Ministry of ICT and National Guidance

Concept Paper

Reduce the Cost of ICT Infrastructure Rollout

Increase Uptake of Broadband Services Increase

Government Tax Revenue

May 2023

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Executive Summary

This concept paper provides a detailed discussion for an Action Plan that has the triple objective of: (i) Reducing the cost of rolling out ICT infrastructure; (ii) Increasing uptake of ICT services, and (iii) Increasing Government Tax Revenue. The Action Plan is aimed at achieving the alignment of the three objectives to create synergy, leading to the successful implementation of the Digital Uganda Vision (DUV) and its contribution to the achievement of the Third National Development Plan (NDPIII). It should be noted that while objectives (i) and (ii) are explicitly addressed, objective (iii) is an outcome of these two.

The following high-leverage interventions, the "why" for which is discussed in the main body of the paper, have been identified as necessary to achieve the triple objective. It should be noted that synergy can only be achieved and maximised through simultaneous action in all the areas.

Improving Coverage of Services

a. Phase out 2G and 3G legacy mobile systems within the next two years to release spectrum for broadband to technologies that are 4G and above. The freed spectrum should be allocated in a manner that incentivizes use of 4G and 5G networks. **(MoICT&NG and UCC)**
b. Require National Operators to provide minimum access speeds equivalent to 4G or higher. **(MoICT&NG and UCC)**
c. UCC should identify populated/geographic areas without any 4G coverage or with poor quality coverage through measurement and develop a schedule for proper coverage through licensing obligations and service provider interventions (that are UCUSAF supported where justified). **(UCC)**
d. UCC needs to undertake, as a priority, nationwide verification of coverage and quality of service. This will provide an evidence-based approach to ensuring compliance of service providers with license requirements and planning for UCUSAF interventions. **(UCC)**

Reducing Cost of Access and Usage

a. Suspend a major part of ICT-sector specific taxes for a defined period (at least two years) and monitor resultant changes in access and volume of usage as well as government tax revenue as a basis for further interventions. **(MoFPED)**
b. Waive import duty and VAT on low-cost smartphones within a set ceiling (to improve access to smartphones and hence broadband applications for low-income categories). **(MoFPED)**
c. Through UCUSAF, introduce guarantees through insurance for low-income brackets to acquire smartphones from service providers on a pay-as-you-go basis; and provide subsidies for the most marginalised. **(MoICT&NG, MoFPED, UCC, Operators)**

Reducing Cost of Rolling out Infrastructure

a. Develop a National Policy and Regulations categorising and protecting critical infrastructure (public and private) to ensure safety, security, and compliance around any infrastructure or assets with significant social or economic impact if damaged or compromised. **(Assign at Cabinet level - Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**
b. Develop a Rights-of-Way Policy to guide and regulate the use of public and private land for the deployment of ICT infrastructure in a fast, safe, and responsible manner. This should especially address the excessive charges imposed by government agencies, municipalities, local governments, and private landowners. **(Assign at Cabinet level - Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**
c. Establish and enforce a "Dig Once" policy, requiring licensed providers and other public works providers to collaborate in any infrastructure rollout, regardless of who the initiator is. **(Assign at Cabinet level -**

Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)

d. Enforce existing regulations on telecommunication infrastructure sharing to reduce Capex and Opex for all service providers. **(UCC)**

e. Require collaboration in rolling out any new ICT infrastructure (for both public and private entities). **(MoICT&NG, UCC)**

Increasing Digital Literacy

Uganda needs to mount a National Digital Literacy Campaign at the Presidential level, backed by the related initiatives to increase access to devices, to ensure a rapid increase in digital literacy and skills over the next five years. Alongside this would be the long-term approaches that should include incorporating digital literacy into educational curricula at all levels; and requiring schools and education institutions to provide digital literacy as a requirement from the lowest levels of education (kindergarten). **(Decision and assignment at Cabinet level as this would be an all-inclusive national programme).**

Addressing Exclusion

Different results cannot be expected from old approaches that have generally tended to address exclusion by catch-all sections added to different policies. It is necessary to include in the National ICT Policy (currently under revision) and its related major strategy (the Digital Uganda Vision) specific sections that will ensure that the challenge of exclusion is directly tackled as a stand-alone programme. Fortunately, the United Nations Capital Development Fund, which has a strong presence in Uganda, has addressing exclusion from the digital revolution as a priority: They should be engaged as a major partner in doing this, in full consultation with the identified categories of the population that face exclusion, to come up with new ways of addressing this challenge. While the new Uganda Digital Acceleration Project-GovNet (UDAP-GovNet) funded by the World Bank includes a few projects that target dimensions of exclusion, particularly for refugees and refugee hosting communities, these are just a start, and much more needs to be done. **(Assign at Cabinet level – a holistic approach involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**

Acknowledgements

The Ministry of ICT and National Guidance (MoICT&NG) acknowledges the following who were part of the Think Tank that developed the content of the Reference Paper and Action Plan:

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1 Background

This concept note provides a detailed discussion for an Action Plan that has the triple objective of: (i) Reducing the cost of rolling out ICT infrastructure; (ii) Increasing uptake of ICT services, and (iii) Increasing Government Tax Revenue. The Action Plan is aimed at achieving the alignment of the three objectives to create synergy, leading the successful implementation of the Digital Uganda Vision (DUV) and its contribution to the achievement of the Third National Development Plan (NDPIII). It should be noted that while objectives (i) and (ii) are explicitly addressed, objective (iii) is an outcome of these two.

