



E-Government in @frica

Prospects, challenges and practices

By Yayehyirad Kitaw



November 2006

Foreword

This study has been carried out by Yayehyirad Kitaw under the framework of the Executive Masters in Management of Technology (MoT) at the Swiss Federal Institute of Technology in Lausanne (EPFL). It was conducted under the supervision of Professor Mathias Finger, Director of the Masters in E-Governance program at the EPFL and Mr Alexander Ntoko, Head of the E-Strategies Division of the Telecommunication Development Bureau of the International Telecommunication Union (ITU).

This report was written by Mr Kitaw who carried out desk research and various interviews with the project managers in the field. The case studies presented reflect the findings, interpretations and conclusions of the author, and are not endorsed by the concerned governments or the ITU.

This study was conducted during a period of three months in a very constraining context where the author had limited time devoted for it. Field assessment of the case studies was impossible during the time; therefore data collection was entirely done through email and telephone discussions.

The views expressed in this report are those of the author and may not necessarily reflect the opinions of the International Telecommunication Union or the Swiss Federal Institute of Technology in Lausanne.

Acknowledgments

The author thanks Mr. Jean Micol Co-Director of the MoT Program at the Swiss Federal Institute of Technology (EPFL), Professor Finger Director of the Masters in E-Governance program at the EPFL, Mr Alexander Ntoko, Head of the E-Strategies Division (ITU) and Mr Stephen Geis, Acting Chief of the Information Services (ITU) for allowing this study to be conducted.

Appreciation is also extended to Gianluca Misuraca, Managing Director of the E-Governance Program at the EPFL, Desire Karyabwite, IP Coordinator ITU/BDT for their valuable inputs, all project coordinators who helped in the collection of documentation and the MoT Management Team.

Table of Contents

I. INTRODUCTION.....	6
II. UNDERSTANDING E-GOVERNMENT.....	7
GOVERNMENT.....	7
E-GOVERNMENT.....	7
FROM E-GOVERNMENT TO E-GOVERNANCE.....	8
III. PROSPECTS IN THE AFRICAN CONTEXT.....	8
E-GOVERNMENT: MYTH OR OPPORTUNITY FOR AFRICA?.....	8
E-GOVERNMENT READINESS IN AFRICA.....	9
CHALLENGES.....	11
OPPORTUNITIES.....	14
CYBERSECURITY ISSUES.....	15
IV. PRACTICING E-GOVERNMENT IN AFRICA.....	17
RWANDA: CASE STUDY.....	19
Rwanda: Country Profile.....	19
Rwanda: E-Government Readiness.....	20
Online Government Services in Rwanda.....	23
ETHIOPIA: CASE STUDY.....	31
Ethiopia: Country Profile.....	31
Ethiopia: E-Government Readiness.....	32
The WeredaNET Project.....	35
MAURITIUS: CASE STUDY.....	40
Mauritius: Country Profile.....	40
Mauritius: E-Government Readiness.....	41
Case Study: Contributions Network Project.....	45
V. CONCLUSIONS AND RECOMMENDATIONS TO ITU.....	54
VI. ANNEXES.....	57
ANNEX 1: QUESTIONNAIRE.....	57
ANNEX 2: WEB MEASURE MODEL.....	58
ANNEX 3: E-GOVERNMENT READINESS INDEXES.....	59
ANNEX 4: ICT INDICATORS FOR AFRICAN COUNTRIES.....	60
VII. BIBLIOGRAPHY.....	63

List of Acronyms

B2B	Business-to-Business
B2C	Business-to-Customer
B2G	Business-to-Government
BDT	Bureau de développement des télécommunications (ITU)
CAGR	Compound Annual Growth Rate
EICTDA	Ethiopian ICT Development Agency
CNP	Contribution Network Project
DAP	Doha Action Plan
ESTC	Ethiopian Science and Technology Commission
EPFL	Ecole Polytechnique Fédérale de Lausanne (Swiss Federal Institute of Technology)
ETA	Ethiopian Telecommunication Authority
ETC	Ethiopian Telecommunication Corporation
G2B	Government-to-Business
G2C	Government-to-Citizens
G2G	Government-to-Government
GIS	Geographic Information System
GPS	Global Positioning System
GPRS	General Packet Radio Service (GPRS)
HDI	Human Development Index
HTTP	HyperText Transfer Protocol
ICT	Information and Communications Technology
ICT4D	ICT for Development
ITU	International Telecommunication Union
IP	Internet Protocol
MACSS	Mauritius Automated Clearing and Settlement System
MMS	Multimedia Messaging Service
MNS	Mauritius Network Services
LAN	Local Area Network
LDC	Least Developed Country
LG2B	Local Government-to-Business
NPF	National Pensions Fund
NSF	National Savings Fund
LG2C	Local Government-to-Citizens
LG2G	Local Government-to-Government
PAYE	Pay As You Earn
PDA	Personal Digital Assistants
RFID	Radio Frequency Identification
SMS	Short Message Service
SSL	Secure Socket Layer
UNESCO	United Nations' Educational, Scientific and Cultural Organization
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WiFi	Wireless Fidelity
WIS	Woreda Information System
WSIS	World Summit for the Information Society
WTDC	World Telecommunication Development Conference

I. Introduction

The advent of the information age and its acceleration effect on globalization are leading the world to a new economic order driven by information and knowledge based economies. In an increasingly globalized world, where information technology has become one of the key determinants of growth, many African countries are facing new challenges as a result of the emerging information age.

The enabling role that Information and Communication Technologies (ICTs) can play in facilitating and accelerating socio-economic development (ICT4D) is now being recognized by most African governments. A growing number of national and local governments are setting up national ICT policies, putting critical information online, automating administrative processes and interacting with their citizens through online services, yet the great opportunities offered by these new technologies remains largely unexploited.

Simply defined, E-Government is the use of ICT to promote more efficient and effective government, facilitate the accessibility of government services, allow greater public access to information, and make governments more accountable to citizens.

On a continent where high illiteracy is prevailing, telecommunication infrastructure underdeveloped, most governments undemocratic and perceived as corrupt, is E-Government a myth or an opportunity?

The second phase of the World Summit of the Information Society held in Tunis in 2005 affirmed its commitment in *developing and implementing e-government applications* based on open standards in order to enhance the growth and interoperability of e-government systems, at all levels, thereby furthering access to government information and services. Moreover, the Doha Action Plan (DAP) adopted by the World Telecommunication Development Conference (WTDC) in March 2006 has resolved to conduct detailed studies on various ICT applications giving priority to e-government, without however neglecting the other applications.

The purpose of this paper is to explore the possibilities offered by E-Government to Africa by documenting few initiatives on the continent that have developed innovative models that contribute to governments' efficiency, accessibility, transparency and accountability through the implementation of ICT based services.

It consists of a documentation of three case studies that would serve as a basis for a publication of the E-Strategies Division of the International Telecommunication Union (ITU) and support for the teaching materials of the Masters in e-Governance program at the Swiss Federal Institute of Technology in Lausanne (EPFL). It is also intended to inform government officials of e-government initiatives on the continent and allow them to assess the possibility of replicating similar projects in their respective countries.

The paper will further attempt to outline few suggestions for the International Telecommunication Union to effectively respond to and address the pressing demands from its membership on e-government applications in developing nations.

II. Understanding E-Government

Government

The word *government* has its origins in the Greek *κυβερνᾶν* (*kybernan*), which means "to steer". In its broadest sense, it refers to a body that has the authority to make and the power to enforce laws within a civil, corporate, religious, academic and other organization. At a nation level, government commonly refers to the administration of a state, in general to the executive function or branch of the body of the exercising authority. The level of government responsible for running a district, province or city is also referred as local government in contrast with bodies at nation-state level.

The advent of new ICTs such as the Internet offers a potential to induce a transformational pattern in the way government functions are conducted and services delivered to citizens.

E-Government

Prefixing the word government with an "e" broadly implies the use of Information and Communications Technologies such as the Internet, Wide Area Networks or Mobile computing to exercise its functions in an efficient and effective manner, hence transform its relations with citizens, businesses and other government entities.

Similar to e-commerce or e-banking, e-government (sometimes referred as e-gov, digital government or online government) may be applied to legislature, judiciary or administration with the objective of improving internal efficiency through the use of ICTs.

The primary delivery models are Government-to-Citizen (G2C), Government-to-Business (G2B) and Government-to-Government (G2G). The most important expected benefits of E-Government include improved efficiency, better accessibility of public services and better processes for democratic governance.

E-commerce and E-banking created a new paradigm of conducting the functions of banks and businesses through the use of ICT. Private enterprises have embraced the opportunities offered by the Internet much earlier in the dot-com era than governments. They have adopted these new avenues that enabled them to leverage their businesses particularly through the use of e-commerce.

Similar to e-commerce, which allows businesses to transact with each other more efficiently (B2B) and brings customers closer to businesses (B2C), E-Government aims to make the interaction between government and citizens (G2C), government and business enterprises (G2B), and inter-agency collaboration (G2G) more convenient, transparent, and cost-effective. A similar comparison can also be made with e-banking, which essentially referred to the electronic handling through the use of ICTs (primarily the Internet) of the banking business.

While E-Government is often perceived as "Internet-based government", many non-IP based technologies can be used in this context including telephone, fax, PDA, SMS,

MMS, GPRS and WiFi. Other technologies can include RFID, biometric identification and smart (identity) cards.

Another example is the e-voting process widely used in large democracies such as India which is entirely conducted offline through polling station technologies. There are also other technology-specific delivery of e-government, such as m-government (mobile government) and g-government (GIS/GPS applications for e-government).

From E-Government to E-Governance

The concept of "governance" is as old as human civilization. In essence, the term "governance" refers to the process of decision-making and the process by which decisions are implemented (or not implemented)¹. The word "governance" can be used in several contexts such as corporate governance, international governance, national governance and local governance.

If we define governance as a process of decision-making involving multiple entities, study on governance would refer to a thorough analysis of the actors and structures involved in this decision and implementation process.

The World Bank defines governance as *the exercise of political authority and the use of institutional resources to manage society's problems and affairs*.

An alternate definition suggests that governance is the use of institutions, structures of authority and even collaboration to allocate resources and coordinate or control activity in society or the economy.

Simply defined, governance is the use of structures of authority to a decision-making process for the management of society's affairs.

E-Governance goes beyond E-Government. It means employing modern ICTs to address the issues of governance i.e. the participation in the decision processes of citizens and other actors. This *inter-alia* implies deploying efforts in the participation of all citizens, the access-divide and promotes opportunities for social empowerment.

III. Prospects in the African context

E-Government: myth or opportunity for Africa?

On the African continent, where 40 % of the adult population is illiterate, where PC penetration is the lowest in the world with 2,2 computers per 100 inhabitant, where the Internet tariffs are the highest in the world, where there are only 2,7 telephones per 100 inhabitant, where political instability is widespread, where most governments are autocratic and perceived as corrupt, where the culture of democracy is not fully embraced, where millions of citizens are not empowered in the decision making processes of their government, one could arguably question the relevancy of a discourse on the prospects of E-Government in Africa.

¹ Good governance as defined by United Nations Economic and Social for Asia and Pacific

Are all E-Government initiatives in Africa bound to fail? Are E-Government applications a luxury that the continent can not afford when their direct socio-economic impact is uneasy to quantify? Do E-Government initiatives deliver the promised efficiency and transparency to African governments? Can they be an enabler in empowering the citizens and lead to better governance? How E-Government ready is Africa?

E-Government Readiness in Africa

The Global E-Government Readiness Report 2005, a study conducted by the United Nations Department of Economic and Social Affairs, has developed an E-Government index that reflects the countries' official on-line presence, assesses their telecommunication infrastructure and human development capacity. The E-Government Readiness Index is a composite comprising the Web Measure Index, the Telecommunication Infrastructure Index and the Human Capital Index.

In essence, the index measures a state's adoption of the Internet and the World Wide Web to deliver critical information and services and combines it with indicators on Telecommunication Infrastructure and Human Development Capacity. As such, the measurement gives a mere indication of the diffusion of E-Government in a given country.

The index reflects three conditions that constitute an enabling environment for E-Government to mature i.e. literate and educated citizens with access to a developed telecommunication infrastructure and the capacity/willingness of a government to adopt ICT enabled governance.

In other words, a state is "e-government ready" when it is ready in terms of telecommunication infrastructure, accessibility of ICT to the population at large and commitment from the state on the use of ICT in a regulated framework associated with a willingness to empower its citizens.

Web Measure Index

The Web Measure Index is based upon a five stage model reflecting the level of sophistication of a state's online presence. It ranges from "Emerging presence" where limited and static information is provided by the government to "Networked presence" where highly integrated and secured interactions are possible with the government. (See Annex web measure model)

Telecommunication Infrastructure Index

The Telecommunication Infrastructure index is a weighted average of six primary indexes based on ICT infrastructural indicators. Data are drawn from the International Telecommunication Union (ITU) and the UN Statistics Division. The indices comprise: PCs/1000 persons; Internet users/1000 persons; Telephone Lines/1000 persons; Online Population; Mobile phones/1000 persons; and TV/1000 persons.

Human Capital Index

This indicator reflects the UNDP Human development index, a composite of adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio.

The following table presents a comparative assessment of E-Government readiness by region.

Regional E-Government Readiness ranking			
	2003	2004	2005
North America	0.8670	0.8751	0.8751
Europe	0.5580	0.5866	0.6012
South & Eastern Asia	0.4370	0.4603	0.4922
South & Central America	0.4420	0.4558	0.4643
Western Asia	0.4100	0.4093	0.4384
Caribbean	0.4010	0.4106	0.4282
South & Central Asia	0.2920	0.3213	0.3448
Oceania	0.3510	0.3006	0.2888
Africa	0.2460	0.2528	0.2642
World Average	0.4267	0.4130	0.4020

Source: United Nations Department of Economic and Social Affairs

The 2005 regional E-Government readiness for Africa was the lowest in the World, despite a constant growth since 2003. Collectively, Northern America and Europe were around 3 times more e-ready than Africa. The three combined indices taken separately for Africa are also the world lowest.

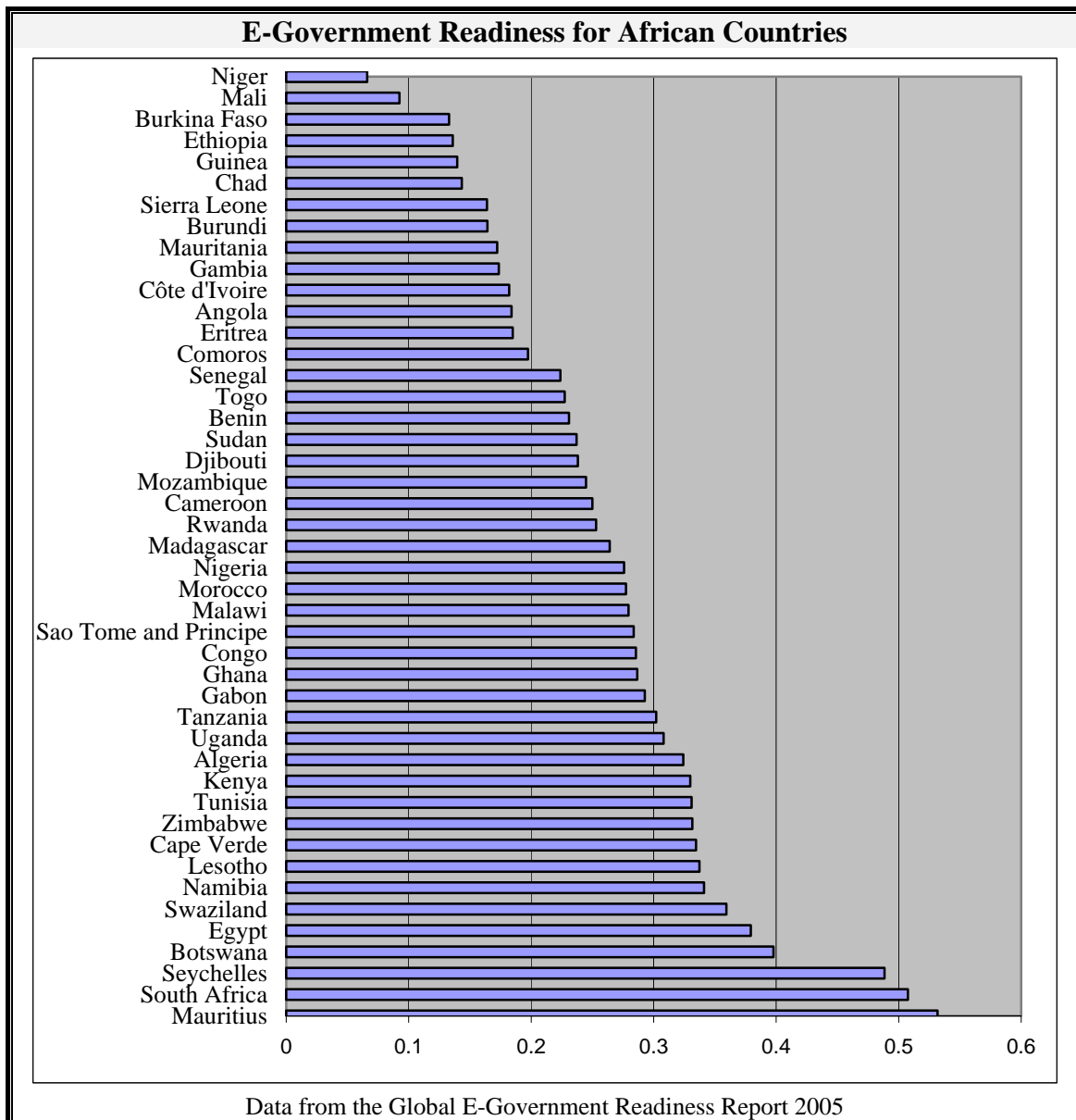
Despite an encouraging growth of the region, this index reflects yet again the serious divide in E-Government readiness between the developed and the developing world. The data shows a disparity between Africa and other regions but the growth over three years suggests an increasing awareness and willingness to embrace ICT applications by African governments.

