

Ministry of Works, Housing and Communications

E-Government Strategy and Action Plan

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REPUBLIC OF UGANDA



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1 Management summary

E-government is a way of tapping unrealized potential for high quality government in Uganda. It enables Government agencies to separately and collectively lift their performance and deliver better results through using information and technology in new, more collaborative ways. The strategy emphasizes that fact that while the centre of government needs to create the right conditions for e-government it is agencies that actually deliver government information and services and therefore deliver on e-government goals. For this reason, achieving the goals of the strategy requires a mix of top-down and bottom-up initiatives. Each agency must thus identify its Statement of Intent, or other strategic planning documents.

The strategy aims at:

- Establishing short, medium and long term actions, projects and programmes in ICT to be achieved by the sector within the given time-frames.
- Developing performance indicators to measure achievements
- Setting achievable targets and goals for the above objectives

The strategy is highly focused on delivery and implementation. The primary focus of the activities to begin with is as follows:

- Infrastructure to enable e-Government
- Standardization across government (initiatives that need to be undertaken to allow agencies to go forward and deliver e-government)
- Coordination between large numbers of autonomous institutions

A framework called 'services delivery architecture' is central to the strategy. This architecture will help shape the ways in which agencies develop their information and technology environments and use them to deliver services. During 2004/05 the Taskforce on E-government (TEG) is expected to develop a framework for creating and using technology components to implement this architecture.

Why e-government?

E-government delivers better results by adapting government to the environment of the information age and the Internet. It makes the best use of the investments made by the public and Government in ICT.

Technological change is only part of achieving this goal and the Internet will not fully replace all the other ways government relates to people. Technology does not guarantee better public sector performance on its own. Success also depends on making ongoing improvements to the design, operation and culture of the public sector, so that it can better respond to the changing demands of Ugandans.

1.1 E-government vision, mission, goals and outcomes

Vision

Uganda must be a leader in e-government in Africa

Mission

- By June 2010 the Internet will be the dominant means of enabling ready access to government.
- By June 2007, networks and Internet technologies will be integral to the delivery of government information, services and processes.
- By June 2010, the operation of government will have been transformed through its use of the Internet.

Goals

- **Better services** — more convenient and reliable, with lower delivery costs and higher quality and value
- **Cost effectiveness and efficiency** – cheaper, better information and services for customers and citizens and better value for their time and money
- **Improved reputation** — building an image of Uganda as a modern nation and attractive location for investments and tourism
- **Greater participation by people in government** — making it easier for those who wish to contribute
- **Leadership** — regaining Uganda's predominance in sub-Saharan Africa

Outcomes

Three broad characteristics mark out successful e-government:

Convenience and Satisfaction

Services provided anytime, anyhow, anywhere

People will have a choice of channels to government information and services that are convenient, easy to use and deliver what is wanted.

Integration and Efficiency

Services that are integrated, customer-centric and efficient

Information and services will be integrated, packaged, and presented to minimize cost and improve results for people, businesses, and providers.

Participation

Participation in government

People will be better informed and better able to participate in government.

These outcomes cannot be achieved overnight, rather progressively through several phases of development.

E-government leads to transformation

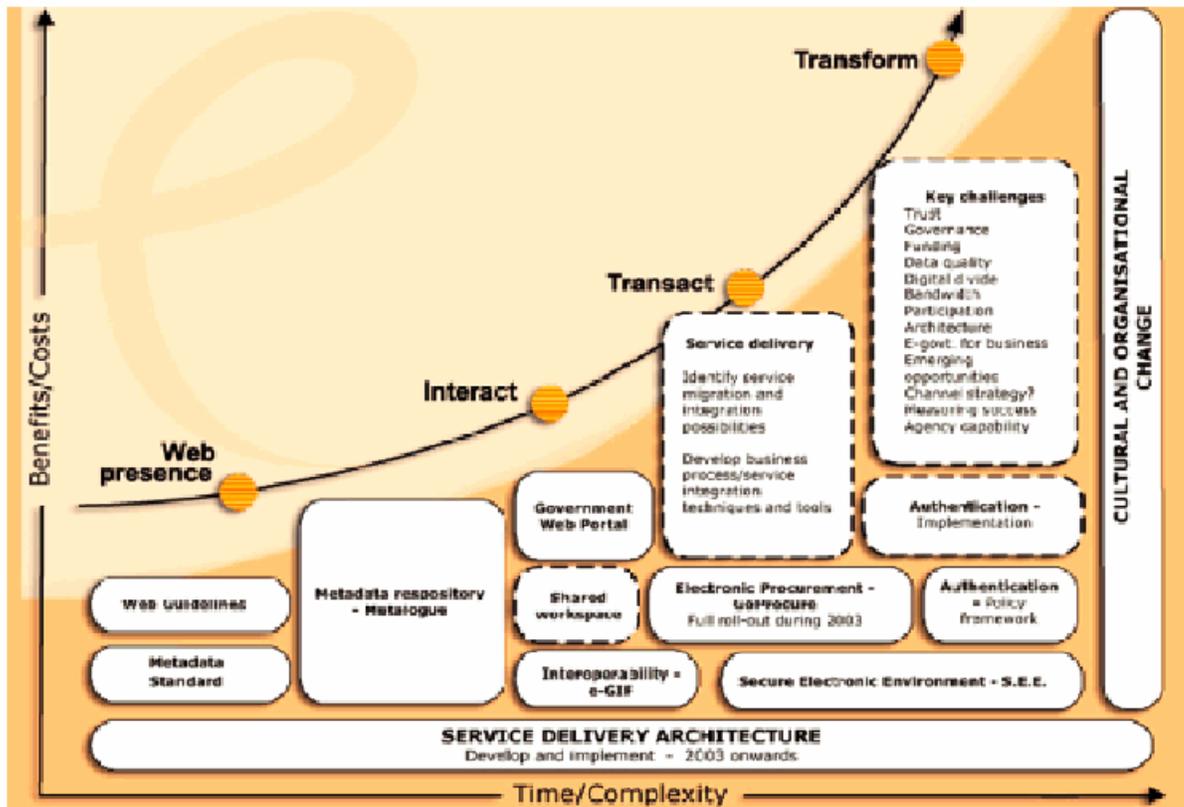
The Internet, and its associated technologies and business models, is profoundly affecting the way government, business, and people interact. Government is adapting to this new environment in a way that will eventually transform how it operates. The design and delivery of services has to change to meet the changing needs of Ugandans.

To be successful in this new environment agencies will need to work together more effectively, sharing resources and integrating their services. People and businesses will have a better, more consistent experience of government if agencies work together. This approach will also help reduce the costs of delivering services online and through other channels.

Transforming the way the public sector operates will not be achieved overnight.

Bearing in mind that more than just e-government will effect the transformation, the model below shows how the foundation components of the e-government programme support the change process through a series of phases. Each phase of the process is described in more detail below.

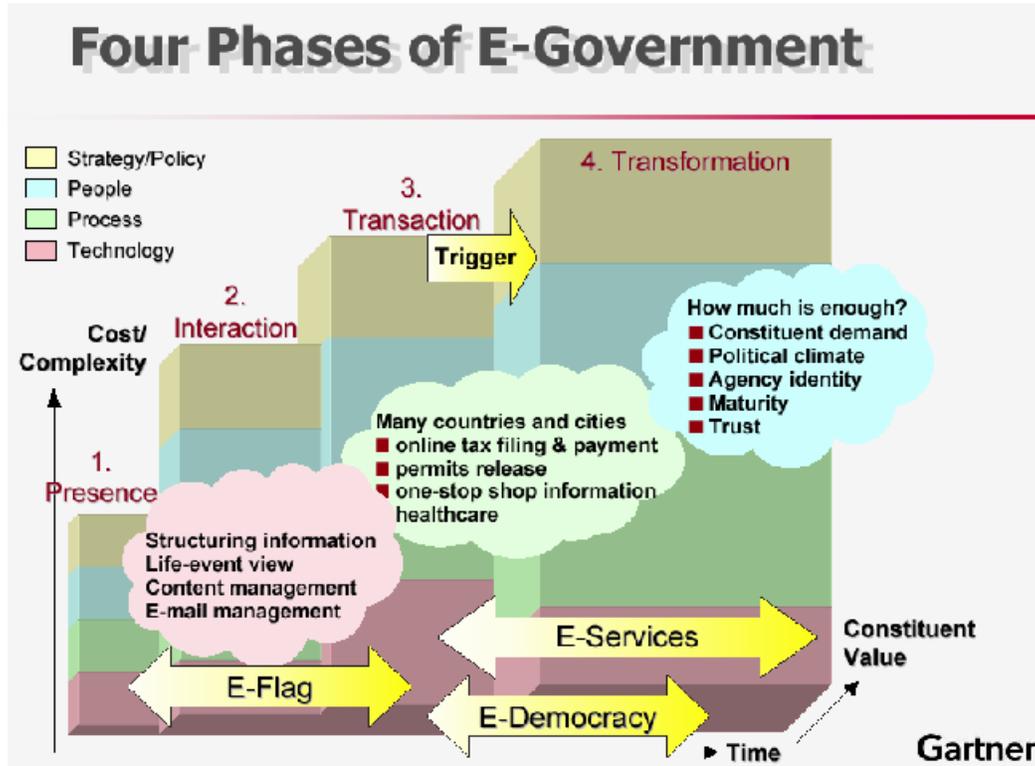
Evolution of e-Government



Different services will sit at different points along the curve. Some services will only ever need a simple web presence, while others may never involve online transactions, or be part of integration efforts.

Some services will never be delivered electronically, even though public officials are supported by technology in delivering these services.

Agencies should consider where each of their services or functions should be positioned on the curve, rather than where the organisation as a whole should sit.



Phase 1 —Web presence

Agencies provide a website to deliver basic information to the public.

Most government agencies have reached this stage right now, publishing information in a way that reflects their agency’s view and mandate.

Phase 2 — Interaction

Agencies extend the capability of their website so people who used to visit a government office now have online access to critical information can download forms and can contact the agency by email.

There is an immediate need to reach this point, but in a country like Uganda with underdeveloped Infrastructure, this is the phase that is the most challenging

Phase 3 —Transaction

Agencies add self-service applications to their websites so that people can complete entire transactions or processes online. The web begins to complement other service delivery channels, providing around the clock access independent of users 'geographic location.' Increasingly agencies develop services that involve different agency business delivery systems that are seamlessly integrated.

Phase II & III should be integrated and Uganda must leapfrog over the normal evolutionary path in order to rapidly progress down this path.

Phase 4 —Transformation

The delivery of government services and potentially the operation of government itself is redefined. Information service delivery and government processes are integrated across traditional boundary lines. Information and services are increasingly customized to the particular needs of individuals and businesses. The identity of individual agencies matters less to people as information and services are accessed through a single point of contact on the web. E-government reshapes the relationships between Government, individuals and business.

The long-term goal of Uganda 's e-government strategy in conjunction with other programmes is to change the design operation and culture of the public sector to better respond to the needs of Ugandans. Increasingly agencies will take a whole-of-government perspective when designing and implementing services. This will involve collaboration with other agencies and meeting whole-of-government requirements. Though it is far ahead, the need to take into account the need for collaboration at a later date is the key for design of the systems today.

Based on Gartner Group Research Gartner's Four Phases of E-government Model

©Gartner Group, November 2000

1.2 Primary actions that need to be taken

Several pilots have been suggested. These primarily fall under the four following categories:

Infrastructure projects

These aim at quickly delivering Infrastructure capability for latter day rollout of the e-Government initiatives. The projects suggested will enable various Government departments to collaborate and share documents and discussions hitherto impossible by electronic means. The Infrastructure projects will provide high-speed bandwidth while connecting offices together and enable email, data, video and file transfers between any Government office that is so connected. A VOIP based Intercom will also provide unlimited free phone calls to anyone on the network (i.e. any other Government employee).

Standards

An architecture that enables collaboration and seamless integration of various systems is required. This requires a careful study of existing and proposed systems as well as a well thought out and detailed strategy as to how this can actually be implemented. The key components of this architecture are a common e-Government Portal, metadata for presenting information and services to this portal, secure e-government environment to ensure that the documents and information sent reaches only the intended recipients and in time.

Human capacity building projects

These are projects that are long term in nature and aim at building capacity of the education system to deliver qualified and skilled talent to business and Government over time. It aims at getting ICT to schools cost effectively, reducing costs and increasing affordability of tertiary education and developing low cost content for training.

Eye-openers

These are projects that can take off quickly and result in substantial savings for the Government. These projects, such as automated salary detail exchange between the Government and BOU, will help save substantial amounts in the long run, but can be implemented cheaply and swiftly. The best way to increase awareness is to derive direct benefit for the target audience. If salary and perquisite or allowance payments are automated, it saves time (deposit cheque in bank, check for credits) as well as gets the credit into the account more quickly. Such systems have little resistance and allow ICT to quickly establish their utility in Government.

2 ICT Infrastructure

The Government is the largest employer in Uganda and as the primary economic player its efficiency is a key necessity. The Government organisations are by and large lean (to the point of being under-staffed) and as efficient as their manual systems allow them to be. The Government seriously lacks delivery capability for the services it offers to individuals, investors, tourists or corporate bodies. E-Government is an extremely cost-effective way of increasing the reach of the delivery mechanism.

As of the moment the Government does not possess the necessary infrastructure for delivering its services by electronic means. The private sector too, cannot provide the bandwidth required within the budgetary constraints. Innovative means of delivering the services need to be discussed and finalized.

2.1 Requirements

The basic requirements for e-Government are:

- A networked PC on every desk
- Broadband Internet connectivity for every PC, delivering reliably at least 5-8 Mbps
- PBX in every office
- UPS, Mail server, Proxy server and firewall at each office
- Standard office productivity packages such as MS or Star Office
- Standard tools such as anti-virus software, etc
- Local email IDs for the entire staff (possibly barring drivers or messengers, though even they could have IDs just as well)
- Restricted Internet access to all the staff depending on the job requirements
- Government-wide Intranet
- Access point in every sub-county or groups of sub-counties

2.2 Current status

Almost all ministries, departments and local governments lack the infrastructure required to deliver anything apart from rudimentary E-Government services.

Power

Many local Government bodies face difficulties with power supply and the Electric Grid reaches just 2% of all rural sub-counties.

Power supply is erratic in many parts and stabilizers and UPS are essential components of the ICT infrastructure.

Phones

Most Government bodies other than around 160 sub-counties have phone access.

Phones are expensive and most ministries run out of their communications budgets well before the end of the month.

Outgoing calls are severely restricted

Several ministries use pre-paid landlines to control usage and costs

Networking and PABX

Most of the computers are not networked and key ministries such as Internal Affairs do not have a PABX installed (though in most cases, work is in progress to remove these anomalies).

Computers

Almost all Government institutions with access to power has a fledgling computerisation program in place

Most Government bodies do not have adequate computing facilities

Several computers are old and need to be replaced or shifted to jobs such as Word Processing, which require less computing power.

Applications

Computerisation of systems is in its infancy in most cases, though Uganda has excellent GIS systems in place in a few Government Departments. Advanced GIS systems are in place in NEMA, Directorate of Land and Water Resources, Directorate of Mines, etc. The maximum use of computers in the Government is for Word Processing, and "advanced usage" means use of Excel or PowerPoint.

Investments

Most of the computer and ICT capacity buildup has been ad-hoc and every ministry and local government body has been doing its own thing (the joys of decentralization)! No thought or effort has been put into evolving any sort of standards or compatibility across systems even within the same ministry. Some Government bodies are even today contemplating implementing Accounting systems, even though these are likely to be scrapped within a year or two, when the IFMS is rolled out.

Most Government organisations and Departments that have adequate access to donor funds have utilized a sizeable portion of these for ICT equipment, networking and provision of Internet access.

ICT spending on equipment as well as training is sourced only from Project resources and next to nothing is available through the regular budgetary channels.

The Government sector as a whole is expected to maintain the same levels of purchase as previous years, because of budgetary constraints. As the e-government initiatives gather steam, the Government would need to invest more on ICT. Government departments and ministries need to invest in ensuring that the pre-requisites for e-government stated above are met. The next round of investments should in customized or special purpose packages to improve productivity and service levels. The third round of investments must be aimed at connectivity with other offices and ministries and development of document management and collaboration systems. All these phases of investments need to be undertaken simultaneously.

Internet Access

In most ministries and departments, Internet Access is restricted to a few individuals. Internet Access is also available on a few shared PC's at the resource centers of some ministries. Many units do not possess broadband access, and even if they do it is usually managed bandwidth and delivers reliably 16-32 Kbps or thereabouts.

Email

Most ministries do not use e-mail for communication, formal or otherwise, since access to computers is limited to only a few of the staff. There are also some who feel that email still lack formal legal approval and cannot be widely used unless the Evidence Act is suitably modified. However, none of the organisations where it is actually widely used (MoFPED, NEMA) had any such inhibitions.

Websites

The Government has taken several positive steps towards setting up of websites of various ministries, parastatals and local bodies. However, in most cases, the websites simply offer information related to the services, not the services themselves. Therefore, one cannot (say) register a birth or death online, or download passport application forms or apply for jobs online. A few websites provide user feedback forms, but that is as far as the interactivity goes. User feedback is usually not acknowledged.

A summary of the ICT infrastructure available in various ministries is given below.

2.3 Principal e-Government enablers

The decentralized nature of the Ugandan polity has made e-Government a relatively simple matter. Decisions are made locally and there are many decision-making authorities. Decentralized decision-making is a huge advantage for computerisation in a distributed environment (in which any Government operates) especially in countries like Uganda, where communication costs are rather high. Localized decision-making is the key since workflows do not span large geographical distances. Most Government workflows involve attachment of several scanned images of supporting documents, and decentralized decision-making reduces the transfer of bulky scanned images across vast geographical areas.

Any large scale computerisation effort by the Government will require very careful planning and a viable and effective regulatory mechanism to be put into place to prevent duplication of effort, ensure standardized systems across different sections of the Government and to ensure that the funds allotted are effectively and efficiently utilized.

2.4 Principal deficiencies

The principal deficiencies in the current scenario is as follows:

- ➔ Grid power is available in few rural areas
- ➔ Inadequate computing facilities
- ➔ Email is not widely used for communications
- ➔ Computers are used for very basic applications
- ➔ There is no payment gateway in the country. No credit cards are issued in the country and banks are shy of taking any credit risk.