1.1 Motivation

Uganda needs to ensure that there is universal access to and utilisation of broadband services if the aspirations for the following sectors that are specific or implicit within NDPIII are to be realised:

- **Economic growth:** ICT can play a crucial role in boosting Uganda's economic growth. By increasing access to ICT, Uganda can enhance her productivity, create new businesses, and generate employment opportunities.
- **Education:** ICT can provide access to educational resources and facilitate e-learning, which can improve the quality and reach of education.
- **Agriculture:** ICT can provide Ugandan farmers with real-time access to weather forecasts, market prices, and other relevant information, enabling them to make informed decisions and improve their market position.
- **Health:** ICT can improve Uganda's healthcare outcomes by enabling better communication and collaboration among healthcare professionals, facilitating telemedicine and e-health services, and improving access to health information for patients.
- **Governance:** ICT can facilitate the delivery of public services, enable greater transparency and accountability, and enhance citizen engagement in decision-making processes.
- **Innovation and entrepreneurship:** ICT can foster innovation and entrepreneurship by enabling the creation and dissemination of new ideas, products, and services.

Overall, increasing the uptake and use of ICT in Uganda can lead to a more competitive and inclusive economy, increase tax revenues for government, improve social and economic outcomes, and enhance the quality of life for citizens. To achieve this, Uganda needs to address several challenges.

1.2 State of ICT Uptake and Use

Uganda has made tremendous growth in the ICT sector (see Table 4), but the country still lags her peers along some key dimensions.

Table 1: Comparative ICT indicators for Uganda and her neighbours (2022)

	Uganda	Kenya	Rwanda	Tanzania	South Africa	Africa	World
Population covered by 4G mobile network (%)	31	94	98	13	98	50	88
Households with Internet access at home (%)	6	18	9		77		
Households with a computer at home (%)	2	9	2	3	27		
Individuals that reported	15	41			60		

owning a smartphone[1]							
Individuals using Internet (%)	10	29	30	32	72	40	66
Fixed broadband subscriptions (%)	0	1	0	2	3	1	18
Mobile broadband basket (% of GNI per capita)	8	3.1	6.5	4.9	2.3	5.0	1.5
Population with access to electricity (%)	42.1	71.4	46.6	39.9	84.4	48.2	90.4

Source: ITU Digital Development Dashboard [2] for ICT data and World Bank for electricity

Key points to note:

i. **A 4G mobile connection is now defined as the minimum threshold for meaningful internet connectivity,[3,4] but Uganda's 4G population coverage is however only 31%, which is below the African average of 50%. Kenya, Rwanda, and Tanzania are at 94%, 98%, and 13% respectively.** The Digital Uganda Vision (DUV) target is 50% 4G coverage.

ii. **Only 10% of Ugandans use the Internet in Uganda, well below the DUV target of at least 50% by 2020.** Kenya, Rwanda, and Tanzania are at 29%, 30%, and 32% respectively. The African average is 40%.

iii. **Only about 15% of Ugandans have smart phones, an essential tool for exploiting the broadband opportunity in all aspects of personal and national economic development.** Using a feature or basic phone ("katoki") in a broadband environment is like riding a bicycle on an expressway: you make progress, but you also slow down other users. Kenya, Rwanda, and Tanzania are at 41%, 15% and 30% respectively, while in South Africa it is 60%.

iv. **Ugandans spend 8% of their average monthly income on a 2GB data-only monthly mobile bundle. This is the highest proportion in the EAC (except for Burundi at 13.7%)** and much higher than the Broadband Commission affordability target of 2%.

v. **Ugandans primarily acquire digital skills in higher education.** Given that only 8% of individuals aged 15 years or older have completed post-secondary education or above[5] means that a significant proportion of the population would require additional training and support to fully participate in a digital economy.

vi. **While access to electricity has greatly improved in Uganda, there is still a large urban-rural divide—70% of urban areas have access to electricity compared to 33% of rural areas.** This affects both users that face challenges charging their devices, as well as operators who must use more expensive alternative sources of energy to run the repeater and base stations.[6] Such operator costs are passed on to users.