These regional E-Government indexes are aggregates on a relative scale and reflect the performance of a group of countries relatively to another group. Therefore, a high growth in a region may affect the index of another, despite the notable performance of one region in the same year.

According to this ranking, Mauritius is the most “e-government ready” country in Africa, followed by South Africa and Seychelles. (See Annex 2).

Egypt has launched an integrated government portal (www.egypt.gov.eg) which boosted its performance on the E-Government readiness index. The web portal offers a wide range of interactive government services online and avails information both in English and Arabic.

Niger and Mali are the least e-government ready in Africa with indexes lower than 0.1.



Challenges

African countries face numerous challenges to fully adopt and adapt E-Government applications and seize the opportunities presented by ICT applications in general. Key challenges for E-Government applications are:

- a) the improvement of overall literacy rate
- b) the development of telecommunication infrastructure
- c) the commitment of governments to genuine transformation towards a more transparent and citizen-centered governance.

Other important challenges include the formulation of new regulations and policies,

Literacy

Literacy remains a major barrier to the development of e-governance in African countries. Despite the progress achieved since 1990, the absolute number of African adults who cannot read or write is increased from 131.4 million in 1990 to 136 million in 2000.

According to the UNESCO's Global Monitoring report, Sub-Saharan Africa has one of the world's lowest adult literacy rates, with only 60% of the population of 15 and over able to read and to write in 2000, well below the world average of 80%. The figure was below 40% in Benin, Burkina Faso, Ethiopia, Gambia, Guinea-Bissau, Mali, Niger and Senegal. Women account for nearly two-thirds of the illiterates in Africa, a figure not expected to increase much by 2015.

In 2000, the average literacy rate in Sub-Saharan Africa was 52 per cent for women and 68.9 per cent for men, with gender disparities prevailing in 75 per cent of the countries in the region. These figures often hide complex social, cultural and economical realities. There are also strong regional differences in literacy levels, Southern Africa being much more literate than Western Africa.

There are diverse literacy policies in Africa, but they commonly suffer from a lack of financial, material and human resources. However, there are positive trends and hopes with growing involvement of NGOs, civil society organizations promoting literacy, but also the opportunities offered by ICTs through e-learning programs. An illustrating example is the SchoolNet program in Ethiopia introduced in collaboration with the private sector and development agencies to connect 500 Schools in rural areas and deliver primary education through distance learning.

On top of literacy, a well-trained human capital is fundamental for the adoption of E-Government and its scarcity is another challenge in Africa. Education needs to be structured as to include ICTs in early stages and also produce ICT specialists through graduate schools of telecommunications and Information Technology.

Telecommunication Infrastructure

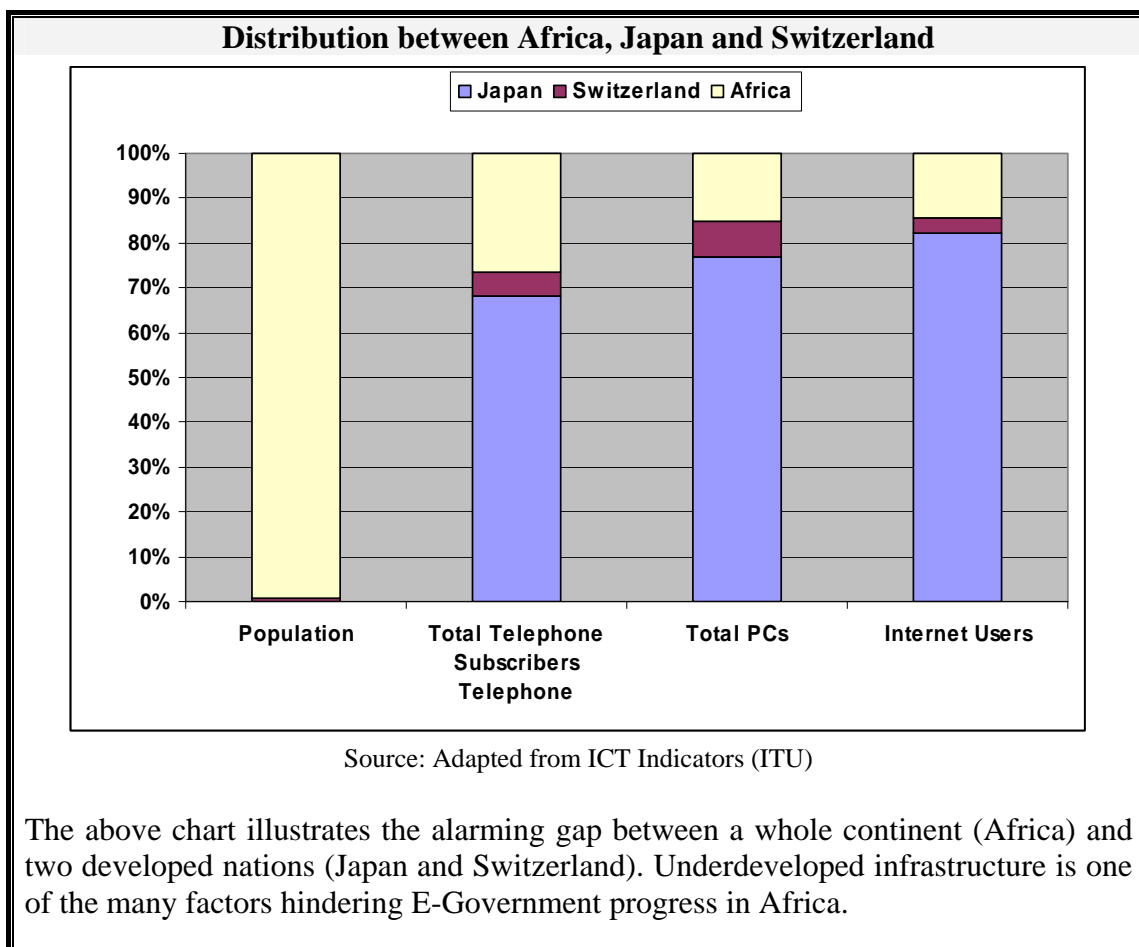
Underdeveloped Telecommunication Infrastructure is the "Achilles heel" of Africa had declared the Executive Secretary of the UN Economic Commission for Africa (ECA), Mr K.Y. Amoako in his speech at the World Summit on the Information Society (WSIS) Africa Regional Preparatory Conference in February 2005. Infrastructure is indeed a pre-requisite for the E-Inclusion of Africans at large and the development of ICT applications including E-Government.

With 13% of the world population, the continent has only 2% of world's telephone mainlines, 1,5% of the total number of PCs, 1% of the Internet users². Stories of power outages disrupting the availability of the Internet and email are numerous.

² World Telecommunication Development Report – Access indicators for the Information Society (2006)

ICT infrastructure is a key determinant of development in the knowledge era. Africa has lagged behind in the past century in that regard. This trend needs to be reversed by intensifying heavy investments on infrastructure in this crucial period where Africans need to catch and capitalize on the opportunities offered by ICTs.

The continent can not afford further marginalization and the digital inclusion, especially for the young and future workforce requires significant attention on the development of telecommunication infrastructure.



Citizen-centered governance and policy framework

African governments need to develop appropriate policies, supported by adequate legislation framework. These challenges have political and legal dimensions and include:

- Political leadership in promoting E-Government and ICT in general (e.g. high level officials that are champions in ICT, formulation of national ICT policies, including E-Government)
- Transformation to citizen-centered governance (e.g. Commitment to empowering citizens through ICTs)
- Adaptation and strengthening of legal frameworks (e.g. appropriate legislation for digital signatures and combating cybercrimes)

Other barriers

There are also several ‘non-connectivity’ and “non political” barriers to accessibility and delivery of E-Government services including cultural background, language and level of technology experience. Particular attention should be drawn to the linguistic and cultural insight to bear on the conception, design and deployment of E-Government applications notably for rural, non-elite communities in Africa.

For instance, Africa’s oldest alphabet, the Ge’ez, used for written communication since 100 BC in Ethiopia, has been facing the challenge of the digitalization. The local script’s inclusion in ICT standards on multilingualism has been a major technical endeavour and still presents additional challenges with respect to Ethiopian’s adoption of E-Government applications as most ICT products and standards do not fully support the Ethiopic character sets.

Another consideration not to omit is the fact that voice based technologies such as radio, TV, Mobile are much more easily adoptable for communities where high illiteracy prevails and where forms of expression are traditionally rather oral than text based.

Opportunities

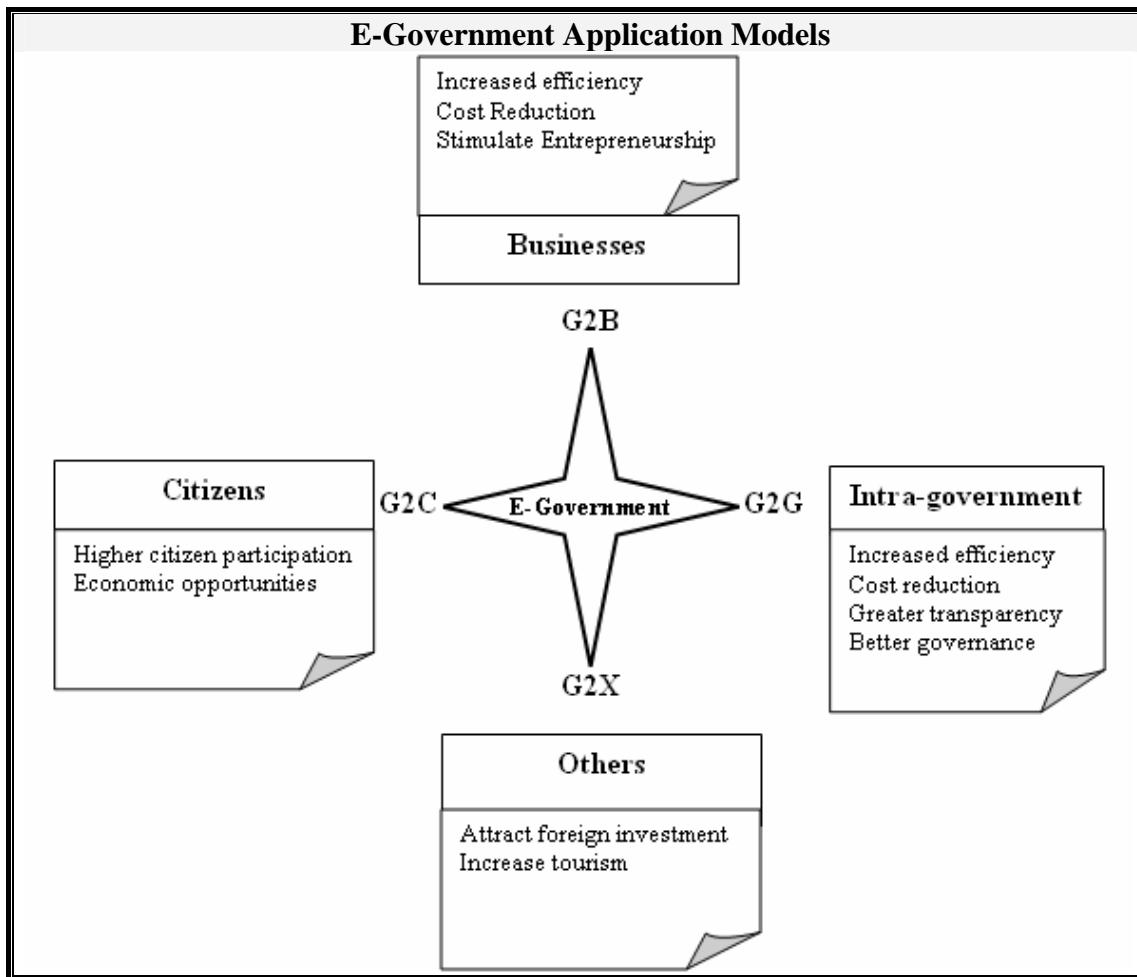
The fourth African Development Forum (held in Addis in October 2004) produced a Consensus Statement declaring that E-Government is an important innovation for enhancing good governance and strengthening the democratic process.³ It further acknowledged that E-Government can facilitate access to information, freedom of expression, greater equity, efficiency, productivity growth and social inclusion.

Quality of public services in Africa is generally poor. Dzidonu describing government services in Ethiopia notes that they are “characterized by cumbersome procedures, long delays in service delivery to clients, and consequently high costs to citizens, discourteous behavior of civil servants to citizens, a demand for compliance by citizens with the bureaucracy’s archaic methods of doing things with a *take it or leave it* attitude”. (ICT4D – Ethiopia, C. Dzidonu, 2006). Introduction of ICT-based services creates an opportunity to identify flawed processes and re-engineer them, consequently improve not only the efficiency but also the quality of service to citizens.

Successful E-Government initiatives offer tangible opportunities which include:

- transformation of cumbersome public administration and service delivery processes thereby increase efficiency of governments
- empowerment and participation of citizens, thereby contribute to strengthening democratic processes
- greater transparency and accountability, thereby lead to better governance and reduce opportunities for corruption
- Stimulation of the usage of ICT applications in other development sectors (E-Health, E-Education), thereby opens opportunities to transform agriculture-based economies.

³ S. Coleman, African e-Governance – Opportunities and Challenges (Bibliography #18)



The above illustration briefly summarizes the various E-Government delivery models and their expected benefits for government, citizens, businesses and other players.

Cybersecurity issues

E-Government applications represent a security challenge as they highly depend on critical ICT systems (both infrastructure and services) that create vulnerabilities in government institutions, businesses and potentially harm citizens. It is imperative for governments to understand and address security concerns in order to leverage the potentials of ICTs in delivering E-Government applications.

In the deployment of E-Government application, attention should be drawn to the prevention of cybercrime (i.e. the use of ICTs by individuals to commit fraud and other crimes against companies and citizens) with the objective of protecting government institutions, businesses and citizens and without hampering democratic progresses and protection of human rights.

Cybersecurity is a global problem that requires global and multi-dimensional response with respect to policy, socio-economic, legal and technological aspects. The ITU's publication⁴ on Cybersecurity offers an excellent reference for understanding these serious concerns and formulating adequate policies and legal frameworks to effectively address security issues involved in the information era.

⁴ Cybersecurity guide for developing countries (see bibliography)

Taxonomy of E-Government possibilities in Africa

Taxonomy of E-Government possibilities in Africa		
G2B	Government to Business	Example
B-local	Government providing online services to local companies.	Online information, registration and processing of business incorporation in Accra, Ghana (Entrepreneurship)
B-regional	Government providing services to other business in the region.	The National Tourism Authority of Nigeria providing services to Travel Agents in Yaoundé, Cameroon
B-global	Government providing services to business on the global market (i.e. outside the sub-region).	The Senegalese government publishing online government's call for bids
G2C	Government to Citizens	
C-local	Government providing services to its citizens.	The Government of Mali sending coffee market prices directly to farmers in remote villages via Public Internet Access Points and SMS
C-regional	Government providing services to other citizens in the region.	The Ethiopian government sending disaster prevention alerts and information to citizens for possible floods of rivers crossing neighbouring countries.
C-global	Government providing services globally.	The Government of Niger launching an international appeal for donation during natural disasters
G2G	Government to Government	
	Government using ICTs to enhance its efficiency and effectiveness.	The Ugandan government deploying an integrated financial management system within Ministries and local government bodies.
G2X	Government to Any	
	Government providing ICT driven services to other players	The government of Rwanda offering an online visa delivery service for tourists and foreign investors.

SWOT analysis for E-Government applications in Africa	
Strength	Weakness
<ul style="list-style-type: none"> ▪ Advantage of late adopter ▪ Borrow solutions from others 	<ul style="list-style-type: none"> ▪ High illiteracy rates ▪ Poor Telecommunication Infrastructure ▪ Lack of democratic governance ▪ Political instability ▪ Lack of IT specialized human capital
Opportunities	Threats
<ul style="list-style-type: none"> ▪ Increase citizen participation thereby induce democratic governance ▪ Reengineer administration processes thereby improve efficiency ▪ Foster proliferation of other e-applications (ICT4D) ▪ Stimulate the use of ICT by the population at large, thereby transform to knowledge based economies. ▪ Reduce opportunities for corruption and promote transparency 	<ul style="list-style-type: none"> ▪ Cybersecurity issues ▪ Citizen monitoring, surveillance and repression ▪ New frontiers for Human Rights abuses (Freedom of expression/information) ▪ Increase urban/rural divides

The SWOT analysis reveals several opportunities but limited strengths. It is detrimental for ICT strategists in Africa to make the most of the strengths and opportunities when directing efforts and crafting policies. A number of the identified threats can be limited through appropriate legislation (National Cybersecurity policies and laws).

