
- Mechanisms for accessing information
- ICT as an industry, including eBusiness, software development and manufacturing

The average real rate of GDP growth in Uganda has been c.6.9 percent since 1990/1991, with significant progress during this period in key areas including privatisation, civil service and financial sector reform, trade liberalisation and decentralisation initiatives.

The goal of implementing the ICT policy is to stimulate even greater participation in socio-economic, political and other developmental activities going forward, which should underpin sustainable national development and increase the overall standard of living in the country.

When the 2003 ICT Policy was finalised, telecommunications was the responsibility of the Ministry of Works, Housing and Communications, while media and information management was under the mandate of the Directorate of Information, President's office. Even then, the cross sectoral nature of ICT was acknowledged as involving a large number of stakeholders, including various ministries, local authorities, development partners, NGOs and the private sector. The Ministry of ICT in Uganda was established in June 2006.

Key sectors that can benefit from leveraging ICT for empowering people include health, education, agriculture, energy, environment, business, science and technology. The liberalisation of the ICT market in that has taken place over the last ten years has lead to significant market growth. This was complemented by liberalisation of the telecommunications sector in 1996, and subsequent liberalisation of the radio, TV and Print markets to break government monopolies and allow private sector participation.

However, an IDRC funded study in 1998 on the current status of ICT found relatively low coverage outside major urban areas such as Kampala, and skewed distribution of ICT infrastructure across the country. The private sector have little incentive to provide nationwide coverage without an appropriate policy and legislative framework in place.

This updated ICT Policy was formulated to meet these challenges.

13.2.1 Background to Policy Formulation

ICT is recognised as a key enabler at national, district and local level for national development programmes (e.g. poverty eradication, decentralisation etc.) to be successful. ICT has a number of key benefits in relation to socio-economic development

- Broad range of applications (e.g. health, education, agriculture, government)
- Enhances economic growth through greater competitiveness
- Access to local and global markets, promotion of rural development
- Improve delivery of social services and reduce vulnerability to natural disasters
- Improve transparency and good governance
- Improve enterprise resource management in the public and private sector
- Facilitate entry to the knowledge based economy and research and development

The government has identified a number of key reasons why an ICT policy is required

- Constitutional requirements implement some ICT related provisions such as Article 29 (Freedom of Expression) and Article 41 (Access to Information)
- Need to streamline information flows and legal frameworks to facilitate coordinated inward investment and overall sustainable development of ICT in Uganda
- Address convergence issues by taking account of industrial, telecommunications, Science & Technology and Information and Communication policy
- Address issues related to good governance, eradicating illiteracy and development
- Support a more coordinated approach to ICT adoption by government agencies

The Uganda National Council for Science and Technology (UNCST) was responsible for initiating a consultation process to formulate the national ICT policy. A task force was established that took advantage of input from a number of key stakeholders including the Uganda Information and Infrastructure Agenda Project (UIAAP) driven by Makerere Institute of Computer Science, the Big Push Strategy by Uganda Investment Authority, a Draft White Paper on Communication and Information for Sustainable Development initiated by the then Ministry of Information and reports by Perwit International focused on eBusiness.

13.2.2 Status of Current Legislation

The most relevant legislation includes

- The Communications Act (1997) which aimed to support private sector investment)
- Rural Communications Development Policy (2001) supporting Universal Access
- Press and Journalist Statute (1995) extending Article 29(1) - Freedom of Expression - of the Constitution to the Print media and regulating the media sector
- Electronic Media Statute (1996) licensing radio and television industry

However, this legislation is seen as inadequate for the following reasons

- Most of rural Uganda has limited or no telecommunications infrastructure (Until 1996, 70% of communication services were concentrated in urban areas)
- Limited local participation in licensed telecom service providers
- Convergence of ICT has enabled new services (e.g. Voice mail, text messaging) which requires new legislation
- The cost of services is still much too high for most Ugandans

An example noted in the ICT policy of a law being considered for adoption into Ugandan law is the UN Commission on International Trade Law (UNCITRAL) for eCommerce, which was forwarded by the Uganda Investment Authority to the Law Reform Commission.

13.2.3 Infrastructure Developments

According to the Uganda Communications Commission, fixed line penetration increased from 45,145 to 60,995 between December 1996 and June 2003 (a 35% increase), while mobile penetration increased from 3,000 to 621,062 during the same period. The number of National telephone operators increased from 1 to 2 (Uganda Telecom Limited and MTN Uganda), mobile operators increased from 1 to 3 (the first mobile operator, Celtel Uganda followed by Uganda Telecom and MTN Uganda). Mobile operators are required to offer nationwide coverage, while MTN fixed line business is also required to cover all districts and county headquarters in Uganda. Over the same 7 year period, Internet Service Providers increased from 2 to 17 (which are considered separately to Public Internet Services delivered through cafes), while the number of Internet/Email subscribers only increased from 504 to 7024. This is partly explained by the requirement for rural subscribers to make a national phone call to access the ISP access point in Kampala. Clearly there was a need in 2003 to establish local Points of Presence (POPs) in all major towns across the country which would require either the installation of International Data Gateways in different towns, or ISPs leasing capacity on trunk routes from the main national infrastructure providers. Most Internet growth was driven by the corporate sector.

The growth in Tele-Centres has been driven in part by donor support, while radio and television has also proven useful in supporting learning and information sharing. However, while radio in 2003 was available nationwide, print and television media was still focused primarily on urban areas and local content was still in the minority. Libraries, archives and documentation centres were generally poorly stocked and required up to date materials.