2.5 Activities underway

Project	Agency	Description	Term		
			S	M	L
Fiber Optic Rings, Kampala	MTN / UTL	Self Healing Fiber rings around Kampala City Center	✓		
Fiber Optic Connectivity	MoFPED	Linking 3 buildings of the MoFPED	✓		
Internet POPs	UCC / RCDF	Establishing Internet POPs & Telecenters in every district headquarters; ensuring every sub-county with over 5000 people have access to a public phone		✓	
Rural Telecenters	UCC / RCDF			✓	
Rural Payphones	UCC / RCDF			✓	
Comtel	COMESA	Link COMESA countries with a fiber optic backbone and connect to proposed East African submarine cable			✓
EAC Digital Transmission	EAC	Link Kenya, Uganda & Tanzania with a fiber optic cable			✓
East African Submarine Cable	Multi-lateral	Links East African coastal countries to the fiber links at Djibouti and South Africa			✓

2.6 Plan of action (other than activities already underway)

Task	Priority	Completion date
At every Government Office		
Installation of a PC on every desk	Immediate	Jun 2005 (KMP)
Installation of a LAN	Immediate	Jun 2005 (KMP)
Installation of a PBX	Immediate	Jun 2005 (KMP)
Installation of a UPS, Mail server, Proxy server and firewall	High	Jun 2005 (KMP)
Installation of standard office productivity packages such as MS or Star Office	High	Jun 2005 (KMP)
Installation of standard tools such as anti-virus software, compression utilities, etc	High	Jun 2005 (KMP)
Configuration of local email IDs for the entire staff	High	Jun 2005 (KMP)
Provision of limited Internet access to staff	High	Jun 2005 (KMP)
Connecting Government offices		
Establishment of a government-wide Intranet in Kampala	Immediate	Dec 2004
Universal Access		
Establishment of pilot e-government telecenters / kiosks	High	Jun 2005

2.6.1 Way ahead

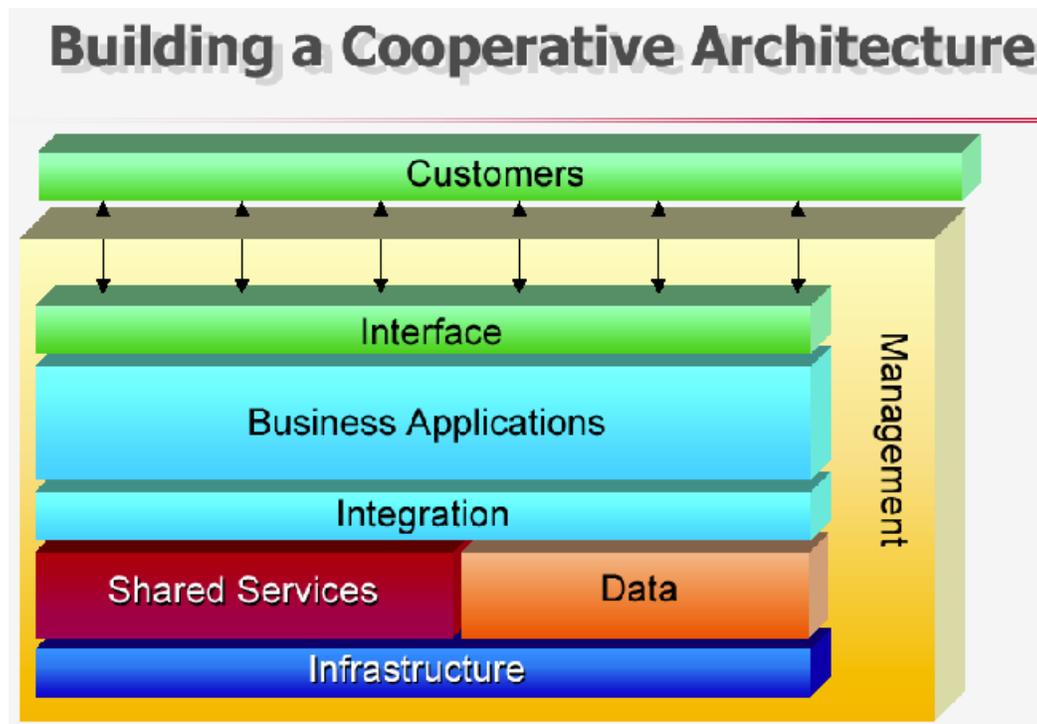
Tasks	Duration	Remarks
Study phase (at every Government office)		
Infrastructure audit	15 days	Build upon e-Readiness survey findings
Preparing the detailed action plan and cost schedule	5 days	
Study of services offered	25 days	Study feasibility for providing these electronically
e-Government Infrastructure study		
Portal	60 days	Define scope and functionality; feasible technology options; detailed technical specifications, policy and guidelines for implementation;
Metadata management	60 days	
Secure Electronic Environment	60 days	
Interoperability Framework	60 days	
WiFi MAN implementation		
Site studies at every office	20 days	
e-Government applications development		
Server side & online application	180 days	
Portal	30 days	
Secure Electronic Environment	180 days	
Offline applications	30 days	
Key application development (technology demonstrators & mindset influencers)		
Salary payment advise	60 days	Automatic credit of salaries; stopping use of physical cheques
Government system operations and process restructuring		
System study	30 days	Study of various functions at each ministry & department
Common module development	2 years	
Integration with pan-Governmental systems	60 days	E.g. IFMS, IPPS
Development of specific functionality	2 years	
Implementation of Pilots		
WiFi MAN	60 days	
WiFi Network in districts	60 days	
e-Government kiosks	90 days	With sample functionality

2.7 Service Delivery Architecture

Courtesy Gartner Group

For agencies to work together in the new e-government environment and successfully bring about this transformation they need a common design framework or architecture for service delivery using information technology. The “service delivery architecture” depicted below shows how the Governments expect agencies to use and be a part of the government information technology and standards environment in future.

Architectures of this kind are becoming increasingly important to governments around the world. In 2001, the Gartner Group stated that “over the next two years 70 percent of governments that do not develop an e-government architecture will duplicate efforts and infrastructure, and will fail to meet constituent expectations for service delivery, resulting in complaints and wasted public funds”.

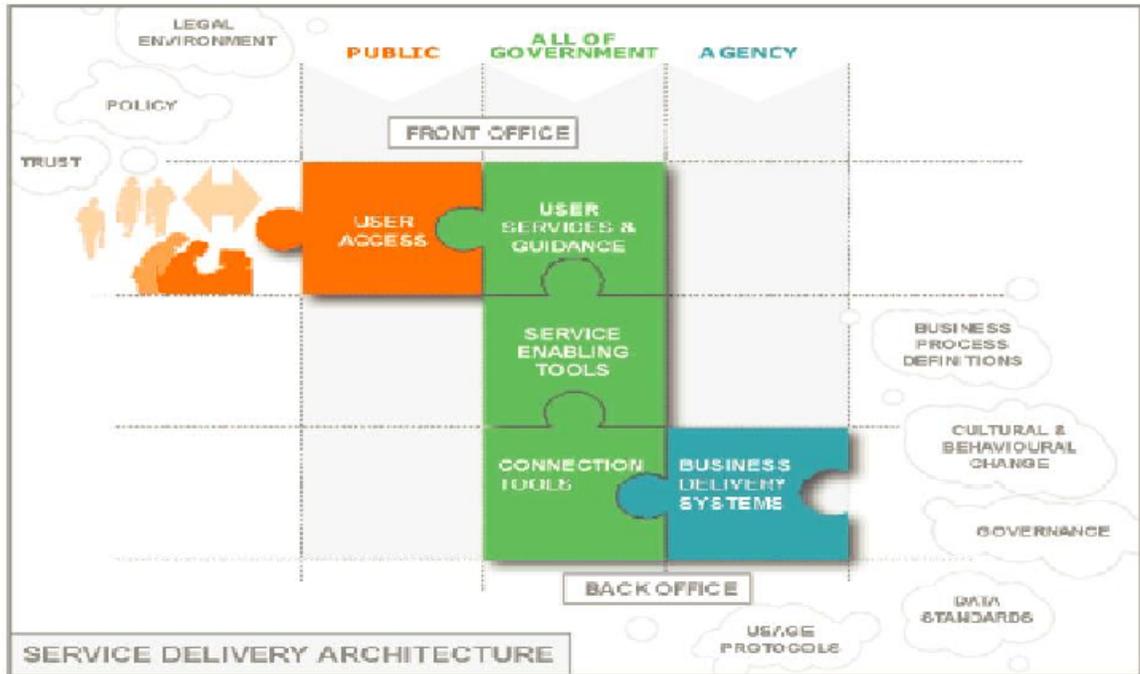


The main benefits of adopting the service delivery architecture are:

- ➔ Agencies make better use of taxpayers' funds when delivering services in the future
- ➔ People and business face lower compliance costs and experience higher quality and greater consistency when dealing with government
- ➔ Ministers are able to evaluate agencies' proposals for future e-government initiatives in a context that emphasizes and enables the collective use of information and technology.

The architecture requires that some elements of agencies' service delivery be developed from an all-of-government perspective (i.e. 'develop once, use many times') in the future. In particular, there are benefits to having a common architecture for:

- ➔ How services are presented to people (User services & guidance)
- ➔ How service delivery is actually electronically enabled (Service enabling tools)
- ➔ How agencies connect to one another and their customers (Connection tools)



This is because many aspects of agencies' service provision are generic (e.g. 'accept an electronic payment', 'authenticate an individual', 'change address', 'deliver a secure e-mail') and are therefore best done in a standardized manner by all agencies. This does not mean that all agencies will share exactly the same information and technology. Instead, the architecture embraces:

Common components: components developed and implemented only once, and used by many or all agencies (e.g. the Portal)

Modular components: standard components that support a generic activity, but are implemented locally (e.g. a technology solution for handling an online registration process that can be incorporated into different business processes in different agencies, say application for a voter ID card or a driving license or a passport)

Unique components: components that are specific to a particular agency, function or service (that may still need to be e-Government compliant).

The architecture needs very careful thought and preparation. It will need a detailed system study for exactly the kinds of applications that are envisaged, identification of common and other modules, handshaking between various existing and proposed systems, etc.

2.8 Pilot projects

Before any large scale computerisation process is undertaken, it is better to implement small projects known as pilots or POC (Proof of Concept). These small projects test certain areas, including new technologies and, if successful, evolve into larger and more complex systems.

Pilot projects are not necessarily very small or academic exercises, though they may deliver only part of the functionality expected of a large system. They are also usually less robust than production or Industrial strength systems, though this need not always be the case.

Pilots tend to save both time and money especially if the technologies are new, or the users are new to computerisation.

2.8.1 E-Government Kiosks / Telecenters

An e-government telecentre or kiosk is required in every sub-county or at least a group of nearby sub-counties. These telecentres could be as simple as a single laptop equipped and phone. Refurbished laptops are available for as little as US\$ 100-200 and could be used. The telecentre should have the capability of making online payments so that any user who wishes to avail of any government service could do so. This could be with the help of charge or smart cards of a fixed value, which are recharged every time the owner of the centre deposits money into the Government account.

The system works as follows:

- A telecentre is set up in each sub-county or a group of nearby sub-counties; no one should have to travel for more than 1-2 km to the nearest telecentre. The telecentre could be a single laptop connected via a dialup line or wireless link.
- The owner of the telecentre is issued a charge or smart card that has a certain value – USX 100,000 (say).
- The owner transacts on behalf of the customers seeking a service using the charge card and collects cash from the customer. He / she gets a commission from every transaction for the services. This is apart from commissions earned from making phone calls, etc.
- All forms required for services available online must be downloaded on the laptop to save time. An application needs to be developed that saves all this information and uploads it at a time using the dialup connection at the end of the day. The application design is critical; least amount of data should be transferred as a compressed file and then should be accepted at the receiving end, acknowledged and the status of previous transactions must be transmitted back. The data transfers could be done using emails to begin with.
- Periodically, the documents or services requested should be delivered to the telecentre for customers to collect (say twice a week).

Project Plan

- System study in various ministries and parastatals to identify potential services that can be provided online
- Design & development of the e-Government software
- Design and development of simplified payment mechanisms till more elaborate ones are in place
- Installation of the hardware and software in selected sub-counties
- Training to the operators
- Awareness programs for the community

Both online and offline systems need to be developed. A single web-enabled system that can accept interactive as well as batch input has to be created. Existing telecenters can be used for the pilot phases, but commercial viability of a single PC kiosk should also be established.

Services offered by the Kiosk

In a phased manner, the following services could be offered to the citizens

Service (in alphabetical order)
Certificates (birth, marriage, death)
Company registration applications
Corporate Tax
Driving license application
Employment information and applications
General Information
Health Information
Income Tax
Leave
Online services for other parastatals and private companies
Pension
Permit and other Immigration document status
Permits
Police reports
Real Estate registration, tax payment
School results
Statistics
Student grants
University enrollment
VAT
Vehicle registration and tax
Visas (application only for those who can collect them at the entry point)

2.8.2 WiFi / VOIP Pilot in Kampala

An effective communications network is one of the primary requirements of the Government at all levels. Communications eats up a sizeable portion of the non-wage budget. Many ministries face problems because monthly budgets for telephone connections are often inadequate for an entire month's worth of phone calls. Many ministries resort to barring or severely curtailing any outgoing call.

The problems

- ➔ Up to 30 million shillings a month spent on Communications per ministry
- ➔ Any future ICT oriented rollout incumbent on high-speed connectivity. E-government initiatives will succeed only if adequate bandwidth is available at all times
- ➔ Costs of connectivity are just too high to afford – most ministries run out of Communications budgets around 20th of the month

Rationale for this solution

2 Mbps connections are available at about US\$ 22,000 / month. This is a ridiculously high figure and there are 50 odd offices to connect. WiFi bandwidth is available at less than US\$ 100 per month per site and will deliver 5-10 Mbps reliably.

As long as the Government owns and operates the system itself and does not provide any service to anyone other than its own staff, it cannot be construed a violation of the exclusivity clause in MTN / UTL's license, just as owning a PBX is not considered one. Things would probably get more complicated if a third party was to be involved and offer fee based services for the same. In this case MTN or UTL would probably have to be involved but a legal expert is required to study this in greater detail. The system can be installed by anyone as long the Government will itself own and run it. In case it wishes to outsource the services, UTL or MTN should be considered.

The solution

A Metropolitan Area Network on a wireless backbone, which delivers high-speed connectivity using WiFi technologies. This provides broadband connectivity over radio links and effectively delivers a combination of a Local Area Network (LAN) and an Intercom system. The major difference is because there are no wires the system is not restricted to a single building as is a conventional Intercom or Local Area Network. Modern day communications technologies have made WiFi networks extremely secure, fast and cheap. Indeed all future networks will be either wireless or fiber based; the days of copper seem to be numbered.

What it delivers

- Intercom cum LAN within a region such (Kampala for the pilot)
- Unlimited free phone calls from / to any Government office within the network (or within the community)
- Unlimited e-mails and data transfer facilities
- Unlimited access to the Internet for anyone authorised
- Secure access from home or car to the office Networks for the PS's, Commissioners and other senior officials
- Web conferencing and full multi-media support
- Ultra high speed data transfer – up to 54 Mbps
- Value for money- recovery of investment in a few months
- Ideal for donor funded projects because of low recurring costs; SUSTAINABILITY

2.8.3 Way forward**System study phase**

- A site study should be undertaken within each ministry to identify networking options, conduct site calculations and gather configuration information for the wireless network
- Draw up a detailed rollout plan
- Draw up a detailed cost schedule
- Draw up a manpower requirements schedule for future maintenance

Statutory requirements

A wireless network will require a license for the bandwidth used from UCC. The Government must reserve a set of frequencies for its exclusive use (for which a license from UCC will have to be obtained). The cost of the license will easily be recovered in the saving accruing from reduced communications costs. Though unlicensed bands are available, these are unregulated and prone to disturbance as well as security threats because of generalized access

A VOIP network does not violate the exclusivity clause just as an Intercom does not do so as long as the Government was to run the network itself. If a private company was to run this network on behalf of the Government, then it could be possibly construed as a violation of MTN & UTL's exclusivity clause. The phone calls will be only within the internal network; any call made to any phone not connected to a ministry or departmental PABX will have to be routed through the carriers.

2.8.4 WiFi / VOIP Rural Networks

RCDF intends to have a public phone for every sub-county with a population of at least 5000. The WiFi metropolitan area network specified above can also be used to provide extensions in every village or sub-county, a few kilometers away from a public phone. This will reduce the travel time and possibly the associated costs for access to the phone. The system would build upon the school repository and network mentioned in the next chapter. Every school connected in this way has a potential to provide public phone services, regardless of whether a phone line actually reaches the school.

The problems

- Even if RCDF was to provide public phones to all sub-counties as proposed, there would still be a sizeable population that would have to travel some distance before they could access phone-calls
- In most of these cases, phones would be a one-way process since the person would usually have to make the call himself / herself. We would imagine that people staying in remote areas would rather receive calls since these would be free and the calling party would most probably be friends or family from the larger towns with possibly better ability to pay. If phones were located conveniently, people could also receive calls
- Schools would provide security for the equipment including the phones

Rationale for this solution

This would act as an additional source of income for the school or the operator of the booth, since the infrastructure would in any case be set up for the school repository project. The public phone itself would be better used since more people would have access to the same line. Internet phone gatekeeper software is available free for download, which handles automatic dialup and billing

The solution

This is similar to the wireless MAN cum intercom proposed for Kampala above. In this case phones in various schools connected via WiFi and VOIP could use a single phone connection located some distance away to provide the community with services closer to home.

This technology could help MTN and UTL easily complete their payphone rollout obligations cost-effectively and with possibly better utilization.

This kind of piggyback riding is also proposed for setting up of the e-Government kiosks. In this case a single payphone line can be used as above, though the operator needs to connect to the Local Government office only for providing the e-Government services. Payphones could augment the operator's income and usage could be controlled by freely downloadable gatekeeper software.