IV. Practicing E-Government in Africa

The following cases studies have been compiled after a series of phone interviews and documentation exchanges with the respective project managers and other knowledgeable persons about the initiatives. Field assessment would undeniably have complemented the desk research, but was impossible during the elaboration of this paper. Therefore, data collection was entirely done through email and telephone interviews except for the case of Rwanda where live discussions were conducted with the project manager in ITU. A standard questionnaire was sent all project coordinators. (See Annex)

Although there are reportedly several E-Government initiatives in almost all African countries, documentation and information is uneasy to collect within a short period assigned for this study. In particular, relevancy for this study of complex and nation-wide projects is difficult to qualify through online researches and phone interviews. The cases were identified according to the following criteria.

- a) Type of E-Government delivery model: the case studies should cover the three main types of E-Government delivery models. Identification of one case study illustrating in practices each of the 3 models (i.e. Government-to-Citizen (G2C), Government-to-Government (G2G) and Government-to-Business (G2B) was a primary condition.
- b) Innovative and pioneering: The case studies should have elements of novelty, prospects of success and replicability in other countries. (Pioneering models / E-Government application)
- c) Documentation and data collection: a direct and facilitated access to detailed documentation, data and focal person for possible interviews with regards to the E-Government initiative is fundamental.

During the research for innovative models of E-Government, a number of cases were discarded due to the lack of response from the project coordinators. A number of them have been inputted in the E-Government portal initiated in the course of this study. (See <http://www.itu.int/egov/>)

The following cases were selected to illustrate three different E-Government delivery models on the continent (G2C, G2G, and G2B).

Project Name	Country	E-Government Model
Online Government Services	Rwanda	G2C
Woreda Net Project	Ethiopia	G2G
Contribution Network Project	Mauritius	G2B

Each case includes an overview of the country's profile completed by an analysis on the country's E-Government Readiness through:

- an assessment of the Human Development Index (literacy indexes emphasised)
- a brief screening of the political scene (governance indexes emphasised)
- an overview of the Telecommunications Infrastructure (Internet indexes emphasised)

The goal is to give a global overview of a country, depict a wider picture of the national context by collecting data relevant to key factors affecting the adoption of E-Government (literacy, governance and telecommunication infrastructure) in order to facilitate readers on the assessment of replication possibilities in other countries.

An attempt to describe in detail each E-Government initiatives was made highlighting the benefits for government, citizens or businesses and the role of ICTs.

Rwanda: Case Study

Rwanda: Country Profile

Overview



The Republic of Rwanda is a landlocked country in the Great Lakes region of east-central Africa. It is bordered by Uganda, Burundi, the Democratic Republic of the Congo and Tanzania.

In 1895, Rwanda became part of German East Africa, but the indigenous administration was kept intact. After Germany's defeat in the first World War, the protectorate was overtaken by Belgium through a mandate of the League of Nations.

Rwanda gained independence in 1962 from Belgium.

Demography

According to the General Census of Population and Habitat (RGPH), the Rwandan population was 8,648,248 in 2005 (3, 879,448 males and 4,249,105 females). Rwanda is most densely populated country of continental Africa with 322 per square km, according to the August 2002 census.

Population indicators	
Total population	8,648,248
Growth over last year	2.43%
Urban population	16.9%
Languages	Kinyarwanda (official), French (official), English (official), Kiswahili (Swahili) used in commercial centres
Literacy	70.4%
Age structure	
0-14	41.9%
15-64	55.6%
65 and over	2.5%

Source: CIA World factbook (2006)
<https://www.cia.gov/cia/publications/factbook/>

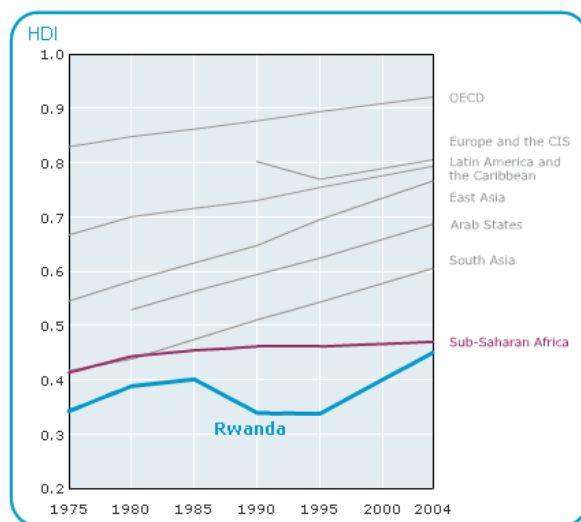
Economy

The Rwandan economy is based largely agricultural production with 88.6 % of the population engaged in (mainly subsistence) agriculture. Landlocked and with few natural resources, Rwanda enjoys of a flourishing tourism. Coffee and tea exports have driven economic growth which exceeded 5% since 2001.

According to the World Food Programme, 60% of the population lives below the poverty line and 10-12% of the population suffer from food insecurity every year.

Rwanda: E-Government Readiness

Human Development



Source: Human Development Report 2006 (UNDP)

The 2006 Human Development Report ranks Rwanda 158th out of 177 countries. It belongs to the group of countries with Low Human Development.

Adult literacy rate has grown from 53% in 1990 to 64.9% in 2004, surpassing the average for sub-Saharan Africa.

It is important to note the constant growth since 1995 after Tutsi-led rebels took power putting an end to the Rwandan genocide.

Governance

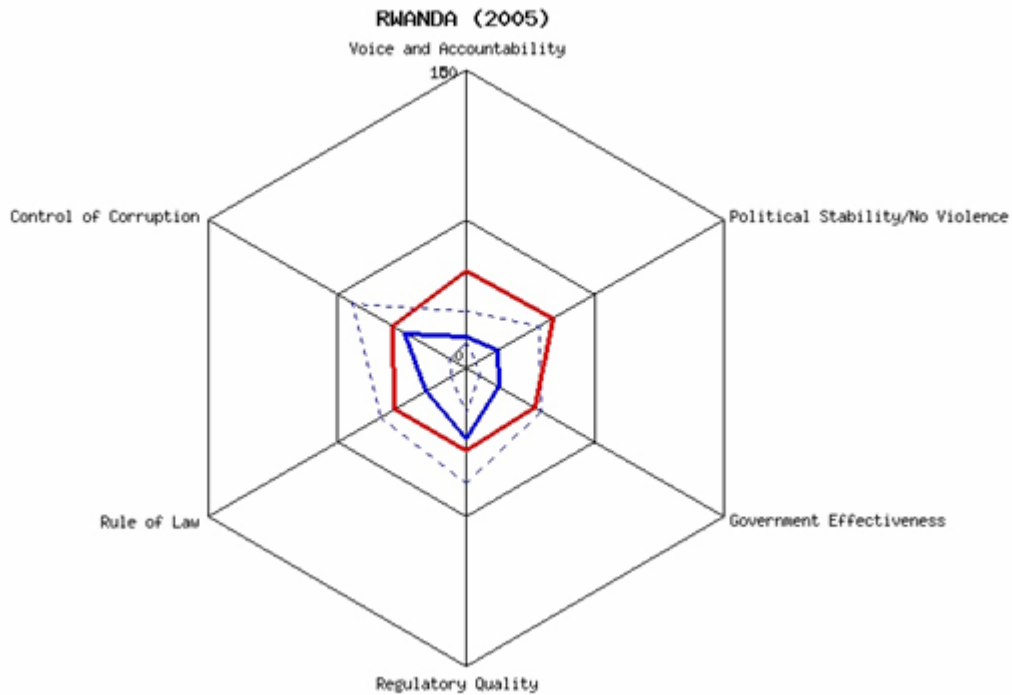
The Rwandan genocide orchestrated by the Hutus came to an end when the Tutsi-dominated Rwandan Patriotic Front (RPF) gained military victory in July 1994. The RPF organized a coalition based government and a new constitution was adopted by referendum and promulgated in 2003. Presidential and legislative elections were held in August and September 2003.

The country is divided into five provinces (intara) and subdivided into thirty districts (akarere).

The World Audit Organization's ranks Rwanda at the 139th out of the 150 with its democracy index. Democracy, Press Freedom and corruption world ranks are respectively 139, 140, 105 placing Rwanda in the last end of the audit lists.

These indicators suggest an overall lack of democratic governance in Rwanda, limited press freedom, political rights, rule of law and transparency.

Comparison with regional average (Sub-Saharan Africa) (red line) and Rwanda's Percentile Rank (0-100)



Source: World Bank Governance Indicators (info.worldbank.org/governance)

Telecommunication Infrastructure

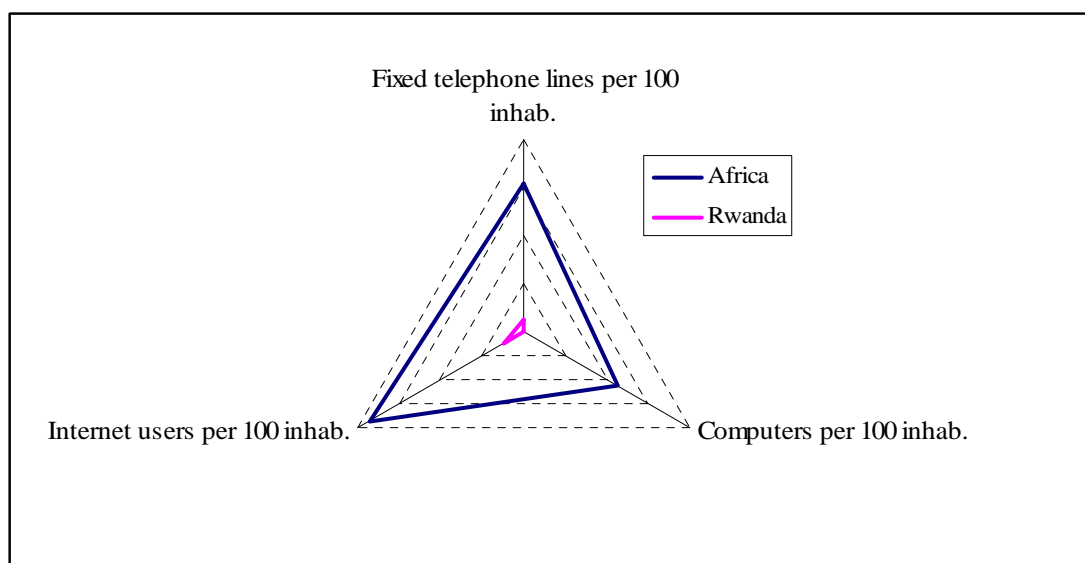
During the events of 1994 much of the human capacity and infrastructure of the country were destroyed. By end of 1994, there were at most a handful of operational phone lines in the country. The telephone infrastructure was repaired operational by 1996, just two years after the tragic events, an estimated of 1,000 lines were operating across the nation.⁵

Telecommunication Infrastructure in Rwanda

Fixed telephone lines per 100 inhabitants (2004)	0.27
Mobile cellular subscribers per 100 inhabitants	3.21
Computers per 100 inhabitants	n/a
Internet users per 100 inhabitants (2004)	0.45
Broadband Internet subscribers per 100 inhabitants (2002)	0.00
International Internet bandwidth (Mbps) (2002)	10
Radio sets per 100 inhabitants (2002)	15.11
TV sets per 100 inhabitants (2003)	0.79
% population covered by mobile signal	75.00

Source: ITU Telecommunications Indicators Database

⁵ The Growth of the Internet in Rwanda: A Strategy for Socio-Economic Development - http://www.cidcm.umd.edu/ntn/rwanda/rwanda_11-26-04.doc



From 1996 to today, Rwanda has made a remarkable recovery, the number of fixed line exceeding the level it was before 1994. However, it remains among the countries with poor telecommunication infrastructure in Africa.

An encouraging sign is the formulation of a national ICT policy. The government has indeed defined a policy for the ICT sector and its role in the country's development. The ICT Policy was adopted by the Cabinet in early 2000.

Furthermore, the government established the Rwanda Information Technology Authority (RITA) to facilitate national ICT strategies. A multi-sector regulatory body, the Rwanda Utilities Regulatory Agency (RURA), was also set up and several operators are active in the telecommunication market.

Services	Operators
Fixed telecom operator	Rwandatel s.a, a state owned company (privatization is in process)
Mobile operator	MTN Rwandacell
ISPs	Rwandatel sa Terracom(new entrant) Artel Mediapost
VSAT network operator	Artel s.a.r.l (rural communication)
Data/leased line	Rwandatel s.a
Gateway	Rwandatel s.a MTN Rwandacel

Online Government Services in Rwanda

This case study includes documentation of an E-Government project in Rwanda conducted under the framework of a joint partnership between the European Commission (EC) and the International Telecommunication Union. The project comprises a set of E-Government services and is included in this paper to illustrate the practical implementation of a Government-to-Citizens (G2C) model in an African country.

Background

In 2003, the ITU signed a Contribution Agreement with the European Commission (EC) on “Capacity Building for Information and Communication Technologies”. This agreement initiated a Global E-Government Project which *inter-alia* had the objective to enhance government services through the use of secure Internet infrastructures, thereby stimulate the development of E-Government applications.

The beneficiary countries had to meet several selection criteria which included being a Developing or Least Developed country with:

- A weak Internet infrastructure.
- A weak but fast growing telephone/mobile/Internet subscription rate.
- An ongoing or planned activity to address the policy, legislative and regulatory requirement for such activities.

Under the framework of this Global E-Government Project, Rwanda was selected as the primary beneficiary country among the Least Developed Countries (LDCs). The project to assist the Rwandan government in enhancing its services through the use of ICTs was initiated by the ITU by the end of 2003.

Problem Description

Over half of the traffic on the Rwandan Network consisted of e-mail exchanges through world wide email service providers such as Yahoo, Google and MSN. In the absence of an established email service by the National Telecommunication Services providers, Rwandan Internet users residing in the same town or working in the same office were obliged to exchange email messages through these international service providers, thereby creating an improper use of the national Internet bandwidth and avoidable network congestion.

The Rwandan government had also expressed its willingness to deploy internet-based services and applications to its citizens. The key challenges to be addressed in the scope of this project were:

- the optimization of the national internet bandwidth’s usage
- the development and accessibility of ICT based government services to citizens
- the deployment of a secured infrastructure allowing email exchanges among government agencies.

General Objective

The objective of the project is to assist the Rwandan government in providing efficient services to its citizens and to facilitate secure inter-governmental communications. By providing Internet based services through cost-efficient and secured communication networks, the project aims to:

- improve the quality and efficiency of government services
- reduce government's administrative costs
- extend the government services to remote urban areas

Applications Description

As a result of a careful assessment of the requirements with the management and IT professionals of the Rwandan Government, the following key services were identified as priority for deployment:

1. Web-based secured e-mail
2. Online electronic forms
3. Public Internet Access Centers

Web-based secured email service

This application aims to provide a secure online email service to high level government officials. This implied the design and deployment of a corporate mail system for the government including the delivery and setup of mail servers.

Deployment of such an email services requires the installation of mail server (both hardware and software) with necessary application licenses. Hardware included servers, PCs and network components such as routers or switches.



Welcome to the gov.rw Messaging Server!

Username: @ gov.rw Password:

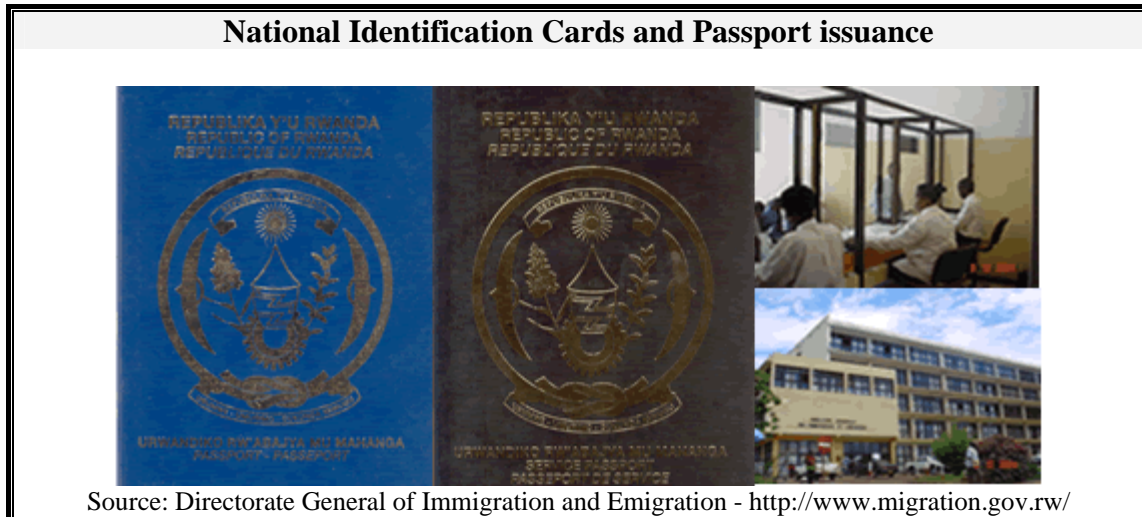
The email services were HTTP-enabled through SSL (i.e. accessible via a web browser through a secured channel) allowing mobility and security for its end-users.