Based on the Inclusive Internet Index 2022, Uganda performed badly in Internet Availability (quality and breadth of ICT infrastructure and levels of Internet usage) and Internet Affordability (high cost of access relative to income and low level of competition in the Internet marketplace). Uganda ranks 7th out of 26 countries in Sub-Saharan Africa (SSA) and 80th globally (out of 100) in terms of positioning for a thriving Internet economy (see Table 1). In SSA, Uganda performed best in Relevance and Readiness (ranked 4th out

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[1] https://www.pewresearch.org/global/2019/02/05/smartphone-ownership-is-growing-rapidly-around-the-world-but-not-always-equally/ for Kenya and Tanzania

[2] https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx

[3] Alliance for Affordable Internet, https://adi.a4ai.org/what-is-meaningful-internet-access-conceptualising-a-holistic-ict4d-policy-framework/

[4] https://www.un.org/en/content/digital-cooperation-roadmap/

[5] Uganda Bureau of Statistics (UBOS), 2021. Uganda National Household Survey 2019/2020

[6] https://www.scientificamerican.com/article/cellular-towers-moving-to-solar-power/

of 26 SSA countries). Uganda needs to address these areas to grow the ICT sector and tap into the potential economic growth.

Table 1: Comparative Internet Index for Uganda and her neighbours

Overall	SSA ranking	Country	Availability	Affordability	Relevance	Readiness
49	1	South Africa	44	43	56	21
58	2	Kenya	67	72	18	49
80	**7**	**Uganda**	**89**	**81**	**61**	**55**
84	10	Rwanda	83	93	72	57
87	26	Tanzania	93	68	82	58

Source: The Economist, https://impact.economist.com/projects/inclusive-internet-index/

Uganda's ICT sector has been vibrant and the fastest-growing sector in the economy in the last 10 years. The ICT sector's contribution to GDP has more than doubled from 0.7% in 2009 to 1.7% in 2022,[7] growing from about US$175 million in 2009 to US$730 million in 2022. But the sector's proportional contribution to GDP is now declining, contrary to the anticipated upward trend inherent in the increased uptake and use of ICT, and GDP growth as shown in Figure 1. Furthermore, **Africa's Internet economy was estimated at US$38 billion in 2019 and estimated to grow to US$180 billion (5% of continental GDP) by 2025.**[8] In addition, mobile technologies and services generated $4.5 trillion of economic value or 5% of global GDP.[9] **All this highlights the tremendous room for further ICT sector growth and contribution to GDP in Uganda.**
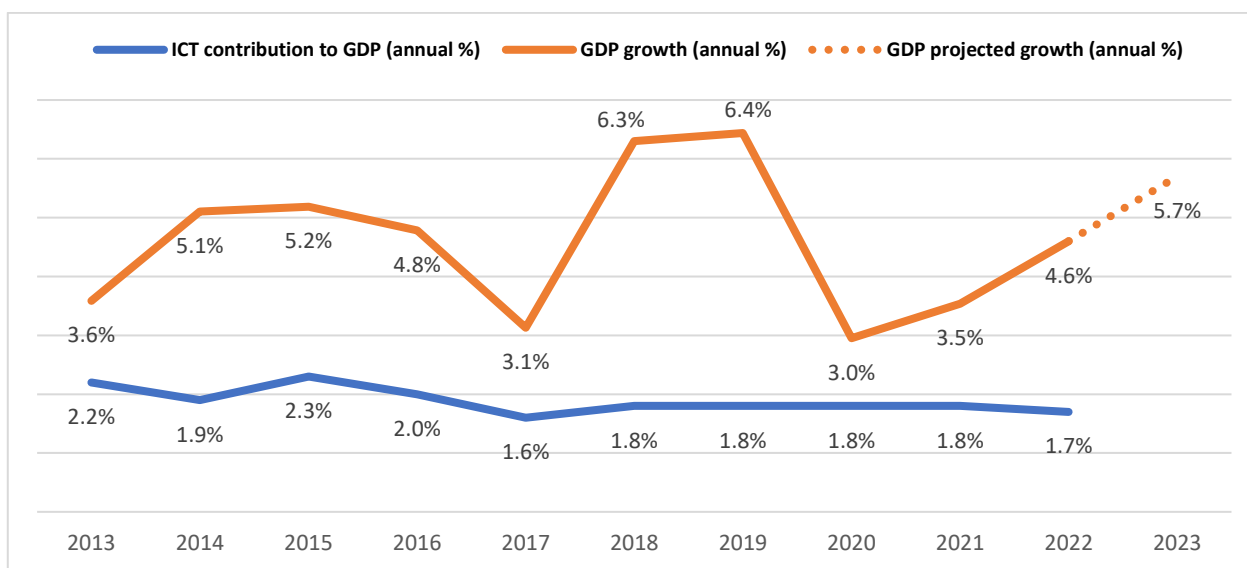
Figure 1: Direct ICT sector contribution to GDP at market prices (Source: National accounts)