2.9 Infrastructure Available (Sep 2003)

Office	Staff Strength	PABX	No of Computers	Internet connectivity	ICT Strategic Plan / Policy in place. Leadership support for ICT	No of computers Networked	No. of computers with Net access	Knowledge Workers to staff (%)	Principal use of computers
Finance		Y	385	Leased Line	Yes; very strong	All	Most	50	High end computing, WP, Email
Justice	350	Y		Wireless 64/32	In progress-workshop conducted; strong	No			Word Processing, Statistics; MIS being planned
PMO	247	N	50 (Postel)	Wireless 64/32	No; not a core priority	3 Floors on LAN, 2 Floors aren't connected	15	65.4	WP
IGG	355	y	70 (HO) + 20 (RO's)	Leased line 64/64	Yes; very strong	All at HO	35	40.5	WP, Internet, email; rollout of Leadership Code and Case Management systems proposed
Local Government	100	Being installed	80	Leased line 64/32	Yes; very strong	Recently shifted to a new office; PABX, Networking work in progress			Wp

Office	Staff Strength	PABX	No of Computers	Internet connectivity	ICT Strategic Plan / Policy in place. Leadership support for ICT	No of computers Networked	No. of computers with Net access	Knowledge Workers to staff (%)	Principal use of computers
UIA	33	y	30	Wireless 192/64	Yes; strong	All	All	84.85	Email, WP, Accounts
MPS	250	Y	80; 25% obsolete	Dial-up	No; Weak, though awareness exists, there is no funding	20	20	45	wp
Gender	361	Y	41	Wireless	No; Weak	Recently shifted to a new office; PABX, Networking work in progress		65	WP; many computers > 3 years old Richard ndikuryayo, sr statistician
* IFMS rollout: Pilots starting in Dec for Works, Finance, Water, Education and Health and for Lira, Jinja, Kampala & Busenyi districts									
Trade	150	Y	30	Wireless 32/32 * 2 One used by project alone	WIP; weak	21	8	~50	Wp; no it dept
Defense	114	Y	40 + 50 new	Freenet dial-up; 128/64 within a month	In place, being reviewed; Strong	Large LAN with up to 375 connections being implemented. PABX with 2 T interfaces, 60 lines and 800 extensions being rolled out		~60	WP; record management; Accounting
UPDF / Army	Varies; 150 units of up to 1500 ppl	Y	5	All	Tightly linked with MoD; strong focus on ICT			<10	WP; Army records management

Office	Staff Strength	PABX	No of Computers	Internet connectivity	ICT Strategic Plan / Policy in place. Leadership support for ICT	No of computers Networked	No. of computers with Net access	Knowledge Workers to staff (%)	Principal use of computers
Education	150	Y	200 + 2 servers	VSAT 128/256	In place; Education MIS developed rolling out into 10 districts Workflow MIS being developed; Statistical data used	All	All	~50	Data entry and analysis; wp; EMIS
Geological Survey of Uganda	~100	Y	20	Dial-up	Not formal, but good support and use of ICT	None	1	~50	Wp; Mapinfo; Remote sensing , Imaging, GIS, drafting software
Health	>3000	Y	>500	VSAT 64/32	Yes; Strong ICT focus;	All	All	~50	Statistical Analysis; wp
Internal Affairs		N (in pipeline)		No	Have a wish list; ICT given increasing priority now				WP

Office	Staff Strength	PABX	No of Computers	Internet connectivity	ICT Strategic Plan / Policy in place. Leadership support for ICT	No of computers Networked	No. of computers with Net access	Knowledge Workers to staff (%)	Principal use of computers
Works		Yes	150	Dial-up	Being formalized; support increasing; tepid so far	0	12	~55	WP; email to some extent
Directorate of Water Resources	200	Yes	200	Leased line 64/64/64 3 locations, being upgraded to 128/128/64	Yes; Very strong	130; 2 servers	70	~50	Wp; email; GIS / MIS/ Technical databases MIS and DMS are priorities
NEMA	50	Y	50	Wireless 32/16	Yes; very strong	All	All	~65	WP; email; accounts, GIS; DMS under consideration
Water Resource Management	120	Y	41 + 15 laptops	Leased Line 32	Yes; very strong	All	All	~60	Wp; email; Technical databases; isolated databases - MIS a priority
UEB	3000	Y	220	Wireless & Leased lines	Yes; very strong	160	160	40	WP; email; Accounts & Billing
Uganda Post	590	Y	90 HQ + 25	Wireless Posta 48/64	Yes; strong	90	90 serving 250 ppl	~42	WP; POS; Accounts; email; HR-Payroll

Office	Staff Strength	PABX	No of Computers	Internet connectivity	ICT Strategic Plan / Policy in place. Leadership support for ICT	No of computers Networked	No. of computers with Net access	Knowledge Workers to staff (%)	Principal use of computers
Agriculture	337*	N	82	Dial-up	No; weak focus	Few in accounts	4-5	~50	WP; Navision for accounting
* 400 including delegated staff; 850 including those in district farm institutes									
Dept of Fisheries	50	Y	8; require 35	Dial-up	Yes; strong	8	8; require 35	~60	Inspection system; WP

3 Human resources

Uganda's has a large English speaking population with excellent communication skills. Education is by and large highly rated in the country, and the literacy rates are over 70%. Almost 100% of children attend primary school, a figure close to 7.5million. 640,000 students attend secondary school and there are over 50,000 tertiary education students attending class in 16 University – colleges in the country, a third of which are Government funded. Makerere of course retains its reputation as one of the premier institutions in Africa and the developing world.

Uganda can exploit the coming ITES revolution by using these human resources to good effect. The population growth is worrisome at almost 3% per year, but the country has coped up remarkably well so far (maybe since it was not optimally populated in the first place). However, with such a high rate of population increase, the country will soon become over-populated and the strains on the already stretched Government, Health, Education and social service machinery will become enormous. A large population is not a bad thing per se if the population is healthy, well fed and educated. There is an urgent need for more vocational training at secondary school level, and education at higher levels must be made more affordable and accessible to students, if the population growth isn't to become a serious cause of concern soon.

3.1 Current status

3.1.1 Government Offices

- ➔ Awareness of ICT and e-Government is limited
- ➔ Uganda is at the first phase of evolution in e-Government i.e. Electronic Information dissemination
- ➔ There is next to no budget available for ICT training in most of the Government institutions. Even where such training budgets are available, they are inadequate and often used for some other purpose. However several ministries have used project funds to support ICT training.
- ➔ Almost all ministries have a full time systems administrator, to manage the internal network / system. Some departments employ people part-time or outsource the tasks to individuals.
- ➔ Most ministries have set up or are in the process of setting up resource centers, which have shared computers
- ➔ Most government officials and staff have had some sort of training on basic use of computers. A continuous program for refreshing skills or retooling needs to be developed so that any one who wishes to attend can do so during a suitable time.
- ➔ There is an urgent need to conduct a sensitization program for senior and middle level Government officials.
- ➔ Training in the use of computers and equipping offices with computers should be conducted side by side for making optimal use of the resources and money spent.
- ➔ The ICT coordinating agency should be entrusted the task of keeping a database of reputed training vendors and develop a specialized training program for Government institutions (along with appropriate training service providers).

3.1.2 Awareness in Civil Society

Current level of awareness about the benefits of e-Government is less than satisfactory in most large towns. Most people are not aware of the benefits and the scope or the functioning of a true e-Government service.

In rural areas there is next to no awareness about ICT or e-Government

3.1.3 Attitude

The attitude of people towards computerisation is quite positive and even older respondents were of the impression that it is both necessary and inevitable. Almost all respondents expressed the desire for more effective training and computer awareness orientation lectures. However some ministries that are laggards in the field of computerisation still do have skeptics at the highest levels. By and large however, it was found that all the Permanent Secretaries who responded were highly interested in bringing about automation in the Government, but most feel budgets are a serious constraint.

No serious opposition or resistance to computerisation in the Government sector is envisaged. However several departments and ministries have still to give ICT the priority of attention that is required. A sensitization workshop for senior and middle managerial levels is a priority.

3.1.4 Training available

Training in the fields of ICT is available in Kampala and to a certain extent in other towns. By and large all knowledgeable respondents considered ICT training facilities available in Kampala to be of Internationally acceptable standards. Most institutions were found to be reasonably well equipped and the faculty was considered knowledgeable and up-to-date with the latest trends in ICT.

3.1.5 Capacity building

Capacity building has been given the appropriate importance by both the Government as well as the Private and non-profit sectors. Government funding in capacity building for ICT is limited by budgetary constraints, but most ministries have managed to get a sizeable portion of their staff trained using project funds or getting small batches trained at a time.

3.1.6 Costs and affordability

Tertiary education in ICT is far too expensive, though it certainly improves ones chances of getting a decent job, post qualification. However, additional qualifications in IT, obtained by Government officials post employment, haven't usually effected in an increase in their salaries. There is an immediate and pressing need to make both communications facilities and tertiary education more affordable.

3.2 Principal e-Government enablers

- ➔ All government employees speak English fluently and are able to communicate well
- ➔ The standard of education in the country is fairly good and education is highly regarded
- ➔ There are several Government websites, which provide information about the organisation, and it's role and activities
- ➔ Availability of high-quality training facilities in ICT at Kampala

3.3 Principal deficiencies

- Connectivity is a major constraint. Outside Kampala and a few major towns, there is very little Internet penetration, hence raising awareness is a challenge there
- The Internet is unknown in most rural areas
- ICT training is unaffordable to most
- Courses in Telecommunications Engineering are not available
- There is no awareness among individuals about the potential benefits of e-government
- Most websites offer only static content
- In rural areas less than 5% of the population has access or knowledge of computers

3.4 Requirements

There is an immediate need to train operators in rural areas to operate the e-government kiosks. They need to be provided basic computer skills and operations of the e-Government applications and services

Users need not be skilled in using computers, since the operator would do the needful

Programs on Radio and television should project the initiatives and highlight the achievements

There is an urgent need to introduce student loans

The Ministry of Education should try to make the Eastern Economy Editions of major college textbooks legal for sale in Uganda

Local and affordable accreditation in ICT is required

3.5 Activities underway

Project	Agency	Description	Term		
			S	M	L
Small scale training programs	Various	Several institutions e.g. Ministry of Defense, Ministry of Justice, IGG, etc have ongoing capacity building programs			

3.6 Plan of action

Task	Priority	Completion date
Capacity building and sensitization workshops for key government officials	Immediate	
Setting up a student loan facility	Immediate	
Setting up a local accreditation body	High	
Making low cost Asian editions of popular and standard college textbooks legal for sale in Uganda	High	
Setting up of an ICT University	High	
Connecting schools with WiFi links and building of a local repository for access by students	Immediate	
Setting up of e-Government kiosks / telecenters	High	

3.7 Pilot Projects

3.7.1 Content repository

A few schools must be connected to each other with a high speed WiFi network. A searchable local content repository needs to be created, which students should be able to browse to enhance the learning experience through self-discovery. Since this repository would be local, there would be no use of Internet bandwidth involved. Internet usage can then be minimized for browsing subjects not available locally, emails outside of the community, etc. A mail server can also reside along with the central repository to route mails within the community so that expensive bandwidth is not used unnecessarily. IICD is setting up systems where content is downloaded at off peak hours over the Internet at one place and distributed to several schools in the neighborhood for use the next day, which could be an alternative to developing a local repository, but it still relies on scarce and expensive bandwidth.

The conventional teacher-centered delivery of facts process can be improved by recording lectures of outstanding teachers and storing these in the repository. Teachers can use these lectures to enhance their own using streaming media delivered over low-cost, high-speed WiFi links. Experiments using expensive equipment not available can be demonstrated in this way as well.

Low cost high-speed WiFi connectivity solutions are available with a range between 5-8 km. Newer WiFi technologies deliver non-line-of-sight solutions at 54 Mbps with a radius of 60 km, but they are very expensive at present. Like all ICT, WiFi costs are expected to reduce substantially in future as the technology matures, while the quality, capability and functionality keeps improving.

3.7.2 Student Loans

Student loans whereby students pay only a fraction of the fees upfront (Banks or financiers pay the rest) are an attractive option. The Ministry of Education has appointed a consultant to work out viable loan schemes for students. A loan based on the certification / degree itself is suggested. Students pay a portion of the fees (to ensure that they value the scheme and give their best to graduate). Interest burden on students can be reduced if institutions take payments for courses in monthly installments, wherever feasible. Students should also be given the facility to pre-pay without penalty. Donors currently offering scholarships could be potential financiers for such a scheme because of its sustainability. It should be also possible for financiers and micro finance organisations to get lines of credit from donors at concessional rates for education loans.

At the time of admission, students bequeath their existing certificates, if any, to the financier. At the end of the course, the financiers take the certificates from the institution and potential employers are allowed access to them as and when required. Installments are deducted from salaries directly by the employer and paid to the financier, for the tenure of the loan. In case of students going abroad for further studies, the loan amount would need to be repaid upfront. Success of any such scheme will rest on the ability of financiers to overcome the inherent fear of lending against unsecured loans. The schemes should be started at Masters levels first, because of the shorter duration of the courses and increased maturity of the applicants and then rolled out to under-graduate studies.

Critique

Student loan programs are often imperfect. Despite the existence of student loan programs in more than sixty countries, access to affordable loans often remains frequently restricted to a minority of students. Moreover, these loans are not necessarily available to those students with limited resources who would be in greatest need of financial aid. An equitable and workable scheme needs to be found.

Student loans have the following benefits:

- It increases affordability and thereby demand for higher education.
- People tend to improve their own skills set to improve their own employability.
- Financiers earn a better rate of return, especially if they can work out concessions from private education providers.
- If demand increases adequately, more service providers (colleges) will be established to meet the demand, increasing the overall education levels in the community.
- ICT Manpower costs for the Government and private sectors will reduce with the increase in local supply, if it reduces the number expatriates required
- A law on Hire Purchase and Mortgages is being framed. This should be extended to cover all sorts of leases and personal lending products, including unsecured lending such as student loans.

3.8 Short term plans

Internal standards and affordable certifications

ICT standards and exams are quite expensive. An MCSE certification exam alone can put you back by almost 1000 US\$ assuming every paper is cleared at the first attempt. Certifications also expire over time, so students have to reappear for exams to get re-certified.

Uganda should set up some form of internal assessment and certification scheme whereby the certification process can be conducted regularly, be of a reasonably high standard and be affordable to all Africans. If a high standard is maintained, there will be a number of aspiring students for the certification and the private sector will reciprocate with jobs for certified professionals. The certification process should be substantially cheaper than the foreign certifications on offer right now. A reputed institution like Makerere can be entrusted the task of framing and conducting the exams and presenting the results.

Books

Books are another problem for students, since they are very expensive and often unavailable. Most western publishers make their books available in South Asia and the Far East in a low cost format called the Eastern Economy Edition. These books are legal for sale only in certain areas but are often more than 20 times cheaper than the original version. The Ministry of Education should try to make these books legal for sale in Uganda as well.

3.9 Long term plans

3.9.1 ICT University

An ICT University should be setup to provide affordable specialized ICT education. It has to be an autonomous, self-supporting institution that should aim at becoming the premier ICT training Institution in Africa within 5 years. A major goal of the Institute must be to impart a uniquely broad and interdisciplinary ICT education of the highest academic quality. Students must go through a rigorous, integrated curriculum that consists of a highly diverse set of ICT courses, interdisciplinary ICT research projects, day-to-day interaction with industry and preparation in entrepreneurship, management and personality development courses.

Mission and Charter of the institute

- To train and educate, at both undergraduate and postgraduate levels, engineers of outstanding ability who can become leaders in the ICT industry and profession.
- To carry out advanced research and development in information, communications and software technologies and their societal, scientific, industrial and financial applications.
- To work closely with the industry leaders through their Corporate Schools and to help them in undertaking training programmes needed in the industrial and financial sectors.

Courses should be conducted in all areas of ICT (a few are listed below):

Under graduate and post graduate courses in

- Telecommunications Engineering
- Computer Science
- Computer Engineering
- Call centre management
- Project Management

Diplomas

- Computer Networking
- Internet technologies
- Specialized packages
- Computer security

The University must offer the following to students:

- Easily accessible student loans to make the courses affordable
- Limited number of sponsorships from leading companies such as MTN or UTL, Banks or even foreign companies
- Local accreditation, which should be of sufficiently high standards to endure widespread acceptability (and which would be considerably cheaper than that available abroad)
- Courses with adequate hands-on experience (e.g. project semesters in the Industry or Government)

Admission could be on the basis of entrance tests combined with consistent academic excellence in school. The university must be completely residential and have world class computing and connectivity. Typical institutes such as these around the world have 1Gpbs Intranets and 5Mbps Internet connectivity.

What is needed is more of a **“learning institution”** than a mere **“teaching institution”**. The institution must never become a **“teaching shop”**; the focus has to be more on knowledge than mere skills. The faculty should be drawn from the best talent available locally and possibly from abroad (both full time and adjunct). Teachers must be researchers qualified to write and critique contemporary textbooks in the area they teach. There would be no fixed syllabus. Teachers would design courses taking into account current trends and the student background so as to blend what is collectively taught across different courses into a cohesive body of knowledge that prepares students for the foreseeable future

4 Institutional Arrangements for E-Government management

One of the only problems with decentralization is the plethora of sub-systems that it can generate. This is particularly true for ICT projects, since several efforts developed in isolation would mean that most of them would be unable to 'talk to' each other.

Just as the MoLG ensures coordination amongst Local Governments, an ICT coordinating agency is required to coordinate the Government's ICT efforts. The ICT Policy implementation will require experts from various fields – Communications, IT, Law and Finance.

The ICT policy document also suggests such an agency. The policy states the role of the coordination agency would encompass:

Coordination

- Acting as the lead coordinating agency in the implementation of the ICT Development Objectives after government has approved them.
- Fostering co-ordination of ICT initiatives in the country
- Ensuring effective implementation of the policy framework.
- Acting as a repository of ICT standards, registration and classification of documentation related to locally developed and imported ICT solutions.

Monitoring, Evaluation and Review

Ensuring that the ICT policy is regularly reviewed and its implementation is continuously monitored and assessed. Furthermore a mechanism will be developed for evaluating the impact of the National ICT Coordinating Agency in terms of:

- The resulting growth of the economy,
- Reduction in poverty,
- Increase in ICT literacy,
- ICT infrastructure growth and any other relevant indicators.

ICT is a high-tech field and encompasses large number of functions and technologies. Apart from the policy and monitoring tasks, there are several functions that are needed to manage the e-Government program. These include setting up of the appropriate infrastructure, managing large databases and networks, security, disaster management and recovery, etc. These are highly sophisticated tasks and require dedicated teams, which is beyond the means of any of the line ministries or local Governments. Also, once the project funds are over, the databases and servers and systems still need to be maintained and administered by knowledgeable and experienced personnel. These are highly paid professional services and the ministries do not have the budgets to employ additional specialists. The much higher salaries offered by the private sector for the same skills would probably attract those already employed who would leave after gaining a few years experience.