Online Electronic Forms

This project's consists of putting critical administrative forms downloadable online for citizens online but also develop an interactive, secured and transactional mechanism to process these forms electronically, thereby improve the quality of service to the citizen and increase the efficiency of the administration.

Included in the first phase of this project are passports and work permit application forms and the visas forms for tourists. A number of other administrative forms have also been put on the Internet.

The second phase includes computerizing the National Police services to better control the issuance of National Identification Cards and passports. Over 100 computers will be needed for the introduction of this service.



In its next phase to be started in 2007, the E-Government project in Rwanda plans to introduce the National ID processing applications for Rwandan Citizens. Passport application forms are currently available for download in a printable PDF format and require the applicant to send his filled form through traditional mail.

The next phase of the project aims to transform this basic online presence to a transactional stage where through a two-way secured interaction between the applicant and the Immigration and Emigration Department, passport and ID deliveries will be more efficient in terms of processing speed and convenience.

Visa online Application Form for Tourists in Rwanda

The screenshot shows a web browser window titled "Entry Facility Application Form - Microsoft Internet Explorer". The browser's address bar is empty. The page content includes the logo of the Government of Rwanda, National Security Service, Directorate General of Immigration and Emigration. Below the logo, there is a "Track documents" section with a dropdown menu showing "Passport", "Visa", and "Entry facility". A "Go" button is next to it. The main heading is "Entry Facility Application Form" in a yellow box. Below this, there is a paragraph: "With this form you can apply online for an Entry Facility. Please fill in all fields since they are necessary for successfully obtaining an Entry Facility." The form fields are: "Firstname:", "Middlename:", "Lastname:", "Father's names:", and "Mother's names:", each followed by an empty text input box. At the bottom of the browser window, the "Internet" logo is visible.

Source: Directorate General of Immigration and Emigration - <http://www.migration.gov.rw/>

The online visa application serves up to 30 applicants per day. The service includes a biometric data collection system to capture and store fingerprints. The application procedure is entirely electronic with a work flow between the various government agencies (Immigration and Emigration Department) and the Kigali International Airport sites. A tourist fills an online e-form to apply for a visa, which is transmitted via secured e-mail to the appropriate department for approval. Upon approval of the visa delivery, an e-notification is sent to the applicant informing him he/she can pick her visa at the Kigali Airport on arrival.

This service not only improves the efficiency of the Visa delivery but also potentially stimulate tourism, foreign investors and business in the country.

Public Internet Access Centers

The Public Internet Access Centers are Internet Access Point set up in post offices allowing citizens to use the Internet at lower tariffs than other Cybercafés in the locality. Five post offices were identified in provinces and provided with the necessary equipment. These post offices are located in Cyangugu, Ruhengeri, Nyagatare, Nyamata and Gisenti. 5 others sites were also included in this project namely the Government Center in Kigali, the Headquarters of Immigration and Emigration Department, the Visa Department and the Kigali International Airport.

Implementation

The project started in three government institutions (the Office of the President, the Directorate General of Immigration and Emigration and the National Post Office). Implementation of services and applications was started as soon as the contract was signed.

Regular evaluation on site and monitoring of the project implementation plan is conducted by the project manager in ITU.

The installation of equipment and applications began in December 2005. By end of March 2006, the installation, configuration and testing of the hardware and software have been successfully completed. A trained human resource to maintain and support the implemented services was mandatory.

Training

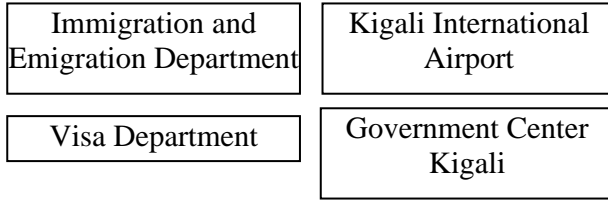
About five technical staff received training on installation, configuration and maintenance, backup and troubleshooting of equipment. The technical trainings included building the know-how on installation, configuration and upgrading of the Operating System, diagnosing and troubleshooting, IP networking, configuration and troubleshooting Printers/Scanners.

Benefits

Benefits of the E-Government projects in Rwanda have multiple folds. The most important ones are:

- Citizen empowerment and accessibility of government services : the Public Internet Access in post offices in remote areas facilitate the access of government information, forms to Rwandans citizens, thereby contribute to their empowerment.
- Efficiency in government services: The Web based secure emails between government offices not only stimulate and speed up intergovernmental information exchange but also increase efficiency.
- Stimulate tourism and foreign investment: the online visa delivery processes eases travel procedures for tourists and foreign business persons. By cutting redundancies in procedures and emphasizing immediate delivery of service, it not only increases the efficiency of the Immigration Department and but also makes the travelling conditions and experience for tourists and foreign investors more convenient by eliminating the cumbersome procedures of visa requests through the embassies.

Online E-Government services through a secured IP based platform



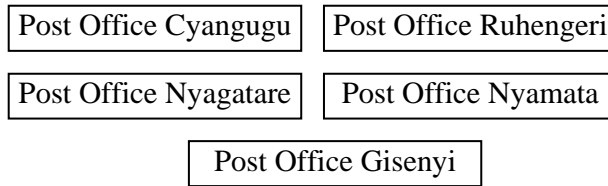
Rwandan Government

E-Government Project in Rwanda



Secured E-mail E-Forms

Government to Citizens (G2C)



Rwandan Citizens



Post office Public Internet Access in Gisenyi.
Photo D. Karyabwite

Initiative	Online Government services
Country	Rwanda
Model	Government-to-Citizens (G2C)
Brief description	Deliver E-Government applications such as secure web-based email service, E-Forms for national ID/passport and visa through Public Internet Access Centers
Implementing body	Office of the President with Immigration and Emigration Department
Funding	European Community and the ITU
Technologies used	LAN, Internet, SSL
Online resource	http://www.itu.int/ITU-D/e-strategy/e-applications/E-government/Rwanda/
Contact person	Desire Karyabwite, IP Coordinator ITU/BDT

Ethiopia: Case Study

Ethiopia: Country Profile

Overview



Federal Democratic Republic of Ethiopia is a country situated in the Horn of Africa. It is the second-most populous nation in Africa behind Nigeria. It is bordered by Eritrea to the north, Djibouti to the northeast, Somalia to the southeast, Kenya to the south, and Sudan to the west.

Unique among African countries, Ethiopia is the oldest independent country on the continent and has never been colonized. Defeating the Italians in 1896, the ancient Ethiopian monarchy maintained its freedom from colonial rule with the exception of a five year Italian occupation during the second World War, which has left no significant influence on the country.

Demography

According to Central Statistics Authority (CSA), the population of Ethiopia was estimated at 75 million in 2006, the last population census being conducted in 2004. Amharic is the official language of the Ethiopian government and has been used for written communication since centuries.

Ethiopia Population indicators	
Total population	74,777,981
Growth over last year	2.31%
Urban population	16.9%
Languages	Amharic (Official), Oromigna, Tigrinya, Guaragigna, Somali and other local languages. English is the major foreign language taught in schools.
Literacy	42.7%
Age structure	
0-14	43.7%
15-64	53.6%
65 and over	2.7%

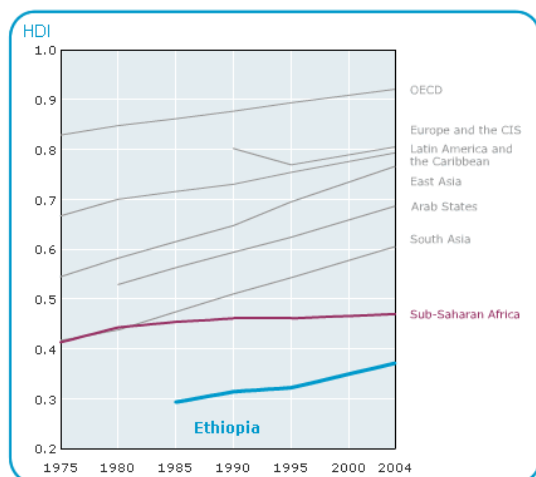
Source: CIA World factbook (2006)
<https://www.cia.gov/cia/publications/factbook/>

Economy

Ethiopia's economy is largely based on agriculture, accounting for half of GDP, 60% of exports, and 80% of total employment. The sector suffers from poor cultivation practices and recurrent droughts. Exports are almost entirely agricultural products with coffee being largest foreign exchange earner.

Ethiopia: E-Government Readiness

Human Development



Source: Human Development Report 2006 (UNDP)

The 2006 Human Development Report places Ethiopia at the 170th rank out of 177 countries.

The seven last countries on this index are all from the African continent (Chad, Central African Republic, Guinea-Bissau, Burkina Faso, Mali, Sierra Leone, Niger).

The literacy rate, fewer than 10 percent during the imperial regime before 1974, increased to about 63 percent by 1984, following an intensive national literacy campaign according to government figures.

Literacy rate is among the lowest on the continent with only 42% of the adult population able to read and write.

Governance

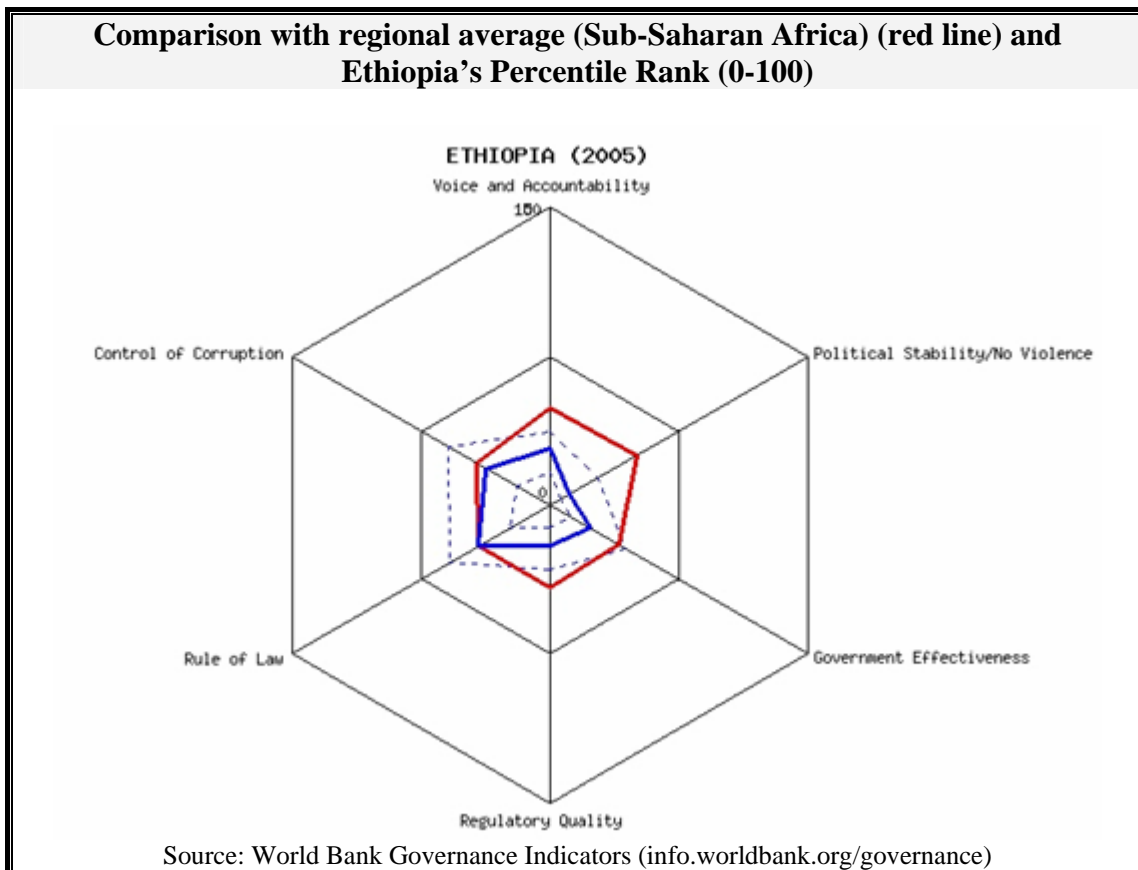
In August 1995, the Federal Democratic Republic of Ethiopia was established by the ruling party who ceased power in 1991 after the overthrow of Colonel Mengistu Haile Mariam's 17-year-long Marxist dictatorship. A new constitution was adopted in 1994.

The country has a tiered government system consisting of a federal government overseeing ethnically-based regional states, zones, districts (woredas), and neighborhoods (kebele). The Ethiopian decentralization process grants a significant role to Woredas in the planning and decision-making processes. It intends to transform Woredas to effective centers of socio-economic development.

The last parliamentary election was held in May 2005 with 90% of the electorate turning out to cast their vote, a tremendous sign of hope for better governance by the population. The opposition complained that the ruling party engaged in widespread vote rigging and intimidation confirmed by European Union election observers.

Following the election fraud, peaceful demonstrations were held by the opposition supporters. The government soldiers massacred 193 peaceful protestors, jailed all opposition leaders, silenced the local free press and restricted access to the Internet.⁶

The World Audit Organization ranks Ethiopia at the 129th place out of the 150 audited countries. Ethiopia rates relatively high in Africa with regards to rule of law and control of corruption, but has overall low governance performance indicators.



Amidst tense political situation and poor governance records, the government appears to consider ICTs as an indispensable tool to alleviate poverty and facilitate a state-transformation aiming an effective and efficient service delivery. It has initiated commendable ICT4D policy frameworks and several E-Government projects.⁷

⁶ See Internet Repression in Ethiopia: a new frontier of Human Rights abuse http://www.cyberethiopia.com/net/docs/internet_repression_in_ethiopia.html

⁷ The National ICT for Development (ICT4D) Five Years Action Plan for Ethiopia (2006-2010) – Ministry of Capacity Building

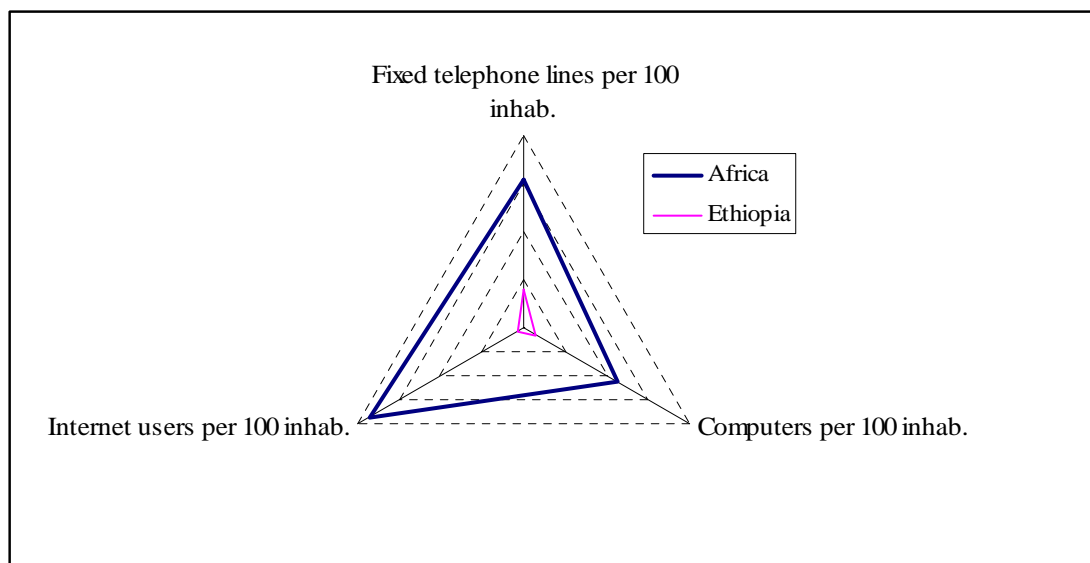
Telecommunication Infrastructure

Telecommunication was introduced in 1894 in Ethiopia. Despite the very early introduction and the oldest telecommunication operator in Africa, Ethiopia has one of most underdeveloped ICT infrastructure on the continent.

Telecommunication Infrastructure in Ethiopia	
Fixed telephone lines per 100 inhabitants	0.79
Mobile cellular subscribers per 100 inhabitants	0.53
Computers per 100 inhabitants (2004)	0.31
Internet users per 100 inhabitants (2004)	0.16
Broadband Internet subscribers per 100 inhabitants (2003)	0.00
International Internet bandwidth (Mbps) (2002)	10
Radio sets per 100 inhabitants (2001)	18.35
TV sets per 100 inhabitants (2003)	0.79
% population covered by mobile signal	n/a

Source: ITU Telecommunications Indicators Database

With an average of 0.79 main telephone lines per 100 inhabitants (the African average being 3.09), Ethiopia ranks at the 40th place out of 55 countries. The number of PC per inhabitant is 0.31, a dramatically low figure even compared to regional figure for Africa averaging to 2,24.



The Ethiopian Telecommunication Corporation (ETC) is responsible for all telecommunication operations and has a total monopoly for an indefinite period. An independent regulator, the Ethiopian Telecommunication Agency (ETA) was created in 1996. Many argue that the end of a myopic monopoly by the government would boost the development of high quality, reliable and affordable Telecommunication Services.