Uganda can earn an additional GDP of US$995 Million, generate additional taxes of US$113 million and create 435,000 new jobs in terms of impact, resulting in a productivity gain of 2.46%[10] **by increasing mobile penetration.** An ITU regional econometric modelling study predicts that a 10% increase in mobile Internet penetration in Africa countries would increase GDP per capita by 2.5%. In addition, a 10% drop in mobile broadband prices will boost adoption of mobile broadband technology by more than 3.1%.[11]

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[7] Uganda Bureau of Statistics (UBOS), Key Performance Indicators, 128th Issue: Q2 2022/23, March 2023
[8] https://www.ifc.org/wps/wcm/connect/e358c23f-afe3-49c5-a509-034257688580/e-Conomy-Africa-2020.pdf
[9] GSMA, https://www.gsma.com/mobileeconomy/wp-content/uploads/2022/02/280222-The-Mobile-Economy-2022.pdf
[10] RIS, ICT Evidence Portal, https://researchictsolutions.com/ict-evidence-portal-africa/ict_evidence_portal_africa.php
[11] ITU, https://www.itu.int/hub/publication/d-pref-ef-bdt_afr-2019/

A major inhibitor of the growth of the ICT sector in Uganda is the high cost of Internet access and digital devices, partly occasioned by high ICT sector-specific taxes. To put this in perspective, while the ICT sector only contributed 1.8% to GDP in FY2019/20, MTN and Airtel alone made up 40% of the total excise duty and nearly 13% of VAT collected by the Uganda Revenue Authority (URA) (see Table 2). This excludes Corporate Income and PAYE taxes paid by MTN and Airtel. **This is certainly an indicator that the ICT sector is currently overtaxed.**

Table 2: MTN and Airtel's share of Excise Duty and VAT revenue

Collected Excise Duty (UGX billion)	Excise Duty		VAT Revenue	
	FY 2018/19	**FY 2019/20**	**FY 2018/19**	**FY 2019/20**
MTN Uganda	312	301	158	176
Airtel Uganda	208	205	117	155
Combined	520	506	275	331
Total Excise Duty	1,317	1,266	2,554	2,609
MTN and Airtel's share	**39.5%**	**39.9%**	**10.8%**	**12.7%**

Source: Uganda Revenue Authority

In a recent survey, only about 15% of Ugandans owned a smartphone.[12] Using a feature or basic phone ("katoki") in a broadband environment is like riding a bicycle on an expressway: you make progress, but you also slow down other users.

If government can lower the cost of smartphones, it would increase the number of smartphone users, boosting tax revenue through indirect taxation resulting from increased consumption of digital good and services, job creation, and increased productivity. Based on modelling from MTN Uganda, when an individual acquires a smartphone, MTN's revenue from that user (or Average Revenue Per User) increases by $1 per month, resulting in incremental government tax revenue (18% VAT, 12% Excise) of $0.31 per subscriber per month or $3.67 for a year. This translates into a total tax increase of $11 after 3 years and would be sufficient to offset any drop in tax revenue lost through tax waivers on low-end smartphones like the MTN Supa Kabode.[13]

It is therefore imperative for Uganda to make the necessary changes and investments to address the different challenges such as infrastructure gaps, cost and affordability, digital literacy and skills, equity and inclusion, limited local content, as well as regulatory issues. This will lead to the achievement of the triple objectives of (i) Reducing the cost of rolling out ICT infrastructure; (ii) Increasing uptake of ICT services, and (iii) Increasing Government Tax Revenue, while also expanding the ICT sector and growing its contribution to the country's social and economic development. It needs to be especially noted that synergy can only be achieved and maximised through simultaneous action in all the areas.

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[12] NITA-U, 2022, National IT Survey 2021/2022, https://nita.go.ug/publications/reports/national-it-survey/national-information-technology-survey-final-report-2022

[13] MTN Uganda launches Kabode Super Smartphone, https://www.mtn.co.ug/mtn-uganda-launches-the-kabode-supa-smartphone-on-mpola-mpola-payment-terms

2 Key Barriers to ICT Uptake and Usage

A recent multi-stakeholder Think Tank team drawn from various parts of the ICT sector (refer to Acknowledgements) explored barriers and impediments to ICT service uptake and usage, across different categories of services in Uganda. This section summarises their findings.

