THE REPUBLIC OF UGANDA

**MINISTRY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
(MoICT)**

(Draft)

THE NATIONAL BROADBAND STRATEGY FOR UGANDA

(2016 – 2020)

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ABBREVIATIONS AND ACRONYMNS

BPO	:	Business Process Outsourcing
CNDPF	:	Comprehensive National Development Planning Framework
DVB-T	:	Terrestrial Digital Video Broadcast
EGI	:	E- Government Infrastructure
Gbps	:	Giga bits per second
ICT	:	Information and Communications Technology
ICT-SIP	:	ICT Sector Investment and Strategic Plan
ISP	:	Internet Service Provider
IXP	:	Internet Exchange Point
Kbps	:	Kilo bits per second
LG	:	Local Government
LGDP	:	Local Government Development Plan
Mbps	:	Mega bit per second
MDA	:	Ministries, Departments and Agencies
MoICT	:	Ministry of ICT
MTN	:	MTN Uganda Limited
NAB	:	National Association of Broadcasters
NBI	:	National Backbone Infrastructure
NITA-U	:	National Information Technology Authority
NCIP	:	Northern Corridor Integration Projects
NDP	:	National Development Plans
NEPAD	:	New Partnership for African Development Organizations
PAIDF	:	Pan - African Infrastructure Development Fund
PEAP	:	Poverty Eradication Action Plan
RCDF	:	Rural Communications Development Fund
SAP	:	Structural Adjustment Programme
SDP	:	Sector Development Plan
UBC	:	Uganda Broadcasting Cooperation
UBIS	:	Uganda Broadband Infrastructure Strategy
UBIST	:	Uganda Broadband Infrastructure Strategy Team
UBOS	:	Uganda Bureau of Statistics
UCC	:	Uganda Communications Commission

UNRA	:	Uganda National Roads Authority
UPL	:	Uganda Posts Limited
UTL	:	Uganda Telecom Limited

EXECUTIVE SUMMARY

Uganda's Vision 2040 aims at a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years. Among others, ICT has been identified as a pillar for socio-economic transformation. Globally, ICTs have become a pertinent aspect in national development. At the center stage is access to broadband connectivity which translates to economic growth, job creation, growth of investment opportunities, improved service delivery, improved education and training services, improved National safety and security among others.

The vision for Uganda's Broadband Strategy is a transformed middle income economy driven by affordable high quality broadband connectivity. The overall objective of the strategy is to facilitate uptake of broadband for socio-economic transformation of the country. It defines the minimum throughput requirements for high speed transmission and access for voice, data and video to homes and businesses in Uganda.

This Broadband Strategy is centered around five thematic areas which are premised on the seven ICT Sector Pillars enshrined in the ICT Sector Investment and Strategic Plan. The thematic areas include:

1. Infrastructure, Connectivity and Devices;
2. Content, Applications and Innovation;
3. Capacity Building and Awareness Creation;
4. Policy, Legal and Regulatory Environment; and
5. Finance and Investment.

The key targets for the first five years (2016-2020) of this strategy include:
- Minimum broadband speeds of 3Mbps by 2020;
- Broadband access penetration of 50% and 100% for rural and urban areas respectively by 2020;
- 100% of district and sub-county headquarters, health centre IVs, tertiary institutions and secondary schools with broadband connectivity by 2020;
- 50% of primary schools with broadband connectivity by 2020;
- Cost per Mbps of broadband in relation to average income reduced to 10% by 2020;

- One national virtual submarine landing station in Kampala by 2020;
- 70% of MDAs and LGs with interactive e-services by 2020;
- 50% of registered Ugandan businesses online by 2020;
- 40% of the population digitally literate by 2020;
- Develop a National Broadband Policy by 2016; and
- Develop a National Broadband Infrastructure Rollout Blueprint for Uganda by 2016.

In many economies especially the developing economies, the availability, reliability and affordability of broadband has translated to economic growth, job creation, growth of investment opportunities and improved service delivery. Critical for Uganda therefore is to exploit these benefits of broadband through a strategy that clearly sets out a roadmap geared towards achieving national development goals.

Against this background, the Ministry of ICT in collaboration with its stakeholders developed the National Broadband Strategy for Uganda. This strategy presents a unified approach to planning, investment and development of broadband infrastructure and services at national and regional levels in order to provide affordable, reliable and equitable access to broadband resources for all citizens.

DEFINITIONS

Bandwidth: The range of frequencies available to be occupied by signals.

Broadband: Transmission capacity with sufficient bandwidth to permit combined provision of voice, data and video.

Communication Satellite: A device sent up into space used to relay telecommunications signals between two or more points. The main advantage of satellites is the relatively low cost of the earth station equipment needed to link up with satellites compared to stringing wire or fibre optic cable over very long distances.

Convergence: This is where advances in technology have made it possible to use different media (cable networks, terrestrial and satellite radio relay systems, computer terminals and television sets) to carry and process all kinds of information and services, including sound, images and data with no distinction between broadcasting and telecommunications data.

Digital Divide: The gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities.

E-Commerce: Electronic commerce which is commercial transactions occurring over open networks, such as the Internet.

E-Government: Electronic Government which is the use of new information and communication technologies (ICTs) by governments as applied to the full range of government functions.

Fixed Internet Subscribers: Customers with an active internet account with a licensed Internet Provider at fixed point of presence.

Frequency: The rate at which an electrical current alternates, usually measured in Hertz. It is also used to refer to a location on the radio frequency spectrum, such as 800, 900 or 1800 Mhz.

Household: Six people living and/or working under one roof.

Information and Communication Infrastructure (ICI): Physical telecommunications systems and networks (cellar, broadcast, cable, satellite, postal) and the services that utilize them (Internet, voice, mail, radio, and television).

Information and Communication Technologies (ICT): Hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. ICT can be split into ICI and IT.

Information Technology (IT): Refers to the hardware and software of information collection, storage, processing, and presentation.

Interconnection: The physical connection of telecommunication networks owned by two different operators.

International Internet Bandwidth: This is the contracted capacity of international connections between countries for transmitting Internet traffic.

Internet users: Individuals who use the internet from a fixed location at least once a month

Knowledge Economy: The use of knowledge to produce economic benefits.

Leased Line: A telecommunications channel leased or "rented" between two or more points at a flat monthly rate. Also called dedicated or private line.

Local Content: Expression and communication of a community's locally generated, owned and adapted knowledge and experience that is relevant to the community's situation.

Microwave Transmission System: A high-capacity transmission system that sends information using high-frequency radio signals called microwaves.

Multiplexing: Techniques that allow a number of simultaneous transmissions over a single circuit so as to accommodate multiple users.

Network: Combination of telecommunications resources, such as exchanges, wire links (copper cable, optical fibre) and terrestrial or satellite radio transmission links.

Signal: The combination of waves that travel along a transmission channel and act on the receiving unit.