Current Status

A proposal has been put forward in Cabinet that recommends the COMESA model for coordination of ICT issues. This model proposes that the Telecom Regulator takes up the additional task of ICT coordination (primarily to conserve financial resources). The following model has been proposed for Uganda:

Coordination will be a 4 level framework

National ICT Coordination Committee (NICTCC) comprising of Ministers from The President and Prime Minister's offices under the chairmanship of the Minister of Works, Housing and Communications. Its main task would be to provide political guidance.

National Technical ICT Sub-committee comprising of the Permanent Secretaries, prominent people from civil society, Industries, Financial Institutions, the Telecom Operators and prominent Educational Institutes such as Makerere, under the chairmanship of the PS of the MoWHC. Its primary task would be to provide technical assistance to the NICTCC.

National ICT Secretariat (NICTS) under the UCC to look after day-to-day coordination issues

Institutional ICT Committees to ensure ICT coordination at institutional levels.

Requirements

The following is the scope of coordination / work envisaged for the coordination agency / agencies

Policy framework and operational guidelines related

- Implement the National ICT Policy objectives
- Policy implementation monitoring and review
- Establish a set of standards and guidelines for computer hardware and software, software development, platforms and connectivity to ensure cross-compatibility between various systems.
- Establish an auditing system for projects and computerisation implementations, independent of the consultants employed, to ensure that the goals and aspirations of the stakeholders have been achieved / met.

Infrastructure related

- Promote pro-actively the concept of universal access of ICT resources within the country
- Ensure steady and rapid growth of infrastructure, in particular bandwidth and connectivity
- Reserve spectrum bands for the Government systems to operate on
- Actively promote WiFi as a cost effective means of connecting offices spread over small geographical distances together
- Promote a one-time investment by the Government in fiber-optic links along the major trunks
- Pro-actively move the Comtel, EAC Digital Transmission and East African sub-marine projects forward

Operational issues

- Conduct thorough security audits to ensure that the security regimes suggested are being meticulously followed, backup and disaster recovery policies implemented, etc.
- Advise on large-scale procurements of sophisticated ICT equipment, including help in preparation of tender specifications.
- Identification of approved vendors for training, equipment procurement, software development and services, system security, etc.
- Manage the various servers with the line ministries and departments within them, even if the servers are located within the ministries themselves. (It is possible to manage servers even if these are housed remotely in the Ministry offices, from elsewhere). The administration of the networks can also similarly be done from elsewhere.
- Ultimately set up server farms and clusters for enabling large central repositories of data and computing power, which other Government organisations can share.

In keeping with established norms of decentralization and division of effort amongst those most qualified to deliver it is proposed that the Policy and Infrastructure related issues be handled by the proposed ICT secretariat. Day to day operational issues should be handled by another agency that is most qualified to deliver results, such as the new UCS.

There have also been several suggestions to leave the operational issues to private parties. This line of thought has considerable merit, but as of the moment the UCS is one of the very few locally available institutions with adequate skills and experience to deliver large projects cost-effectively. Though government institutions would no doubt engage the services of private vendors, there is a need to coordinate between these since many of the line ministries are unable to safeguard their own interests.

The functions detailed above require the fifth agency to be involved with the process on a long-term basis (7-10 years or so). It is probably inappropriate for the Government to get into such long term contracts with a single or group of private parties without being able to effectively monitor their performance.

5 Research and Development activities in ICT in Government

Though very little basic research has gone into ICT in Government, there have been several highly successful projects run by the Government or quasi-Government bodies as well as by NGO's and multi-lateral Institutions such as the World Bank, UNDP, etc. These projects are showcases for implementation of development strategies and several such pilot projects in the fields of education, health and agriculture (to name a few) have been sterling successes.

5.1 Current status

A few outstanding efforts are listed below. The list is by no means comprehensive or complete but just an indication of the outstanding work the Government and development agencies are putting in. All projects listed here use ICT as the basis for development.

5.1.1 Wireless Healthcare Initiative

Courtesy Uganda Chartered HealthNet

Community health workers are using the mobile network to send and receive critical health related data. Uganda's wireless health care initiative is an expansion of SATELLIFE trials with personal digital assistants (PDAs), or handheld computers, that began in 2001. PDAs can be used in environments where computers are impractical. PDAs were found to be especially useful in health administration, ordering and tracking medical supplies, and delivering new treatment guidelines.

In scaling up the project to provide nationwide coverage for the health care initiative, a central wireless server was installed in Uganda's capital, Kampala. It is linked to computer systems at the Ministry of Health, and at HealthNet Uganda, a local SATELLIFE affiliate housed at Makerere University. The server manages the entire network and communicates with "Jacks" in the field over the GSM cellular phone networks, which in turn communicates with the PDAs. The WideRay technology used is self-contained -- it comes with industrial grade batteries that can hold their charge for up to a year and a "packet" radio that uses the GSM standard. Each Jack stores content sent to it from the central computers in Kampala and, in turn, relays reports and emails received from the PDAs back to the capital. The technology is readily scalable to any size deemed necessary and reliable in remote locations, including those with no electricity or fixed telephone lines.

Previously, handwritten reports and drug shipment requests took months just to reach Kampala, where it would typically be months longer before data was analyzed so as to be useful to administrators. Information can now be acted upon on the day after submission, and manual error has been dramatically reduced.

5.1.2 District Administrative Network Project (District Net)

Information courtesy Ministry of Local Government

The District Administrative Network Project (District Net) is funded by the International Institute for Communication Development (IICD) in collaboration with the Department for International Development (DFID) of the United Kingdom, the Ministry of Local Government and the four beneficiary Districts. The project aims at improving the performance of Local Governments through establishing functional data/ information management and public communication systems for effective and efficiency decentralized service delivery.

Aims to improve performance in the Local Governments by establishing functional data/ information management and public communication systems for effective and efficiency service delivery in a decentralized governance. The activities include:

- ➔ Installation of Local Area Networks and Wide Area Networks, email/ Internet systems.
- ➔ Installation of data/voice communication links between District headquarters, the pilot sub-counties and the central government headquarters.
- ➔ Setting up of computerized databanks, vote books, work plans, accounting and reporting systems; and training users in basic Information and Communication Technology (ICT) applications.
- ➔ Training programme for users in basic ICT skills, and use of basic computer applications.

Various project related activities such as design of the ICT basic skills training materials, pre-qualification of firms for the suppliers, acquisition of training equipment, development of databases and procurement of resources needed is underway. Training of District Staff in Basic ICT Skills has begun and during Oct-Dec 2003, staff from Mbarara, Lira, Mbale and Kayunga will be trained.

5.1.3 SchoolNet / Uganda Connect

Both these were pioneering programs to get Internet connectivity and technology to rural schools. Both projects have been highly successful in spite of being pilots and implemented under very difficult circumstances.

SchoolNet

SchoolNet Uganda (SchoolNet) is a pioneering organisation, which has tried several means of connecting schools to the Internet using dial-up, wireless and VSAT technologies, and has achieved considerable success in the latter two. SchoolNet is a national network of professional educators and schools whose vision is to transform the Uganda educational system from an Industrial model (learning by assimilation) to a knowledge-based model to prepare the youth of Uganda to effectively enter a Global Economy based on Knowledge, Information and Technology.

SchoolNet's stated mission is to make graduates of Uganda's education system more globally competitive. World Links/ SchoolNet piloted wireless spread spectrum connectivity using microwave modems, which proved to be both technically and financially viable for schools in and around Kampala. SchoolNet also piloted connecting rural schools to the Internet using VSAT (earth -satellite) technology.

Services include training for ICT in Education, community access. High impact services include telemedicine, youth training in ICT, AIDSWEB, and e-commerce. Supply and infrastructure challenges to the project include the lack of electricity in many schools in north Uganda and the time consuming process to develop new materials for the community.

Uganda: Connect-ED

This Academy for Educational Development / LearnLink implemented project is increasing computer literacy among teachers and equipping 9 educational centers. In addition, Connect-ED is preparing a multimedia, online teacher training curriculum based on a student-centered learning approach and the Ugandan core curriculum; it is enabling teachers and student teachers to integrate information and communication technologies (ICTs) into the classroom.

All Connect-ED activities encourage the increased use of information technology for education as a means of promoting democracy and increasing access to economic opportunities. Moreover, the activities are delivering urban and rural equipment, training, and resources as a means of enhancing the Universal Primary Education (UPE) policy in Uganda. Specifically, the educational improvements are expected to increase rural students' literacy, reduce inequities among children, and advance school administration and the professional development of primary level educators.

Connect-ED is helping ITEK to advance its core curriculum with the creation of a series of Digital Resource Library CD-ROMs and an Online Multimedia Curriculum to assist and enable adult learners to use ICTs and integrate computers into student learning and to gain expertise in subjects taught in the classroom. Online curriculum access will offer timely skills and new approaches to teaching and learning and facilitate outreach to teachers in rural and urban areas. These online resources enrich the learning environment and supplement traditional classroom materials. Revising the curriculum, making it accessible via computer, and training teachers in ICT use is expected to begin the process of improving educational quality.

5.2 Principal e-Government enablers

- Several pioneering efforts have been successful and have proved that ICT can successfully help in the development of the country.
- Media attention for these pioneering efforts has ensured widespread awareness
- Ground realities and means of overcoming the odds have been well documented
- There is a less risk perception because the success of the pioneering projects

5.3 Principal deficiencies

- Connectivity and electricity are the main constraints apart from finances for widespread rollout
- Some of the pioneering efforts including SchoolNet are not sustainable without sizeable assistance from donors (for large scale rollout)
- Many projects including the Telecentre at Nakaseke are struggling to survive once the donor agency funding dries up, since the population benefited does not have the capacity to pay

5.4 Requirements

The prime requirement is to now build upon these pioneering efforts – replicate SchoolNet with WiFi links instead of VSAT or replicate Nakaseke on a minute scale; a telecentre with just a single computer or laptop, connected using a dialup or WiFi links and providing wide ranging services to the community – e.g. cheaper letters, phone access apart from e-Government services

5.5 Plan of action

All the pilots that have been described under various sections of this report will be pioneering R & D efforts to ensure quicker and less painful transitions to e-Government.

5.6 Pilot Projects

The following pilots are mainly R&D efforts aimed at ensuring quicker and more stable transition to e-Governance

- WiFi / VOIP based Metropolitan Area Networks
- WiFi / VOIP based Rural Networks
- WiFi / VOIP based School Networks & School information repository
- E-Government Telecenters / Kiosks

6 Investments in ICT development within the Government

6.1 Current status

Figures of the exact investments made are not available accurately, since all projects could not be covered

Most of the funds for ICT related projects comes from donors

Even when internal funds are available for ICT training or development, they are often utilized for more pressing needs elsewhere

Communication costs are by far the most important recurring expenses on ICT

On an average stationery and printing accounted for approximately 3% - 5% of the non-wage budget and communications about 8% (including telephone and Internet costs)

Ministries and departments with sufficient donor support have invested heavily in ICT, particularly MoFPED and bodies such as NEMA or the Department of Water Resources (to name a few). Other ministries with strong internal support for ICT such as Local Government, Health, Education and Foreign Affairs have also managed sizeable investments in ICT related activities.

Few ministries such as Justice and Defense invest in regular training programs for their staff in ICT

According to surveys, the Government spending accounted for approximately 30% of hardware and 50% of software sales in the country. This would mean an investment of around US\$ 20m per year on hardware and about US\$ 10m per year on software. This however does not include software and hardware sourced directly by donors from abroad, which could add substantially to this figure. Large projects such as IFMS cost around US\$ 5m; smaller efforts such as LoGICS cost approximately US\$ 125,000.

6.2 Principal e-Government enablers

- Strong support by lenders and donors to several ministries
- Growing pool of trained and talented software and hardware technologists who are associated with the projects
- Several projects have been highly successful (e.g. HealthNet, LoGICS, EMIS, UConnect or SchoolNet) but lack of funding may have hampered further rollout

6.3 Principal deficiencies

- Lack of internal resources
- Ministries that do not have access to donor funds are left without any worthwhile ICT infrastructure
- Lack of coordination between ministries sometimes results in duplication of effort
- No standardization of systems across the Government
- Undue influence of consultants and companies from donor countries

6.4 Requirements

The Government should now concentrate in revenue generating (or expense saving) projects. The Government needs to invest heavily in ICT infrastructure projects or ensure that infrastructure companies are invited to invest in Uganda. In particular, a one-time investment in a fiber-optic connectivity backbone is vitally important.

As the e-government initiatives gather steam, the Government would need to invest more on ICT. Government departments and ministries must invest to ensure the following:

- A networked PC on every desk
- PABX in every office
- Mail server, Proxy server and firewall
- Standard office productivity packages such as MS or Star Office
- Standard tools such as anti-virus software, etc

The next round of investments should be in customized or special purpose packages to improve productivity and service levels. The third round of investments must be aimed at connectivity with other offices and ministries and development of document management and collaboration systems. All these phases of investments need to be undertaken simultaneously.

6.5 Other ICT Investment

The Ugandan IT market is growing at a cumulative annual growth rate (CAGR) of about 25%. The hardware market is estimated to touch US\$ 63m in 2004 (up 23%) and the software market to US\$ 22m (up 27%). However piracy, which is rampant, could adversely affect this figure. The fledgling IT related services market is placed at US\$ 25m, mostly from the ICT training, website development and custom software development sectors.

MTN has invested close to US\$ 185m in Uganda till sep 2003 and UTL at least US\$ 100m. This trend is likely to continue as the Telcos increase their penetration as well as upgrade their networks. Post July 2005, substantial investments are expected in both the telecom as well as the ISP sectors.

Private businesses are as a group the most e-ready entity in the country. The private sector is investing at a steady rate in automation and capacity building and at least two large companies are actively scouting for ERP implementations. This is a steady source of investments in ICT that can be counted upon to expand in synch with economic expansion. Other steady markets are the NGO and non-profit sector. The financial sector has recently begun expanding its automation and could be a big driver of the ICT market in future.

The Government sector as a whole is expected to maintain the same levels of purchase as previous years, because of budgetary constraints.

Investments in infrastructure

Investments need to be made in infrastructure, especially in fiber optic connectivity, particularly between the larger towns and to the submarine trunks. These investments hold the key to continued growth of the ICT sector. Both MTN and UTL have invested in building fiber links in downtown Kampala. Large-scale Infrastructure projects like digital links over transmission towers or fiber links along railway lines are required and Uganda must fulfill its commitments to the Comtel and EAC Digital Transmission projects. A one-time investment by the Government in ensuring a high-bandwidth fiber backbone along all major trunks within the country is essential.

ICT technology parks and incubators need to be developed, which will need a great deal of investment up front. ICT incubators, especially for IT enabled services such as call centers, need infrastructure that can deliver 24/7 services. Double and triple redundancies in such critical areas such as power and Internet bandwidth are needed. It is unlikely that any large investment will be made as long as only limited wireless or VSAT based bandwidth is available.

Lastly, any improvement in ICT spread and usage will ultimately depend on the strengthening and expansion of the electricity grid, particularly in rural areas.

7 Policies, Programs and Projects in E-Government

7.1 Current scenario

Public policy can help or hinder e-Governance. The favorable climate that public policy can create for Internet use and e-commerce encourages communities, organizations and individuals to invest in and use information and communication technologies. The phenomenal success in the Telecommunications sector is due to the visionary Telecom policies of the Government. Uganda has one of the most deregulated Telecom markets in Africa and UCC is the highest rated regulator among the developing countries.

In Uganda there are two regulatory arrangements for the telecommunications sector: the Communications Act and an ICT policy. Telecom companies in the country have been specializing in providing Internet only or wireless services, and lately a combined set of services. A Rural Communications Fund has been established, and is subsidizing communications services to rural areas, also attempting to develop local content for Internet communications. The number of private telecommunications' providers and operators has been increasing, as well as the number of subscribers. However the exclusivity clause in the license of the two major operators has hindered entry of new participants in the sector and has particularly hit International bandwidth infrastructure. Tariffs and subscription fees have been significantly reduced.

The Uganda ICT Policy Framework document completed in September 2002 was submitted to the cabinet for consideration in late 2003, after several reviews, deliberations and a few amendments (since this document was developed through a national consultative process). The Cabinet has recently ratified the ICT policy. The Ugandan government has selected five institutions to implement the national ICT strategy. The institutions include the Ministry of Works, which is working on e-Governance, the Uganda Investment Authority working on establishment of e-Commerce, Office of the President working on establishing e-Information, e-Education by the Ministry of Education and e-Health by the Ministry of Health.

The Government has been long considered ICT as one of the key sectors that has the potential to ensure rapid development of the country. Telecom reforms have been a major success. The Government has also waived off all duties on hardware and software in an effort to make computers more affordable and hence encourage their usage. A number of capacity building efforts have been undertaken to improve the efficiency of the Government itself and various ministries have executed several key ICT projects.

By and large Uganda rates high on the Policy front. The legal loopholes that existed that hindered the growth of e-commerce and e-transactions (such as the Evidence Act) are also being comprehensively reviewed and should soon be suitably amended

The National ICT policy has identified 14 key objectives, which include improving connectivity and human capacity; sensitizing society about the role of ICT in development; promoting local and foreign direct investments in ICT, working out an enabling legal framework and establishing innovative financial schemes to promote the sector. Other objectives include improving access, encouraging use of ICT to improve efficiency in organisations, enhancing local content and ensuring gender or linguistic equality of opportunity. The ICT policy also aims at ensuring respect for intellectual property, encouraging research in ICT and enhancing collaboration in various fields of ICT.

Implementation of the above policy is the critical factor and will depend on how well the country is able to further improve access, sensitize the population and build human capacity.

Government ICT related policies have so far been highly successful. The telecom policy has been a stellar success and has resulted in a quantum jump in availability of mobile services in many parts of the country. Uganda was the third country after Cambodia and Finland where mobile teledensity exceeded landline teledensity. The result has been increased competition; better quality services and amongst the lowest calling rates in East Africa. The exclusivity clause in the licenses of UTL and MTN has however curtailed growth of International bandwidth and the EAC digital transmission project, which would have considerably improved East African infrastructure, was canned at the last moment because of the reluctance of the new incumbent in Uganda and Tanzania who were not keen to proceed with the project for which financing had already identified.