13.2.4 Human Resource Capacity

The Ugandan ICT Policy of 2003 recognises the importance of providing people with the necessary skills and knowledge to allow them to benefit from and operate ICT efficiently, so as to take advantage of the Information Society and Knowledge Economy. That having been said, the policy notes the need to assess the national requirement for ICT skills, the current level of supply and how best to meet the current demand. It is clear that with the deployment of Local Area Networks

(LANs) and Wide Area Networks (WANs) across all government agencies, networking skills are of critical importance. Clearly once these networks are in place, staff will require training to leverage this infrastructure. However, most training of government staff is reliant on donor-funded projects, with a significant amount of training taking place outside the country and insufficient focus on local training capacity, which obviously must be a critical goal for the National ICT policy going forward.

Computer Science training is available at many Ugandan universities including Makerere University, Islamic University in Uganda, Mbarara University of Science and Technology, Kyambogo University, Uganda Communications Institute, Uganda Management Institute and Uganda Martyrs University, Nkozi. However, there is often a lack of sufficient computers in labs to allow students to receive sufficient hands-on training.

By 2003, there were a number of private companies providing ICT training in areas such as word processing, spreadsheets, databases, computer programme skills and networking. However, a major challenge was a general lack of standardisation of courses, so that employers and employees have a common understanding of the new capacity achieved.

The Ministry of Education and Sports has approved an ICT training curriculum for Secondary Schools. Only a very small number of schools currently offer ICT training, with equipment provided under with the SchoolNet and/ConnectEd Projects. However, often the amount of equipment available is insufficient to allow reasonable hands on training. In 2003 it was hoped that an ICT Policy for Education developed by the Ministry of Education and Sports would result in a more structured and systemic impact.

Key issues that need to be addressed include

- Need for better coordination of ICT training, including standardised IT literacy courses delivered by different IT training institutions
- Need to recognise and protect Intellectual Assets in context of Knowledge Society
- Need to find financing for ICT innovations to create sustainable enterprises
- Minimum standards for ICT training at all levels of education
- Address media convergence by including ICT in media training
- Build capacity at grass roots level as well as with professional journalists and communication specialists
- Put mechanisms in place to enforce observance of professional ethics in the media
- Prioritise ICT training in the public sector

13.2.5 Use of ICT in Public and Private Sectors

In 2003, there was less than 1 personal computer per 1000 of population. Most computers are in use in the private and public sectors, with most computers used for basic tasks (e.g. word processing) rather than MIS, databases, personnel management system, accounting and budgeting etc. As LANs and WANs become more prevalent, this is gradually changing.

To date, most ICT projects are undertaken based on donor funding, including

- ACACIA project for pilot Tele-Centres at Nakaseke, Nuwama and Nabweeru
- Danida Local Government Project in Rakai District
- InfoDev Information Infrastructure Agenda at Institute of Computer Science, Makerere University
- Inter-Ministerial Mapping and Geographic Information System (GIS)
- Academic Research Network Project
- Initiative to Create an ICT Resources Centre and Internet Café
- Local Area Network and Internet Connectivity Project for Parliament of Uganda
- Campus Network Project for Makerere University
- NGOs, Development Partners and Private sector funded projects

The 2003 ICT Policy clearly identified the following requirements

- Need to carry out R&D activities in the application of ICT for national development
- Need to attract the Ugandan Diaspora (scientists, engineers) who have a successful track record of R&D abroad to return home and become agents of change
- Need to establish, promote and strengthen centres of excellence in ICT R&D
- Develop a National ICT long term plan with targets aligned with regional needs
- Develop sector-specific policies and implementation strategies and establish sector-specific Round Tables on ICT that take regional needs into consideration
- Establish a National Information and Communication Infrastructure planning process at national and district level in consultation with all stakeholders
- Cross-sectoral, integrated approach to introduce ICT including eGovernment

13.2.6 Investment in ICT Industry

The ICT policy notes that financial constraints are less important to making progress in developing the ICT industry than obtaining the necessary human resources, instituting the appropriate regulatory environment and the commitment by decision makers to using ICT. The overall goal must be to broaden equitable access to ICT (both geographically and socially) to create new opportunities for socio-economic development in Uganda.

Significant progress has been made in establishing telecommunications infrastructure but national coverage was still an issue in October 2003. Access to radio and television is similarly skewed towards urban areas, with competition issues to be fully resolved. Developments in ICT hardware and software are still at an early stage of development.

The government is very ambitious in relation to leveraging ICT (particularly outsourcing capacity) to attract foreign inward investment. Key issues to be addressed include

- Need to create and promote an enabling environment to encourage public and private sector investment in the ICT industry
- Need to finance innovations and applications in ICT to establish productive ventures
- Incentives to encourage investors to tackle rural areas
- Reduce import taxes on newsprint to reduce cost of newspapers (which are a form of educational material)
- Licensing and tax structure must take into account the types of services offered by media, with benefits for those involved in collecting material for news and education
- Need for regular audience research to identified information needs of different interest groups across the country
- Need to encourage development of a communications maintenance culture
- Need to ensure inherent use of after sales support for ICT equipment

13.2.7 ICT Policy Objectives and Strategies

The goal of the Ugandan ICT Policy is to promote the development and effective utilisation of ICT so that quantifiable impact is achieved across the country by 2013. The Vision is a Uganda where national development, especially human development and good governance, will be sustainably enhanced, promoted and accelerated by efficient application and use of ICT, including timely access to information.

The Government has set fourteen Strategic Objectives which are summarised below.

Objective 1 (Sensitization and Creation of Awareness) aims to sensitize the general public and all stakeholders about the role of ICT in Uganda's development process, and ensure an adequate level of engagement to inform policy formulation and regulation. Promoting ICT awareness is seen as a responsibility of both the public and private sectors.