2.1 Coverage

There are geographic disparities in terms of infrastructure coverage across the country. ICT infrastructure and therefore broadband services largely follows the main transport arteries and is biased towards urban areas compared to rural areas. It is true that the legacy 2G (covering 94% of the population) and 3G (81% of the population) technologies cover most of Uganda (see Table 1), providing the footpaths along which users can walk in the ICT environment, because they provide limited bandwidth and slower download speeds, resulting in a poor user experience. But this is a far cry from the pervasive broadband (at a minimum 4G) every Ugandan, every school or health centre, and every parish or sub-county need to support and contribute to development. This is aggravated by the fact that 2G and 3G, like the bicycles on the expressway, take up spectrum that, if released, would enable the more bandwidth-efficient technologies like 4G and 5G to be rolled out and operated more cheaply.

Table 1: Comparative Coverage for Different Mobile Technologies across Uganda (2022)

Coverage type	2G	3G	4G	5G
Geographic coverage (%)	98.3	85.7	31.2	
Population coverage (%)	94.1	81.1	16.9	

Source: UCC Sector Performance Reports

The sector regulator, Uganda Communications Commission (UCC) has limited capacity (equipment and related resources) to monitor coverage requirements that licensed operators are mandated to meet as part of their license obligations, which means that government does not have a clear hold on both coverage and quality of service. Government therefore largely relies on data provided by the service providers to determine whether they have met their coverage obligations, creating a conflict of interest. Licensed operators have a financial incentive to report that they have met their coverage obligations, even if the actual coverage is inadequate or non-existent. The physicist William Thomson is quoted to have said *"If you cannot measure it, you cannot improve it."* Inaccurate reporting of coverage can have significant negative impacts on consumers and the broader economy. If coverage is overstated, consumers may be led to believe that they can access ICT services that are unavailable or of poor quality, creating frustration and loss of trust. If coverage is overstated, potential new entrants maybe discouraged from the market, believing that coverage is already adequate. This can limit competition, reduce innovation, and lead to higher prices for consumers.

Coverage gaps limit the potential impact of the ICT sector on national economic development and overall GDP. Such gaps can be addressed through government adopting a comprehensive approach to monitoring coverage and embarking on a coordinated effort that leverages partnerships with a wide range of stakeholders to ensure that ICT infrastructure coverage is equitable and accessible to all.

2.2 Cost

Uganda has one of the highest internet data rates in the region, with 2GB of data costing up to 8% of an average Ugandan's monthly income. In Kenya, Rwanda, and Tanzania the costs of 2GB of data are 3.1%, 6.5% and 4.9% respectively of average income. The African average is 5% while the UN Broadband

Commission's 2025 target is 2% or less of average monthly income.[14] The high cost of broadband (31% of data cost is taxes) reduces utilisation, drives up per unit cost of delivery, and leads to a vicious cycle: when cost of access goes up, usage goes down, and per unit cost of delivery of services increases leading to higher costs. This high cost of usage limits access and use of broadband among the lower income brackets, excluding them from the ICT revolution - and these are often the same groups (including women, the disabled, refugees, and rural residents) marginalised in other ways.

The high cost of usage is compounded by the high cost of smartphones and other devices used to exploit broadband opportunities for social, development, and business opportunities. The high cost paid by the users includes the basic cost of importing devices since there is limited local production, taxes like import duty (10% CIP) and VAT (18%), local clearance charges (2%), and the infrastructure levy (1.5%). All this cost is directly passed onto the consumer, limiting accessibility and adoption among the lower income brackets, and excluding them from the ICT revolution. Similar to having bicycles on the expressway, basic and feature phones provide voice service, limiting opportunities for social, development, and business activities.

The cost of deploying, operating, and maintaining broadband infrastructure is very high. This emanates from limited collaboration and coordination among stakeholders (e.g., government MDAs, local authorities, and operators) in rolling out and operating infrastructure – leading to high capital expenditure (Capex). Absence of effective enforcement of infrastructure sharing among licensed operators, excessive charges for access to wayleaves, lack of an umbrella national law that protects national critical infrastructure as well as the limited access to electricity for operators to run base stations, particularly in rural areas, all lead to very high operating expenditure (Opex) for service providers.

2.3 Content

Lack of locally relevant content is highlighted as a major barrier to broadband use among users in Africa.[15] In Uganda, the local content available is not very relevant to consumer needs, forcing most Internet users to look for content abroad. The ICT sector and government need to work together to ensure that the country produces sufficient relevant content and in languages that people understand. Conversely, Uganda can also leverage the fact that English (one of the official languages of the country) is the predominant online language to produce content for the global audience. An example is the children's orphanage in Masaka with Uganda's biggest channel on Google's Youtube Video channel (Masaka Kids Africana), that is claimed to have earned millions in US dollars, thanks to content creation.[16,17]

The National Intellectual Property Policy covers the country's approach to intellectual property protection and management, but public awareness of the policy appears to be limited, resulting in a few Ugandans registering patents for their innovations. It is also noted that the process for applying for patents is laborious and needs to be simplified, especially considering the rapid evolution of technology.[24] Besides building more public awareness, government needs to improve enforcement efforts to incentivise local content production and innovation.[18]

2.4 Digital Literacy

The very limited digital literacy represents a major barrier to broadband exploitation in Uganda. Digital literacy is an essential ability for the 21st century – an ability without which Uganda's development efforts will be stunted. The impact is two-fold: first, digital literacy like other competencies should start in school.