The removal of duties on computers made them affordable to companies and the ownership has since doubled. Costs are still too high for most individuals to own computers, but standard computer equipment is now more reasonably priced. The same policy needs to be extended for a few years. ICT training is exempted from VAT, which should be extended to software services meant for exports (not for local consumption). Finally, the policy must encourage locally incorporated companies by giving them a 3% or so grace in tender prices and a certain percentage of tenders (based on value and expertise required) must be reserved for local companies.

7.2 Principal e-Government enablers

- Telecom deregulations is a stellar success
- The ICT trade liberalization policy is also highly successful and has doubled the number of computers in the country
- A National ICT policy framework has been put in place and strategies for its implementation are being formalized
- UCC is the highest rated regulatory authority in the developing world for its professionalism and sense of purpose
- To encourage ICT growth, Uganda scrapped import taxes on computers and in August 2002 waived a \$500 licence fee on communication services providers like fax bureaus, Internet cafes and phone kiosks to make services accessible and cheaper.

7.3 Principal deficiencies

- Legal framework for e-transactions is not in place. The Evidence Act also has to be amended.
- Several laws need to be amended for e-Governance to take off in this country

7.4 Requirements: Judicial Reform

Judicial Reform is a critical input for improving the readiness of a country for e-governance. The **Uganda Law Reform Commission** was mandated (among a number of other tasks), the job of suggesting reforms in laws vital for e-Commerce and spread of use of ICT in business, such as the Evidence Act. ULRC has published the following reports (only those relevant to ICT are listed here) as well as prepared draft bills, which are currently being debated. It is critical that the following laws are quickly amended.

Laws that directly affect the ICT sector

- Trade Marks
- E-Commerce, Evidence, Computer Crime
- The proposed Copy rights and Neighboring Rights
- Secured Transactions
- The Law of Intellectual Property
- Intellectual Property Office

Laws that could help in encouraging sales of ICT equipment

- Hire Purchase and Mortgages
- Consumer Protection
- Sales of Goods and Trade Licensing

Laws that could help in encouraging Foreign Direct Investment into the country

- Insolvency
- Business Associations
- Bankruptcy
- Deeds of Arrangement
- Co-operatives and Joint Ventures
- Personal Properties
- Labour Laws (2000)
- Industrial Property
- Trade Secrets

ULRC has formulated (or is in the process of formulating) the following draft bills, which are currently being debated:

- The proposed Copyrights and Neighbouring Rights Act
- The proposed Industrial Property Act
- The proposed Trade Secrets Act
- The proposed Intellectual Property Office Act
- The proposed Trade Marks Act

7.5 Commercial Justice Reform Programme

Under commercial Justice Reform programme the following areas / laws are currently being worked on and are in their final stages of completion:

7.5.1 Intellectual property law project

This project involved a study and proposals on the current intellectual property regime, with a view to strengthening the enforcement of Uganda's intellectual property rights so as to encourage investment and invention, to propose amendments or where necessary new legislation for areas not currently covered and to bring the current law into conformity with Uganda's international obligations. The study covered Patent, Copyright and Trademarks law among others and also introduced Trade Secrets, Geographical Indications, proposed legislation to regulate Traditional Medicine Practitioners and to establish an intellectual property office.

7.5.2 Codification of contract law

The objective of this project is to develop a codified law of contract for Uganda. Contract law in Uganda is currently dependent on common law and case law and is therefore inaccessible to most people. Furthermore it is difficult to adapt some of the principles to local situations. In the interest of promoting commerce and adapting to new developments in technology, several other jurisdictions are doing away with the ancient doctrines of contract. The codification of the law of contract is not only in tandem with harmonizing laws within the East African Community and other regional groupings, but is also pivotal in facilitating business transactions and trade.

7.5.3 E-Commerce, Computer Crime and E-Evidence

The study on e-transactions, seeks to provide legislation that will remove certain impediments currently preventing the use of electronic communications and record keeping in some areas and secondly to remove avoidable uncertainty surrounding the legal status of the use of electronic transactions and related uses of modern technology.

7.5.4 Subsidies and countervailing measures

This study seeks to develop a modern law on subsidies and countervailing measures to support a competitive economy and ultimately ensure fair trade by checking on the adverse effects that imported subsidized products may cause to the domestic industries in Uganda.

7.5.5 Radio Programmes

This is an ongoing activity with Radio One. It involves the dissemination of work the Commission has done so far and what it is planning to do. The major objective is to encourage communities to participate in the law reform/making process.

7.6 Sample Projects in Key Sectors (apart from those mentioned in Section 5)

RCDF is an outstanding effort to develop ICT infrastructure at the districts & to bring universal access to ICT to the people.

7.6.1 Rural Communications Development Fund (RCDF)

Information courtesy UCC

Background

The Government having realised that there were likely to be imbalances in communication services between the urban and the rural areas provided in the law for the establishment of a Rural Communications Development Fund (RCDF) under Uganda Communications Commission (UCC) as a main leverage to address universal access issues. The Minister Works, Housing & Communications, Hon. John Nasasira launched the Rural Communications Development programme on 12th February 2003.

Funds were released on 12th February 2003 to private companies to install telephone services in 154 sub-counties currently not being served by the national operators but where their signal is received. Further an Internet point-of presence (POP), a telecentre and ICT training facility and a website will be created for each of the country's 56 districts. The websites were to be up and running by May 2003, and all the others by end September. The 154 sub-counties where phone services are to be extended are those, which the national operators said they would not invest it because it was deemed un-economical. RCDF is funded by a \$5m World Bank grant and a 1% levy on the annual gross revenue of the two national telecom operators. (The law provides for them to pay up to 2.5% of their earnings to the RCDF but they are paying 1% because they have not yet recovered their investments).

The Government's vision is as follows:

- ➔ Bridging the glaring digital divide between the urban and the rural areas
- ➔ Ensuring that basic communication services of acceptable quality are accessible, at affordable prices and at reasonable distances by all people in Uganda
- ➔ Securing the active participation and partnership of the private sector in meeting this challenge

Objective of the RCDF

The main objective of the RCDF is to support the provision of ICT services in the rural areas not considered viable by the national operators. The specific objectives of this project are to:

- ➔ Ensure that all sub-counties with at least 5,000 inhabitants have access to basic communication services by 2005.
- ➔ Ensure that the limited resources of the RCDF are effectively utilized to create immediate impact.
- ➔ Support establishment of an Internet Point of Presence (PoP) in every district of Uganda by 2003, where each PoP shall be associated with at least one Internet Cyber café'.
- ➔ Increase the use of Information and Communication Technologies (ICT) in Uganda by supporting introduction of ICT use in at least one "vanguard" institution in every district of Uganda by 2003.
- ➔ Promote provision of communication services in rural areas as a profitable business.

The private sector will be the main implementers of the programme.

7.6.2 The Integrated Financial Management System (IFMS)

Courtesy Ministry of Finance, Planning and Economic Development

IFMS is one of the first efforts to roll out a pan-Government system. The e-Government project implementers should study the IFMS project carefully and replicate the systems that have ensured its success.

In order to improve financial information processing and reporting systems, the Government of Uganda (GOU), through the EFMP II project is implementing an Integrated Financial Management System (IFMS) that will eventually cover all the major Government business processes including **Budgeting, Accounting and Reporting, Purchasing, Payments / Payables, Revenue management, Commitment Accounting, Cash Management, Debt Management, Fixed Assets, Fleet Management, and Inventory/Stock Control.**

An IFMS bundles all financial management functions into one suite of applications. It is an IT-based budgeting and accounting system that will assist GOU entities to initiate, spend and monitor their budgets, initiate and process their payments, and manage and report on their financial activities. The IFMS can streamline all fiscal and financial management processes throughout Government & provide GOU with a modern budgeting and accounting system with state of the art functionality on which to undertake its national and public sector accounting and financial management. The IFMS will interface with other systems such as the Integrated Personnel and Payroll system (IPPS), URA Revenue systems and Bank of Uganda systems.

IFMS implementation calendar

TASK	START	FINISH
Financial Management Systems Study by Ernst & Young	10/1/2001	04/30/2002
Implement Uniform Chart of Accounts across Government	4/1/2002	6/27/2003
Development and Pilot Site Preparation	3/20/2002	11/18/2002
Data Centre Preparation	3/20/2002	3/31/2003
Capacity Building	4/1/2002	12/31/2003
IFMS Pilot Implementation	6/3/2002	9/30/2003
Engage Supplier	6/3/2002	1/6/2003
Application Development (set-up)	2/1/2003	5/31/2003
Hardware and Software Delivery and Installation	1/15/2003	6/30/2003
IFMS Pilot Site G0-Live Date	7/1/2003	
Monitoring and Evaluation	7/1/2003	12/31/2003
IFMS Rollout Implementation	10/1/2003	9/30/2004

NB: Full rollout of a system of this magnitude can take a further 4 to 5 years

7.6.3 LoGICS

Courtesy Ministry of Local Government

MoLG is an outstanding example of how far an institution can go in inducting ICTs into its functioning, given a clear vision of the senior management and a dedicated and talented ICT team.

LoGICS is a computerised system for monitoring the performance of Local Governments (LGs). LoGICS uses a subset of current routine data requirements so that Local Governments do not face an additional data collection burden. It is flexible allowing for partial implementation based on local capacity and for customised analysis and reporting in response to local needs. Designed as a shared management tool for Local Governments and the Ministry of Local Government, LoGICS makes information available to other Ministries and stakeholders through the web-enabled One Stop Resource Centre.

LoGICS delivers the following advantages:

- **A management tool for Local Governments** LoGICS is designed so that the collection of data is done by Local Government, for Local Government, providing a local incentive to collect good quality data for decision-making purposes.
- **Based on current realities** LoGICS' data requirements have been identified in consultation with LGs, focusing on information that is feasible to collect and useful for decision-making.
- **Encouraging stakeholder dialogue** Information from all districts will be aggregated at the One-Stop Centre and made freely available via the Web. At LG level simple performance reports can be made available on local bulletin boards.
- **Designed for ease of navigation and use** It is easy to enter, edit and retrieve information, as well as design, save and print reports. LoGICS has validation routines to find errors, and data collection forms can be printed from the computer.
- **Flexibility, allowing partial implementation** LoGICS does not require all data-sets to be operational. It can operate with data for only some sectors or aspects of Local Government work, with data coverage expanding as local capacity develops.
- **A complete package** LoGICS is not just software. It comes with user manuals and facilitators' guides for conducting training courses. It also has a Meta Database describing LoGICS' structure and data, allowing programmers to develop the system easily.
- **Designed and programmed in-country** The system has been designed in consultation with Local Governments and the programming done by Ugandan consultants. This builds technical sustainability, allowing technical problems to be solved locally.

7.6.4 e-Government Initiatives

Uganda has launched websites for 26 of the country's 56 districts. The websites were developed by Uganda Home Pages (www.myuganda.co.ug) and is part of the UCC's campaign to place Ugandan content on the Internet and encourage ICT use. The facilities are being established under a Rural Communications Development Fund (RCDF) to which national telephone service providers contribute one percent of their gross revenues.

The district Information Portal (www.districts.go.ug) has in-depth information various aspects of Uganda, including its history, government, tourism, investment opportunities, etc. Each district will have its own website linked to the district information portal. The name of each district is also its online domain name, hence the website for Mbale district is www.mbale.go.ug. The district websites contain information on the local Government administrative setup, education, health, agriculture and other economic activities, investment opportunities and infrastructure. Patrick Masambu, the Executive Director of UCC, says over \$7.4 million has been raised for the rural telecom fund, including about \$2.4m from telecom providers, and a \$5 million World Bank grant.

7.6.5 Education Management Information System (EMIS)

Information courtesy MOES, Africon

Uganda's Education Management Information System (EMIS) measures the state of the country's education system on an annual basis to enable informed management and planning. EMIS provides reliable information about schools, pupils, personnel, finance and infrastructure and is vital to the daily planning activities of the country's Ministry of Education and Sport (MoES). It also provides a credible source of information based upon which donor funding can be obtained. The consultant, Africon has been involved in Uganda's EMIS since 1999 when the initial system was implemented. In addition to capacity building, Africon is also responsible for:

- ➔ The installation of a local area network (LAN) at the Ministry's head office
- ➔ A pilot project to implement a wide area network (WAN) for improved communications to the districts
- ➔ Additional software modules to include data for other education sectors (e.g. Pre-primary, post-primary, non-formal and tertiary)
- ➔ A school mapping exercise to link the EMIS data to a geographical information system.

Key data monitored by the EMIS:

Category	Sample Data Collected
School Particulars	Ownership, Funding Source, School Type, Registry Status, Distance to nearest school of the same level, Location
Pupil information	Enrolment Age, Streams by class, UPE children, Orphans, Pupils with special learning needs, Repeaters, New entrants to P1
Pupils with adequate seating or writing space	
Transferred pupils	Transfers in, Transfers out, Dropouts with reason
Teacher information	Age, Highest Level of education, Highest Teacher qualification, Date of first posting, Additional School Responsibility, MPS Salary Scale, Training Last Year, Previous Posting (District), Main Subject of Specialisation (secondary only), Main subject taught (secondary only)
Teaching Staff	Reason for Leaving School (last year)
Office Staff	
Technical Staff / Others	
Infrastructure and Sanitation	Buildings, Rooms, rooms needed, Main Water Source, toilets
Teaching Materials (primary only)	Number of textbooks, teacher guides, and class periods per week by subject
Financial Information (last school year)	Total Income, Government Grants Received
Fees	Parent Contributions, Salaries for Teachers from government, Donations in kind
Recurrent Costs	Salaries, Government Payroll, Instructional Materials, Administration, Examination Fees, Other Recurrent Costs
Development Costs	Construction, Classroom furniture, Other Development Costs

7.6.6 Agricultural Research Information Services (ARIS)

Background

In 1989, a national agricultural information service was established in collaboration with the Food and Agriculture Organisation (FAO) within the research division, under the Ministry of Agriculture and Forestry into a central unit to co-ordinate agricultural information services within the agriculture sector ministries. The unit was to essentially assemble information emanating from researchers and actively promote its access to the users. The Centre was known as the National Agricultural Documentation Centre (NADIC).

With the establishment of NARO, in 1994 NADIC was incorporated under NARO. Through the information policy strategy of 1995, NADIC was renamed the Agricultural Research Information Service (ARIS). ARIS is one of the support service units of the NARO responsible for co-coordinating library, documentation and information activities and enhances access to scientific knowledge on agriculture research at national and international levels.

ARIS aims to:

- ➔ Establish an effective, efficient, systematic, up-to-date, well managed and easily accessible system of gathering, processing, storing and disseminating agricultural information
- ➔ Provide scientists, research policy makers and managers and technology users with accurate, timely, and up-to-date information
- ➔ To collect, process, store and disseminate scientific and technical information to support agricultural research and development.

AGRIS

The National Information System for Agricultural Sciences and Technology database. (AGRIS) - Focuses on collecting, processing, storing, disseminating and exchanging of unpublished literature among and within member countries from developing and developed countries. WebAgris, is being tested by FAO to enable scientists access the AGRIS database online.

National Current Agricultural Research Information System (CARIS) database - focuses on completed and on-going agricultural research projects.

AGRIS, CARIS and Regional databases are integrated into ARIS reporting

7.6.7 Key ICT Projects in Government Institutions

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Office of the President (OP)	Internet/E-mail System (OP, State house, OPM) Intranet (OP, Statehouse)	To easy both internal and external communication and data/information sharing at the headquarters and in the LGs field offices (Procurement, financial management, HR, inventory etc.) To provide a protected and secure internal data/information sharing system – Ministers, PSs have already been assigned user IDs
Office of the Prime Minister	ICT Capacity building for Central Government Ministries, Departments and Agencies Resource Centre	To enhance capacity of central Government Ministries, Departments and Agencies to effectively coordinate their activities and tasks more efficiently and effectively by sharing information amongst themselves and other stakeholders (Development of a policy framework on IT. Increase of computer literacy among political leadership and civil servants, expansion of the usage of Internet/email and web technology, provision of computer hardware/software to stakeholders, establishment of LANs and WANS) To provide data/information on coordination and monitoring of government programmes
Parliament of Uganda	Internet/Email Parliamentary MIS	To easy both internal and external communication and data/information sharing To provide a protected and secure internal data/information sharing

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Ministry of Finance, Planning & Economic Development (MoFPED)	Integrated Fiscal Management System (IFMS) Information Sharing System (ISS)	To provide IT-Information systems in order to increase efficiency, effectiveness, transparency, accountability and relevance to Government fiscal management. To provide a back- bone infrastructure for the sharing of information within the MoFPED to ensure its fast and efficient flow together with minimizing the usage of physical paper work, therein

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Uganda Revenue Authority (URA) National Revenue Collection	<p>Tax Identification No. Project</p> <p>ASYCUDA (Automated Systems for Customs) Project</p> <p>SCALA Financial Management</p> <p>EHORIZON Human Resource Management</p> <p>Advance Cargo Management Information System</p> <p>Backbone Infrastructure (Local Area Network – LAN) Project.</p>	<p>A databank for maintaining the Tax Identification Numbers for all taxpayers including both categories of personal and business to enable a centralized storage/access for the different tax payment points i.e Large Tax, VAT, Customs, Income Tax and Fees & Licenses.</p> <p>To handle Customs processes together with the movement of goods within the country.</p> <p>To handle the financial accounting and management.</p> <p>To handle the human resource management systems</p> <p>To link to the Uganda Railways Corporation (URC) to monitor cargo flows as well as road tracking</p> <p>To lay Local Area Networks (LANs) at each URA station with the eventual link into a wide Area. The (WAN). The WAN would enable the implementation of a centralized Information System whilst also providing possible facilities to link to the commercial banks and the Ban of Uganda for faster payments processing.</p> <p>The backbone infrastructure would also allow for an on- line with the sector stakeholders, 120 bended warehouses (inland cargo depots) for faster and efficient payments processing.</p>

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Uganda Revenue Authority (URA) National Revenue Collection	<p>Integrated Tax Administration System</p> <p>Data warehousing project</p> <p>Motor Vehicle Licensing & Registration</p> <p>Document Management System</p> <p>Training Project</p>	<p>To facilitate and manage the tax administration for large Tax, VAT, Customs, Income Tax and fees & Licenses.</p> <p>To provide a comprehensive databank with archival facilities in order to establish an enhanced Decision Support System (DSS).</p> <p>To establish and maintain a motor vehicle licensing and registration databank.</p> <p>To hasten the flow of information through minimized usage of physical paper documents especially within the institution. It would also allow for on- line storage and retrieve of information through the intranet.</p> <p>To provide training in the basic ICT skills to be able to operate the specific applications more efficiently.</p>

MINISTRY / INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Makerere University, Kampala University Higher Education	ICT Policy & Master Plan	To provide strategic direction in realizing Makerere University's vision.
	Setting up the Directorate of ICT Support (DICTS)	To provide management, maintenance and control of the University's ICT resources.
	Network Infrastructure (Maknet)	To establish University-wide platform for access to communication and data sharing facilities.
	Email/Internet Service (EMI)	To ease communication in both the Intranet/Internet.
	End User Training Project	To equip students and staff with basic computer skills needed to exploit the ICT potential.
	Setting up of Information Systems	
	Makerere Library Information System (MAKLIBIS)	The library is the focus of a university academics and research functions
	Academic Record Information System (ARIS)	Enhances and streamlines student related administrative and managerial processes
	Finance Information System (FINIS)	Streamline financial management processes and reporting facilities at both central and faculty levels.
	Human Resources Information System (HURIS)	Ensure adequate utilization of human labour for productivity and attainment of organizational mission and goals.
eLearning	To create a dynamic and timely learning environment.	