Objective 2 (Literacy Improvement and Human Resources Capacity Building) aims to increase the levels of ICT functional literacy in all sectors (including pupils and students at all level of education) and build national human resource capacity (particularly in the public sector) through collaboration between industry and training institutions, including developing ICT Centres of Excellence, twinning of Ugandan trainings institutions with those elsewhere to enhance skills transfer and develop incentives to attract ICT professionals.

Objective 3 (Promotion of Building Appropriate Infrastructure Strategies) aims to promote and enable the building and establishment of appropriate infrastructure that supports ICT development and achievement of Universal Access in Uganda. It also targets establishing district level Internet Points of Presence (PoP), a National Internet Exchange Point, infrastructure supporting ICT requirements in Health, education, governance, agriculture etc. and establishment of Internet ready Industrial Parks for inward investment

Objective 4 (Promotion of Competition, Private Investment and Local Participation) aims to promote fair competition and private investment in the ICT sector, with a particular emphasis on development and encouragement of local participation including specific incentives for investing in ICT.

Objective 5 (Innovative Financing for ICT Development) aims to identify and establish innovative financing mechanisms that address specific needs of ICT development, including tax reliefs for innovations & research and a Strategic Partnership for eBusiness in Uganda

Objective 6 (Stimulation of Production, Storage and Dissemination of National Information) aims to promote the use of ICT in the stimulation of production, storage and dissemination of in-country information and knowledge in both the public and private sectors. This includes updating relevant laws to provide adequate legal protection for proprietary indigenous and foreign information, protection of IPR, encouraging development of websites, local participation in media programme productions and community exchange.

Objective 7 (Facilitation of Access to Public Domain Information) aims to facilitate the broadest possible access to public domain information. This will include establishing mechanisms for public bodies to provide information at the lowest possible cost (including digitization and publication through public website and library systems, and low cost access to communications facilities, with an emphasis on reducing gender and spatial disparities.)

Objective 8 (Conducive Environment for Media Pluralism) aims to promote a conducive environment for media pluralism that will enhance cultural identity and national sovereignty. This will include legislation, developing regulation to prevent mom-media, cross-media concentration and mergers and require minimum percentage of public service programmes.

Objective 9 (Promotion of Multilingualism and Information to Disadvantaged) aims to ensure gender mainstreaming in ICT programmes and ICT development, develop multilingual search engines, encourage private sector initiatives to develop and disseminate multilingual content, particularly to disadvantaged groups and special needs communities.

Objective 10 (Gender Mainstreaming) aims to establish gender mainstreaming in ICT programmes and ICT development, reduce the gender gap by increasing Women's access to information especially in rural areas and ensure equal opportunities in development.

Objective 11 (Establishment of Desirable and Enabling Legal Framework) aims to establish an enabling and desirable legal and regulatory environment taking into account national security, technology convergence, major cross-cutting issues like privacy, security IPR & copyright, define nature of public interest obligations, code of conduct and responsibilities of communications businesses, especially broadcasters using public owned frequencies. It will also translate into law international treaties (e.g. WIPO agreements, ITU resolutions, UNCITRL on eCommerce etc) to provide regulatory certainty to investors.

Objective 12 (Encourage and Support R&D in ICT) aims to encourage and support research and development in ICT, establish a national R&D fund promoting innovation nd participation of national professionals, encourage private sector local R&D investment in collaboration with local universities and institutions.

Objective 13 (Accord Due Regard to Intellectual Assets) aims to accord due regard, recognition and protection to intellectual property rights, develop necessary policies providing for transition to a knowledge based society and encourage innovation.

Objective 14 (Enhancement of Collaboration and Coordination at Local, Regional and International Level) aims to enhance collaboration and coordination in ICT development at local, regional and international level. This must take into account other national development policies (e.g. Plan for Modernization of Agriculture (PMA), Poverty Eradication and Action Plan (PEAP) and remain consistent with Strategic Framework for National Development Vision 2025), coordinate programmes and avoid duplication with existing or planned actions by government agencies, NGOs and development partners, consider multi-sectoral needs and ensure cross-sectoral involvement in ICT development efforts and programmes, establish a database of local, regional and international ICT development partners, develop programmes that attract development partner assistance into ICT development and organise and participate in ICT Fora to support cooperation opportunities.

13.2.8 Institutional Framework

Coordination of the following areas are identified as critical for ICT policy implementation

- Implementation of ICT development objectives & fostering of national ICT initiatives
- Regular national surveys of ICT status, periodic reviews to measure market changes
- Repository of ICT standards, registration and classification of documentation related to local and imported ICT solutions
- Mechanism for collaboration by sector implementing, policy and regulatory bodies
- Rollout of national and regional infrastructure
- Implement the ICT policy in line with decentralisation policy

The policy proposed a coordination framework between the

- National ICT Coordination Committee (NICTCC) – Minister from Office of President, Minster from Office of Prime Minister, Minister of Works, Housing and Communication (Chair), Minister of Finance, Planning and Economic Development, Minister of Education and Sport and Minister for Tourism, Trade and Industry
- National Technical ICT Sub-Committee (NTICTSC) – technical support to NICTCC from Permanent Secretaries and representatives from all key stakeholders
- National ICT Secretariat (NICTS) – Ministry of Works, Housing and Communications under the Uganda Communications Commission, responsible for implementation

- Institutional ICT Committees (IICTCs) – responsible for forwarding institutional requirements and interest to NICTCC through the NTICTSC

Monitoring, evaluation and review is envisaged by the National ICT Coordinating Committee through the Secretariat. National ICT policy impact will be evaluated using indicators (e.g. economic growth, poverty reduction, ICT literacy, infrastructrure growth etc.)