However, the government has taken several actions to create an enabling environment for the development of ICTs. The Ethiopian Information and Communications Technology Development Agency (EICTDA) has been mandated under the Ministry

of Capacity Building to formulate ICT policies and strategies, and coordinate their implementation.

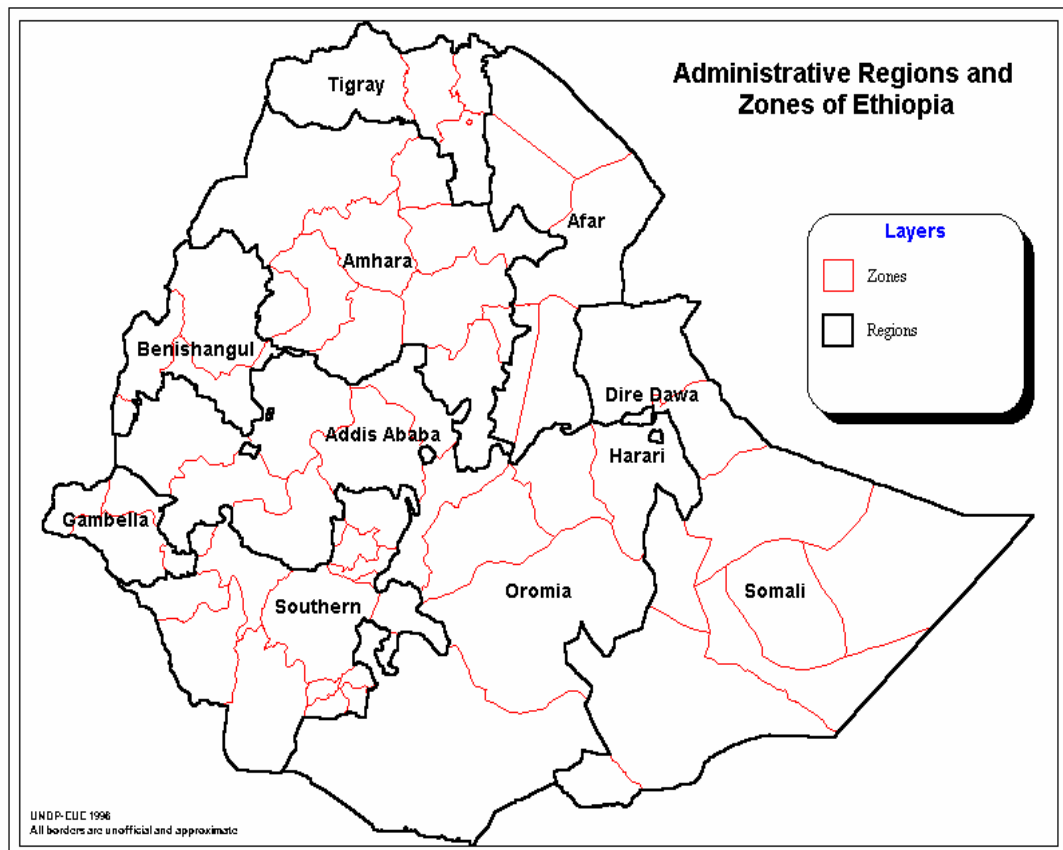
The policy document outlines key strategies including ICT infrastructure development, human resource development, ICT for governance/e-government. An important initiative under the national ICT4D Action Plan is the WoredaNet project which aims to connect all administrative zones to enhance the efficiency and effectiveness of civil and public service deliveries.

The WeredaNET Project

This case study includes documentation of an E-Government project in Ethiopia conducted under the Ministry of Capacity Building and implemented by the ICT Development Agency. The project aims to build terrestrial and satellite-based network connecting lowest levels of government. It is included in this paper to illustrate a practical implementation of a Government-to-Government (G2G) model in an African country.

Background of the administrative divisions

The government in Ethiopia consists of a federal government composed of ethnically-based regional states.



The country is divided into 9 ethnically-based administrative regions (*kililoch*, sing. *kilil*) which function as autonomous entities. They are subdivided into 68 zones and

two chartered cities (*astedader*). It is further subdivided into 550 *woredas* and six *special woredas*.

Woreda (also spelled wereda) is an administrative sub-division, or local government, of Ethiopia, equivalent to a district. Beginning with 2002, more authority was passed to woredas, in the form of staff and budgets transferred from the Regional governments.

General objectives

The objective of the Woreda-net ICT network is to deliver IP (Internet Protocol) based services through the use of broadband terrestrial and VSAT infrastructure. This part of a broader ICT initiative to promote sustainable development through a massive program of ICT application is aimed at empowering citizens. The long term objectives include the following:

- providing all levels of government, with accurate and timely information
- building organizational capacity at all levels of the government
- providing knowledge and information to citizens
- bridging the digital divide between urban and rural communities

Specific objectives

Woreda-net aims at delivering the following core services at the federal, regional and woreda level of government.

- **Video Conferencing:** a service that allows one to one meeting and broadcast of recorded sessions and programs to remote woredas.
- **Web Services:** a series of web servers and pages that provide civil servants with access to government restricted information, but also access to content available on the internet on education, health agriculture and governance.
- **Voice over IP (IP telephony):** a service that permits common and singular voice exchange over IP communication infrastructure between federal, regional and woreda sites.
- **Messaging:** an electronic messaging environment for a free flow of e-mail messages through a secure and organized IT framework reflecting the government hierarchical structure.

Application Description

There are several applications used (or planned to be) through the Wereda Information Systems (WIS). Some are intended for the use of citizens (e.g. electronic forms through the Internet). A highly visible and effectively used application is the Video Conferencing service for officials at wereda, regional and federal level.

The Government Video Conferencing solutions works over a nation wide IP based video conferencing within Ethiopia between:

- the Federal Government, and all 11 regional States
- different regional states

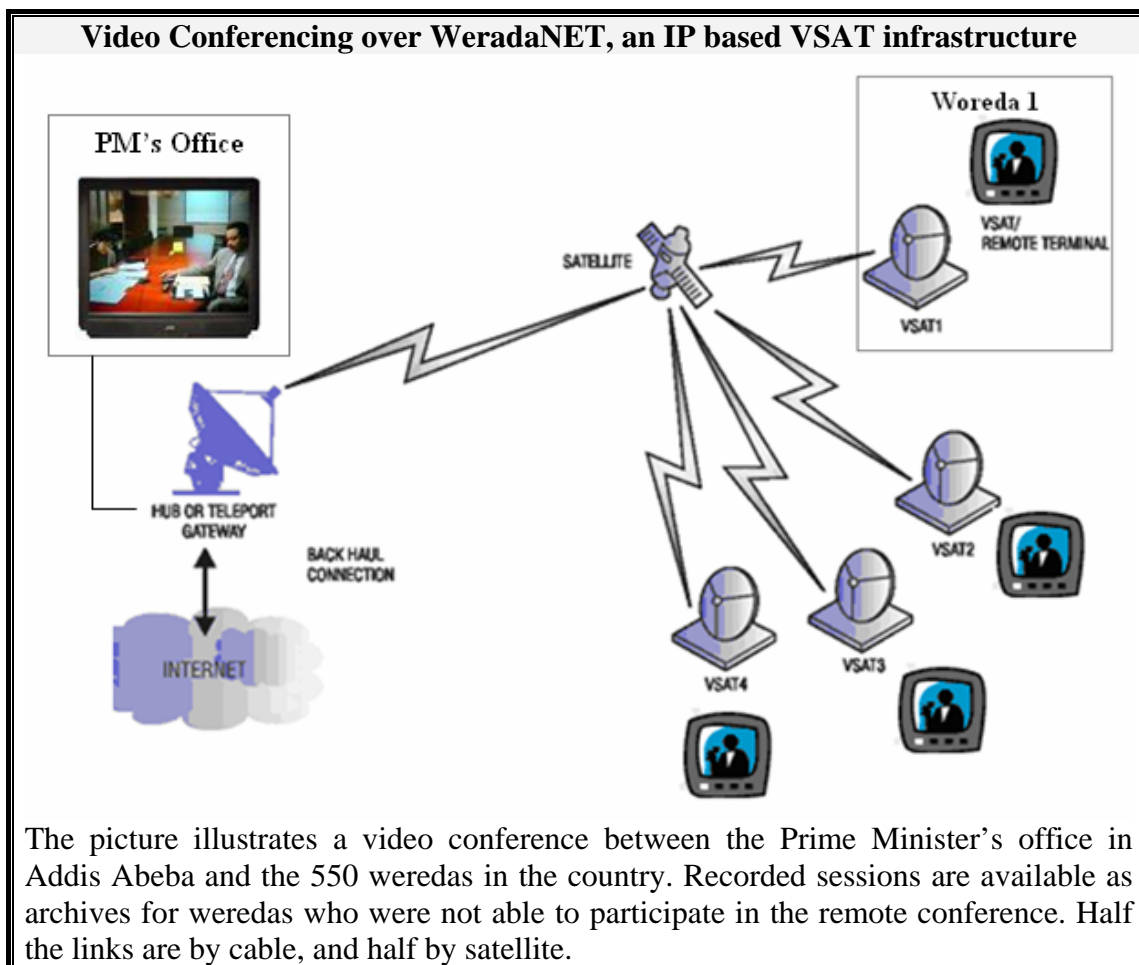
- regional states and their woredas (approximately 574)
- the federal government and the rest of the world
- international videoconferencing and training sessions

Technology used

VSAT technology is a telecommunication system based on wireless satellite technology. The term VSAT, which stands for very small aperture terminal, refers to a small fixed antenna dish 2.4-m or smaller in diameter. The VSAT unit is configured to support a variety of protocols, including the TCP/IP and PPP for Ethernet connection, as well as X.25 and Telnet. As such, it allows satellite communications of data, voice and video signals, as well as Internet or Intranet connections. A VSAT network has three components:

- A central hub (also called a master earth station)
- The satellite
- A virtually unlimited number of VSAT earth stations in various locations - across a country or continent

Content originates at the hub, which is a very large antenna (4,5 -11m). The hub controls the network through a network management system (NMS) server, which allows a network operator to monitor and control all components of the network.



Benefits

The Video-Conferencing application for weredas in Ethiopia contributes in increasing the efficiency of the government at the wereda, regional and federal level as it allows:

- Effective and frequent communication and collaboration between woreda administrators, region heads and the federal government
- Improved use of executive time (speed up decision making)
- Provision of timely information to the lowest government institution through the web services (static web pages and archived video sessions)
- Reduced travel and administrative costs for sharing information

Initiative	WoredaNet
Country	Ethiopia
Model	Government-to-Government (G2G)
Brief description	Delivers IP-based services (Video Conferencing, VoIP, secured messaging) through a terrestrial and satellite-based network connecting lowest levels of government.
Implementing body	ICT Development Agency under the Ministry of Capacity Building
Funding	Ethiopian Government (Ministry of Capacity Building)
Technologies used	VSAT, VoIP, DSL, SSL
Online resource	http://www.eictda.gov.et/
Contact	Ethiopian ICT Development Authority (EICTDA).

Noteworthy ongoing E-Government and ICT projects in Ethiopia

Project Title	Project Objectives	Implementing Organization	Project Leader	Project Time Line	Collaborating Partners	Project Status/
WoredaNet	To connect 600 local administrative districts in the country with broadband Internet access to enhance local administration	ETC	Ministry of Capacity Building	Major part Completed	EICTDA	Currently on practical implementation
SchoolNet	To connect more than 550 high schools in the country with VSAT based broadband for delivery of video-based distance education	ETC	ETC	Major part Completed	Ministry of Education, Ministry of Capacity Building, World Bank	Currently on practical implementation
AgriNet	To connect about 26 agricultural research institutions in the country with broadband Internet access	ETC	ETC	Planned	Ethiopian Agricultural Research Center	Planned
RevenueNet	To network the inland revenue and customs offices all over the country to primarily support relevant data exchange	ETC	Ministry of Finance	Planned	Ministry of Finance & Revenue	Planned

Adapted from the Draft ICT policy, The Federal Democratic Republic of Ethiopia, June 2002

Mauritius: Case Study

Mauritius: Country Profile

Overview



The Republic of Mauritius is situated in the South-West of the Indian Ocean, 2000 kilometers from the east coast of Africa and 800 kilometers of Madagascar. The island has an area of 1864 square kilometers is almost entirely surrounded by coral reefs.

The Dutch claimed possession in 1598 and named the island Mauritius after the Prince Maurice Van Nassau, governor of Holland.

The Dutch abandoned the island in 1710 and France took possession until the British captured the island and agreed in 1814 Treaty of Paris to respect the culture of the inhabitants.

The Republic of Mauritius consists of four islands: Mauritius (the largest at 1'865 square kilometers), the Agalega Islands (70 square kilometers), and the Cargados Shoals (1.3 square kilometers).

The island of Mauritius itself is divided into 9 districts: Black River (Tamarin), Flacq (Centre de Flacq), Grand Port (Mahebourg), Moka (Moka), Pamplemousses (Triolet), Plaines Wilhems (Rose-Hill), Port Louis (Port Louis), Rivière du Rempart (Poudre d'Or) and Savanne (Souillac). The islands of Agalega Islands (Vingt Cinq), Cargados Carajos Shoals (Raphael), Rodrigues (Port Mathurin) are also dependencies belonging to Mauritius.

Demography

According to the Central Statistics Office, the population of Mauritius was 1,240,827 in 2004 and has the highest density in Africa with 607 / km².⁸ The main island Mauritius is home to ninety seven percent of the population, where the capital Port Luis has 129,400 inhabitants.

⁸ Mauritius in figures. See <http://www.gov.mu/portal/sites/ncb/cso/mif04/mif04.pdf>

Population indicators	
Total population	1,240,827
Growth over last year	0.82 %
Urban population	43 %
Languages	Creole 80.5%, Bhojpuri 12.1%, French 3.4%, English (official; spoken by less than 1% of the population), other 3.7%, unspecified 0.3% (2000 census)
Literacy	85.6 %
Age structure	
0-14	23.9%
15-64	69.5%
65 and over	6.6%

Source: CIA World factbook (2006)
<https://www.cia.gov/cia/publications/factbook/>

The population is composed of various ethnic groups including Indo-Mauritian (68%), Creole (27%), Sino-Mauritian (3%), Franco-Mauritian (2%).

Economy

Mauritius has developed from a low-income, agriculture based economy to a middle-income diversified economy with growing tourist sectors. Annual growth has been in the order of 5% to 6% for a number of years.

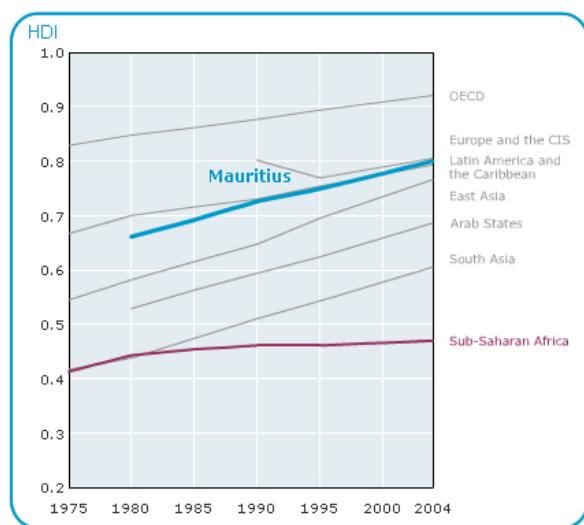
This rapid economic growth has been reflected in increased life expectancy, lowered infant mortality, and a much-improved infrastructure.

Sugar has been at the heart of Mauritius' economy since the Dutch introduced its cultivation in the 17th century. Grown on about 90% of the cultivated land area, sugar accounts for 25% of export earnings. Diversification policies of the economy lead to a remarkable development of the textile industry and the offshore financial sector. Government has expanded local financial institutions and strengthened the local telecommunication industry. Often referred as the African Tiger, Mauritius is home to over 9,000 offshore companies with investment in the banking sector surpassing 1 billion USD.

Mauritius: E-Government Readiness

Mauritius is the African leader in E-Government Readiness according to the indexes. The strength of Mauritius has essentially two folds. First, through an integrated portal at www.gov.mu, the government provides an enormous amount of information in one single place. Services can range from sophisticated transaction-based services to static information to citizens, businesses, civil servants and tourists. Second, Mauritius enjoys of a relatively high Human Development Index (0.800) with an adult literacy rate of 84.4%. Since 2006, Mauritius is listed among the countries with High Human Development index.

Human Development



Source: Human Development Report 2006 (UNDP)

In the 2006 Human Development Report⁹ by the United Nations Development Program (UNDP), Mauritius was ranked 63 out of 177 countries just behind Romania and Malaysia.

It ranks second among African countries (Seychelles ranks first).

85 % of the adult population can read and write, an impressive literacy rate impacting on adoption of E-Government application in the country.