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Ministry of Local Government	<p>Monitoring & Evaluation Compliance Inspection Information Communication System for Local Government (LGs)</p> <p>District Administrative Network (Lira, Kayunga , Mbarara and Mbale)</p> <p>MOLG performance Monitoring MIS</p>	<p>To develop a viable, practical and usable M&E Compliance inspection Information Communication System .</p> <p>To setup a one-stop center at MOLG with data/information on decentralization and its implementation in Uganda (LAN, Internet/email connectivity)</p> <p>To establish database in LGs for data information processing for decision making and planning functions.</p> <p>To improve performance in the LGs by establishing functional data/information management and public communication systems for effective and efficient service delivery (LANs, Internet/email servers, data/voice communication links between Districts and Sub countries, computerized databanks, vote books, workplans, financial accounting, basic user ICT training program)</p> <p>To enhance the performance of the MOLG headquarters in delivering it's mandate strategic objectives.</p>

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Ministry of Education and Sports Government Ministry	<p>Education Management Information System (EMIS)</p> <p>ICT Maintenance Facility</p> <p>Workflow Management and Financial in planning and Budgeting.</p>	<p>To provide quality education statistics in a timely, cost-effective and sustainable manner (PCs and software-ED* Assist have been purchased and distributed to all Districts and municipalities)</p> <p>To develop the capacity of users to handle ICT equipment and carry out preventive maintenance and remedies to equipment failure (Establishment of support call Centre/Help desk, introduction of maintenance mobile unit)</p> <p>To improve performance by reducing long cycle of releasing funds within MoES, provision of interfaces with external parties, ICT skills training, timely delivery of work plans enhancing transparency and accountability</p>
Ministry of Public Service	Integrated Personnel and Payroll System (IPPS)	To improve management of human resources and the wage bill/payroll. (Payroll Management and processing, HR management, control and monitoring systems)
Ministry of Health Government Ministry	Health Management Information System (HMIS)	<p>To provide an integrated system with comprehensive data/information on the health sector</p> <p>(Tele medicine, web driven databases, Intranet, E-Library-Resource Centre</p>

MINISTRY/ INSTITUTION	NAME OF PROJECT	OBJECTIVE OF PROJECT
Uganda Communications (UCC) Telecommunications Regulatory Authority	Rural Communications Project.	<p>The objectives of the projects are as follows :</p> <p>To provide voice/telephone communications in 154 non-commercially viable sub-counties by Aug 2003.</p> <p>To provide Internet Points of Presence (POPs) to 31 district headquarters by 2005</p> <p>To provide multipurpose telecenters to 7 locations starting with Paidha and Kisiizi (Rukungiri Districts)</p>

Courtesy: UCS

8 Planned / Future activities in E-Government

8.1 Current scenario

The primary focus so far has been on providing websites with lots of information.

Uganda has launched websites for 26 of the country's 56 districts in an endeavor to increase access to and usage of modern information and communication technologies (ICTs) in underserved districts. Uganda Home Pages developed the websites. The UCC (under RCDF) will also establish telecentres, Internet Point of Presence (POPs) and ICT training centres in underserved districts in a programme that highlights the success of its telecommunications liberalization programme.

The websites contain information on education, health, agriculture and other economic activities, investment opportunities and infrastructure. There is also information on the districts' administrative set-up, as well as the various administrators and their contact details.

The Government's vision is as follows:

- Bridging the glaring digital divide between the urban and the rural areas
- Ensuring that basic communication services of acceptable quality are accessible, at affordable prices and at reasonable distances by all people in Uganda
- Securing the active participation and partnership of the private sector in meeting this challenge

The main objective of the RCDF project of the UCC is to support the provision of ICT services in the rural areas not considered viable by the national operators. The specific objectives of this project are to:

- Ensure that all sub-counties with at least 5,000 inhabitants have access to basic communication services by 2005.
- Ensure that the limited resources of the RCDF are effectively utilized to create immediate impact.
- Support establishment of an Internet Point of Presence (PoP) in every district of Uganda by 2003, where each PoP shall be associated with at least one Internet Cyber café'.
- Increase the use of Information and Communication Technologies (ICT) in Uganda by supporting introduction of ICT use in at least one "vanguard" institution in every district of Uganda by 2003.
- Promote provision of communication services in rural areas as a profitable business.

The private sector will be the main implementers of the programme. Four successful firms were selected through a competitive bidding process to provide the above-mentioned services. These include Uganda Telecom Limited (UTL), MTN Publicom, Uganda Home Pages and Telecom Equator 17,807,000/=. UTL is expected to establish Internet Points of access at the districts while MTN will establish public telephone booths. In addition, Uganda Home Pages Ltd will develop local content for the districts websites, while Equator Telecom Uganda will set up Internet cafes.

8.2 Requirements

Infrastructure

Successful e-Government initiatives depend on availability of quality power supply and adequate Internet access

The proposed projects use newer technologies to solve the problems of connectivity and bandwidth

8.3 Plan of action

The plan of action in short:

- A simple demonstration of e-Government would be to automate payments of salary checks by the Bank of Uganda. The Bank pays about 200,000 cheques every month to Government employees at various places. If these were automated, salaries would be credited faster and the Government would save a sizeable amount on cheques books, which are imported.
- Supply each Government ministry and department with a PBX system (where it is not available)
- Place a Computer on each desk in each Government office
- Setup local area networks in all offices that do not possess them. Setup Internal mail and file collaboration systems
- Setup the Wireless MAN in Kampala as explained above
- Revive the East African Community Digital Transmission Infrastructure project
- Setup an ICT Incubator and an ICT University
- Setting up of an ICT University and local ICT accreditation and increasing the affordability of ICT (or for that matter any) education by offering prospective students a simple education loan scheme with the degree or diploma certificate themselves as guarantees (explained in the section 3: Human Resources)
- Setting up of a body to coordinate all ICT related activities of the Government such as procurement, maintenance of hardware and software, creation of standards. It is possible to increase affordability of ICT equipment and resources to Government organisations by suggesting standardized equipment, an approved list of dealers and bulk purchasing to reduce costs and improve bargaining capability
- Setting up of ICT technology parks for encouraging private sector startups
- Inviting Infrastructure companies to set up masts, fiber optic trunks and other infrastructure that could be leased by the major ICT players for a fee; in particular reviving plans such as the East African Digital Transmission Project

8.4 Pilot projects

The 6-point action plan suggested focuses on the following (the first three are candidates for R&D pilot projects)

- ➔ Setting up of a low cost WiFi / VOIP Metropolitan Area Network in Kampala to provide all the Government offices with Intercom and Data Networking services across all Government buildings in Kampala. The same technology can also be used to improve access to communication facilities for people, schools and small businesses or for connecting counties to District Governments (see Section 2: ICT Infrastructure)
- ➔ Setting up of a content repository for schools (explained in the section 3: Human Resources)
- ➔ Setting up of e-Government kiosks

8.5 Long term Projects

8.5.1 ICT Incubators / Technology Parks

It is the ability to create wealth from intellectual and social capital and reduce time to market that is critical to the survival of the company in the early stages. Entrepreneurs and small businesses may have potentially good ideas but lack the proper framework to support them to successfully commercialize these ideas. The Incubator Centre helps to overcome these barriers and enables entrepreneurs to translate their ideas into marketable products, applications and services via an appropriate package of infrastructure, technical advice and financial support.

In a country like Uganda where Infrastructure is weak, it is necessary to create “islands of plenty” where companies can operate without facing the problems that are faced by similar businesses operating in other parts of the country. These incubator companies must be viewed as an investment into the future. Several of them may not survive in spite of the facilities offered; others would probably die as soon as the umbilical cord of the incubator is removed. Long term development of the sector will be ensured by the companies that do survive the initial period. The Incubator will simply make it easier for these companies to survive the initial phases.

Uganda has one of the highest cost structures for setting up an information, communication and technology (ICT) centre compared to other countries. In most other countries, bandwidth is available for a tenth of the cost. Skilled labor in Uganda is by no means cheap compared to many competing economies. Uganda’s successes in the ICT field will come from the ITES sector initially. The Government has to provide subsidies to companies investing in ICT, such as tax breaks and other concessions such as VAT holidays for a limited period.

The Incubator must be built on the plug-and-play concept, providing tenants with all necessary amenities, such as reliable and adequate power, ample car parking, a state-of-the-art Building Management System and more.

Mission of the ICT Incubator

To be a centre of excellence where ideas and entrepreneurship are transformed into successful and viable business ventures.

Chief Objectives

- Help entrepreneurs and start-ups counter the reasons for most failures or inability to reach full potential i.e. the lack of breadth of business skills and the lack of finance.
- Provide cost effective facilities and efficiently managed infrastructure together with value added business support and advisory services to start-ups.
- Boost job creation in the ICT Sector
- Develop managerial talent in the ICT sector
- Promote entrepreneurship in the ICT sector.
- Develop linkages with other businesses incubators
- Promote the marketing of the Incubator Centre as well as its products and services.

Benefits

- Availability of cost competitive office space facilities
- Facilitate the process of securing funding through links to financing and venture capital sources
- Access to information on government grant schemes including access to facilities offered by other Incubators
- Consulting services regarding development of business plans, marketing strategies, ICT solutions, recruitment, financial management and legal matters at concessionary rates
- Promotion and Assistance of start-ups and assist them in marketing their products and services

Infrastructure

The Incubator must provide the following facilities:

- 24 / 7 Uninterrupted Power Supply
- 24 / 7 broadband Internet availability at 128kbps minimum per unit. Additional bandwidth should be available on demand
- Shared Voice & Data Communications facilities should also be available
- Shared secretarial
- Air-conditioning
- Vehicle parking facility
- Security & Safety
- Environment - Sewage & Landscaping
- Water Storage

Value-added Services / Amenities

Typically, incubators also provide the following facilities:

- Property Maintenance and Management
- Project Management Team
- Transportation
- Incubator Business Centre
- Incubator Health Club
- The Incubator should have a small Mall with an ATM / Bank, multi-cuisine restaurant, F&B outlets / food court, Foreign exchange service, Travel agent, Courier service, Laundry service, Stationery store, Medical clinic, Supermarket, Lifestyle store, Salon for Men & Women, Mobile phone service center, etc
- The Incubator must have an in-house dedicated Telephone Exchange, providing Voice and ISDN lines. An exchange with a capacity of 3,000 lines is adequate
- The Incubator should have a centrally monitored Air Conditioning & Mechanical Ventilation (ACMV) system. Lifts, fire protection system, water level status and common area lighting are monitored and controlled centrally
- Security is a crucial factor. The incubator must provide adequate and effective security for its tenants
- In the beginning, the tenants will be startups in need of business. The Incubator must act as a facilitator between potential customers and startups.

8.5.2 Infrastructure options

Uganda must actively look for investments from Infrastructure companies that can build ICT Infrastructure for use by the major and minor players in the market. Typical infrastructure that needs to be developed is fiber optic links between major cities and with neighboring countries, high bandwidth up and down links, etc.

Infrastructure built can be leased out to the operators for a fee. Even infrastructure such as mobile masts can be shared between operators; after all if there are 7 carriers operating after July 2005, would there be seven towers on each hill in Kampala? A single mast can hold several antennas and would result in savings in rent, security, maintenance, etc.

The East Africa Digital Transmission Project must be revived and pushed through at the earliest. The East African Microwave backbone network spanning Kampala – Nairobi – Mombasa – Tanga – Dar-es-Salaam was planned and implemented by the EAP & TC in the early 70s. Coupled with the Hitachi X-bar exchanges provided throughout EA at the time, the three countries enjoyed relatively good telecommunication services, with the external services provided by EXTELCO, a private company owned by Cable and Wireless and the three EA states. It owned a standard A station at Mt. Longonot in Kenya and an international switch in Nairobi.

The network has since seen expansion, extensions and upgrading mainly driven by national needs and priorities. The latest major project to provide an optical fibre cable spanning the three countries was aborted at the last moment precipitated mainly by the new incumbent in Uganda and Tanzania who were not keen to proceed with the project for which financing had already identified. This was a serious setback to infrastructure development in the three countries and goes to show how inward looking and probably more profit motivated the new companies are in their investment choices, for which funding had already been sanctioned. It is project such as these that will ultimately improve the affordability of communication facilities in Uganda.

Programme Area	Objective	Goals	Actions Suggested	Indicators of Achievement	Timeframe		
					S	M	L
Policy	Create a favorable legal and economic environment for roll-out of the e-Government Programme		Continue with existing policies	Number & types of regulations approved			
			The following laws need to be amended: Trade Marks E-Commerce, Evidence, Computer Crime The proposed Copy rights and Neighboring Rights Secured Transactions Law of Intellectual Property & Intellectual Property Office To encouraging sales of ICT equipment Hire Purchase and Mortgages Consumer Protection Sales of Goods and Trade Licensing To encouraging Foreign Direct Investment into ICT in the country Insolvency Business Associations Bankruptcy				
	Deeds of Arrangement Co-operatives and Joint Ventures Personal Properties Labour Laws (2000) Industrial Property Trade Secrets	Increase in the turnover (market size) of the ICT industry	✓				
	Encourage growth of ICT businesses in Uganda	To make IT enabled services a US\$ 1 million by June 2005; US\$ 5 million by June 2006 and US\$ 1 billion within the next 10 years	Monitor growth and progress of ICT industry annually and take immediate corrective actions in case of slipup	Number of people employed by ICT organisations		✓	✓

Programme Area	Objective	Goals	Actions Suggested	Indicators of Achievement	Timeframe			
					S	M	L	
Infrastructure	Encourage the development of ICT of affordable infrastructure	Provide every Government office the following by June 2010 (in Kampala by Jun 2005):	One-time investment by the Govt in a fiber-optic backbone connectivity	Teledensity		✓		
	Widen coverage, increase the number of beneficiaries and promote universal access	PBX, Local area network and every desk with a PC Broadband Internet connectivity for every PC, delivering reliably at least 5-8 Mbps	Pro-actively champion projects such as Comtel, EAC Digital Transmission and East-African sub-sea cable	Internet access; costs and bandwidth availability	✓	✓	✓	
	Improve service quality of ICT	UPS, Mail server, Proxy server and firewall Standard office productivity packages such as MS or Star Office Standard tools such as anti-virus software, etc Local email IDs for the entire staff (possibly barring drivers or messengers, though even they could have IDs just as well)						
		Restricted Internet access to all the staff depending on the job requirements	Set up a WiFi Network to link all Government offices in Kampala	Internet access in regions and rural areas	✓			
	Create a Government that reaches out to everyone	Government-wide Intranet	Portal Infrastructure	Stationery budget in Government organisations	✓			
		Access point in every sub-county or groups of sub-counties	Metadata management	Data & Internet bandwidth	✓			
			Secure Electronic Environment Infrastructure	International Bandwidth	✓			
			Interoperability Framework	ITU's Digital Access Indicator	✓			
			Set up e-Government kiosks		✓			

Programme Area	Objective	Goals	Actions Suggested	Indicators of Achievement	Timeframe		
Human Capacity	Develop ICT human resource capacity	Double the number of graduates from 50,000 to 100,000 by June 2006 and to 500,000 by June 2010	Set up an ICT University	Number of students graduating every year			✓
	Create a fully ICT literate nation	Get technology into every school by 2010	Increase affordability of education by introducing student loans	No of schools connected		✓	
	Use ICT to enhance the education system and services	Provide every Government employee ICT training commensurate with their job requirements by June 2005	Create a web browse-able content repository for use by schools	No of students per computer	✓		
		Provide computer access to all students for at least 3 hrs per week by 2010	Establish an Internal accreditation system for ICT	No of students using computers	✓		
		Provide computerised content for all subjects taught in schools by 2010	Make economy editions of text books legal for sale in Uganda	Hours of computer usage per student per week	✓		
			Provide a WiFi network for schools		✓		
e-government	Improve productivity in Government institutions	Provide all Government services electronically by 2010	Salary payments	Amount saved for cheque books	✓		
	Improve effectiveness and efficiency of public services		e-Government applications at the kiosks	No of people using kiosks	✓	✓	
				Transaction volume at kiosks			
				Transaction amount at kiosks			
				No of sub-counties covered			
				Population served			

9 SWOT Analysis

9.1 Strengths and Weaknesses

The most important strength that Uganda possesses is a decentralized Government. This is an enormous enabler as far as e-Government is concerned.

9.1.1 Decentralization

- ➔ There is full political decentralization: 5 levels of government at district and below exist in the country.
- ➔ There is full administrative decentralization and Local Govt technical staff no longer answers to sector ministries directly
- ➔ There is at least partial financial decentralization (of recurrent budgets - development budgets are being decentralized on a pilot basis while capacity is built)

Advantages of decentralization

Decentralized administrations have enormous benefits for large-scale computerisation and e-governance systems. Workflows in decentralized environments are smaller and shorter and usually restricted to a small geographical region. This can easily be handled over LANs or at most over Metropolitan Area Networks (MANs). These are high speed networks and usually do not require expensive third party connectivity.