13.3 Conclusions

The Government of Uganda has developed an outcome oriented ICT Policy, which when fully implemented will significantly impact on national socio-economic development. Critically, the policy acknowledges the importance of coordination of programmes to avoid duplication of effort by government, NGOs and development partners, identifies relevant indicators (even through these currently are quite high level in nature) and a proposal to develop and run programmes that attract development partners assistance into ICT development. These are very good practices other countries should also take into account in their national ICT policies. It is clear that addressing some problems at a cross-border level would offer significant advantages including potential cost savings when rolling out solutions at a national level, for countries addressing common problems.

13.3.1 Progress to Date in Implementing the ICT Policy

The National ICT policy (published in July 2002 and updated in October 2003) focuses on three areas: as a resource for development, mechanisms for accessing it, and ICT as an industry, including e-business, software development and manufacturing.

The Government created a fully-fledged Ministry of ICT in 2006 to provide strategic and technical leadership, overall coordination, support and advocacy on all matters of policy, laws, regulations and strategy; sustainable, effective and efficient development, harnessing and utilization of ICT in all spheres of life to enable the country achieve its national development goals.

Uganda joined the IST-Africa Consortium in 2007. It is instructive to note that through the coordination effort of UNCST (National IST-Africa Partner for Uganda), the Ministry of ICT has actively participated in a number of IST-Africa activities both nationally and internationally. The progress in implementing the ICT policy since Uganda became a consortium partner is noteworthy.

A preliminary analysis of the progress of implementation of the policy has shown significant achievements as discussed below.

The current dynamism of ICT sector can be attributed to the good ICT legal and regulatory framework, a stable macroeconomic environment and economic reforms pursued since the early 1990s. The active participation of the ICT Ministry in the IST-Africa initiative and the fact the key policy areas above where aggressively addressed during the IST-Africa activities in Uganda lends credit to the Initiative in contributing to the observed ICT policy implementation progress.

The implementation of the National ICT Policy in Uganda in Uganda involves various ministries, department and agencies, district and local authorities, development partners and non-governmental organisations (NGO) as well as the private sector (UCC 2003). Progress has been made in a number of areas, including developing a national backbone, rural access, education, systems integration and stimulating private sector investment.

12.3.1.1 Infrastructure

The Government of Uganda is working with the private sector and other development partners to provide infrastructure that is required for the full utilization of the ICTs. The government has liberalised the sector and thus allowing more players into the market. This brings about market efficiencies and enables ordinary citizens choice.

National Backbone Infrastructure (NBI)

Another strategic intervention by Government is the provision of broadband communications Infrastructure County wide through the Ministry of ICT. This is done through the implementation of the National Data Transmission Backbone Infrastructure and e-Government Infrastructure Project (NBI/EGI). The major aims of this project are to connect all major towns within the country onto an optical fibre cable based Network. The process of connecting these national networks to the optical sea cable, namely SEACOM and TEAMs through Kenya on the East coast of Africa is ongoing.

The roll out of the national backbone in Uganda has been taking place in three phases.

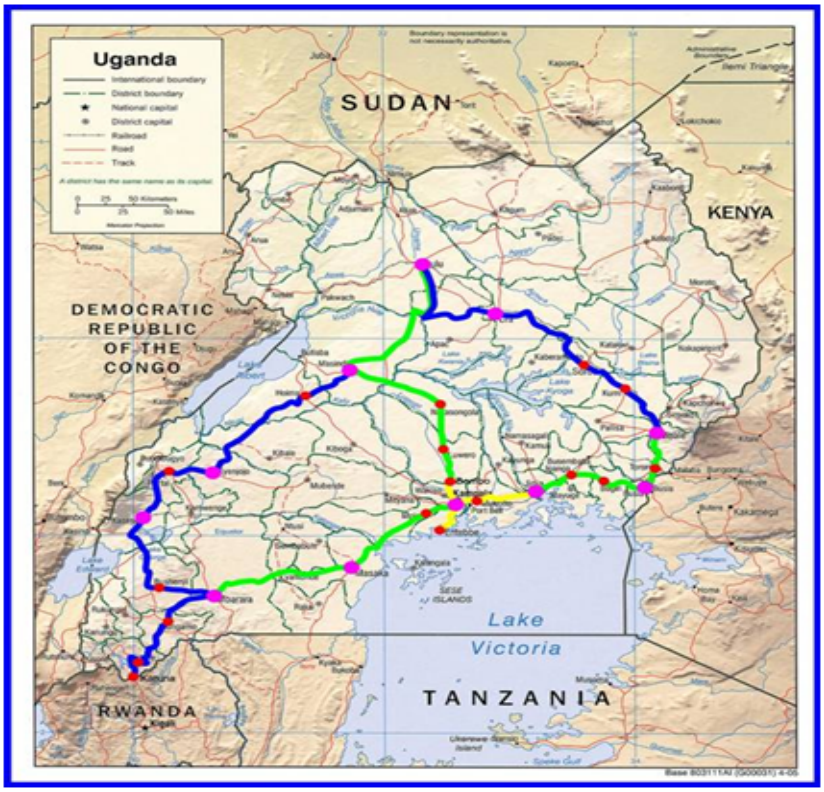


Figure 2: Coverage of the NBI
Source: Ministry of ICT

At the time when Uganda became a member of the IST-Africa consortium, only a total of 168.52 km had been covered under phase 1. Since then a distance of additional 2,000km has been covered

under phases 2 and 3. All the major cities, towns and districts of Uganda are now connected to IP backbone network. This core data communications network will pave the way of providing diversified services such as the Internet, VoIP, and video conferencing, which are already operational in some jurisdictions.