Spectrum Management: The management of planning, allocation, assignment and monitoring of spectrum range of radio frequencies and authorization for use of radio equipment available for communication, industrial, and other uses. Frequencies are allocated and assigned to users for specific purposes, such as commercial radio and television, terrestrial microwave links, satellites, etc in such a manner as to optimize the use of the spectrum and to enable a large number of services to operate within specified limits of interference

Radio Spectrum: The radio frequency spectrum is the electromagnetic spectrum up to around 300GHz used for cellular radio, radio paging, satellite communication, over-the-air broadcasting and other services.

Rural: Areas outside designated cities, town councils and municipal councils.

Subscription: An agreement in which the user accepts the terms and conditions for access of ICTs including payment a payment to the service provider for access to ICTs.

Tariff: Tariffs are the schedule of rates and regulations governing the provision of telecommunications services.

Universal Access: Access to ICTs within a radius of approximately 5km per household.

Urban: designated cities, town councils and municipal councils.

CHAPTER 1: INTRODUCTION

1.1 Background

Over the last 26 years, the Government of Uganda has undertaken a number of initiatives aimed at socio-economic transformation of the country. This has been through a number of policy reforms which include privatization, liberalization, decentralization, democratization and good governance.

These initiatives have been implemented through programmes such as the Structural Adjustment Programme (SAP) and the Poverty Eradication Action Plan (PEAP). In 2007, Government adopted a Comprehensive National Development Planning Framework (CNDPF) which provides for the development of a 30-year Vision to be implemented through 5-year National Development Plans (NDPs), Sector Development Plans (SDPs), Local Government Development Plans (LGDPs), Annual work plans, and Budgets.

Under CNDPF and in conformity with the National Vision 2040, Information and Communications Technology (ICT) has been identified as one of the key priority thematic areas in the development process. As a result, Information and Communications Technology Sector Strategic and Investment Plan (ICT-SIP) which sets the National ICT priorities for a five year period covering 2015/16 to 2019/20 was developed. The ICT-SIP identifies among other priorities, broadband as a critical area for investment to enhance improved service delivery, creating employment and wealth to fast track social economic transformation. In addition, broadband is one of the priority areas identified in realizing the benefits of regional integration in the Northern Corridor Integration Projects initiative.

1.2 The NBS Development Process

The Ministry of Information and Communications Technology (MoICT) spearheaded the development of the Broadband Strategy. A multi-stakeholder approach involving all relevant institutions in the country was adopted in the development of the strategy.

The Ministry of ICT established a National Broadband Task Force comprising of members from key ICT Sector stakeholders. These included Uganda Communications Commission (UCC),

National Information Technology Authority (NITA-U), Uganda National Roads Authority (UNRA), Makerere University, National Association of Broadcasters (NAB), Uganda Broadcasting Cooperation (UBC), Internet Service Providers (ISPs); Uganda Electricity Transmission Company Limited (UETCL), Kampala Capital City Authority (KCCA) and Telecom Operators. The taskforce's mandate was to guide the overall development of a comprehensive strategy for promoting the national development of broadband based Information and Communication Technologies (ICTs) in the country.

Broadband strategy initiatives started with the development of the Uganda Broadband Infrastructure Strategy (UBIS) of 2009. However, it was overtaken by technological advancements that rendered the definition of broadband at 256Kbps[1] no longer sufficient for modern ICT services.

1.3 Situational Analysis

Globally, broadband has been acknowledged as the foundation for transformation to a knowledge-based economy.

A regional level, broadband has been prioritized as a key driver for integration and socio-economic development. A Regional Broadband Strategy has since been developed among the Northern Corridor member states.

Broadband is seen to play a big role in business, job creation and services delivery due to its cross-cutting nature, thereby contributing to national economic development.

This Broadband Strategy focuses on five thematic areas that include: Infrastructure, Connectivity and Devices; Content, Applications and Innovation; Capacity Building and Awareness Creation; Policy, Legal and Regulatory Environment; and Finance and Investment. Below is a glance at the current situation of broadband under these areas.

1.3.1. Infrastructure, Connectivity and Devices

One of Uganda's immediate priorities under the NDP 2010/11-14/15 is enhancing country wide access to quality, affordable and equitable ICT services through development of ICT

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[1] Uganda Infrastructure Broadband Strategy , 2009.

infrastructure and enhancing the use and application of ICT services in business and service delivery[2].

At the national front, broadband infrastructure coverage in Uganda consists of wireless broadband transmission, satellite technology; and the fixed broadband transmission, using optic fibre. Broadband infrastructure coverage is however still limited.

Optic Fibre Infrastructure

As of 2014, Uganda had about 5,000 kilometers of optic fibre rolled out by both the Government of Uganda through the National Backbone Infrastructure initiative and the private sector enabling border-to-border connectivity from the East at Busia to the West at Mpondwe. Connectivity also exists at the northern border with South Sudan at Nimule and Mutukula to the south with Tanzania.

The Government of Uganda established the NBI/EGI project that is composed of two components, the National Data Transmission Infrastructure and the e-Government Infrastructure (EGI). The NBI component is designed to connect all major towns within the country onto an optic fibre cable-based network, while the EGI component is designed to connect he MDAs onto the e-Government network.

Phase I and II of the NBI/EGI project have been completed. Twenty two district headquarters across the country have so far been connected. Phase III is scheduled to commence in 2015 and will avail an alternative route to the undersea cables at Mombasa through Tanzania and also connect Uganda to the Rwandan border.

Privately owned optic fibre backbone networks have been rolled out by Airtel, MTN, UTL, Africell, Roke Telecom, Infocom, and Google among others. Uganda Electricity Transmission Company Limited (UETCL), a government owned power entity has also rolled out fibre along her high transmission lines.

Broadband Satellite

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[2] Uganda National Development Plan 2010/11-2014/15.

Today, Broadband Satellite is used by Internet Service Providers to connect their servers to upstream international Internet connectivity. Satellite technology is also used in the provision of internet access in hard to reach areas, mobile telephone trunking, television broadcasting, and internet connectivity and community internet cafes.

Up until 2009 when the undersea fibre optic cables landed at Mombasa, Uganda's international traffic was being carried via satellite. With the crippling effect of fibre cuts, Uganda appreciates that satellite technology cannot be discarded due to its critical back-up role. However, satellite bandwidth still remains very expensive.

Mobile Broadband

GSM is the predominant technology for mobile internet based on EDGE in rural areas, with 3G mainly in urban areas and 4G LTE concentrated around Kampala. Fixed broadband is also available for large institutional users through CDMA, Fibre, WiMAX, leased lines, and ISDN depending on the network reach in urban areas.

International Bandwidth

International internet bandwidth in Uganda was reported at 369 Mbps in 2008 and rapidly grew starting in 2009 mainly due to the reach of the submarine cables at the Mombasa coast and the corresponding reduction in the bandwidth prices. By the end of the FY 2012/13, total international bandwidth in the country stood at 25,678.8 Mbps. The trend is as shown in the graph below.