Mauritius Human Development Index (HDI)			
<i>World</i>		<i>Africa</i>	
<i>Rank</i>	<i>Country</i>	<i>Rank</i>	<i>Country</i>
61	Romania	1	Seychelles
62	Bosnia	2	Mauritius
63	Mauritius	3	Libya
64	Libya	4	Tunisia

Source: United Nations Development Program (UNDP)

Governance

Since independence in 1968, Mauritius has a multiparty parliamentary democracy. The prime minister holds executive powers while the President of the Republic has primarily representative roles.

The president and vice president are elected by the National Assembly for five-year terms and are eligible for a second term. The next election is scheduled for 2007 (the last election being held on the 25 February 2002). The Militant Socialist Movement (MSM) is the governing party since 2002. Several other parties such as the Alliance Sociale (AS), Mauritian Labor Party (MLP), Mauritian Militant Movement (MMM), Mauritian Social Democrat Party (PMSD) are active in the political arena.

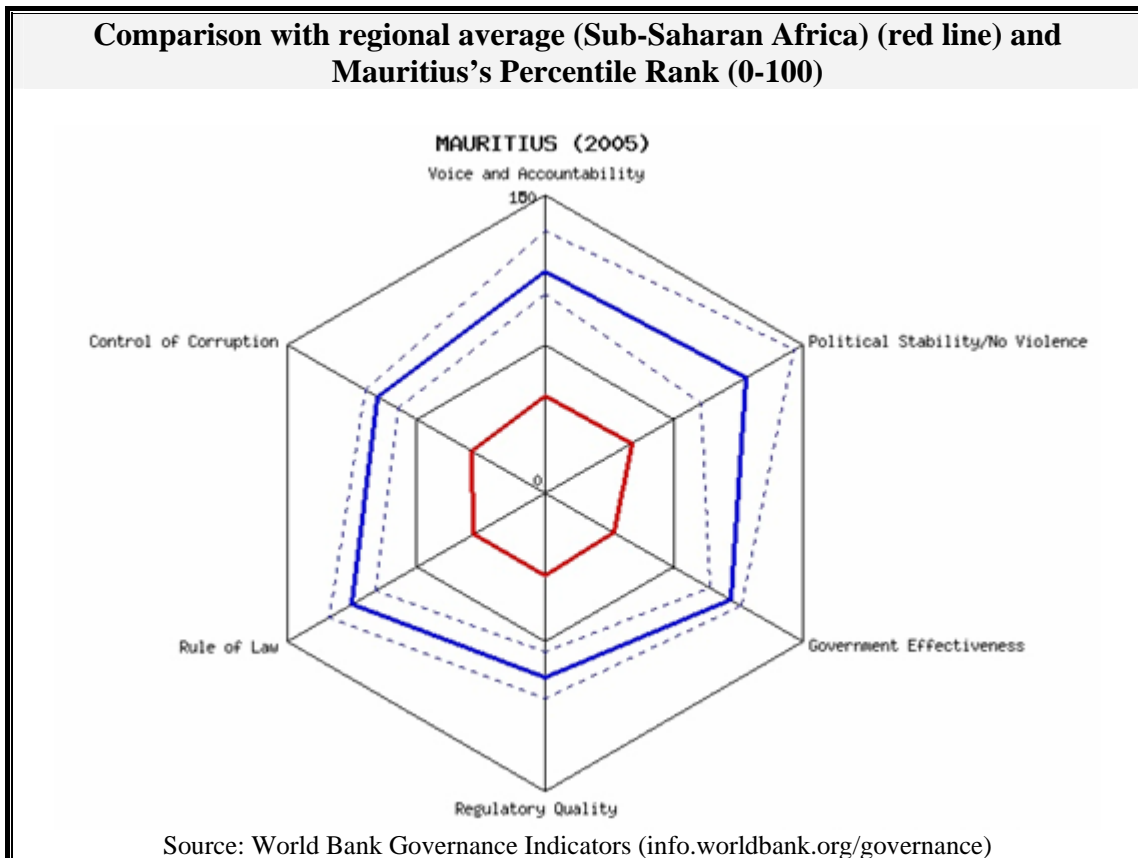
According to the World Audit Organization's¹⁰ democracy table in 2006, Mauritius ranks 36th in the overall democracy audit and is second among the African Union.

⁹ UNDP: Human Development Report 2006 <http://hdr.undp.org/> compiles the Human Development Index ranking based on a composite of four indicators (Life expectancy at birth, Adult literacy rate, school enrolment and GDP per capita)

¹⁰ World Audit Organization publishes ranking achieved by countries with indexes combining political rights, civil liberties, press freedom and corruption. (see worldaudit.org)

The ranking is based on indicators on press freedom, political rights, rule of law and also includes calculations using Transparency International Corruption perceptions Index (CPI).

World Bank's governance indicators¹¹ rank Mauritius high compared to other sub-saharan Africa countries. This ranking combines 6 governance indicators (Voice and Accountability, Political Stability/No Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption). Mauritius' high values imply that public institutions conduct and manage their affairs in a rather corrupt free manner and human rights are essentially respected in the country.



This chart depicts the percentile rank of Mauritius on each governance indicator. Percentile rank indicates the percentage of countries in sub-saharan Africa that rate below Mauritius in each component.

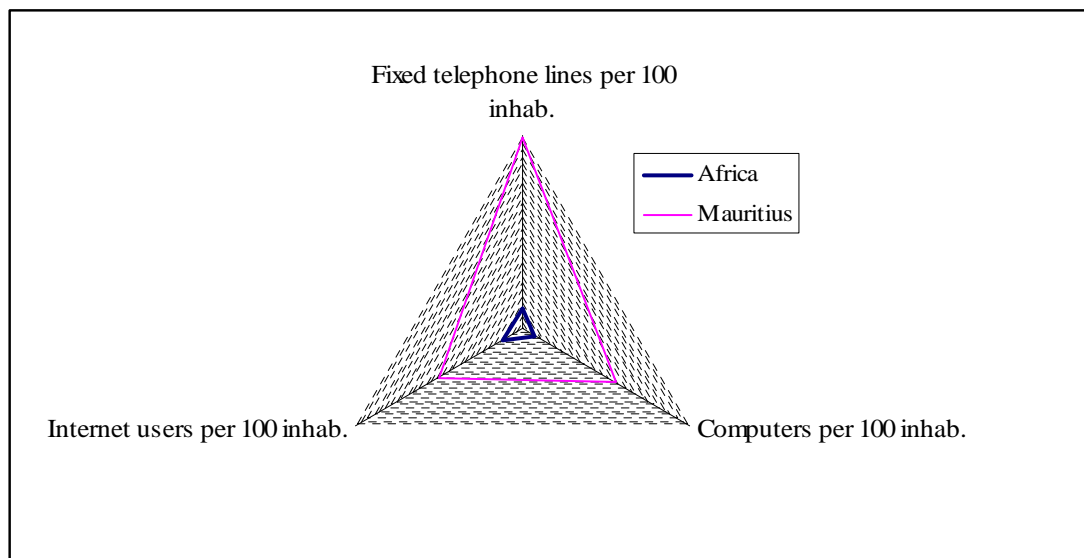
Source: Kaufmann D., A. Kraay, and M. Mastruzzi 2006: *Governance Matters V: Governance Indicators for 1996-2005*.

¹¹ See <http://info.worldbank.org/governance/>

Telecommunications Infrastructure

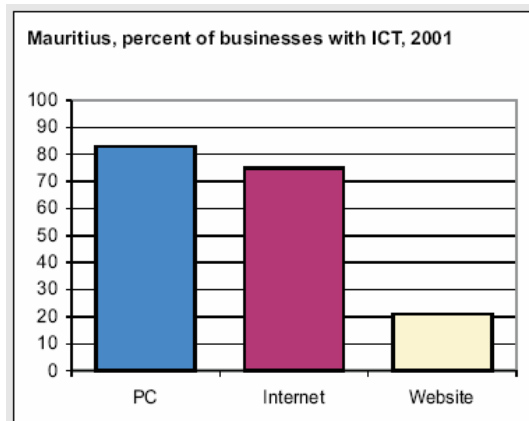
Telecommunication Infrastructure in Mauritius	
Fixed telephone lines per 100 inhabitants	28.84
Mobile cellular subscribers per 100 inhabitants	57.29
Computers per 100 inhabitants (2004)	16.22
Internet users per 100 inhabitants (2004)	14.60
Broadband Internet subscribers per 100 inhabitants (2004)	0.22
International Internet bandwidth (Mbps) (2003)	61
Radio sets per 100 inhabitants (2001)	38.33
TV sets per 100 inhabitants (2003)	37.02
% population covered by mobile signal (2004)	99.80

Source: ITU Telecommunications Indicators Database



Source: ITU adapted NCB (Mauritius 2001, 10+ employees)

The government of Mauritius has been conscious since early 1990 of the importance of ICTs in socio-economic development. An ICT promotion agency was set up and the way to E-Government was initiated in 1996 with projects to put all Ministries on the web, thereby give online access to new acts, publications and events.



Source: ICT – Mauritius Case Study (2003)

Mauritius also enjoys the highest rate in Africa for ICT penetration in businesses. The 2001 figures demonstrate a high PC ownership by companies and online presence suggesting a greater potential for adoption of electronic based tax collection for businesses.

The government has initiated numerous projects to pave the way for E-Government, the Contribution Network Project being one of them.

Case Study: Contributions Network Project

The Contribution Network Project (CNP) in Mauritius is a Government-to-Business (G2B) initiative of the Ministry of Finance that allows electronic payment of tax for all large employers¹² in the country. Through an exemplary public-private sector partnership, the project has set up secured networks and ICT applications allowing a fully electronic tax collection in Mauritius.

General objectives

The overall objective is to allow electronic submission of returns, payment of tax and contribution, hence increase the efficiency of the tax collection process through the use of ICTs.

Contributions and taxes constitute an important revenue stream for the government. Income Taxes and VAT account to around 34% of the government annual revenue. Tax collections are handled by 3 different government departments (Income Tax Department, the VAT Department and the Ministry of Social Security, National Solidarity & Senior Citizen Welfare and Reform Institutions). Despite the computerization of these various departments since 1993, tax collection remained a paper based, time consuming and cumbersome process until the launch of the CNP.

Specific objectives

The Contributions Network Project (CNP) was introduced after the successful implementation of the TradeNet System at Customs which offered a 24-hour service for electronic submission of bills of entry. More specifically the objectives are:

- Submission of corporate information and payment of fees for Companies' Registrar
- Electronic submission of returns
- Payment of contributions by employers to the National Pensions Scheme, the National Saving Fund and the Industrial Vocational Training

¹² Large employers are companies paying over 400,000 USD as a monthly VAT

Application Description

The CNP has implemented two alternate methods of electronic submission of returns.

a) the front-end EDI software

This application is intended for large employers i.e. companies contributing over 12 million Rs (400'000USD) as monthly VAT payment. The software is used to input all the data, which is then translated into standard EDI messages, processed and routed to the relevant government departments through the Value Added Network (VAN).

The VAN is secured private network connecting government departments and commercial banks. The network is operated and maintained by the Mauritius Network Services (MNS)¹³, a joint venture company involving public and private sector. The MNS is a trusted service provider, specialized in operating nation-wide electronic networks. The SNS (Singapore Network Services Private Limited) acts as an essential technical partner of the MNS.

b) the web based interfaces

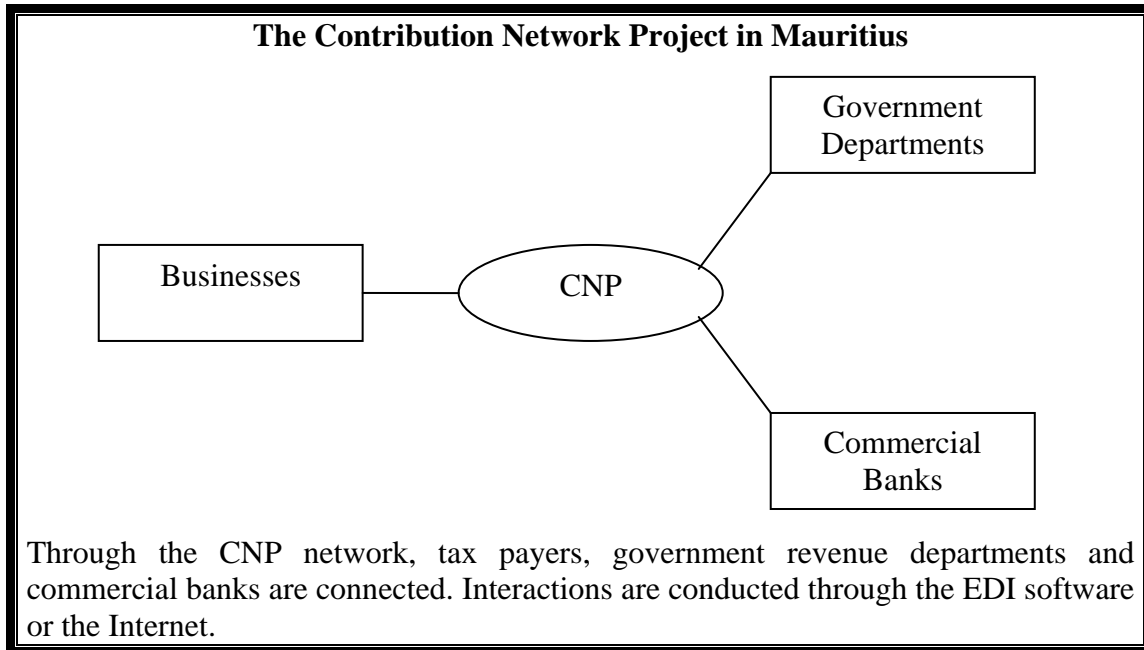
For small employers (not using any application software, a web-based version will allow them to submit their returns through common Internet browsers. Security will be ensured through implementation of firewall controls and data encryption through SSL (Secure Socket Layer). The web version of the CNP is scheduled to be launched and the current front-end software version will ultimately be phased out.

A harmonized Identity Management schema has been adopted. Duplicate contributions are handled through embedded codes by the EDI software installed on both the employer's and government systems, where multiple message verification, syntax checking, user validation and integrity check are performed.

Upon receipt of a return, automatic acknowledgment is sent to both the employer and the relevant government department. The employer's bank is notified and instructed to execute the necessary fund transfer to the government's account. Credit and debit notification message are then relayed to both parties including all the details of the transaction.

Prior to the implementation of the Mauritius Automated Clearing and Settlement System (MACSS), a specific government account was opened in each bank to receive exclusively PAYE and VAT payments through the CNP. In December 2000, the MACSS permitted to credit directly the accounts of the relevant government departments.

¹³ The Mauritius Network Services (MNS) was set up in April 1994 to operate the Value-Added Network (VAN), a network connecting government departments initially to implement the trade documentation process (TradeNet launched in July 1994). The shareholders of MNS are MauriNet Investment Ltd (60% of more than half is owned by public organizations) and the Crimson Logic Private Limited (40 %) operating the Singapore Network Services.



Implementation

The Contribution Network Project is a joint public private sector initiative launched by the Ministry of Finance and has been worked out in collaboration with the Ministry of Social Security, the Ministry of Telecommunications and Information Technology for the public sector, the Joint Economic Council and the Mauritius Employers Federation for the private sector.

The World Bank has financed the fees for consultancy services through a loan from the International Bank for Reconstruction and development (IBRD) under its program of Technical Assistance to Enhance Competitiveness.

The final report submitted in February 1999 by the consultants’ kick started the CNP, which was included in the 1999-2000 budget announced by the Ministry of Finance.

Two committees were collaborating throughout the implementation, one steering Committee chaired by the Advised to the Ministry of Finance and a technical committee.

Phased approach - Start small, but think big

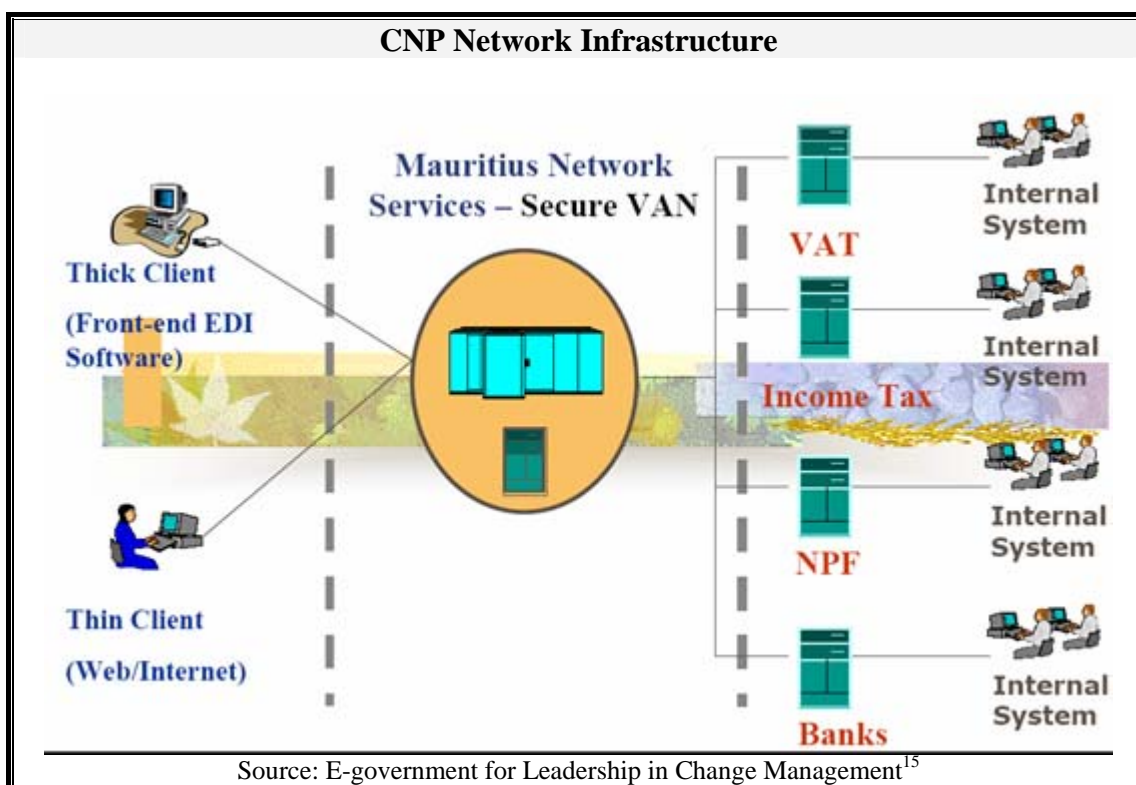
Given the complexity and excellent project management skills required, the CNP was approached in a phased manner. The implementation consisted of three phases.