The completed national backbone network will comprise two ring networks and one chain network. Multiplex section protection (MSP) technology protects the ring network as part of a network structure that delivers sufficient bandwidth for access nodes and avoids single point failures. Thus, service interruption caused by networking issues is eliminated.

The government can lease the network to Uganda's communications operators to utilise and benefit from the country's backbone network, and on this basis, deliver e-enabled services such as e-hospital, e-shopping, e-education. The goal is to achieve universal service delivery, help Uganda attract more Foreign Direct Investment (FDI) and generate employment opportunities.

eGovernment Infrastructure (EGI)

Construction of the e-government infrastructure has been running parallel with the construction of the National Backbone Infrastructure. The e-government infrastructure is now enabling the provision of government to government; government to businesses and government to citizens services as exemplified by the integrated financial management system under Ministry of Finance, planning and Economic development inter alia.

Migration from Analogue to Digital Broadcasting

The main challenge in this subsector is the mandatory conversion from analogue to digital broadcasting. Internationally all countries are switching from analogue to digital broadcasting with the switch –over date slated for June 2015**.** In Uganda an analogue digital migration strategy and policy has been developed to facilitate the switch over.

12.3.1.2 Other Strategic Interventions

In an effort to reduce the rural–urban ICT divide the rural communications development fund (RCDF) was set up under the Uganda Communications Commission (UCC) in 2003. These subsidies contribute towards the provision of communication services in various parts of the country. This move has promoted the proliferation of ICT usage in the country.

I. ICT Training centres and Internet Cafés

More than 54 ICT training centres and 50 Internet cafes have been set up countrywide through Public-Private Partnerships

II. Internet Points of Presence (PoPs)

In order to facilitate local Internet access and reduce usage cost in the country, the UCC subsidised the installation of Internet points of presence (PoPs) in 32 of 80 districts by 2006.

III. **District Information Portals (DIPs)**

The UCC facilitated development of information portals for all districts to allow information to be shared with local communities, development partners and the outside world

IV. **Public Payphones**

The UCC has facilitated the installation of public payphones in 316 selected sub-counties across the country since 2004. The government plans to provide access to a public telephone for every 1200 people in the rural areas by end 2010.

ICTs are being integrated in the educational institutions at all levels. Most universities and other tertiary institutions are currently offering ICT-related courses. In addition there are several initiatives and organisations promoting ICT for development in schools in both urban and rural areas. These include the council for economic empowerment of women in Africa (CEEWA-Uganda), I-Network, SchoolNet, Uganda Connect (uConnect) and women of Uganda Network (WOUGNET).

Some government departments are using ICT to enhance service delivery. Information Systems developed include the integrated financial management system (IFMS), the local Government Information communication system (LoGICs), the Education Management Information system (EMIS), the Health Management System (HMIS) and the parliamentary communication and Management Information system (PMIS). The government has also developed an automated system for Customs data (or ASYCUDA)- a system developed in Geneva by UNCTAD, which is free for countries to use and customise.

12.3.1.3 Successful Public-Private Partnerships

The Eastern African Submarine Cable System (EASSy)[11]

EASSy is a multi-country, multi-partner fiber-optic cable project that will connect 21 African countries to each other and the rest of the world. The partners will be a combination of publicly and privately owned entities. EASSy is set-up to operate as a non-profit making initiative and endeavours to bring about substantial bandwidth cost reductions to the countries where its members operate. The ownership structure of EASSy is a “hybrid consortium” of which one of the members is the West Indian Ocean Cable Company Limited (WIOCC). WIOCC is a specially created investment company owned by Djibouti Telecom (Djibouti), Dalkom (Somalia), Telkom Kenya (Kenya), Uganda Telecom (Uganda), Zanzibar Telecom (Tanzania), ONATEL (Burundi), U-COM (Burundi), Botswana Telecom (Botswana) and Telecommunicacões de Mocambique - TDM (Mozambique), Lesotho Telecommunications Authority (Lesotho) and Gilat Satcom Limited Nigeria.

The full project funds of US$ 248 million are in place and fully committed. The construction of the cable commenced in March 2008. EASSy will be ready for commercial service during first half 2010. Along with the WIOCC parties' equity contributions of US$ 20 million, a syndicated loan of US$ 70.7

[11] www.eassy.org

million has been secured by WIOCC from the following international developmental financial institutions (DFIs), the African Development Bank (AfDB), the Development Bank of France (AFD), the European Investment Bank (EIB), Germany's development bank (KfW) and International Finance Corporation (IFC). The balance of EASSy's US$248 Million project cost not covered by WIOCC's funding is provided from direct capital investments from all its other parties. The other EASSy parties comprise of Mauritius Telecom, MTN Group, Comores Telecom, Sudan Telecom (Sudatel), Botswana Telecommunications Corporation, Tanzania Telecommunications (TTCL), Telecom Malagasy, Bharti Airtel India, Telkom South Africa and Zambia Telecommunications. The international telecommunications operators who are party to EASSy include British Telecom, Etisalat - UAE, France Telecom and Saudi Telecom (STC).

The EASSy cable system will improve access for over 250 million Africans. The EASSy cable will run 10,500 kilometers from the continent's southern tip to the African horn, connecting South Africa, Mozambique, Madagascar, Comoros, Mayotte, Tanzania, Kenya, Somalia, Djibouti, and Sudan. The EASSy cable will be extended to the Comoros Archipelago at Grand Comoro and Mayotte. A further 13 adjoining, land locked countries will also be linked to the system as terrestrial backbone networks are completed by the relevant participating parties in Botswana, Burundi, the Central African Republic, the Democratic Republic of Congo, Chad, Ethiopia, Lesotho, Malawi, Rwanda, Swaziland, Uganda, Zambia and Zimbabwe.