Bandwidth Growth, 2012/13

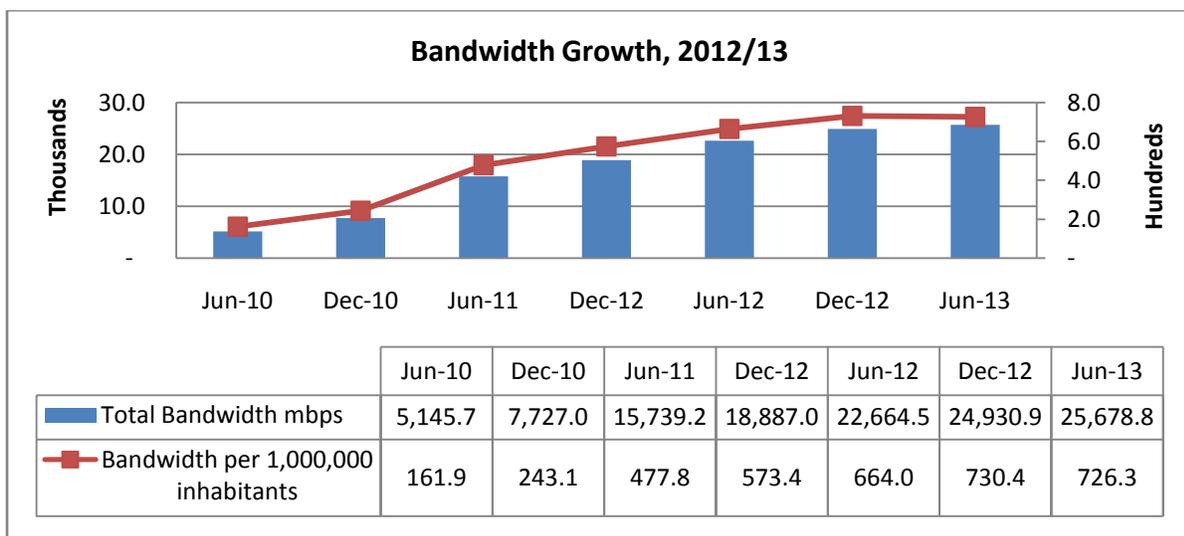|	Jun-10	Dec-10	Jun-11	Dec-12	Jun-12	Dec-12	Jun-13
Total Bandwidth mbps	5,145.7	7,727.0	15,739.2	18,887.0	22,664.5	24,930.9	25,678.8
Bandwidth per 1,000,000 inhabitants	161.9	243.1	477.8	573.4	664.0	730.4	726.3

Figure 1: Bandwidth growth in Uganda

Internet Subscription

Mobile internet connectivity has continued to become the dominant internet and data solution in the country. By the end of June 2013, mobile and fixed internet subscriptions were estimated at 3,556,851 active accounts as indicated in the figure below.
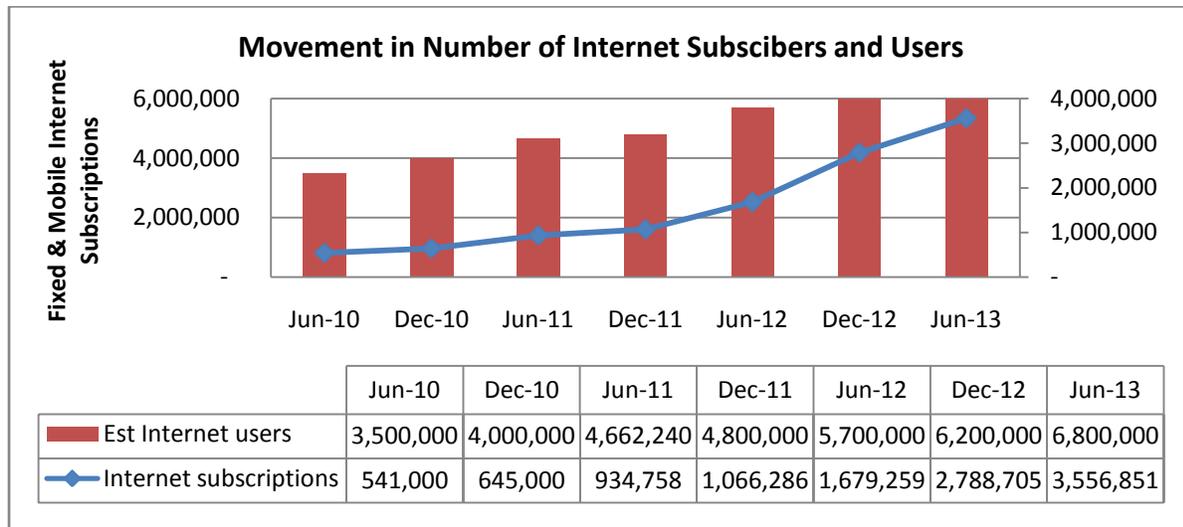

Movement in Number of Internet Subscibers and Users

	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13
Est Internet users	3,500,000	4,000,000	4,662,240	4,800,000	5,700,000	6,200,000	6,800,000
Internet subscriptions	541,000	645,000	934,758	1,066,286	1,679,259	2,788,705	3,556,851

Figure 2: Internet Subscription in Uganda

Internet Costs

High Internet costs are probably the biggest cause of the low internet usage and demand in Uganda. The lack of affordable international bandwidth is the direct result of overall dependence on expensive satellite international connectivity and sub marine costs which have however significantly dropped since 2009. Studies have also shown that around 20 to 35 percent of costs that ISPs incur arise from international internet connectivity. This percentage is usually far higher for LDCs, small island and landlocked states. Below is a summary of average broadband rates for select bundles and speeds in Uganda.

	Low	**Median**	**High**
Modem Prices			
Retail Price	Sh.25,000	Sh.59,000	Sh.110,000
Monthly Bundle Rates			

500MB	24,000		25,000
1GB	30,000	39,000	45,000
Unlimited	60,000	120,000	299,000
Dedicated Speed Based-Packages (Optic Fibre, WiMax)			
512Kbps	$280	$300	$450
1Mbps	$600		$700

Table 1: Average Broadband Rates in Uganda

1.3.2. Content, Applications and Innovation

The availability of broadband serves as the foundation for content creation, storage and utilization among and across communities. The internet is primarily used for collection of information, interaction and e-mail. Availability of services like robust e-services, movies on demand, IPTV and local multi-media is still limited. Users are price sensitive therefore prefer to access content on the internet at low costs either through fixed or mobile technologies.

e-Government services such as e-tax, IFMS, IPPS, HIMS, E-learning and e- Health have been implemented to a certain degree. Private sector led initiatives include e-banking, mobile money, e-commerce, and e-learning.

Innovations such as BPO are beginning to take shape in Uganda. There are three innovation hubs in Kampala whose major objective is to encourage innovation and stimulate development of locally relevant internet and mobile applications. These facilities offer technology incubation and collaboration space providing support to technologists to transform their ideas that utilize mobile and web into sustainable businesses.

The improvement in mobile broadband coupled with the presence of a young population especially in urban areas has led to the increase in use of social media sites.

1.3.3. Capacity Building and Awareness Creation

Uganda's literacy level currently stands at 73%[3] with 95.5%[4] of the population being below 54 years of age. This age bracket accounts for the largest uptake, usage, provision of technical support, development and creation of contents and innovative broadband applications. The introduction of Universal Primary Education in the late 90's and that of Universal Secondary Education in 2000 by Government was an attempt to increase the literacy level.