Since bulk of the workflow travels over LANs, very little transaction information actually flows over the wide area network. The information that actually needs to be sent across to the sector ministries is in the form of summary reports; concise, packed with information and little if any raw data is transmitted. These reports are also sent as per a well-defined schedule and can be automated or scheduled accordingly. This amount of data flow can easily be handled by low-bandwidth, inexpensive connections.

The information that flows the other way from the sector ministries to the local governments usually relates to policy and related issues and is equally concise.

Though not part of the formal assessment process, a high level of decentralization, more than anything else, improves the readiness of a country (or at least the Government) for e-Governance and ICT adsorption.

Disadvantages of decentralization

Decentralized decision-making has a few serious drawbacks that Uganda will have to address. With every local body and department doing its own thing, there is a great deal of duplication of effort.

Centralized purchasing results in economies of scale that ad hoc decentralized purchasing cannot hope to take advantage of.

There has been no concerted effort towards ensuring that various systems developed have any sort of cross-compatibility, even between departments of the same ministry. Most of the computer and ICT capacity buildup has been ad-hoc and every ministry and local government body has been doing its own thing. Some Government bodies are even today contemplating implementing Accounting systems, even though these are likely to be scrapped within a year or two, when the IFMS is rolled out.

For e.g. almost all ministries and have gone for Internet connectivity, with various ISPs. This decentralized approach has increased costs because if a bulk purchase of about 30-40 connections had been made, the Government would have been able to negotiate a much better rate. There is a school of thought within the Government for ensuring equitable distribution of tender awards between various bidders and service providers, but there is no need for the Government to subsidize multinational private networks to its own detriment. Even if all these were purchased from out of project funds, the fact still remains that a monthly fee needs to be paid from out of the communications budget. The same amount of money would have got better bandwidth or connectivity speeds or the current connectivity could have cost much less.

The answer to such problems is to improve the decentralized setup by having central monitoring or nodal agencies that advise on and monitor ICT based activities to ensure adherence to the broader goals of the Government.

9.1.2 ICT Infrastructure

Strengths

- Mobile Teledensity is improving at a CAGR (Compounded Annual Growth Rate) of 128.8% for the past 5 years. Overall teledensity (combined) has a CAGR of 37.7%
- Wide spectrum of Internet connectivity solutions available to customers
- Government and regulator keen on ensuring equitable and widespread growth of connectivity; in particular, the Government is keen to expand the network into hitherto unconnected areas considered unviable by the carriers
- Abundant hydroelectric potential

Weaknesses

- Combined Tele-density (fixed + mobile) is still less than 3 per 100 individuals
- Only about 50% of the geographical area is currently covered. The entire northern region barring a few towns is totally unconnected.
- Internet connectivity in rural areas is almost inconceivable; only 2% of rural households have electricity connection
- Bandwidth availability, both national and international, is low and expensive
- Costs of phones, phone calls and Internet is still very high, particularly in areas distant from Kampala
- Very strong divide between Network Access haves and have-nots. Kampala and surrounding areas account for over 80% of telephone / mobile and 90% of Internet connections
- Currently, only 225,000 Ugandan households, i.e. 4.3%, are connected to the electric grid; only 2% of rural households have electricity connections.
- No PKI or payment infrastructure is available; no secured servers for electronic transactions exist within the country

9.1.3 Human Resources and Education

Strengths

- Second highest rate of primary enrollment in the world
- 65% literacy of population over 15 years of age
- Widespread respect for education
- Outstanding culture of higher education; Makerere was the oldest University in East Africa and rated as one of the few world class Universities in Africa
- Medium of education is English; communication skills in English usually excellent
- Pioneering projects such as SchoolNet Uganda and Uganda Connect

Weaknesses

- Only 5% of the schools have access to electricity
- 61% of schools have no electricity
- Teacher sensitization to ICT is very poor in rural areas
- ICT given low priority; The Ministry of education does not even mention computers on its otherwise informative website
- Large numbers of dropouts after primary school
- Tertiary education is unaffordable to most
- Teacher training content is inadequate
- Even in schools with computers, the level of use is mainly for applications software such as word processors and not related to the curriculum
- Many schools do not have access to technology even when they possess adequate resources to do so

A serious attempt must be made to sensitize teachers and schools administrators to the uses of ICT in enhancing education. Getting computers to schools is the easiest part; what is lacking usually is the means of putting them to effective use.

9.1.4 Society

Strengths

- English is the official language of Uganda so there is no shortage of online content. Locally relevant content is produced by several websites some of which are updated regularly.
- There is no gender mismatch among Internet users; maximum number of users are within the 20-40 age bracket
- Awareness of the Internet in towns is high
- UCC is trying to get Internet access to all districts
- UCC is trying to get payphones to 154 sub-counties where the operators feel functioning will be unviable
- Dial-up Internet is available from any landline at fixed rates regardless of distance
- Most private companies have good ICT facilities
- Many Government organisations including ministries have made excellent use of their project budgets to train users and equip their offices with the latest ICT equipment
- Several departments of the Government have sophisticated GIS systems
- Larger companies are investing in high-end ICT solutions such as ERP implementations
- Most organisations have their own websites, but the content is mostly static

Weaknesses

- There are only 125,000 Internet users. UCC reports just 7024 subscribers, but several of those are organisations; Makerere itself has over 10000 regular users
- Means of access in rural areas is non-existent and awareness is very low
- ICT except radios and increasingly mobile phones does not touch the lives of most of the rural population
- Use of ICT in Government offices is mainly for word processing
- Most ministries run out of budgets for phone calls towards the end of the month
- Some key ministries do not possess PBX systems

9.1.5 Economy and e-Government

Strengths

- Decentralized Government
- ICT is seen increasingly as a source of opportunity among job hopefuls
- Employment for individuals based purely on ICT expertise is increasing
- There is awareness in the Government about the advantages of offering services online
- Private businesses generally accept online acceptance of orders or email order confirmation as formal correspondence
- The ICT policy framework should be able to improve assessment ratings in future
- Legal reforms are underway that could provide an enabling framework for transactions

Weaknesses

- No transactions carried out online
- Physical signatures are required on any legally valid document
- Credit cards are not available
- Government officials have not been given individual email Ids in most cases
- Most government websites offer static content only

9.1.6 Policy

Strengths

- Telecom policy a major success
- ICT trade policy was also hugely successful
- Free and fair market for ICT goods and services (except telephony)

Weaknesses

- No e-commerce and e-transaction enabling legislation
- Poor protection for Intellectual Property
- Exclusivity clause in operator licenses has affected growth in International bandwidth

A few strengths and weaknesses are highlighted in this section. There are several opportunities that Uganda has identified where it has competitive advantages. Only those opportunities where ICT will play a predominant role are listed here.

9.2 Opportunities

9.2.1 IT Enabled Services (ITES)

The next great global economic opportunity is the opening up of the so-called IT enabled services sector. This promises to be a US\$ 200 billion industry within a short while. The IT enabled services involves back-office functions and non-critical tasks that are out sourced in order to take advantage of cheap connectivity in the industrialized West and low cost skills and talent in developing countries, to offer cost-effective services to customers. A single call center of a company like General Electric can receive tens of thousands of calls per day (average 80,000 per day). Answering these would require over a few hundred people working round the clock, and if done offshore, even given the greater connectivity costs and the somewhat less efficient labor, the costs savings are substantial.

A lot has been written about the loss of jobs in the West and the backlash there. If Western companies are to stay competitive with Chinese and Korean companies, they have to cut costs. General Electric earns several times more from sales originating in India than what it spends on its call center there. So it is ventures such as the cost center that makes its goods competitive in the market. ITES covers an entire gamut of activities – call centers, accounting services, Insurance Claims processing, e-mail responses and so on. Africa already has several call centers, in Ghana, Senegal, Zimbabwe and South Africa.

It is an opportunity that Uganda can exploit to its advantage. If Uganda were to utilize its resources optimally, it will be able to tap the lucrative call-center business. Uganda has also been able to put every child in school, which bodes well for the future of this industry in the country. This, plus an adult literacy rate of 65% and excellent English speaking skills (with good diction and clarity) should prove adequate for success in ITES.

Uganda's abilities in this field have been untested, though the two or three organisations that actually invested money in these ventures closed down rather quickly. These were third party call centers and suffered from inadequate quality consciousness as well as poor marketing and possibly inexperienced managers. ITES is a high-tech and specialized field and requires excellent managerial as well as technical skills supported by a strong, localized infrastructure. At this stage it would be better for Uganda to attract multi-national companies to set up their own call centers for internal use, or attract International ITES companies to invest in facilities here, rather than attempt local investment in third party call centers. Ugandan investments will follow once managerial skills are available locally and in sufficient numbers to support the industry.

The advantages that Uganda has are:

- Well educated, English speaking population
- Disciplined labor with a good work ethic
- Deep rooted belief in education
- More acceptable English accent, as compared to competing countries such as India
- Convenient time zone
- Low labor costs and turnover

Infrastructure, communications and real estate costs are disadvantages. However, the primary concern of any potential client is quality and not costs. While cost control is critical, no organisation is willing to accept customers unhappy with services. As India or the Philippines have shown, potential customers can be attracted to highly localized facilities with excellent infrastructure. Sometimes these even consist of only a single building, but with connectivity links from multiple vendors and first and second lines of backup in case of failure of utilities such as electricity. These facilities have world-class infrastructure, even if there are potholed roads and power outages all around the facility. There are currently no such facilities in Uganda.

9.2.2 Fish and flower auctions

A large part of the Kenyan IT industry is involved in supporting the export and tourism sectors. Ugandan farmers and producers of primary products too need direct access to the global market. Currently, Ugandan produce is largely sold to middlemen or agencies, which in turn sell the products to distributors abroad. Physical presence in Uganda is a luxury that few small and medium sized foreign distributors can afford. Hence interaction between Ugandan producers and foreign buyers is severely restricted. Online auctions allow even small and medium sized outlets to take part ensuring better returns to the producers and lesser number of agents in the middle.

The cut flower industry is estimated to be US\$ 6 billion a year and growing at 12-15% annually. Uganda's weather and abundant water resources make it suitable for growing a wide variety of flowers and exotic plants. Similarly, if fish caught could be quickly graded and auctioned off, producers would earn a better return for their endeavors.

It will take time and several confidence building measures in between, but if implemented Ugandan producers could directly be interacting with the procurement sections of Western supermarkets.

9.2.3 E-Government

The Government seriously lacks delivery capability for the services it offers to individuals, investors, tourists or corporate bodies. E-Government is an extremely cost-effective way of increasing the reach of the delivery mechanism. The Government has taken several positive steps towards setting up of websites of various ministries, parastatals and local bodies. However, in most cases, the websites simply offer information related to the services, not the services themselves. Therefore, one cannot (say) register a birth or death online, or download passport application forms or apply for jobs online. A few websites provide user feedback forms, but that is as far as the interactivity goes. User feedback is usually not acknowledged.

The decentralized nature of the Ugandan polity has made e-Government a relatively simple matter. Localized decision-making is the key since workflows do not span large geographical distances. This is a huge enabler as far as e-Government goes, since it means that bulky scanned images of documents sent along with any workflow, move over fast (and free) local networks rather than the much slower & expensive wide area networks.

A strategy for the rollout of e-Government services is briefly mentioned in the chapter on critical factors.

9.3 Threats

The primary threat is that the opportunities, especially in the ITES sector will slip away. There are serious problems that need to be overcome. The infrastructure is weak but that is not a limiting factor as several countries have shown. However the managerial skills are lacking as well as access to the market. Managerial skills can be outsourced to a certain extent but ultimately success will lie in how soon local managers are able to take charge. Uganda also unfortunately is not perceived to be a destination of choice for investment in high-tech industries.

More advanced developing countries such as India, Philippines and China are attracting large investment in the ICT. Uganda will have to offer investors several incentives to attract investments at least in the beginning

Despite progress made in Uganda, a participant from the business sector, noted there are still major obstacles that prevent local firms from competing internationally:

- Telephone costs are still high in comparison to international prices
- The cost of electricity is particularly high in the continent
- Rents in downtown Kampala are very high for the services offered
- Enabling legal framework is lacking
- The cost of doing business (regulatory barriers, tariffs, taxes, software and hardware costs, corruption, etc...) is also high in comparison to international standards, and
- Availability of locally relevant content in the particular case of the Internet is very restricted and hard to develop.

9.4 Strengths and weaknesses

Definition	+/ - Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other	
Policy						
		Telecom deregulation has been a stellar success. It is too early to react to the proposals in the ICT Policy as the cabinet has approved it very recently. However along with public policy, few legal reforms are required, the process for which is underway.				
Telecommunication policy well defined,	+	Huge improvements relative to the low basis in terms of quantity, diffusion and quality, also in terms of roll-out into rural areas	Government realizes importance of ICT and encourages it pro-actively	Most ICT developments induced through FDI and overseas loans. Government sector IT spends are almost always funded externally	Strong demand for telecom services, high willingness to use and pay	
Overall ICT strategy has recently been passed by the cabinet	-	1/6 th of the population in the Northern parts of the country will be excluded at least as long as the war in the region continues	Plans were originally ambitious but have been moderated a bit now with hindsight	Private sector interest in the North is unlikely unless the security situation improves appreciably	Limited demand and use of the competitive ISP and Internet Café market	Huge number of international donors participated in the restructuring of the sector, it is hard to trace, evaluation of efficiency is scarce
Legal reforms for recognition of e-commerce and other digital transactions	+	The existing Evidence Act does not recognize email or digital communications; digital signatures are not recognized;	The Legal reforms commission has initiated work on modifying the Evidence Act for allowing digital evidence; it is also deliberating on a law governing all types of electronic transactions. Laws should soon be passed.	The ULRC has initiated dialogs with many private and public sector participants and an effort has been made to make the process truly participative		

	Definition	+/-	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
		-					
Policy	Decentralization	+	Government structure highly decentralized and lower levels of Government operationally independent	Very strong			Huge advantage as far as e-governance and computerisation of Government systems and overall e-readiness

	Definition	+/ -	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Network Access / ICT Infrastructure	Includes fixed, public and cellular phones as well as Internet access	+	Significant increase of teledensity, access to Internet in the capital and particularly to cellular phone services; introduction of a rural communications development fund (RCDF)	Government supports autonomy of regulatory agency, no preferential treatment of the former incumbent	Private sector very active	In fixed telephony there is a duopoly and an oligopoly in cell phones and Internet. There is an predominant ISP (Infocom)	The SNO has overtaken the former incumbent, indicating the market liberalization
		-	High speed Internet access restricted to Kampala	Strong; Uganda is one of the few countries with unified dial-up costs regardless of distance	Concentrated in Kampala	Dominance of few players primarily interested in business connectivity only. VSAT connectivity in other centers expensive	
	Exclusivity	-	An Exclusivity Period was granted to UTL & MTN (the two national telecom operators) in which the provision of what is termed as protected telephony service was restricted to these operators and those other service providers licensed prior to the beginning of this Exclusivity Period to provide the same services. This protected telephony service consists of basic telephony service (real time voice communications including voice over Internet protocol - VoIP), Cellular telecommunications service and satellite service. The Exclusivity Period runs for five years beginning 25th July 2000 Many requests have been made to roll back the exclusivity, which are not wholly justified; MTN and UTL have delivered more than what they committed and Uganda should be seen as honoring its terms of the contract; also a sizeable amount needs to be paid if the country was to breach its part of the contract. However, it does restrict more players from entering and further rationalization of rates			Prevents other players from entering; however it has affected neither expansion of the network, growth of the sector, quality of service or steady reduction in prices for consumers. When MTN entered Uganda, the country had a dubious reputation as an investment destination, and sops had to be given to attract the investment. MTN's success has made Uganda one of the hottest investment destinations in Africa today; the country hasn't lost much by way of the pragmatic decision made then by providing exclusivity	

Definition	+/ - Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other	
Network Access / ICT Infrastructure	-	Prices for individual access (connection charge / hand sets) are still to high for majority of population	Even though prices of phone calls in Uganda are less than those paid by citizens of other countries in East Africa, they are still too high for most people to readily afford.	Problems for smaller ISPs and NGOs that interact as ISPs because of preferential treatment of big players who have an exclusivity arrangement up to July 2005	Big players dominate market but prices are still steadily dropping. Post mid-2005 prices are expected to drop further	Costs can only be reduced by larger investments in Bandwidth and fiber connectivity to major international trunks; however the Geography of the country and small market hinder this
	+	Leading players investing in optic fiber	Technology determination left to operators to decide	Pro-active and competitive	Big players will continue to dominate because of the investments made already and market saturation in a way will hinder fresh investments	
	-	Connectivity and Internet bandwidth	One-time investment in the backbone by the Government or Infrastructure companies is direly needed	Limited but increasing	Both MTN and UTL are laying fiber optic cables but to a limited extent	

	Definition	+/-	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Human Resources, Education and Human Capital	Current ICT literacy, efforts in ICT training and use of ICT in educational training	+	Most schools (even secondary ones) do not have any form of ICTs present. Almost only private schools maintain computer labs	Strong support by government	Key role in the provision of ICT related training		Focus of donors and also the private sector
		-	Only few universities and colleges enjoyed an increase in ICT equipment and application.	General structural problems of the education sector	Some private sector investments in Kampala; fewer elsewhere	Dominance of Makerere in terms of quality, reputation, intake and budgetary support	Target group are the young urban elites
	+	Training facilities	Strong support in terms of liberalized investment policy; no preferential VAT treatment or tax benefits	Several shops provide training on all aspects of IT from networking to programming and web page design	Few shops predominant in Kampala; very little penetration of high quality education services at other centers	Target group are the young urban elites	
	Affordability	-	Training facilities	Government supporting Hire-purchase laws which could be extended to student loans	Costs are too high for the general public and smaller firms to be able to afford those offered courses that are of valuable content and quality	Only few private firms offer proper training, most offer inadequate courses with low quality personnel and equipment, but things are improving. Industry recognized International certification available in Kampala	NGOs sponsoring some students

	Definition	+/ -	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Human Resources, Education and Human Capital	Quality of Manpower available	+	An educated, English speaking workforce with a good work ethic	Strong support by the Government for Primary education and English language education	Increasing investments in school education	Government sponsorship available for few students, which is grossly inadequate considering the number of students.	
	Standards of Education	+	16 university colleges with an intake of over 50000 students a year and a traditional reputation of excellence in education	Strong support by government	Increasing investments in tertiary education, albeit at high prices	Some NGOs and private sector sponsorship available but lots more needs to be done	

Definition	+/-	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Economy & e-Governance	+	Diffusion of services fostered by private enterprises	Various government agencies involved in supporting application of ICTs in SMEs	Mid to large scale farmers use telecommunications in the rural areas in the South of the country	Service provision and retailing of telecommunication services gained momentum quickly, banking sector will be strengthened through online applications	Creativity of the people, e.g. provision of generator driven recharge of batteries where there is no electricity supply
	-	Access to Internet services is limited to urban areas	Lack of financial and human capacity to properly foster the spread of ICTs amongst enterprises	Generally low level of entrepreneurial skills in the country, particularly outside the capital city	No hard- and software production, concentration in urban areas; the enterprises in rural areas that may have demand for ICTs lack capital to use them extensively	People tend to destroy their own markets by simply copying business ideas, eventually leading to oversupply
	+	Use of email and basic ICT facilities	Lukewarm – strong support from ministries; most rely excessively on paper	Private sector much more progressive in use of electronic means as formal communication; fax or email confirmation of orders acceptable		

Definition	+/ -	Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Economy & e-Governance	+	ICT projects given increasing prominence and several projects underway simultaneously; pioneering efforts such as IFMS and IPPS nearing rollout	Strong non-financial support	Mainly involved in execution and consultancy	Almost invariably donor funded; donors have a high degree of influence and contracts usually won by companies from donor countries, even if cheaper equally qualified bidders from other countries are available	
Power	-	Power: Grid power readily available in Kampala and south and southeast only. Most villages without any supply	Not much support for expanding the grid; strong support for additional generating capacity	UEB and other power companies to be privatized soon; limited private sector involvement in a few areas in the North	State run power production and transmission companies dominant; Aga Khan Trust operates 2 power plants in the North	
Power	+	Huge hydro electric potential	Strong in spite of strong opposition from environmentalists	Several bids made to tap this potential	Uganda is seriously energy deficient and imports all of its oil and gas requirements. Tapping the hydro electric potential can save huge amounts of polluting fossil fuels	Strong opposition from environment groups, but the country badly needs the foreign exchange from power; can also save considerable amounts on motor fuel

Definition	+/- Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Economy & e-Governance - Credit cards	- No credit cards offered by any bank to normal citizens; even debit cards are not available. This is a serious handicap for e-commerce transactions	Laws on credit purchases such as hire purchase and leasing being formalized	Very strong risk aversion; poor recovery rates and lenient laws	Lending done mostly by Micro Finance organisations; banks lend only to corporates and very sound individuals.	