The Nakaseke Multipurpose Community Telecentres (MCT) in Uganda

The Nakaseke MCT is part of the broader MCT Pilot Programme launched at the coordination for the African Information Society Initiative (AISI) in Addis Ababa in 1996. The Programme was a major component of the Harnessing Information Technology for Development (HITD), an element of the U.N. System-wide Special Initiative for Africa. Three international sponsors - the International Development Research Centre (IDRC), International Telecommunication Union (ITU) and UNESCO - with support from the Danish aid agency, DANIDA.

The general concept was to provide, in the face of scarce resources, a centre where the rural community could access information and communication resources - print, video, CD-ROM, telephone, fax, e-mail and the Internet/Web - and where it could be shown whether providing ICTs to rural communities could catalyse their development and improve the quality of their lives. The effectiveness of the MCT strategy was to be measured against the level at which the community had received increased access to ICTs, local content for capacity-building in ICTs and socio-economic development, and had participated in documenting and using indigenous knowledge (Mayanja 1999).

In pursuit of the above objectives, the MCT forged partnerships with institutions and individuals who had the required resources or who could provide access to potential users. At the international level, these included UNESCO, the Food and Agriculture Organization (FAO) and The British Council. At the national level, they included the Uganda National Commission for UNESCO, the Uganda Public Libraries Board, Uganda Telecom Limited, NARO (National Agricultural Research Organisation),

Kawanda Agricultural Research Institute, local non-governmental organisations (NGOs) and the community and opinion leaders within the Nakaseke and Kasangombe communities. These partnerships provided invaluable technical resources and support free of charge, which has in turn facilitated programming and content creation. For instance, the partnership with The British Council brought in £15,000 worth of library and information materials, while the FAO and NARO have collaborated in the development of a much-needed electronic agricultural information system for sharing information among researchers, agricultural extension workers and farmers in Nakaseke.

12.3.1.4 Current Performance Indicators

Market Penetration Rates in Uganda's Telecom Sector

The number of universities that have significantly invested in ICT related training has improved. This means as a country we have the capacity to train a number of Ugandans and other people from the region. For example Makerere University is currently training over 5,000 students on regular programmes and over 5,000 students per year on technical skilled courses. This therefore means that as a country we have the capacity to meet our training needs and serve demands for the entire region. With the current infrastructure development at Makerere University for example Uganda has positioned itself as an ICT training hub for the region.

Uganda has witnessed significant development in the market penetration of mobile telephony and internet. As of 2010 this stood at 34 and 11% respectively with an estimated general increase in penetration from 2.5% in 2007 to 7.7 in 2012 with a corresponding increase in per capita GDP from USD 280 to USD300.

Uganda Internet Usage and population statistics

YEAR	Users	Population	% Pen.	GDP p.c.*
2000	40,000	24,400,000	0.1 %	US$ 410
2006	500,000	28,574,909	1.7 %	US$ 280
2007	750,000	30,262,610	2.5 %	US$ 280
2008	2,000,000	31,367,972	6.4 %	US$ 300
2009	2,500,000	32,369,558	7.7 %	US$ 300

Note: Per Capita GDP in US dollars, source: United Nations Department of Economic and Social Afl

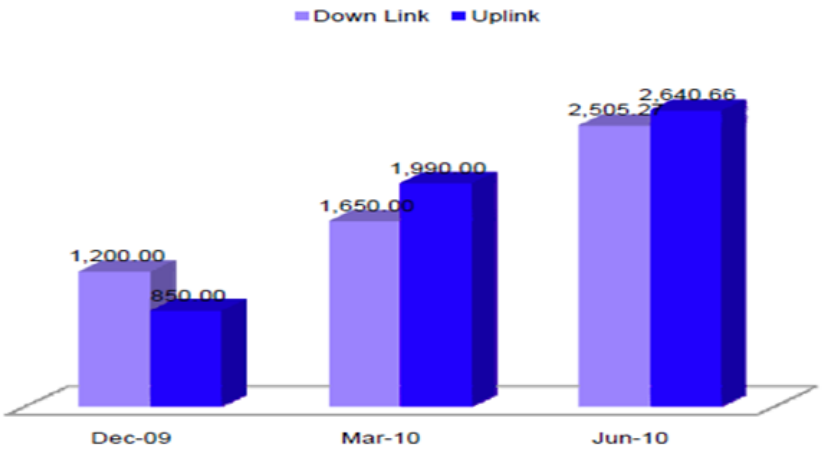
The cost of international bandwidth has been reduced dramatically following the landing of the first international submarine fibre optic cables on the African east coast in 2009/10 to which landlocked Uganda is now connected via a national fibre backbone extending to its borders with neighbouring countries. On the access network level, 3% of fixed lines are using fibre for the last mile.

Internet subscription and usage

According to UIA, during the period of IST-Africa implementation has witnessed an increase in popularity of mobile Internet subscriptions with a figure of 300,000 users in 2009. This steadily grew to 510,000 users in 2010. By the end of 2010, the total number of Internet users (fixed and mobile) was estimated to have grown to over 3.5 million.