The National ICT Policy framework document recognized that Uganda would need to embrace the goal of "lifelong education for all."

Literacy is largely 'traditional literacy', with small ICT components limited to schools at which civil society efforts have made ICT applications available for education and training.

The National Curriculum Development Centre (NCDC) proposed a pilot project for an ICT-based curriculum delivery strategy for primary and secondary schools entitled CurriculumNet which was approved by Government.

Most of the institutions of higher learning, both private and public, offer varying levels of ICT skills training with courses specializing in Information Technology, Computer Science and Telecommunications Engineering. Basic ICT training is also incorporated in most academic programmes as part of formal academic qualifications.

Other than higher institutions of learning, ICT skills development in Uganda is carried out mainly by computer vendors and private computer training institutions. These institutions generally offer short courses on standard applications such as Microsoft Office, including database management. However, most of the training institutions lack proper teaching materials, and often employ trainers who are inadequately qualified.

1.3.4. Policy, Legal and Regulatory Framework

The Government of Uganda recognizes the key role ICT plays in socio-economic development and as such has endeavors to put in place an enabling Policy, Legal and Regulatory environment. Broadband is about effective and efficient access to information; the right of access to

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[3] Statistical Abstract 2013, UBOS

[4] CIA world Factbook, accessed online, 14th January 2014

information is enshrined in the Constitution of the Republic of Uganda[5]. To ensure effective and efficient access to information, the Constitution is supported by various policies, laws and regulations. The policies and laws supporting broadband development in Uganda include:

Uganda Communications Act 2013

The Uganda Communications Act of 2013 was a result of the merger of the Communications Act of 1997 and the Electronic Media Act of 1996. It was enacted to address the gaps of the Communications Act of 1997 which were premised around convergence of technologies and changes in the ICT sector brought about by new technologies, value added services, new demands and a widening market. It also saw the formation of a regulator for Telecommunications, Postal services and Broadcasting.

National ICT Policy, 2013

The National ICT Policy is the policy and strategic framework that captures the approach to, and the expected role of ICT in national development.

The Policy positions itself to address ICT technological requirements and broadband challenges, among others.

The National Information Technology Authority-Uganda Act, 2009

National Information Technology Authority, Uganda Act 2009, provides for establishment of the National Information Technology Authority. The core objective of the formation of NITA-U is to provide high quality information technology services to Government, to provide guidance and other assistance as may be required to other users and providers of information technology.

The Act gives NITA-U a service provider as well as regulator mandate. This is against the principles of liberalization and good governance. There is need to remove regulator roles from NITA-U.

National e-Government Framework for Uganda, 2010

The National e-Government Framework for Uganda states Uganda's e-Government goals and spells out its core pillars, critical success factors and a roadmap which will be adopted to achieve it. The framework concentrates more on the Government to Government function in e-government. There is need to have a framework which capture all facets of e-Government.

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[5] Constitution of the Republic of Uganda, 1995, Article 41(1)

Analogue to Digital Migration Policy, 2011

The Analogue to Digital Migration policy sets the parameters of migrating Uganda's Television broadcasting sector from analogue to digital terrestrial broadcasting. This policy provides a framework establishment of a policy environment within which digital broadcasting migration can be implemented.

Digital migration will free spectrum previously used for UHF Television broadcasting The freed spectrum commonly referred to as the digital dividend is expected to be used for delivery of mobile broadband services. The mobile broadband technologies will go a long way in providing broadband services in areas not covered by optical fibre provided by the private sector and Government.

Cyber Laws

As the Government of Uganda embraced the use of ICT in delivery of its services, it was envisaged that more citizen and business targeted services would be carried out online for easier access and efficiency. As such, there was need for a legal framework to govern such transactions and to address cybercrime and terrorism. This led to enactment of the Cyber laws.

The cyber laws consist of the Electronic Signatures Act, Electronic Transactions Act and The Computer Misuse Act.

ICT Governance Framework

The ICT Sector in Uganda is structured into three functional levels namely: Policy, Regulatory and Operational. The Policy aspect is handled by the Ministry of ICT, the regulatory aspects are handled by UCC and NITA-U which is recognized primarily as the body for delivery of e-government services, IT standards and NBI management on behalf of Government.

Furthermore various MDAs, Local Governments and the Private Sector composed of Telecommunications, Postal, Information Technology (IT) and Broadcasting operators undertake provision of public and commercial services.

1.3.5. Finance and Investment

ICT investments have largely been funded by the private sector, since the 1990s. The private sector has proved itself more efficient than Government in ICT service provision since private providers are more flexible and able to keep up with technological change. However,

Government has played the major role of creating the right environment through policy, regulation, and legal framework for attraction of investment.

The Government of Uganda has further gone ahead to facilitate the implementation of a high capacity backbone (NBI) to support high speed broadband services for improvement of service delivery to the population, as well as creating opportunities for existing operators and new investors to participate in extending the broadband backbone and last mile networks. It is however not enough for Governments to say "leave it to the private sector".

1.4   Rationale for the National Broadband Strategy

Broadband encompasses a host of technologies that connect users to the Internet faster than traditional telephone line dial-up connections. Higher connection speeds are required to take full advantage of rich online content. As the social and economic lives of citizens become increasingly digital, reliable and rapid access to the Internet and its wealth of content has become essential. High-speed Internet broadband is no longer seen as a luxury, but as basic infrastructure. Like electricity a century ago, broadband is a foundation for economic growth, job creation, global competitiveness, and a better way of life.

Broadband connectivity has made considerable progress in the last decade enabling a large part of businesses and citizens to participate in digital activities of different sorts. However, there is still need for action until everyone is connected to sufficient broadband infrastructure. This is the reason why a common broadband strategy and policy is needed, defining aims and targets of broadband development and serving as a point of reference for strategies and policies.

Internet and broadband have been globally acknowledged as the foundation for transformation to a knowledge-based economy. It is also widely acknowledged that broadband infrastructure is an enabler for economic and social growth in the digital economy. Broadband has the potential of enabling entire new industries and introducing significant efficiencies into education delivery, health care provision, energy management, ensuring public safety, government/citizen interaction, and the overall organization and dissemination of knowledge. It is widely accepted that an increase in broadband penetration has positive impact on GDP growth.

A 2009 World Bank study suggests that a 10% increase in broadband penetration yields an additional 1.38% increase in GDP growth for low to middle income countries[6]. McKinsey & Company estimates that a 10% increase in broadband household penetration delivers a boost to a country's GDP that ranges from 0.1 percent to 1.4 percent[7]. Booz & Company[8] found that 10 percent higher broadband penetration in a specific year is correlated to 1.5 percent greater labor productivity growth over the following five years. Booz also suggests that countries in the top tier of broadband penetration have exhibited 2% higher GDP growth than countries in the bottom tier. These studies are the latest in the already extensive work estimating broadband's economic impact.