[14] https://www.broadbandcommission.org/Documents/publications/wef2018.pdf

[15] Connected Society - GSMA. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/07/Consumer-Barriers-to-mobile-internet-adoption-in-Africa.pdf

[16] https://www.cashnetusa.com/blog/2022-youtube-rich-list/

[17] https://www.monitor.co.ug/uganda/lifestyle/entertainment/did-masaka-kids-earn-shs5b-from-youtube--4180942

[18] https://www.trade.gov/country-commercial-guides/uganda-protecting-intellectual-property

But our education system lacks the infrastructure, equipment, and teacher training to integrate digital literacy and skills training into the curricula. This has created a gap for basic digital literacy and skills among individuals to be able to use digital devices and applications, or to access the internet, to take advantage of digital opportunities. A 2022 NITA-U survey found that only 10% of the population had used the internet for any purpose in the previous three months. Among individuals that had not used the internet (90%), one in two individuals (51%) cited lack of knowledge or skills as their biggest barrier, followed by one in four (28%) that cited lack of knowledge about what the internet was and the high cost of internet access (26%).[12]

There are very few individuals in Uganda with advanced technical skills to be able to build advanced applications and to take up increasingly advanced jobs in ICT as the world transitions towards frontier technologies like big data, artificial intelligence, the Internet of Things (IOT), cloud computing, blockchain, and robotics. The major pathway for acquiring technical skills in Uganda is through higher education institutions (HEIs), but the Gross Enrolment Ratio (GER) for higher education in Uganda is still low at about 7%[19] (Comparative GER for SSA is 10% while GER for the world is 40%), implying that few individuals that complete secondary education continue for higher education.[20] Other issues further hinder the ability of HEIs to produce individuals with technical skills including, fewer students pursuing Science Technology Engineering and Mathematics (STEM)-related programs, limited ICT infrastructure, slow internet access, and the dated curricula in STEM.[3]

Uganda needs to mount a National Digital Literacy Campaign, alongside increased access to access devices, at the Presidential level to ensure a rapid increase in digital literacy and skills over the next five years. The Uganda government first launched a mass literacy campaign in 1964. The National Literacy Campaign was available in 22 languages, helping to improve the very low level of adult literacy from about 22% to 49% by 1970.[21] Currently, adult literacy (% of people aged 15 and above) stands at 84%.[22] During the late eighties, the President launched the National AIDS/HIV Awareness Campaign, one of the first comprehensive national responses, which was credited with contributing to a significant decline in HIV/AIDS prevalence, making Uganda a global exemplar in the fight against AIDS.[23] **A similar initiative, combined with increased access to digital devices, is required to address the crisis level challenge of digital illiteracy.** The campaign can include advertising campaigns, public service announcements, and other outreach efforts that help citizens understand the benefits of digital literacy, how to get started, and put in place opportunities for learning. Government should at the same time ensure long-term approaches by incorporating digital literacy into the educational curricula at all levels and requiring schools and education institutions to digital literacy as a requirement from the lowest levels of education (kindergarten). Government can co-opt other stakeholders like service providers, the private sector, and NGOs to support these efforts.

2.5 Legal and Regulatory

There is urgent need to rationalize the many policy documents that relate to the broadband value chain in Uganda that are not necessarily always consistent so that all stakeholders (including MDAs and licensed operators) have a single clear source that establishes policy (and the related strategy that is revised from time to time).[24] This will make it easier for the high-level political leadership to communicate a clear plan, and to implement the plan with oversight over all relevant parts of government, breaking down silos and coordinating actions.

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[19] https://unche.or.ug/the-state-of-higher-education-and-training-in-uganda-2018-19/
[20] https://data.worldbank.org/indicator/SE.TER.ENRR
[21] UNESCO, https://uil.unesco.org/case-study/effective-practices-database-litbase-0/functional-adult-literacy-fal-programme-uganda
[22] World Bank, https://data.worldbank.org/indicator/SE.ADT.LITR.MA.ZS?locations=UG
[23] Ministry of Health, https://www.health.go.ug/ministry/aids-control-program/
[24] Ministry of ICT and National Guidance, 2022, National Broadband Baseline Survey & Infrastructure Blueprint

There are some policy gaps identified by sector players that need to be addressed so that appropriate laws and institutions can be put in place. The major ones identified include the **National Policy on Critical Infrastructure** (of which critical ICT infrastructure is a sub-set) to ensure safety, security, and compliance around any infrastructure or assets that would have significant social or economic impact if damaged or compromised and the **Rights-of-way for public utilities** (of which ICT infrastructure is now a recognised subset) to minimise delays and very high costs of rolling out infrastructure.