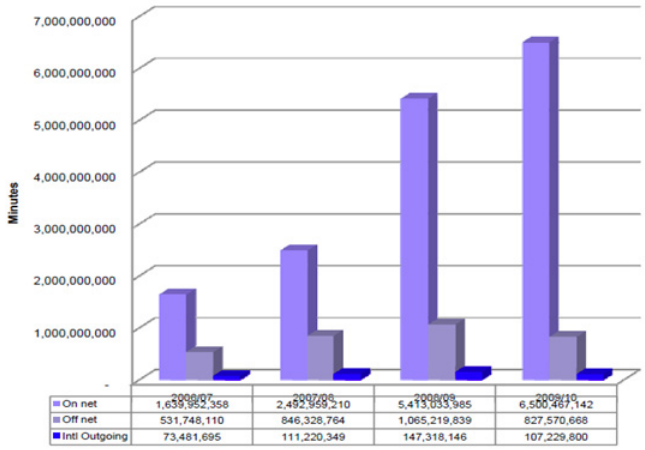
Broadband capacity growth

The landing of the cable systems at the East African coast has caused a spur in growth of capacity with international bandwidth growing more than 5-fold as shown in the figure below.



International bandwidth growth (Source: UIA)

Growth of Call Traffic



Growth in call traffic (Source: UCC)

The growth in traffic, as shown in the figure above, was the result of increased service penetration and usage which resulted from increased promotions and the introduction of unlimited calling pricing schemes.

Adequate Training Programs

The number of universities that have significantly invested in ICT related training has improved. This means as a country we have the capacity to train a number of Ugandans and other people from the region. For example Makerere University is currently training over 5,000 students on regular programmes and over 5000 students per year on technical skilled courses. This therefore means that as a country we have the capacity to meet our training needs and serve demands for the entire region. With the current infrastructure development at Makerere University for example Uganda has positioned itself as an ICT training hub for the region.

Proliferation of mobile Technologies

Mobile technologies have revolutionalized the access and use of ICT's in Uganda. The mobile phone is presenting numerous opportunities hitherto not envisaged by the original inventors. The convergence of several technologies onto the mobile phone is unveiling several avenues to technology. The number of Ugandans accessing Internet over mobile phone is phenomenal. For example it is now possible to undertake a national census using the mobile phone and this would tremendously reduce the costs of undertaking such exercises. Makerere University, Faculty of Computing and Information Technology has developed adequate capacity to develop these solutions as well as implement them.

Improved Literacy

As more people access education through Universal Primary Education and Universal Secondary Education, it implies that the number of people that can read and write is equally improving tremendously. This makes it possible for such persons to have the zeal to yearn for knowledge/information. With ICTs it is possible to deliver this information synchronously over multiple formats.

Business Process Outsourcing (BPO)

Uganda has put in place the right infrastructure appropriate for ensuring that BPO can take place. The use of the English language as the primary language of instruction in our education systems positions Uganda as a prime destination for BPO services like the call centre services. The other factors include qualified low cost labour and deliberate hosting policies.

Uganda has made several initiatives to develop the ICT/ BPO industry. Initiatives through the 'Big Push' strategy of 2000, the Strategic Exports programme (SEP) and the Presidential Investors Round Table (PIRT) have greatly contributed towards improving the BPO business environment.

A number of entrepreneurs have been trained in the business process outsourcing portfolio. Currently, Uganda is focusing on BPO in the area of Customer Support Services such as call centres; Policy Maintenance/Management such as human resource; Data Process Services such as payroll outsourcing as well as Technical Support Services.

Other activities known as Knowledge Process Outsourcing (KPO) and form an offshoot of BPO but require greater skill, knowledge, education and expertise are in the pipeline. The rapid development in BPO has given birth to the Uganda Business Processing Outsourcing Association (UBPOA) which was registered in January 2010.

The Association has members operating in various types of BPOs as shown in the table below.

BPO membership in Uganda

	Type	No. Of firms	No. Of employees
1	Call/ contact centres	5	827
2	Software development	4	37
3	Human Resource Outsourcing	4	1,704
4	Financial and Payroll services	3	35
5	Data entry conversion	4	158
6	Website design and development	4	30
7	ICT Training and Consultancy	4	49
8	SMS Value-Added Services	4	78
9	Data Entry/ Processing and storage (Backup)	7	219
10	Hardware Sales and maintenance	6	60
	Total	**45**	**3,197**

Source: Uganda Investment Authority

Software Development

A number of companies that provide products and services have been borne as a result of the ICT policy implementation. These deal in the areas of technology solutions, ICT human resource outsourcing, ICT training solutions, infrastructure and Hardware/ software solutions, Enterprise solutions, support and Business management solutions.

These developments have seen institutions like Makerere University Faculty of Computing & IT launching the National Software Incubation Centre (NSIC), which is the first incubation centre on any university campus in East Africa. Housed in a new $8 million computing facility, NSIC is open to graduates of recognized universities working on software development projects ranging from stand-alone applications to Internet-based/ mobile applications. Some of the software tools developed are; a hotel reservation system, a centralized procurement system, a real estate management and maintenance system, a Bluetooth social network tool, an asset management system and a human resource/payroll system.

The students have also developed a university electronic directory, an inventory management tool, translated the Mozilla Firefox browser into a local language, a mobile instant messenger, an iLab system (e-library system) and an e-government implementation tool for local governments.

Already, a number of top technology companies, like Google and IBM, have expressed interest in working with the NSIC.

Reduction in the cost of service delivery

With the investment in the national backbone infrastructure the Government envisage a reduction in the cost of service delivery. The national backbone is connecting all the Government entities onto e-

Government network implying that it will be possible for the different government offices to deliver services synchronously. This in turn will enable efficient service delivery

Rural communication development fund

The Government of Uganda set up a Rural Communications Development Fund (RCDF) in 2003 to cater for rural and undeserved areas. The RCDF programme is funded by mainly by a 1% levy on the gross annual income of the communications operators. It was found out that private operators are mostly interested in urban areas where they make big profits with heavy investments. Through the RCDF programme, the Government provides ICT training centres, pay phones, computer labs to both health centres and school etc

E-tourism

The Uganda Wildlife Authority under the Ministry of Tourism, Trade and Industry recently launched a campaign to promote tourism in Uganda. The friend a Gorilla campaign uses the latest technologies and this enables Uganda to earn revenue from tourists who visit the cyber space that has been created to promote the gorilla.