[6]

http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDT
ECHNOLOGIES/EXTIC4D/0,,menuPK:5870641~pagePK:64168427~piPK:64168435~theSitePK:5870636,00.html

[7] McKinsey & Company, Mobile broadband for the masses, February
2009, http://www.mckinsey.com/clientservice/telecommunications/mobile_broadband.asp

[8] Booz & Company, Digital Highways: The Role of Government In 21st-Century Infrastructure, 2009, p. 5

CHAPTER 2: THE NATIONAL BROADBAND STRATEGY

2.1 Vision
A transformed middle income economy driven by affordable high quality broadband connectivity.

2.2 Objective
To facilitate uptake of broadband for socio-economic transformation of the country.

2.3 Principles
Broadband in Uganda will transcend viewing of television, surfing the internet, and basic telephony services. It will facilitate new forms of communication and mass collaboration through the virtually unlimited potential for sharing of information, storage capacity, processing power, transmission and access all made possible through high bandwidth connections. The following key principles will guide the implementation of the broadband strategy:

1. Open Access and Infrastructure Sharing: to reduce duplication of infrastructure and end user cost of broadband while encouraging competition at service level.

2. Technology Neutrality: to facilitate the adoption of a wide variety of technologies as long as they are affordable, interoperable, resource efficient and contribute to socio-economic transformation.

3. Coordination and Collaboration: to ensure that Uganda approaches and implements broadband initiatives in harmony with other national development programmes and regional frameworks.

4. Research and Innovation: to identify, support and nurture ideas and talent that can contribute to Uganda's technological advancement in the areas of business, manufacturing, assembly and recycling.

5. Policy Responsiveness: to facilitate the development and rollout broadband infrastructure and services that responds to the dynamic nature of the economy.

6. Capacity Building: to realize the critical mass in terms of human, technological and financial resources necessary for effective deployment and usage of broadband infrastructure and services.

7. Equity: to ensure equitable access to broadband for all Ugandans irrespective of geographical location, gender, age among others.

2.4 Defining Broadband for Uganda

Broadband is no longer defined by data rates but by how it is used to improve the lives of people in the socio-economic agenda. As a result of this new orientation, broadband is an interconnected multi-layered ecosystem of high-capacity communications networks, services, applications, devices and users. The broadband ecosystem includes the networks that support high-speed data communication and the services these networks provide (also known as the supply side). It also includes the applications provided by these services, devices and the users who are increasingly creating the demand side in the broadband market.

By defining broadband in this way, to include both the supply and demand sides of the market, it is time to rethink approaches to spur broadband uptake. It is, therefore, critical to create an enabling environment for the supply side and stimulate the demand sides of the broadband market in Uganda.

For the duration of this strategy (2016-2020), broadband for Uganda means a robust connectivity that is affordable, always on and delivers a minimum of 3Mbps to the user for applications, content and services.

This will be achieved gradually as shown below.

	2016	**2017**	**2018**	**2019**	**2020**
Urban	15%	25%	40%	60%	100%
Rural	1%	5%	15%	30%	50%

Table 2: Broadband Connectivity Targets for Uganda

The key broadband targets include:

- Minimum broadband speeds of 3Mbps by 2020;
- Broadband access penetration of 50% and 100% for rural and urban areas respectively by 2020;
- 100% of district and sub-county headquarters, health centre IVs and secondary schools with broadband connectivity by 2020;

- 50% of primary schools with broadband connectivity by 2020;

- Cost per Mbps of broadband in relation to average income reduced to 10% by 2020;

- One national virtual submarine landing station in Kampala by 2020;

- 70% of MDAs and LGs with interactive e-services by 2020;

- 50% of registered Ugandan businesses online by 2020;

- 40% of the population digitally literate by 2020

- Develop a National Broadband Policy by 2016; and

- Develop a National Broadband Infrastructure Rollout Blueprint for Uganda by 2016.

2.5   Strategies Under the Thematic Areas

The strategies to achieve Uganda's broadband aspirations are organized under the five thematic areas of: Infrastructure, Connectivity and Devices; Content, Applications and Innovation; Capacity Building and Awareness Creation; Policy, Legal and Regulatory Environment; and Finance and Investment. The objectives and expected outcomes are also presented alongside the strategies in the following tables.

2.5.1 Infrastructure, Connectivity and Devices

Objectives	Strategies	Outcomes
Guide broadband infrastructure planning, investment and development	• Develop a National Broadband Infrastructure Rollout Blueprint • Use the Blueprint as a basis for approval of both private and public broadband infrastructure development • Centralized planning, monitoring and evaluation of infrastructure development • Develop a legal framework to enforce the National Broadband Strategy	• Well planned broadband infrastructure • Open access to broadband infrastructure • Affordable and equitable access to broadband infrastructure
Provide quality broadband services to all citizens	• Extend the national broadband infrastructure to cover entire country as well as addressing last mile challenges • Government in collaboration with private sector to fund infrastructure development through PPPs • Establish one-stop telecenters at all Post Offices in the country • Use of Universal Access Fund to extend broadband network penetration • Develop a framework for monitoring and evaluation of quality of service • Periodic review of national spectrum planning and allocation mechanisms • Spectrum forecasting or determination of spectrum requirements in line with national broadband objectives or Sector policies	• Improved quality in the way citizens work, live and learn
Provide a harmonized and enabling environment for infrastructure	• Establish an existing body to be charged with planning, management and development of national ICT infrastructure • Enforce sharing of physical infrastructure amongst operators • Embrace convergence of ICT technologies through common infrastructure development for communication, broadcasting and information technology infrastructure and systems • Revise the organizational functional units of public institutions in line with developments in ICT • Have a single ICT sector regulator for telecommunications, broadcasting and information technology • Develop a framework for synchronized planning of infrastructure rollout for all utility services (ICT, water, power, and roads) • Establish a unit to coordinate all space technologies including satellite service in the region	• Reduced cost of deployment, maintenance and operation of broadband networks
Ensure accessibility and affordability of broadband services for all citizens	• Formulate an ICT scarce resources management policy for their optimal utilization (frequency spectrum, orbital slots, .ug top level domain, numbering plans) • Issue policy guidelines for allocation and use of the digital dividend • Re-firm and avail additional spectrum to facilitate last mile connectivity • Government to provide subsidies for high end access device (PDAs, Smart Phones,	• Increased demand and utilization of broadband services

Objectives	Strategies	Outcomes
	Conditional Access Set Top Boxes)	
	• Lower the cost of bandwidth to 10% of the average income per capita	
	• Utilization of a mix of technologies for broadband rollout	
	• Purchase satellite bandwidth in bulk as a region in order to reduce the costs	
	• Promote local production of access devices	
	• Promote availability of online local content to spur demand for broadband services e.g e-Government, e-business	
	• Continued expansion of power, alternative renewable energy sources, security and road networks across the country	
	• Build data-centres of international standard to enable hosting of content locally	
	• Establish one national virtual submarine landing station in Kampala	
Develop a robust and reliable backbone for the broadband network	• Ensure confidence and security in networks and services e.g. establishing the CERT	• A rich interruption-free broadband experience
	• Harness the potential of broadband satellite as a backup option for international connectivity	
	• Establish redundancy within the domestic network (country level)	
	• Enhance capabilities of Local Exchange Points	
Benefit from regional collaboration	• Participate in international fora on broadband	• Reduced cost of access to broadband
	• Direct interconnection between regional national backbone infrastructure and Internal exchange points (ref. Northern Corridor ICT projects)	
	• Coordinate at a regional level in the development and harmonization of policies laws and regulation	
	• Share expertise within the region	
	• Create a framework for cross boarder interconnectivity especially for physical infrastructure	