	Objective	Operational since
Phase 1	e-payment of VAT and PAYE	May 2000
Phase 2	e-payment of NPF & NSF contributions	July 2001
Phase 3	e-payment of corporate tax	January 2002

The first phase consisted of the electronic submission of one Single Return for VAT and PAYE. It also included the implementation of payment of both taxes in a single amount to the Commissioner of Inland Revenue.

The second phase included the electronic payment of contributions to the National Pension Fund (NSF) and the National Saving Fund (NSF) and IVTB¹⁴ levy.

The third phase comprised the electronic submission of corporate income tax return and payment of tax.



Through the Mauritius Automated Clearing and Settlement System (MACSS) by the Bank of Mauritius, payment of tax and contributions are credited directly to the accounts of the government.

Benefits

The CNP enables businesses to submit their returns directly through a two-way, fully electronic system. The benefits induced by the introduction of ICT in the tax collection process include:

- Faster electronic processes of tax collection
- Convenience of doing the submission directly from the office, hence avoid the time consuming physical movements to the various government department

¹⁴ The Industrial and Vocational Training Board (IVTB) is an organization operating under the Ministry of Training, Skills Development and Productivity to provide for, promote, assist and regulate the training of persons who are/will be employed in commercial, technical and vocational fields. Employers contribute up to 1% of employees' salary as levy of the IVTB to finance the trainings.

¹⁵ Presentation done at Dar es Salaam, Tanzania on 14-17 September 2004 by Sanjay B. Lollbeheree, Deputy Director, Ministry of IT & Telecommunication, Government of Mauritius

- Eliminate paper returns and paper payments
- Increased efficiency for businesses/employers and government
- Unified Tax Identification Number and filing process (as opposed to the different paper-based processes in each tax agency)
- Confidentiality and security guaranteed with licensed encryption from Certification Authority
- Redeployment of government staff to more productive tasks

Initiative	Contribution Network Project
Country	Mauritius
Model	Government-to-Business (G2B)
Brief description	Allows electronic payment of tax by all large employers in the country.
Implementing body	Ministry of Finance
Funding	Ministry of Finance
Technologies used	WAN, Internet, SSL
Online resource	http://www.gov.mu/portal/site/incometax/
Contact person	Sanjay B Lollbharee, Deputy Director, Ministry of IT & Telecom, Government of Mauritius

Other ICT applications in the government of Mauritius

The government portal at www.gov.mu aims to be the one-stop-shop providing comprehensive information and delivering integrated government services. Divided in four sub-portals, the web site offers a gateway of information for citizens, businesses, tourists and other government agencies.

The screenshot shows the Government of Mauritius website in a Mozilla Firefox browser window. The address bar displays <http://www.gov.mu/>. The page has a blue header with the text "Welcome to the Portal of The Republic of Mauritius" and the national coat of arms. Below the header is a navigation bar with four main tabs: CITIZEN (red), GOVERNMENT (blue), NON-CITIZEN (yellow), and BUSINESS (green). There are also links for "Contact Us", "Feedback", and "Quick Tips/Help".

The main content area is divided into several sections:

- About E-Government:** A introductory text stating the portal is a one-stop-shop for information and services.
- Quick Links:** A list of links including "National Assembly", "Government Directory", "Rodrigues & Outer Islands", and "Embassies and Consulates in Mauritius".
- Search:** A search box with a "Search" button.
- News and Events:** A section with news items, such as "172nd anniversary of the Arrival of Indentured labourers in Mauritius" and "Mauritius aims to alleviate poverty through its economic reform".
- Highlights:** A section with key events, including "Budget Speech 2006/2007" and "World Environment Day 2006".
- Sub-Portals:** Four sub-portals are featured:
 - CITIZEN:** A gateway for citizens to access government services.
 - GOVERNMENT:** A gateway for government employees to access online services.
 - NON-CITIZEN:** A platform for non-citizens to interact with the government.
 - BUSINESS:** A platform for the business community to access government services.

The footer contains a "Disclaimer", "Copyright Notice", "Privacy Policy", "Quick Tips / Help", and "Accessibility Guidelines". The page is dated "Last Updated on 31 October 2006" and "© 2005 Government of Mauritius Site hosted by NCB".

The Citizen sub-portal provides useful information and services to the citizens including e-services such as applications for Lump Sum, Learner's Driving Licence, scholarships, government job vacancies and work permit. Applicants are required to register to use these e-services and all online transactions are encrypted and secured.

The Government sub-portal offers secured online services and information for government employees. Online information to improve inter-governmental collaboration include resources for civil servants (conditions of service, job vacancies and salary structure), code of ethics for public servants to promote effective administration and responsible behaviour.

The Non-Citizen sub-portal is a web based platform allowing interactions between non-citizens and the government. It provides information to foreigners, tourists and foreign investors (Visa requirements, residence Permit, Labour legislation etc...).

The Business sub-portal provides detailed information to the business community, with the aim of reducing/eliminating administrative procedures hence increases government's efficiency and stimulates entrepreneurship and investment.

Major operational ICT projects

Ministry/Department	Project Description	Operational since
Judicial, Supreme Court, Headquarters	Computerisation of follow-up of cases lodged till delivery of judgments Retrieval of past judgments by using Zyindex Text retrieval system	Sep 1994
Judicial, Supreme Court, Headquarters	Digital Court Recording System. Computerisation of Court Hearings (Recording and retrieval of Court Hearings at Supreme Court)	Jun 1999
Judicial – New Court House	Computerisation of activities of the Intermediate, Industrial & District Courts	Jun 2000
National Assembly, Reporting Section	Computerisation of the Reporters' section and the library so as to enable members of Parliament to access previous National Assembly's Debates.	Nov 1998
Public & Disciplined Forces Service Commissions	Computerisation of Competition Section	Mar 1995
	Computerisation of Scrutiny, Personnel & Registry sections	May 1997
Electoral Commissioner's Office	Computerisation of Register of Electors, Staff Management & Election	Dec 1992

Local Govt. Service Comm.	Computerisation of Competition & Implementation Sections	Feb 1999
Prime Minister's Office, Police Department	Computerisation of Passports & Immigration Services	Jun 1992
Prime Minister's Office, Police Department	Computerisation of records of people filed at Anti Drug Smuggling Unit	Jun 1997
Prime Minister's Office, Police Department, Central CID	Computerisation of management of fingerprints and criminal records at Central CID (AFIS)	Feb 1999
Prime Minister's Office, Pay Research Bureau	Computerisation of the Pay Research Bureau	Dec 1998
Prime Minister's Office, Meteorological Services	Computerisation of the weather forecasting division.	Dec 1997
Prime Minister's Office, Home Affairs Division	Computerisation of Residence Permits, Citizenship & Visas, Property Restriction Act & Registry sections. Link to Passport & Immigration Office	Dec 1999
Ministry of Finance	Contribution Network Project. This comprises the setting up of an electronic one-stop shop for all payments and contributions of the private sector to Government. The electronic submission of Income Tax and VAT returns is operational May 2000. This will be extended to cater for contributions to NPS/NPF/IVTB	May 2000
Ministry of Finance, Customs & Excise Department	TRADENET Phase I – Electronic authorisation by customs for delivery of goods	Jul 1994
	Phase II – Electronic submission of sea manifest by shipping agents	Jan 1995
	Phase III – ‘Customs Management System’ Electronic declaration & processing of bills of entry	Jul 1997
	Phase IV – Transfer of containers	Jul 2000
Ministry of Finance, Income Tax Department	Computerisation of activities of the Income Tax Department	Dec 1999
Ministry of Finance, VAT department	Computerisation of new Value-Added Tax (VAT) system	Sep 1998

Ministry of Finance, Revenue Authority	Electronic link with revenue collection departments - VAT, Income Tax and Customs	Jun 2000
Ministry of Finance, Accountant General	On-line system for Pension, Passage, Mission, Vote control, Financial Accounting & District cashier systems.	Aug 1999
Ministry of Industry, Commerce and International Trade	This project consists of the implementation of an industrial database, a registry system, a stock system and a finance system	Nov 1998
Ministry of Agriculture, Food Technology and Natural Resources	Computerisation of Personnel and Stores	Nov 1998
Ministry of Social Security and National Solidarity, Senior Citizen Welfare and Reform Institutions	Computerisation of the contributions Branch – contribution from employers/calculation of pension points	1993 (Reviewed in 1999)
Ministry of Social Security and National Solidarity, Senior Citizen Welfare and Reform Institutions. Mauritius Prisons Service	Computerisation of Stores, Registry, Personnel, Finance and Detainee Information System	Jul 1994
Ministry of Social Security and National Solidarity, Senior Citizen Welfare and Reform Institutions	Computerisation of retirement, widows, invalids, orphans pensions, industrial injury and Medical Unit	Dec 1997
Ministry of Local Government, Rodrigues and Rural and Urban Development. Rodrigues Administration	Computerisation of central administration at Rodrigues (Stores, Registry, Payroll and Personnel, Administration, Finance)	Dec 1999
Ministry of Public Infrastructure, Land Transport and Shipping - Central Stores and Plaine Lauzun Mechanical Workshop	Upgrade of stores computer system	Mar 1997 (Fort Georges)
		Apr 2000 (Plaine Lauzun)
Ministry for Civil Service Affairs and Administrative Reform	Civil Service Human Resource Management System. Phase I: Creation of Personnel Central System at the Ministry – Query of data & General Service Staff	Dec 1999
Ministry of Labour & Industrial Relations. Work Permit	Computerisation of the activities of Work Permit Division	Jul 2000

Division		
Ministry of Foreign Affairs and Regional Cooperation	Computerisation of Registry, Personnel and Administration	Feb 2000
Ministry of Health and Quality of Life - Central Supplies Division	Computerisation of stores activities	Jul 1994
Ministry of Health and Quality of Life - Jawaharlal Nehru Hospital	Integrated hospital & patient care system. computerisation of all the sections at Jawaharlal Nehru Hospital	Feb 1996
Ministry of Health and Quality of Life - Central Health Laboratory	All the sections of the Central Health Laboratory have been computerised. This involves recording of requests as well as results of tests.	Jul 1998
Ministry of Economic Development, Financial Services and Corporate Affairs	Computerisation of license, cash, companies, partnerships, trusts, offshore & search procedures	Sep 1997
Ministry of Economic Development, Financial Services and Corporate Affairs	Setting up of a Local Area Network system with Statistical Information Database at Central Statistical Office Headquarters	Dec 1997
Ministry of Housing and Lands	Cartography Modernisation Project. Installation of specialised equipment (Digitisers, plotters, powerful computers) mainly for the production of high quality maps & plans	Apr 1997
Ministry of Housing and Lands	Computerisation of Administrative and Archives modules	Mar 2000
Ministry of Youth & Sports	Computerisation of allocated stores of Ministry.	Apr 1999
Ministry of Youth & Sports	Computerisation of youth, sports and administrative sections	Jul 2000

Source: Central Informatics Bureau and Commonwealth Network of Information Technology for Development. See <http://www.comnet.mt/unesco/>

V. Conclusions and Recommendations to ITU

As the cases studies partially demonstrate, there are important nuances among African countries. Whilst there is a certain risk of generalization, it would be erroneous to consider the continent as a homogenous bloc when evaluating the prospects of E-Government.

The cases presented in this paper are meant to illustrate three different E-Government delivery models in Africa. There are not presented here as best practices that should be replicated where possible. Solutions that are successful in a country may be failures in another for numerous reasons; therefore preliminary assessment of the requirements at the national level should be carefully conducted.

Despite the difficulty to correlate data across countries, there are however several common issues in terms of governance, literacy and telecommunication infrastructure that need to be addressed as to improve the E-Government readiness of the continent as a whole.

Low literacy rate is a serious impediment for the adoption of E-Government in Africa as it hinders the accessibility of G2C services. For citizens to fully enjoy the benefits of E-Government, they should not only know how to read and write but also possess basic ICT literacy. The collateral effect of E-Government in catalysing development of other ICT applications such as E-Education for the young can help in improving literacy rates and overall access to education. Besides literacy, developed telecommunication infrastructure and commitment of governments towards a citizen-centred governance are key determinants for full-fledged deployment of E-Government applications in Africa.

E-Government is an enabler not a solution. It does present avenues of opportunities for African countries. Driven and adapted by Africans themselves, it should figure high among the key areas of action in national e-strategies not because development partners have recommended it for “good governance”, but because it inherently contributes to the socio-economic dynamism and the overall livelihood of African societies. E-Government has the ability to stimulate the emergence of an Africa-adapted cyber-culture and hasten ICT literacy, hence encourage the development of ICT4D applications with high socio-economical benefits such as E-Agriculture, E-Commerce, E-Education, E-Health.

It also directly impacts on cost effectiveness and efficiency of governments, empowers citizens and improves government-citizens relationships especially with those in remote and underserved rural areas. However, the expected benefits on efficiency are only possible if and when profound transformations in administrative processes occur with the adoption of ICTs rather than attempting to automate flawed and cumbersome processes without re-engineering them. As such, E-Government can just facilitate change towards new efficient processes, but will not remedy all inefficiencies and corruption related problems.

Other important (but less direct) effects include greater transparency and accountability, (consequently reduce the opportunities for corruption) and the adoption/strengthening of democratic processes.

E-Government is not primarily about technology. Technology is as important as the length of the letter “E” in the word “E-Government”. Current technologies that facilitate e-governance include the World Wide Web, eServices, IP-centric technologies and mobile technologies (Millard 2003). Fundamental to seize the opportunities of E-Government in Africa is the genuine commitment and willingness of governments to induce transformational patterns towards being more citizen-centred.

Recommendations to ITU

Through the World Telecommunication Development Conference (WTDC) in March 2006, the Telecommunication Development Bureau of the ITU was instructed to conduct detailed studies on various ICT applications giving priority to E-Government.

For the ITU to effectively respond to and address the pressing demands from its membership on E-Government and in line with the Program 3 of the Doha Action Plan, the author forwards the following recommendations:

- a) **Allocate resources** to conduct studies on E-Government applications, further assist governments in developing countries on their implementation.

As an international organization with over 160 member states, the ITU needs to develop a consolidated program on E-Government. More staff and resources should be assigned to push forward the implementation of Program 3 of the DAP.

- b) **Develop an E-Government Toolkit** for policy makers including related Cyber-security issues

Despite the abundant theoretical work on E-Government, there is a certain lack of coherent message to governments, particularly in developing countries where E-Readiness is low. The E-Government Toolkit will aim to provide government officials and policy makers with a clear understanding of the various terminologies, definitions, technological possibilities and trends, thereby demystify issues associated with E-Government. It will be written in a simple, easy-to-understand wording, translated in several languages, providing clear examples, case studies, challenges and issues, lessons learned and best practices with the intent to facilitate the readers in crafting appropriate policies and strategies.

- c) **Organize a multi-stakeholder workshop** jointly organized by the ITU/EPFL on E-Government (two Swiss based institutions conducting E-Government related works).

The Doha Action Plan clearly highlighted six main programs for the BDT which included the “E-strategies and ICT Applications” underlining E-Government as a key ICT application for members states of the Union.

In Academia, a growing number of research papers are being published by scholars on “e-governance”. An illustrating example is the 2nd International Conference on E-Government organized at the University of Pittsburgh in October 2006.¹⁶ Another is the creation of a masters program on e-Governance by the Swiss Federal Institute of Technology in Lausanne (EPFL) in 2005.¹⁷

On the other hand, many industry players in the ICT are competing to develop E-Government solutions as they realize the huge market segment and opportunity offered by governments world wide adopting ICTs.

Noting the above points, a proposal is hereby put forward to organize a joint ITU/EPFL multi-stakeholder workshop on the theme of “e-Governance”. The venue of the workshop, to be held in the second quarter of 2007, can be in the premises of the ITU. Participants will include ITU member states, sector members, academicians who have researched on subject and key industry players.