12.3.1.5 Recent Policies

Telecommunications Policy

The broad objectives of the Policy include the following:

i. To facilitate private sector participation in communications and overall national development;
ii. To provide a Legal framework for the development of communication services in Uganda;
iii. To separate the roles of Policy formulation, regulation and operations; and
iv. To introduce competition through licensing of multiple operators.

The specific objectives of the Policy are to:

i. Put in place an independent regulator;
ii. Increase tele-density from 0.28 lines per 100 people to 2.0 lines per 100 people by 2012;
iii. Improve communication facilities and quality of service, and variety of communication agencies;
iv. Respond to the demand of customers; and
v. Increase the geographical distribution and coverage of the services throughout the country.

Communications ACT CAP 106

The policy recognizes the responsibility of Uganda Communications Commission regarding the management of the radio frequency as mandated by Cap 106

In tandem with the role of Uganda Communications Commission, the policy seeks for a more coordinated planning approach between Broadcasting Council and Uganda Communications Commission, so as to ensure that the process of frequency planning and allocation is properly managed.

Rural Development Policy[12]

This policy lays focus on three key aspects for the development of Uganda as an information society and these are: Coverage, Connectivity, and Content.

Coverage: It is considered vital to broaden coverage in order to reduce the percentage of Ugandans that are underserved and thus attain the WSIS target for access to basic information and communications services.

Connectivity: This is to specifically address the country's future goal of a broadband-enabled information society especially with respect to education institutions and government's service delivery plans.

Content: This is emphasized because local content production and utilization are essential for the entrenchment and consolidation of information society in any country.

The tables below summarises a number of key indicators that reflect the level of national development in a number of areas that reflect the relative level of maturity of ICT policy adoption. These are based on criteria that allow comparative analysis of both developing and developed countries internationally. They are sourced from a number of key stakeholders including the United Nations (UN), International Telecommunication Union (ITU) and World Economic Forum (WEF).

	Human Resource Development	ICT Infrastructure Development	Institutional Development or Government readiness
Dimensions	The development of national ICT related skills capacity improved slightly from 2008 to 2010 (ICT Skill Index Score out of 10: 3.34 in 2008 and 3.42 in 2010), **Source:** ITU Measuring Information Society Report 2011	The Network Readiness Index score has improved slightly from 2008 to 2010 (Index Score out of 10: 2.98 in December 2008 and 3.26 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011 The Infrastructure Environment Index has improved from 2008 to 2010 (Index Score out of 10: 2.27 in December 2008 and 2.58 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The Government Readiness Index has continued to improve from 2008 to 2010 (Index Score out of 10: 3.65 in December 2008 and 4.12 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

[12] http://www.ucc.co.ug/rcdf/rcdf-Policy.pdf

	Political & Regulatory Environment	e-Government Development	ICT Usage
Dimensions	The Political & Regulatory Environment Index Score has improved from 2008 to 2010 (Index Score out of 10:3.66 in December 2008 and 4.01 in December 2010), **Source:** WEF Global Information Technology Reports 2008-2009 & 2010-2011	The eGovernment Development Index Score has improved slightly from 2008 to 2011 (Index Score out of 1: 0.3133 in 2008 and 0.3185 in 2011), **Source:** UN e-Government Survey Reports 2008 & 2012	The usage of ICT nationally has made significant progress from 2008 to 2010, albeit from a very low base level (ICT Development Sub-Index (use) Score out of 10: 0.27 in 2008 and 0.44 in 2010), **Source:** ITU Measuring Information Society Report 2011)

Data sources:
UN: United Nations
ITU: International Telecommunication Union
WEF: World Economic Forum

14. CONCLUSION

This report provides an overview of the most recent ICT Policies implemented across a number of IST-Africa Partner Country. Each of the full national ICT Policies can be downloaded from www.ist-africa.org/home/default.asp?page=ictpolicies. As new countries join the IST-Africa Initiative, their national policies will also be made available via this link, as well as through www.ist-africa.org/home/default.asp?page=countries which provides access to IST-Africa Partner Country Profiles.

While obviously the individual circumstances of each profiled IST-Africa Partner Country vary (both in terms of available human and financial resources, level of infrastructural development, skills capacity etc), there are clearly considerable overlap of issues being addressed by individual countries. In many cases, similar strategies are being employed. The best of these stands up to comparison with the most sophisticated developed countries. Each ICT Policy presented in this report was agreed to be fit for purpose in its home country, at the time it was finalised.

There are clearly a number of key challenges associated with successfully implementing each of these individual policies. These include the significant cultural and change management issues involved in getting different Ministries – let alone different stakeholders to collaborate and learn to work together in different ways, and that the needs and expectations of citizens, business and investors in all countries continuously evolve. What was perceived to be a demanding and exciting achievement at a specific point in time, can quickly become superseded by events and new developments.

Of the thirteen IST-Africa Partner Countries who collaborated during 2010 – 2011, only Egypt indicated that it had fully implemented all planned aspects of its current ICT Policy and that it had started to undertake a comprehensive review in 2011 to start developing its new policy based on the current needs of key stakeholders. Tanzania is currently undertaking a review of their 2003 ICT Policy as part of the TANZICT Programme. Botswana undertook a review of their existing STI policy during 2011 and a new Research, Science, Technology and Innovation Policy has been approved by Cabinet and is scheduled to be presented to Parliament in the current Parliamentary session (Q1 2012).