Table 3: Strategies for Infrastructure, Connectivity and Devices

2.5.2 Content, Applications and Innovation

Objectives	Strategies	Outcomes
Reduce the digital divide	• Implement a laptop per child initiative • Develop relevant content (including people with special needs & interests) and in local dialects • Promote development of interactive technological applications • Develop standards and guidelines for local content development and uptake	• Increased participation and usage • Formation of an information society
Improve service provision and stimulate online local content Improve interaction between Government and citizenry	• Develop high impact e-Government services • Implement robust PKI -Create public awareness • Redesign and equip Post Offices for country-wide delivery of e-Government services	• Increase in level of service provision and broadband utilization
Develop online local content Stimulate innovation	• Promote capacity of transforming local content to innovative digital formats and solutions • Promote development of innovative solutions for universal accessibility • Incentivize Research and Development • Develop Public Private Partnerships for Venture Capital funding • Establish and equip regional innovation and incubation hubs • Create mass public awareness	• Increased presence of applications for local content
Promote the Uganda IXP	• Encourage telecommunication players and ISPs to peer at the Uganda IXP • Develop capacity of local hosting companies to utilize the Uganda IXP • Develop and implement strategy to introduce an instance of one of the root servers in the country • Incentivize large scale content providers to install cache servers in Uganda • Create public awareness	• Increased offer of local content through the Uganda IXP
Protect user's personal information online	• Develop and implement comprehensive data protection and privacy legislation • Create public awareness	• Increased confidence of a user's personal information protection online
To foster the development and use of ICT financial services and applications	• Promote and expand the use of ICTs in government related financial transactions. • Tighten security of financial systems through cyber related legislation and enforcement. • Promote the use of shared ICT financial applications amongst MFIs/SACCOS/SMEs. • Promote collaboration amongst service providers within the Financial sector	• Widespread utilization of ICTs in the delivery of financial services

Table 4: Strategies for Content, Applications and Innovations

2.5.3 Capacity Building and Awareness Creation

Objectives	Strategies	Outcomes
Improve digital literacy	• Conduct ICT education and awareness campaigns • Organize annual ICT events to showcase ICT developments and benefits • Facilitate the use of ICT amongst special interest groups (women, elderly and PWDs) • Create model ICT resource centres at all district headquarters • Require all schools to incorporate basic ICT skills training in their programs	• Increased mass of ICT knowledgeable citizenry
Increase ICT specialized manpower	• Develop a comprehensive plan for human resource development in ICT to meet present and future manpower needs • Facilitate the rollout of e-learning facilities in all higher institutions of learning • Establish a national educational network to enable sharing among educational institutions of e-libraries, teaching and tutorial systems • Develop curricula that aligns training and skills imparted with industry demands • Strengthen UICT to become a centre of excellence for ICT training • Employ a consultative and participatory approach among training institutions, government, and the industry in implementation of capacity building	• A critical mass of ICT professionals

Table 5: Strategies for Capacity Building and Awareness Creation

2.5.4 Governance, Policy, Legal and Regulatory Environment

Objectives	Strategies	Outcomes
Develop broadband policy framework	• Review the National ICT Policy, 2003 to prioritize issues of broadband • Review the Telecommunications Policy to prioritize issues of broadband • Leverage on regional • And international frameworks for collaboration on broadband	• Improved growth in broadband services
Develop legal and regulatory framework to support broadband	• Review the NITA-U Act and remove regulatory role • Develop enabling regulations for the Electronic Signatures Act, 2011, Electronic Transactions Act, 2011and the Computer Misuse Act, 2011 • Review and align existing • Legislation with requirements of the National broadband policy	• Enhanced institutional and legal framework

Table 6: Strategies for Governance, Policy, Legal and Regulatory Environment

2.5.5 Finance and Investment

Objectives	Strategies	Outcomes
Stimulate Private Investments and Promote PPPs within the ICT sector.	• Operationalize the RCDF Fund to avail opportunity for extending Broadband Coverage. • Develop Funds for regional Projects • Develop Innovative Financial funding mechanisms eg Broadband Infrastructure Bonds, Government Supported Broadband Venture capital Fund, etc. • Lobby for increase in the ICT government budget funding. • Enhance the role of Government in promoting broadband related investments. • Develop linkages between the ICT sector and Financing Institutions and Donor entities	• Improved Service Delivery through ICTs. • Increased Investments in the ICT Sector. • Achievement of the Millennium Development Goals

Table 7: Strategies for Finance and Investment

CHAPTER 3: STRATEGY IMPLEMENTATION

3.1 Institutional Framework and Stakeholder Groups

ICT projects in the country are implemented and managed by the Ministry of ICT, UCC, NITA-U and the Private Sector. Whereas this is not deemed to change regarding the implementation of the Broadband strategy, it is worth noting that the success of the implementation will warranty some immediate considerations and necessities which are highlighted below.

3.1.1. Broadband Steering Committee

There is need to establish a focal oversight function for the implementation of the Broadband strategy. This will be responsible for the overseeing and coordinating the implementation of the NBS and reporting to the Minister of ICT.

3.1.2. Institution to Manage Public Infrastructure

Establish a new institution an existing one to carry the mandate of managing public ICT infrastructure such as NBI and LTE. The benefits of this institutional arrangement include:

- Project ownership and management
- Structured coordination
- Investment sourcing and rationalization
- Providing a one stop shop for future investment in public ICT infrastructure

However the other stakeholder groups as mentioned below will have the following roles and responsibilities.

No.	Stakeholder	Roles and Responsibilities
1	Ministry of ICT	- Review and develop appropriate policies, laws, regulatory frameworks - Provide guidance in terms of coordinated approach to strategy implementation - Provide national policy objectives in regard to broadband, e.g. provide data on the estimated broadband demand from government ministries and departments as well as nation as a whole - Ensure that interests of all stakeholders are catered for in the policy that will emerge - Provide support and guidelines for the Transition to IPV6 - Coordinate demand aggregation from the public sector