2.6 Exclusion

Universal access to and utilisation of broadband is negatively impacted by multiple dimensions of exclusion that include poverty, gender, disability, refugee states, location (rural urban) and age. The following equity dimensions impact access to and utilisation of broadband in different ways:

- **Poverty**—the high cost of broadband and digital devices does create affordability barriers, limiting the ability of low-income populations to participate in the digital economy. **Using the UN's Multidimensional Poverty Index (MPI),[25] UBOS estimates that 42% of Ugandans are multidimensionally poor. This is double the proportion of individuals estimated as poor (20%) based only on the usual income poverty measure**.[26,27]
- **Gender**—women and girls face additional barriers to access and use ICT due to gender-based discrimination, social norms, and limited access to education and economic opportunities.
- **Disability**—the disabled face social exclusion, discrimination, physical barriers, and limited access to education and digital literacy training. In addition, many available digital devices and services lack accessibility, limiting their usability for people with disabilities. All this limits the uptake and use of ICT among people with disabilities
- **Refugees**—tend to live in temporary shelters and camps with limited access to infrastructure, tend to speak different language, tend to have financial challenges, and may face legal restrictions. All this can affect their ability to access, afford and use ICT services.
- **Location**—rural areas have less access to ICT infrastructure and services compared to urban areas, creating inequities in access to information and opportunities for economic and social development.
- **Age**—older people have less familiarity with technology, tend to experience physical limitations that may be combined with health issues or cognitive impairments. Most older people also lack a regular income and may have to depend on support from family or the government. This makes it difficult to learn and use digital technologies.

All these, along with the rural-urban divide, are often mutually compounding, creating negative synergies that block an often-major percentage of each category from the opportunities for economic and social development created by broadband.

The new Uganda Digital Acceleration Project-GovNet (UDAP-GovNet)[28] funded by the World Bank includes a few projects that target dimensions of exclusion, particularly for refugees and refugee hosting communities. These include 1,000 km extension of the National Backbone Infrastructure (NBI) to refugee hosting communities, installation of 80 masts for voice and data in 12 refugee settlements, and establishment of 24 telecentres in refugee hosting communities. The project also provides for the scale up of six e-services drawn from four priority sectors (agriculture, education, health, justice, tourism, trade) with a focus on inclusion and accessibility for Persons with Disabilities and provides 2,000 computers for local governments.

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[25] The MPI is calculated using four dimensions—health, living standards, employment and financial inclusion. It compliments the usual income poverty measures by looking at different facets of poverty in line with SDG 1
[26] UBOS, 2022, Multidimensional Poverty Index for Uganda.
[27] UBOS, 2021, Uganda National Household Survey 2019/2020.
[28] Uganda Digital Acceleration Project, https://ict.go.ug/2021/03/05/uganda-digital-acceleration-program/

3 Recommendations and Interventions

The following high-leverage interventions were identified as critical if Uganda is to achieve the triple objectives of reducing the cost of rolling out ICT infrastructure, increasing uptake of ICT services, and increasing Government Tax Revenue. The interventions need to be addressed as a package to achieve the resultant synergy.

3.1 Improving Coverage of Services

Key recommendations and interventions to address coverage-related issues include:

i.   Phase out of 2G and 3G legacy systems within the next two years to release spectrum for broadband at 4G and above. The freed spectrum should be allocated in a manner that incentivises the rollout of 4G and 5G networks, which can lead to better network performance and capacity. **Based on recent modelling, an operator can save 28% in Capex and 46% in Opex by deploying 4G or better technology using the right spectrum, in return government can earn 17% more from spectrum levies. Some of these cost savings can be passed onto consumers in form of broadband price discounts. (MoICT&NG and UCC)**

ii.   Require National Operators to provide minimum access speeds equivalent to 4G or higher as the basic service (proposed for the new National ICT Policy that is not yet approved); and generally require pervasive broadband as defined by the MoICT&NG from time to time. **(MoICT&NG and UCC)**

iii.   UCC should identify populated/geographic areas without any 4G coverage or with poor quality coverage through measurement and develop a schedule for proper coverage through licensing obligations, and service provider interventions that are UCUSAF supported where justified. Pervasive broadband will support the provision of all services and platforms, including digital TV. **(UCC)**

iv.   UCC needs to develop capacity (equipment and related resources) and undertake, as a priority, nationwide verification of coverage and quality of communication services. This will provide an evidence-based approach to ensuring compliance of service providers with license requirements and planning for UCUSAF interventions. **(UCC)**