	Definition	+/ - Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other
Society	Country specific production and use of ICT services	+	Good telecom infrastructure	Eagerness of the government to foster local content and also leadership in doing so: online information available on ministries, the parliament, etc. Local Governments also pro-active	Numerous portals and attempts to provide local content	Latent demand for information in all areas of society
		-	Most efforts are supply driven, no local production of hardware little software development	Only information provided on Government websites; they need to start transactions such as job applications, tender document downloads, etc on websites	Limited private sector involvement, mainly relevant for emigrants and foreigners or urban elite	Very limited market due to lack of access of the vast majority of the population

Definition	+/ - Infrastructure	Political Leadership and Support	Private Sector Involvement	Market Structure	Other	
Society	-	Lack of co-ordination and adjustment to the needs of the people / creation of white elephants	Dependency on external funding and own benefits make government unable to judge on appropriateness and usefulness of projects; often projects are undertaken on a one-off basis. E.g. Several ministries have Internet connections, but if they had approached the ISPs collectively with a requirement of 50 or so connections instead of independently as they have today, they could have got better rates	No evaluation of impact and actual strategy behind involvement; no independent audit of projects completed or benefits that have accrued	Undue influence of donor agencies in most cases; in some cases donors tend to favor companies from their own countries, but several projects have been highly successful	No evaluation as yet; difficult due to the lack of appropriate impact measures as well as limited duration of most projects

10 Financing

An entire e-Government project would entail an expense of approximately US\$ 5million. Ways of funding such an enormous project need to be assessed in detail.

The pilot projects listed here would cost approximately US\$ 200 - 250,000 for the school browsable content repository (not counting content costs, which are assumed to be public domain, hence free); US\$ 300,000 – US\$ 400,000 for the WiFi / VOIP MAN for Kampala and approximately US\$ 250,000 for the smart card based e-Government telecentre / kiosk project. Return on investment for the WiFi / VOIP project is as follows (considering US\$ 300,000 setup costs; 1% maintenance charge per elapsed month; US\$ 2000 per annum for an ISP license from UCC; and 30% reduced bills for 50 offices):

Average spend on telephone (USX)	Estimated savings (%)	ROI (months)
300,000	30	14
600,000	30	7
900,000	30	5
12,000,000	30	3
15,000,000	30	2.5

There is no detailed cost and benefit analysis of e-governance in Africa. However, the cost of not embracing e-governance is far greater than the cost of its implementation. ICT can play a substantial role in attaining the transparency and good corporate and public governance that are necessary for attracting foreign direct investment. Investment is fundamental for poverty reduction. Therefore good e-governance projects pay for themselves in the long run.

Funding for ICT projects

Funding by multilateral and bilateral institutions is suggested. The World Bank, the African Development Bank and others should be approached for financing these projects. The G8 DOT Force e-governance recommendation and its current take up by the Government of Italy and the World Summit on the Information Society provide some other avenues for mobilizing global cooperation and finances. Government and the private sector could also play a key role in mobilizing resources. Yet, the capacity of government to coordinate and implement e-governance projects is fundamental. Resources could easily be wasted without harmonization and co-ordination of e-governance initiatives at national and regional levels.

Financing is primarily the responsibility of the government but with its limited budget, funds will have to come from suitable donor agencies. Funds are available to support pilots, trials and development of the infrastructure for community-based bottom-up projects from the World Bank and other development banks. An extensive list of funding agencies and contacts is provided below.

The World Bank and its agencies provide aid for both government and ICT initiatives in developing countries. Both loans and special grants are available. The Bank manages the Information for Development Program (InfoDev) - a global, multilateral donor programme aimed at helping developing countries benefit from information technology. Its objectives include "increasing the efficiency, accountability and transparency of governments" and it encourages applications for funding for pilot projects. Applications can be made to InfoDev on an electronic form that guides the applicant through the various types of information that are required.

The International Telecommunication Union (ITU), under the terms of its Special Development Initiative, is planning and carrying out a series of pilot projects around the world to demonstrate the feasibility of using new technologies to deliver information and communication services. Some US\$2.6 million have been allocated to the Initiative, and areas that may be covered include efficient government operations and good governance. The ITU will play a catalytic role in bringing together partners with funds, skills and facilities, and helping them cooperate in management and implementation.

Canada is one of the major donors for ICT projects. Funding is available for community-level activities from international organizations such as the International Development Research Centre. Its Acacia project has the overall goal of bringing information and communication technologies to Africa and its initiatives include promotion of community networking, school networks, school to community connectivity and strategic planning for capacity building. Acacia evaluates proposals according to criteria which can be found on its website. 'Anyone or any organization is welcome to approach the Acacia programme officers for more information and/or to give suggestions for a possible project, and this can be done through the website. Acacia believes this is the best approach because the programme officers are well informed about activities happening in their respective regions. The International Development Research Centre also has a partnership and business development branch that can help if an applicant is unsure which part of the organization to approach for funding'.

Cost-sharing arrangements with the private sector should be explored. Additionally, vendor financing for equipment and software through project finance, loan guarantees and export credits may be available. Leasing of equipment can be a financially attractive alternative to purchasing, and as suppliers retain ownership of their computers or other equipment, repair costs are included in the arrangement. Effective procurement procedures such as bulk purchases and grouping of orders are also important for cost reduction and maximization of available finance. When planning for the use of information and communication technologies for governance it should be borne in mind that the same networks could be used by other sectors. For example, the computers and software at multi-purpose community telecentres will have different users, including government administrators, health care workers, small businesses, agriculturalists, and perhaps banks or other financial service providers. Sharing the network and computer equipment should generate enough demand and usage to make the shared costs affordable for each user. If a longer view can be taken, it will be apparent that at least some of the funding for the deployment of information and communication technologies will come from the cost savings that their use will itself engender. Uganda, wrestling with widespread problems and inadequate budgets, needs to find the most cost-effective way to place its resources. This implies the optimal use of its financial, physical and human resources. Information and communication technologies can help meet this challenge.

10.1 Funding agencies

Some agencies providing funding for e-Government projects

10.1.1 MULTILATERAL AGENCIES

African Development Bank (AfDB)
Banque Ouest Africaine De Développement (BOAD)
East African Development Bank (EADB)
European Bank For Reconstruction And Development (EBRD)
European Commission (EC)
European Investment Bank (EIB)
International Finance Corporation (IFC)
United Nations Development Programme (UNDP)
World Bank Group (5 bodies)
WorldTel

10.1.2 BILATERAL AGENCIES

Australian Agency For International Development (AusAID)
Belgian Administration For Development Cooperation (BADC)
Canadian International Development Agency (CIDA)
International Development Research Centre (IDRC)
Danish International Development Agency (DANIDA)
Department For International Development Cooperation (DIDC)
Agence Française De Développement (AFD)
Natexis
Bundesministerium Für Wirtschaftliche Zusammenarbeit Und Entwicklung (BMZ)
Kreditanstalt Für Wiederaufbau (KfW)
General Directorate For Development Cooperation (DGCS)
Japan International Cooperation Agency (JICA)
Overseas Economic Cooperation Fund (OECF)
Norwegian Agency For Development Cooperation (NORAD)
Swedish International Development Cooperation Agency (SIDA)
Swiss Agency For Development And Cooperation (SDC)
Commonwealth Development Corporation (CDC)
Department For International Development (DFID)
U.S. Agency For International Development (USAID)

11 Major Constraints

It is not the Government, not the attitude of the people, not the leadership, or the policies that are hampering the growth of ICTs in the country. It is only funding, investments and affordability – in short, it is **monetary resources** that are the problem. The digital divide is very real in Uganda, not just among the haves and have-nots among the population, but also within cities, organisations and the Government itself. Ministries and departments with well-funded projects have world-class facilities, while those without access to donor funds languish without even a PABX system or the means to pay for an entire month's phone bills.

Communication bandwidth is a major bottleneck. The pipe to the country is wireless and has considerably less bandwidth than a fiber optic cable. It also costs substantially more. Several Universities abroad have better connectivity than the country does and this hinders it from tapping lucrative markets such as so-called IT Enabled Services. The lack of a fiber pipe to the outside world must rate as Uganda's primary handicap (for e-Government). The country must be pro-active in pushing through the multi-lateral initiatives such as Comtel and the EAC Digital Transmission projects. The then new incumbents in Uganda and Tanzania scuttled the EAC Digital transmission project at the last moment. EAC Digital Transmission Project could have eased connectivity problems between the East African countries enormously. There are signs that it is being revived again. Comtel is another project that could ease Uganda's connectivity woes. Both these projects propose to connect the country with fiber optic cables to the proposed submarine cables landing at Mombasa and Dar Es Salaam.

Uganda must utilize the resources it possesses optimally. UEB owns a fiber optic cable from Kampala to Jinja, which is being underutilized. The bandwidth available can be leased to any / all of the three operators. Worldwide, railways and electricity transmission companies utilize their right of way and infrastructure (towers) to provide connectivity (e.g. fiber optic cables). These are the kinds of innovative uses that the country must put its existing infrastructure to. It would also help UEB (or UETCL) to expand its own grid. Similarly, the railway company can make use of its right of way to lay cables and other infrastructure for use by the telecom companies. Fiber optic cables cannot be recycled the way copper cables can so they would probably not be subject to the same amount of vandalism. Towers have also been used to hold microwave wireless equipment and space on them can be rented out.

Improving bandwidth within towns, within the country and connecting to the worldwide submarine cables is priority number one.

Electricity and the grid is the third major constraint. Though Uganda has abundant hydroelectric potential and exports electricity, most of the country lacks power and even in places where the grid does reach (e.g. Kabarole), the quality of the supply is pathetic. The Jinja – Kampala – Mbarara route gets reliable power.

There are no easy ways of getting out of these problems. The proposed plan takes into account the ground realities and has suggested ways by which Uganda can achieve some of the goals and targets it has set itself in the National ICT policy, in spite of these crippling constraints.

12 Recommendations

12.1 Key areas and issues

- Affordable connectivity is the main problem faced by the country
- Electricity reaches on just 4.5% of the population
- Tertiary education of internationally acceptable standards is available only in Kampala and a few selected towns. It is expensive and unaffordable to most and far from “available to anyone who wants it.” International ICT accreditation is available in Kampala but is expensive
- The latest hardware and software is available off the shelf, or can be easily ordered, but it is still far too expensive for most schools, many Government departments and individuals and families.

12.2 Immediate Priorities

The main priorities are:

- Pro-actively cooperate with and push forward the Comtel and EAC digital transmission projects
- A one-time investment by the Government in building a fiber backbone is required urgently
- Equip every desk with a PC and every Government office with email, office productivity and collaboration software; setup wireless Metropolitan networks to connect Government offices together
- Set up the ICT coordinating agency for the Government
- Encourage UETCL and the railways to use their existing facilities to augment internal bandwidth
- Enhance the production and distribution of electricity and strengthen and expand the national grid.
- An enabling legal framework for lease and hire purchase schemes, student loans and online payments must be set up. Uganda is a high cost economy and Ugandans pay several times more for (usually inferior) services, as compared to consumers in many other parts of the world, particularly outside Africa. The high costs are compounded by the fact that income levels are substantially less in Uganda. Affordability is thus another critical issue for improved e-readiness. Ugandan students cannot afford professional tertiary education in most cases, either from the Universities or from private ICT training institutions. Most Ugandan businesses cannot afford to buy ICT equipment or software and spend too much on communications and connectivity solutions compared to their counterparts in more developed areas of the world.
- Improving the affordability of education is another critical issue that needs to be tackled at the earliest. The scholarships available from the Government are inadequate but it is not realistic to expect the Government to do any more. What the Government must do is to push through enabling legislation to allow student loan and hire purchase schemes, which can substantially increase the market size and possibly attract large players. Hire purchase schemes can also substantially increase the market for computers and peripherals and result in (hopefully) more realistic pricing.

- Set up an ICT incubator for encouraging investments in the sector
- Set up an ICT University and internal assessment mechanisms
- Implement the ICT policy in letter and spirit
- A sensitization workshop for trainers, teachers and school administrators is direly required. Even in cases where adequate funds exist, schools often do not undertake investments in ICT related areas. ICT can be a vital tool in the teaching process and the Internet can add a dimension of self-discovery to the learning experience.

12.3 E-Government initiative and the National ICT policy

The strategies for implementation of the National ICT policy are being worked out. The weaknesses and shortcomings highlighted in this report need to be addressed along with the objectives laid down in the National ICT Policy. The main players in this exercise are the Ministry of Works, Housing and Communications and Ministry of Education & Sports. The major thrust areas are Communications infrastructure and human capacity augmentation.

In the global networked economy, information and knowledge have become strategic resources, based on which Governments, corporations and the public at large make their decisions. The availability of up-to-date and accurate information, created and disseminated by information and communication technologies (ICTs), has decisive impact on peoples' lives and on the socio-economic development of a country as a whole. The countries that have created an enabling environment are experiencing revolutionary effects especially in the governance, education, health and business sectors, as its citizens are now more empowered, can change the equilibrium of power and start creating choices and opportunities for themselves. Yet, there are people who are not able to make informed decisions on their daily lives because of lack of access to ICTs, information and knowledge. The primary goal of e-Government will be to make the Government reach everyone. The proposed micro telecentre project will achieve this and several other goals. e-Government is more about Government than "e". It is the services that are offered and how efficiently that counts.

As far as the steps towards e-governance are concerned, there is a need for increasing awareness of government and its stakeholders while putting a national framework for e-governance together. Government should be aware of the importance of e-governance readiness and strategies and the potentials and the consequence of ICTs. Capacity building, development of conducive policies and infrastructure has to go hand in hand with development of e-governance programmes and projects. Evaluation and research has to be an integral part of the e-governance process.

This presupposes a need for interaction and exchange of knowledge and resources among government, civil society and private sector. Different actors should be responsible in planning, designing and implementing e-government projects and programmes in their areas of competencies. The ministries of health, education, transport and communications, agriculture, tourism, etc., public utilities, NGOs, civil society organizations and private sector should work together to develop and implement knowledge management and information systems that seamlessly integrate with each other. E-governance projects should take local, national, regional and global dynamics into account.

The e-Government initiative is a tool to meet some of the objectives of the National ICT Policy. The National ICT policy has identified 14 key objectives, which include improving connectivity and human capacity; sensitizing society about the role of ICT in development; promoting local and foreign direct investments in ICT, working out an enabling legal framework and establishing innovative financial schemes to promote the sector. Other objectives include improving access, encouraging use of ICT to improve efficiency in organisations, enhancing local content and ensuring gender or linguistic equality of opportunity. The ICT policy also aims at ensuring respect for intellectual property, encouraging research in ICT and enhancing collaboration in various fields of ICT.

The e-Government initiative will help meet the following objectives from the above:

Improve connectivity and human capacity; sensitize society about the role of ICT in development; improve access; encourage use of ICT to improve efficiency in organisations; enhance local content; encourage research in ICT and enhance collaboration in various fields of ICT

One problem facing e-governance projects is resistance by different groups. In Uganda by and large ICT are welcome as a means of enhancing efficiency and reducing workload. However adequate training and sensitization helps in reducing the ICT phobia through incentives, awareness and training.

List of Acronyms

ISP	Internet Service Provider
LAN	Local Area Network, a networked group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building)
SLA	Service Level Agreement, a contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish (quality of service level), i.e. minimum access bandwidth or data volume per month, minimum service availability (up-time), fault escalation procedure and handling
VPN	Virtual Private Network, a private data network that makes use of the public communication infrastructure (Internet), maintaining privacy through the use of special protocols and security procedures
WAN	Wide Area Network, a geographically dispersed data network across distant buildings or office locations. It distinguishes a broader network structure from a local area network. Several LANs can link to a WAN
WLL	Wireless Local Loop, wireless radio technology for high speed data connectivity

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