No.	Stakeholder	Roles and Responsibilities
2	Regulator (Uganda Communications Commission)	• Provide data on existing operators and lessons from other countries; interpretations thereof • Provide guidance on the existing regulatory framework and how it could be made more efficient to deliver broadband services • Efficient and timely implantation of agreed broadband and related policies • Provide technical guidelines on infrastructure sharing • Provide data on existing ISP operators •
3	Legislators	• Build necessary legislations into the broadband national policy
4	Other MDAs	• Provide guidance on the broadband needs to support respective sector policies and objectives • Provide more accurate estimates of the future Broadband demand • Government budget allocation to support the ICT sector
5	Telecom Operators	• Provide data on existing telecom operators broadband plans and existing investments in infrastructure • Adequately invest in broadband infrastructure and technologies, including transmission (domestic, regional and global) and last mile • Affordable rates for broadband services; stimulate demand • Present a clear plan on the migration to IPv6
6	Internet Service Providers (ISPs)	• Articulate challenges to growth and sustainability • Educate the industry on the value and benefits of the Internet exchange Point • Present a clear plan on the migration to IPv6
7	Local Government Councils	• Educate the community of the need to protect broadband infrastructure from possible vandalism • Articulate specific local needs and requirements thus creating relevance by localizing the content
8	Uganda Investment Authority / Investors	• Give input into the planned number and nature of investors in the near future • Provide data on the interests of the investors and consumers
9	Academia, Civil Society, Consumers	• State the needs of institutions of higher learning and research institutions • Provide data on the interests of the investors and consumers
10	Energy, Oil & Gas Companies	• Improve access to electricity for powering terminal equipment and telecom infrastructure • Rural Electrification programme
11	Owners of Submarines Cables	• Clear dates on arrival of connectivity and constant updates to help potential users make plans • Timely implementation of the submarine cables
12	EAC Member states	• Provide lessons from their learning experiences on broadband strategy formulation and implementation • Harmonization of regional ICT policies • Support for the EABS project

Table 8: Stakeholder Roles

3.2 Implementation Plan

This involves the objectives to be fulfilled, the strategies undertaken, projects to be initiated, responsible agencies, and the estimated cost for a five year period. This section will guide the realization of outcomes of the Broadband Strategy.

The table below summarizes the implementation plan of the strategies as per the thematic areas highlighted in Chapter 2.

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
Infrastructure, Connectivity and Devices									
Guide broadband infrastructure investment and development	Develop a National Broadband Infrastructure Rollout Blueprint	Yes	MoICT, UCC	0.3	0.3				0.6
	Use the Blueprint as a basis for approval of both private and public broadband infrastructure development	No							0
	Centralized planning, monitoring and evaluation of infrastructure development	No	MoICT, NITA-U, UCC & Private Sector players	0	2.5	3.75	3.75	4.6	14.6
Provide quality broadband services to all citizens	Extend the national broadband infrastructure to cover entire country as well as addressing last mile challenges	Yes	Government , Private Sector	0	15	20	20	20	75
	Government in collaboration with private sector to fund infrastructure development through PPPs	No							0
	Establish one-stop telecenters at all Post Offices in the country	Yes	UPL, MoICT, UCC	2	2	2	2	2	10
	Use of Universal Access Fund to extend broadband network penetration	No	MoICT, UCC, NITA-U						0

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Develop a framework for monitoring and evaluation of quality ofservice	No	MoICT, UCC	0	0.1	0	0	0	0.1
	Periodic review of national spectrum planning and allocation mechanisms	No	UCC, MOICT						0
	Spectrum forecasting or determination of spectrum requirements in line with national broadband objectives or Sector policies	No	UCC, MOICT						0
Provide a harmonized and enabling environment for infrastructure	Establish a body charged with planning, management and development of national ICT infrastructure	No	MoICT						0
	Enforce sharing of physical infrastructure amongst operators	No	MoICT, UCC						0
	Embrace convergence of ICT technologies through common infrastructure development for communication, broadcasting and information technology infrastructure and systems	☐ ☐							0
	Revise the organizational functional units of public institutions in line with developments in ICT	☐ ☐							0
	Have a single ICT sector regulator for telecommunications, broadcasting and information technology	☐ ☐							0

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Develop a framework for synchronized planning of infrastructure rollout for all utility services (ICT, water, power, and roads)	Yes	MoICT, UCC, MoWE, MOE&MD			0.05	0.05		0.1
	Establish a unit to coordinate all space technologies including satellite service in the region	No							0
Ensure accessibility and affordabilityof broadband services for all citizens	Formulate an ICT scarce resources management policy for their optimal utilization (frequency spectrum, orbital slots, .ug top level domain, numbering plans)	Yes	MoICT, UCC	0.35	0.51	0	0		0.86
	Issue policy guidelines for allocation and use of the digital dividend	No	MoICT, UCC						0
	Re-firm and avail additional spectrum to facilitate last mile connectivity	No	MoICT, UCC						0
	Government to provide subsidies for high end access device (PDAs, Smart Phones, Conditional Access Set Top Boxes)	No	MoICT, UCC, URA, MoFPED						0
	Lower the cost of bandwidth to 10% of the average income per capita	No	MoICT, UCC, URA, MoFPED						0
	Utilization of a mix of technologies for broadband rollout								0
	Purchase satellite bandwidth in bulk as a region in order to reduce the costs								0
	Promote local production of access devices								0

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Promote availability of online local content to spur demand for broadband services e.g e-Government, e-business		MoICT, UCC, MING						0
	Continued expansion of power, alternative renewable energy sources, security and road networks across the country		MoICT, UCC, MOIA						0
	Build data-centres of international standard to enable hosting of content locally		NITA-U, MoICT, UCC						0
	Establish one national virtual submarine landing station in Kampala		NITA-U, UCC, MoICT &Development Partners	0	6	4.8	0	0	10.8
Develop a robust and reliable backbone for the broadband network	Ensure confidence and security in networks and services e.g establishing the CERT		NITA-U, MoICT, UCC & Development Partners	2.5	3.36	4	2.9	2.5	15.26
	Harness the potential of broadband satellite as a backup option for international connectivity		NITA-U, MoICT, UCC						0
	Establish redundancy within the domestic network (country level)		NITA-U, MoICT, UCC &Private Sector						0
	Enhance capabilities of Local Exchange Points		NITA-U, UCC	0	6.7	7.04	2.75	2.6	19.09
Benefit from regional collaboration	Participate in international fora on broadband	No		9	9	9	9	9	45
	Direct interconnection between regional national backbone infrastructure and Internal exchange points(ref. Northern Corridor ICT projects)	Yes	NITA-U, MoICT	Existing resources					

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Coordinate at a regional level in the development and harmonization of policies laws and regulation	Yes	NITA-U, MoICT, UCC	0.6	0.6	0.6	0.6	0.6	3
	Share expertise within the region	No		0.03	0.03	0.03	0.03	0.03	0.15
	Create a framework for cross boarder interconnectivity especially for physical infrastructure	No	NITA-U, MoICT	Existing resources					
	Content, Applications and Innovations								
Reduce the digital divide	Implement a laptop per child initiative	yes							0
	Develop relevant content (including people with special needs & interests) and in local dialects	No							0
	Promote development of interactive technological applications	No							0
	Develop standards and guidelines for local content development and uptake	No	NITA-U, MoICT, UCC	0.44	0.44	0	0	0	0.88
Improve service provision and stimulate online local content	Develop high impact e-Government services								0
Improve interaction between Government and citizenry	Implement robust PKI -Create public awareness		NITA-U, MoICT	3.5	4.28	3	0	0	10.78