The proposed set of objectives would be to:

- to raise further awareness among government officials on the E-Government opportunities
- to share information on national approaches and practices
- to assess technical standards and industry solutions

The workshop will promote collective efforts in the development of national E-Government strategies where ITU can play a pivotal role in assisting its member states on the implementations. Further discussion between ITU and EPFL officials is necessary to better define the outcome and explore funding possibilities of such a timely and important event.

¹⁶ See www.academic-conferences.org

¹⁷ See egov.epfl.ch

VI. Annexes

Annex 1: Questionnaire

List of questions for documenting E-Government initiatives
Name of the Initiative
What are the general objectives?
What are the specific objectives?
What is the scope of the project (Local, National, International)
What are the ICT applications used?
Description of the applications
What is the role of ICT?
What are the technologies used?
Are there Cybersecurity issues?
What are the initiatives drivers? (Stakeholders)
How is the project funded?
What are the impacts on governments and citizens?
How is evaluation of failure and success measured? (Critical success factors)
What are the constraints and challenges?
Online references and contact person

Annex 2: Web Measure Model

Stages of E-Government evolution

Emerging Presence is Stage I representing information, which is limited and basic. The e-government online presence comprises a web page and /or an official website; links to ministries/departments of education, health, social welfare, labor and finance may/may not exist; links to regional/local government may/may not exist; some archived information such as the head of states' message or a document such as the constitution may be available on line, most information remains static with the fewest options for citizens.

Enhanced presence is Stage II in which the government provides greater public policy and governance sources of current and archived information, such as policies, laws and regulation, reports, newsletters, and downloadable databases. The user can search for a document and there is a help feature and a site map provided. A larger selection of public policy documents such as an e-government strategy, policy briefs on specific education or health issues. Though more sophisticated, the interaction is still primarily unidirectional with information flowing essentially from government to the citizen

Interactive presence is Stage III in which the online services of the government enter the interactive mode with services to enhance convenience of the consumer such as downloadable forms for tax payment, application for license renewal. Audio and video capability is provided for relevant public information. The government officials can be contacted via email, fax, telephone and post. The site is updated with greater regularity to keep the information current and up to date for the public.

Transactional presence is Stage IV that allows two-way interaction between the citizen and his/her government. It includes options for paying taxes; applying for ID cards, birth certificates/passports, license renewals and other similar C2G interactions by allowing him/her to submit these online 24/7. The citizens are able to pay for relevant public services, such as motor vehicle violation, taxes, fees for postal services through their credit, bank or debit card. Providers of goods and services are able to bid online for public contracts via secure links.

Networked presence is Stage V which represents the most sophisticated level in the online e-government initiatives. It can be characterized by an integration of G2G, G2C and C2G (and reverse) interactions. The government encourages participatory deliberative decision-making and is willing and able to involve the society in a two way open dialogue. Through interactive features such as the web comment form, and innovative online consultation mechanisms, the government actively solicits citizens' views on public policy, law making, and democratic participatory decision making. Implicit in this stage of the model is the integration of the public sector agencies with full cooperation and understanding of the concept of collective decision-making, participatory democracy and citizen empowerment as a democratic right.

Source: Global E-Government Readiness Report 2005 – From E-Government to E-Inclusion

Annex 3: E-Government Readiness Indexes

	<i>Index</i>	<i>Rank in:</i>		<i>Change</i>
	2005	2005	2004	
1 Mauritius	0.5317	52	51	-1
2 South Africa	0.5075	58	55	-3
3 Seychelles	0.4884	63	70	7
4 Botswana	0.3978	90	91	1
5 Egypt	0.3793	99	136	37
6 Swaziland	0.3593	108	101	-7
7 Namibia	0.3411	111	116	5
8 Lesotho	0.3373	114	117	3
9 Cape Verde	0.3346	116	107	-9
10 Zimbabwe	0.3316	120	130	10
11 Tunisia	0.3310	121	120	-1
12 Kenya	0.3298	122	126	4
13 Algeria	0.3242	123	118	-5
14 Uganda	0.3081	125	114	-11
15 United Republic of Tanzania	0.3020	127	131	4
16 Gabon	0.2928	131	124	-7
17 Ghana	0.2866	133	143	10
18 Congo	0.2855	134	125	-9
19 Sao Tome and Principe	0.2837	135	133	-2
20 Malawi	0.2794	137	135	-2
21 Morocco	0.2774	138	138	0
22 Nigeria	0.2758	139	141	2
23 Madagascar	0.2641	141	148	7
24 Rwanda	0.2530	143	140	-3
25 Cameroon	0.2500	145	139	-6
26 Mozambique	0.2448	146	150	4
27 Djibouti	0.2381	149	153	4
28 Sudan	0.2370	150	147	-3
29 Benin	0.2309	151	149	-2
30 Togo	0.2274	152	146	-6
31 Senegal	0.2238	153	145	-8
32 Comoros	0.1974	155	157	2
33 Eritrea	0.1849	157	..	..
34 Angola	0.1840	158	151	-7
35 Côte d'Ivoire	0.1820	160	160	0
36 Gambia	0.1736	163	162	-1
37 Mauritania	0.1723	164	163	-1
38 Burundi	0.1643	166	166	0
39 Sierra Leone	0.1639	167	161	-6
40 Chad	0.1433	169	169	0
41 Guinea	0.1396	170	168	-2
42 Ethiopia	0.1360	171	170	-1
43 Burkina Faso	0.1329	172	158	-14
44 Mali	0.0925	173	172	-1
45 Niger	0.0661	174	173	-1
Average	0.2642			

Source: Global E-Government Readiness Report 2005

Annex 4: ICT indicators for African countries

Main Telephone Lines

	<i>Main telephone lines</i>			<i>Main telephone lines per 100 inhabitants</i>		
			<i>CAGR</i>			<i>CAGR</i>
	<i>(000s)</i>		<i>(%)</i>			<i>(%)</i>
	2000	2005	2000 - 05	2000	2005	2000 - 05
1Algeria	1'761.3	2'572.0	7.9	5.79	7.82	6.2
2Angola	64.9	94.3	7.8	0.49	0.59	3.7
3Benin	51.6	76.3	8.1	0.81	1.02	4.7
4Botswana	135.9	132.0	-0.6	8.27	7.48	-2.0
5Burkina Faso	53.2	97.4	12.9	0.47	0.74	9.5
6Burundi	20.0	27.7	8.5	0.30	0.39	7.2
7Cameroon	95.0	99.4	1.1	0.63	0.61	-0.8
8Cape Verde	54.6	71.4	5.5	12.57	14.09	2.3
9Central African Rep.	9.5	10.0	1.4	0.26	0.26	-0.6
10Chad	10.3	13.0	6.1	0.14	0.15	1.7
11Comoros	6.8	16.9	20.1	0.98	2.12	16.8
12Congo	22.0	13.8	-11.0	0.75	0.36	-16.6
13Congo (Dem. Rep.)	9.8	10.6	1.5	-	-	-1.3
14Côte d'Ivoire	263.7	257.9	-0.5	1.78	1.53	-3.8
15Djibouti	9.7	11.1	3.4	1.54	1.63	1.5
16Egypt	5'483.6	10'396.1	13.6	8.64	14.04	10.2
17Equatorial Guinea	6.1	10.0	10.4	1.35	1.99	8.1
18Eritrea	30.6	37.7	4.3	0.84	0.86	0.5
19Ethiopia	231.9	610.3	21.3	0.37	0.79	16.6
20Gabon	39.0	39.1	0.1	3.18	2.83	-2.3
21Gambia	33.3	44.0	5.7	2.65	2.90	1.8
22Ghana	212.5	321.5	8.6	1.08	1.45	6.1
23Guinea	24.3	26.2	1.9	0.32	0.34	0.9
24Guinea-Bissau	11.1	10.6	-1.7	0.93	0.82	-3.8
25Kenya	291.7	281.8	-0.7	0.95	0.82	-2.9
26Lesotho	22.2	48.0	16.7	1.24	2.67	16.6
27Liberia	6.7	...	...	0.21	...	...
28Libya	605.0	750.0	7.4	10.79	13.56	7.9
29Madagascar	55.0	66.9	4.0	0.34	0.36	1.2
30Malawi	46.4	102.7	17.2	0.45	0.80	12.2
31Mali	39.2	75.0	13.8	0.38	0.66	11.5
32Mauritania	19.0	41.0	16.7	0.74	1.34	12.4
33Mauritius	280.9	359.0	5.0	23.53	28.84	4.1
34Mayotte	10.0	...	...	6.75	...	...
35Morocco	1'425.0	1'341.2	-1.2	4.96	4.26	-3.0
36Mozambique	85.7	69.7	-5.0	0.50	0.37	-7.3
37Namibia	110.2	127.9	3.8	6.19	6.36	0.7
38Niger	20.0	24.0	3.7	0.19	0.17	-1.6
39Nigeria	553.4	1'223.3	17.2	0.49	0.93	13.9
40Réunion	280.0	...	...	40.06	...	...
41Rwanda	17.6	23.0	6.9	0.23	0.27	4.5
42S. Tomé & Príncipe	4.6	7.0	11.2	3.30	4.61	8.7
43Senegal	205.9	266.6	5.3	2.16	2.29	1.1

44Seychelles	20.6	21.4	0.7	26.72	26.54	-0.1
45Sierra Leone	19.0	...	...	0.42	...	...
46Somalia	25.0	100.0	32.0	0.36	1.22	27.8
47South Africa	4'961.7	4'729.0	-1.0	10.88	9.97	-1.7
48Sudan	386.8	670.0	11.6	1.24	1.85	8.2
49Swaziland	31.9	35.0	1.9	3.16	3.39	1.4
50Tanzania	173.6	148.4	-3.9	0.50	0.39	-5.7
51Togo	42.8	58.6	6.5	0.92	0.95	0.7
52Tunisia	955.1	1'257.5	5.7	9.99	12.47	4.5
53Uganda	61.7	100.8	10.3	0.25	0.35	6.6
54Zambia	83.3	94.7	2.6	0.78	0.81	0.8
55Zimbabwe	249.4	328.0	5.6	2.19	2.76	4.7
Africa	19'730.1	27'349.9	6.7	2.52	3.09	4.2

Information Technology

	<i>Internet</i>				<i>PCs</i>	
	<i>Hosts total 10'000 inhabitants</i>	<i>Hosts per 1000 inhabitants</i>	<i>Users (000s) 2005</i>	<i>Users 100 inhabitants 2005</i>	<i>Total (k) 2005</i>	<i>Per 1000 inhabitants 2005</i>
	2005	2005	2005	2005	2005	2005
1Algeria	944	0.29	1'920.0	5.83	350	1.06
2Angola	420	0.30	172.0	1.22	...	...
3Benin	899	1.24	425.0	5.67	32	0.43
4Botswana	2'097	11.85	60.0	3.39	80	4.52
5Burkina Faso	436	0.33	64.6	0.49	31	0.24
6Burundi	155	0.22	25.0	0.35	34	0.48
7Cameroon	461	0.28	167.0	1.02	160	0.98
8Cape Verde	228	4.88	25.0	5.35	48	10.27
9Central African Rep.	12	-	9.0	0.23	11	0.28
10Chad	6	-	35.0	0.40	15	0.17
11Comoros	9	0.11	20.0	2.51	5	0.63
12Congo	46	0.12	36.0	0.94	17	0.45
13Congo (Dem. Rep.)	163	-	140.6	0.24	...	...
14Côte d'Ivoire	3'801	2.25	160.0	0.95	262	1.55
15Djibouti	772	11.35	9.0	1.32	21	3.09
16Egypt	3'499	0.50	5'000.0	6.75	2'800	3.78
17Equatorial Guinea	16	0.32	5.0	0.99	7	1.38
18Eritrea	1'037	2.46	70.0	1.59	35	0.80
19Ethiopia	38	-	113.0	0.16	225	0.31
20Gabon	194	1.43	67.0	4.84	45	3.25
21Gambia	784	5.36	49.0	3.35	23	1.57
22Ghana	373	0.17	401.3	1.81	112	0.52
23Guinea	385	0.49	46.0	0.59	44	0.56
24Guinea-Bissau	2	-	26.0	1.99	...	...
25Kenya	10'016	3.05	1'054.9	3.22	300	0.95
26Lesotho	152	0.84	43.0	2.39	...	...
27Liberia	17	0.05	...	...	...	...
28Libya	67	0.12	205.0	3.62	...	...
29Madagascar	883	0.49	90.0	0.50	91	0.50
30Malawi	65	0.05	52.5	0.41	25	0.19

31Mali	364	0.33	60.0	0.53	45	0.40
32Mauritania	27	0.09	14.0	0.47	42	1.41
33Mauritius	4'243	34.41	180.0	14.60	200	16.22
34Mayotte	-	-	...	...	...	...
35Morocco	4'118	1.38	4'600.0	14.61	740	2.35
36Mozambique	7'167	3.78	138.0	0.73	112	0.59
37Namibia	3'359	16.70	75.0	3.73	220	10.94
38Niger	145	0.12	24.0	0.19	10	0.07
39Nigeria	966	0.08	5'000.0	3.80	867	0.68
40Réunion	24	0.31	200.0	26.08	278	36.31
41Rwanda	1'744	2.06	38.0	0.45	...	...
42S. Tomé & Príncipe	1'025	67.01	20.0	13.07	...	...
43Senegal	685	0.66	540.0	4.63	250	2.14
44Seychelles	266	332.87	20.0	250.28	16	19.84
45Sierra Leone	277	0.52	10.0	0.19	...	...
46Somalia	1	-	90.0	1.09	50	0.63
47South Africa	350'501	74.25	5'100.0	10.75	3'966	8.36
48Sudan	-	-	2'800.0	7.73	3'250	8.97
49Swaziland	2'642	24.40	36.0	3.32	36	3.32
50Tanzania	5'908	1.57	333.0	0.89	278	0.74
51Togo	81	0.16	300.0	4.88	185	3.01
52Tunisia	373	0.37	953.8	9.46	568	5.63
53Uganda	2'678	0.96	500.0	1.74	250	0.87
54Zambia	2'342	2.04	231.0	2.01	113	0.98
55Zimbabwe	8'055	6.77	1'000.0	8.40	1'200	10.08
Africa	424'968	4.92	32'753.7	3.72	17'450	2.24

VII. Bibliography

1. D. Banks, J Oxman, S Rodgers, P. Irish, *Mission in Action: an operational definition of E-government*, National Defense University, Washington DC, 2002
2. R.B. Heeks, *E-government in Africa, Promises and practices*, IDPM, University of Manchester, 2002
3. Ethiopia, The Federal Republic of, *The National ICT for Development (ICT4D) Five Years Action Plan for Ethiopia [2006-2010]*, Ministry of Capacity Building, Addis Abeba, 2006
4. ITU, *2006 World ICT Development Report*, ITU, Geneva, 2006
5. ITU, *ICT and Telecommunications in Least Developed Countries*, ITU, Geneva, 2006
6. ITU, *Internet in the Horn of Africa: Ethiopia Case Study*, ITU, Geneva, 2004
7. ITU, *E-strategies- Empowering Development*, ITU, Geneva, 2006
8. ITU, *World Telecommunication Development Report – Access Indicators for the Information Society*, ITU, Geneva, 2006
9. ITU, *The Fifth Pillar: Republic of Mauritius: ICT Case Study*, ITU, Geneva, 2006
10. ITU, *Cybersecurity guide for developing countries*, ITU, Geneva, 2006
11. United Nations, *Global E-government Readiness Report 2005 – From E-Government to E-Inclusion*, Department of Economic and Social Affairs, UN, New York, 2005
12. M. Finger, T. Zwahr, *Critical steps towards e-Governance: a case study analysis*, Network Industry Management and E-governance, EPFL, Lausanne
13. G. Misuraca, *e-Governance in Africa, from theory to action*, E-Gov Masters in E-governance, EPFL, Lausanne, 2004
14. InfoDev, *The E-government Handbook for developing nations*, InfoDev, World Bank, Washington, November 2002
15. Ministry of Finance and Economic Development, *Contribution Network Project (CNP) – Instruction to CNP users*, Saint Louis, August 2005
16. Eduardo Contreras Budge, *Foundations of E-Government, an Emerging Model-Of-Use for Developing countries*, LearnLink, 2005

17. UNDP, *The 2006 Human Development Report – Beyond scarcity: power, poverty and the global water crisis*, UNDP, New-York, 2006
18. World Bank, *Worldwide Governance Indicators: 1996-2005*, World Bank, Washington DC, 2006
19. Professor Stephen Coleman, *African e-Governance – Opportunities and challenges*, Oxford Internet Institute, University of Oxford, UK, 2005
20. Janet Kaays, *Implementing e-Government Services in East Africa: Assessing Status through Content Analysis of Government Websites*, Department of Information Studies University of California, Los Angeles, USA, 2004
21. E. Barnard, L. Cloete, H. Patel, *Language and technology literacy barriers to accessing government services*, University of Pretoria, South Africa, 2003
22. Å. Grönlund, A. Andersson, K. Hedström, *NextStep eGovernment in developing countries*, Informatics Department, Örebro University, Sweden, 2005
23. D. Kaufmann, A. Kraay, and M. Mastruzzi, *Governance Matters V: Governance Indicators for 1996–2005*, World Bank, Washington DC, 2005
24. J. Millard, *eStrategies for government*, Danish Technological Institute, Aarhus, 2003