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Redesign and equip Post Offices for country-wide delivery of e-Government services		UPL, NITA-U, MoICT, UCC	Catered for under Quality broadband					
Develop online local content	Promote capacity of transforming local content to innovative digital formats and solutions		NITA-U, MoICT, UCC						0
Stimulate innovation	Promote development of innovative solutions for universal accessibility		NITA-U, MoICT, UCC						0
	Incentivize Research and Development		NITA-U, MoICT, UCC						0
	Develop Public Private Partnerships for Venture Capital funding		NITA-U, MoICT, UCC						0
	Establish and equip regional innovation and incubation hubs		NITA-U, MoICT, UCC	0	5.53	10	10	10	35.53
	Create mass public awareness		NITA-U, MoICT, UCC	0.5	0.5	0.5	0.5	0.5	2.5
Promote the Uganda IXP	Encourage telecommunication players and ISPs to peer at the Uganda IXP		NITA-U, MoICT						0
	Develop capacity of local hosting companies to utilize the Uganda IXP		NITA-U, MoICT						0
	Develop and implement strategy to introduce an instance of one of the root servers in the country		NITA-U, MoICT						0
	Incentivize large scale content providers to install cache servers in Uganda		NITA-U, MoICT						0
	Create public awareness		NITA-U, MoICT	0.5	0.5	0.5	0.5	0.5	2.5
Protect user's personal information online	Develop and implement comprehensive data protection and privacy legislation			0.3	0	0	0	0	0.3
	Create public awareness			0.2	0	0	0	0	0.2

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
To foster the development and use of ICT financial services and applications	Promote and expand the use of ICTs in government related financial transactions.	No	NITA-U	15.88	8	8	8	8	47.88
	Tighten security of financial systems through cyber related legislation and enforcement.								
	Promote the use of shared ICT financial applications amongst MFIs/SACCOS/SMEs.								
	Promote collaboration amongst service providers within the Financial sector								
Capacity Building and Awareness									
Improve digital literacy	Conduct ICT education and awareness campaigns	No	MoICT, MOE,UCC,NITA-U						0
	Organize annual ICT events to showcase ICT developments and benefits	No	MoICT, MOE,UCC,NITA-U						0

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Facilitate the use of ICT amongst special interest groups (women, elderly and PWDs)	No	MoICT, MOE,UCC,NITA-U						0
	Create model ICT resource centres at all district headquarters	No	MoICT, MOE,UCC,NITA-U						0
	Require all schools to incorporate basic ICT skills training in their programs	No	MoICT, MOE,UCC						0
Governance, Policy, Legal and Regulatory Environment									
Develop broadband policy framework	Review the National ICT Policy, 2003 to prioritize Issues of broadband	No	MoICT, UCC, NITA-U	0.35	0.51	0	0	0	0.86
	Review the Telecommunications Policy to prioritize Issues of broadband	No	MoICT, UCC, NITA-U						
	Leverage on regional nd international frameworks for collaboration on broadband	No	MoICT, UCC, NITA-U						
Develop legal and regulatory framework to support broadband	Review the NITA-U Act and remove regulatory role	No	MoICT, UCC, NITA-U	0.35	0.51	0	0	0	0.86
	Develop enabling regulations for the Electronic Signatures Act, 2011, Electronic Transactions Act, 2011 and the Computer Misuse Act, 2011	No	MoICT, UCC, NITA-U						
	Review and align existing Legislation with requirements of the National broadband policy	No							

Objectives	Strategies	Project	Implementing Agency	Estimated Cost (UGX BN)					
				Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Finance and Investment								
Stimulate Private Investments and Promote PPPs within the ICT sector.	Operationalize the RCDF Fund to avail opportunity for extending Broadband Coverage.	No	MoICT, UCC, NITA-U						
	Develop Funds for regional Projects	No	MoICT, UCC, NITA-U						0
	Develop Innovative Financial funding mechanisms eg Broadband Infrastructure Bonds, Government Supported Broadband Venture capital Fund, etc.	No	MoICT, UCC, NITA-U						
	Lobby for increase in the ICT government budget funding.	No	MoICT, MOFPED						
	Enhance the role of Government in promoting broadband related investments.	No	MoICT, UCC, NITA-U						0
	Develop linkages between the ICT sector and Financing Institutions and Donor entities	No	MoICT, UCC, NITA-U						
			Total	36.8	66.37	73.27	60.08	60.33	296.85

Table 9: Implementation Plan of the National Broadband Strategy for Uganda

3.3 Risk Mitigation Strategies

Risk	• Detail	Risk Level	Mitigation Strategies
Overlap in institutional mandate	• Convergence not reflected in institutional set up • Lack of an institution dedicated for planning, investment and development of broadband infrastructure	High	• Review of the laws that established the sector institutions • Review of the current institutional setup to align with technological developments
Insufficient funding of broadband initiatives	• Competing Government priorities • Low private sector investment	High	• Ensure Government buy-in • Integrate Broadband Strategy into performance contracting process • Political advocacy/lobby groups
Poor implementation of the broadband strategy	• Capacity challenges in project management • and planning • Procurement delays	High	• Recruit competent personnel • Adopt international Project Management methodologies • Adhere to procurement regulations

Lack of supportive policy and legal framework	• Delays in enacting legislation • Delays in operationalizing enacted legislation	High	• Advocacy and lobbying of Government agencies to operationalize legislation
Spectrum inavailability	• Lack of spectrum to deploy last mile solutions	Medium	• Expedite the migration from analogue to digital broadcasting to free up the digital dividend by funding digital broadcasting infrastructure and subsidizing the purchase of Set Top Boxes • Expedite frequency re-farming exercises to optimize the utilization of the already allocated spectrum for deployment of mobile broadband
High cost of implementation	• Cost of infrastructure • Duplication of infrastructure • Lack of coordination between civil works and ICT works • Use of out dated technologies	Medium	• Promote shared infrastructure • Provide tax incentives • Use of alternative technologies • Establish a coordinating body as proposed in 3.2.2

Slow uptake of broadband services	• Lack of relevant content • Affordability of broadband devices and services • Low awareness • Low ICT literacy	Medium	• Implementation of content Strategies including development of relevant Content • Provide tax incentives/subsidies • Promote competition • Implement capacity building strategies
Service availability	• Maintenance of infrastructure • Vandalism	Medium	• Enforce SLAs • Operationalize legislation

Table 10: Risk Mitigation Strategies

3.4 Monitoring and Evaluation

The Broadband Steering Committee will oversee the implementation of the Broadband Strategy, with the guidance of the implementation plan to ensure that short and long term targets are achieved.

There will be harmonized planning and consultations with all stakeholders for future deployment of broadband infrastructure and services in collaboration with other infrastructure providers such as roads, water, and power to minimize duplication in investments and damage to existing infrastructure.

The strategy shall follow the National Monitoring and Evaluation Framework as enshrined in Article 108(a) of the Constitution of the Republic of Uganda. Accordingly, an M&E plan for this shall be developed.

CHAPTER 4: CONCLUSION

The full benefits of broadband for enhancing national competitiveness and empowering citizens are most likely to be realized where there is strong partnership between Government, industry and other stakeholders and where Government engages in a consultative, participatory approach to the policy-making process, in conjunction with key stakeholders. There is a need to move from 'silo thinking' to a more comprehensive point of view encompassing different sectors, in recognition of the nature of broadband as a cross-sectoral enabler. Implementation is still an issue, with broad-based buy-in by different stakeholders critical to the strategy's success. Some

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