3.2 Reducing Cost of Access and Usage

Key recommendations and interventions to address cost of access and usage issues include:

i.   Suspend a major part of ICT-sector specific taxes for a defined period (at least two years) and monitor resultant changes in volume of usage and government revenue as a basis for further interventions. **(MoFPED)**

ii.   Waive import duty and VAT on low-cost smartphones within a set ceiling (to improve access to smartphones and hence broadband applications for low-income categories). **(MoFPED)**

iii.   Through UCUSAF, introduce guarantees through insurance for low-income brackets to acquire smartphones from service providers on a pay-as-you-go basis; and provide subsidies for the most marginalised. **(MoICT&NG, MoFPED, UCC, operators)**

3.3 Reducing Cost of Rolling out Infrastructure

Key recommendations and interventions to address cost of rolling out infrastructure include:

i.   Develop a National Policy and Regulations categorising and protecting critical infrastructure (public and private) to ensure safety, security, and compliance around any infrastructure or assets with significant social or economic impact if damaged or compromised. **(Assign at Cabinet level – Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**

ii. Develop a Rights-of-Way Policy to guide and regulate the use of public and private land for the deployment of ICT infrastructure in a fast, safe, and responsible manner. This should especially address the excessive charges imposed by government agencies, municipalities, local governments, and private landowners. **(Assign at Cabinet level - Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**

iii. Establish a "Dig Once" policy, requiring licensed providers and other public works providers to collaborate in any infrastructure rollout, regardless of who the initiator is. **(Involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**

iv. Enforce existing regulations on telecommunication infrastructure sharing to reduce Capex and Opex for all service providers. **(UCC)**

v. Require collaboration in rolling out any new ICT infrastructure (for both public and private entities). **(MoICT&NG, UCC)**

3.4 Increasing Digital Literacy

Key recommendations and interventions to address digital literacy-related issues include:

i. Mount a National Digital Literacy Campaign, backed by the related initiatives to increase access to devices, at the Presidential level to ensure a rapid increase in digital literacy and skills over the next five years. This will help build public awareness on the potential of ICT for socio-economic transformation and development, as well as to improve digital skills to enable users to participate actively and effectively in the development process and enhance their livelihood.

ii. Incorporate digital literacy into educational curricula at all levels; and require schools and education institutions to provide digital literacy as a requirement from the lowest levels of education (kindergarten). Attention should be paid to gender equity by encouraging the participation of women and girls in STEM programs.

iii. Review and adopt a global framework (e.g., UNESCO ICT-CFT or DigCompEdu) that can be used as a guide to inform policies, interventions and to assess digital literacy and skills.

iv. Explore avenues to bring ICT infrastructure and affordable Internet access into schools and other educational institutions.

v. Promote digital literacy and skills for public service to improve efficiency in the delivery of public services.

vi. Incentivise and encourage private sector players, NGOs and other stakeholders to improve user awareness of the potential benefits of ICT, to implement training and to provide complimentary services like technology hubs and accelerators (physical spaces and programs that provide resources supporting digital entrepreneurship).

3.5 Addressing Exclusion

Key recommendations and interventions to address equity-related issues and ensure that vulnerable and marginalised populations who are unable to access and use broadband services do not get left behind include:

i. Include in the National ICT Policy (currently under revision) and its related major strategy (the Digital Uganda Vision) specific sections that will ensure that the challenge of exclusion is directly tackled as a stand-alone programme. **(MoICT&NG)**

ii. Engage major development partners that have interest and programs targeting exclusion. For example, the United Nations Capital Development Fund, which has a strong presence in Uganda, has addressing exclusion from the digital revolution as a priority. This should be done in full consultation with the identified categories of the population that face exclusion, to come up with new ways of addressing this challenge. **(Assign at Cabinet level – a holistic approach involves MDAs covering other sectors outside the immediate Digital Transformation Sector Working Group)**

iii. Create favourable policy on taxation and subsidy on digital devices suitable for individuals with special needs (vision, hearing, etc.) which are currently very limited or not available. **(MoFPED)**

Annex 1: Abbreviations

Term	Description
4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
API	Application Programming Interface
EAC	East African Community
GB	Gigabyte
GDP	Gross Domestic Product
GNI	Gross National Income
ICT	Information and Communication Technology
ID	Identification Card
IoT	Internet of Things
IP	Intellectual Property
ISP	Internet Service Provider
IT	Information technology
ITU	International Telecommunications Union
LGA	Local Government Administration
MDA	Government Ministry, Department and Agency
MoICT&NG	Ministry of ICT and National Guidance
MoFPED	Ministry of Finance, Planning and Economic Development
MPI	Multidimensional Poverty Index
NDP III	3rd National Development Plan
NIRA	National Identification & Registration Authority
NITA-U	National Information Technology Authority-Uganda
NGO	Non-Government Organisation
PAYE	Pay As You Earn
SIM	Subscriber Identity Module or Subscriber Identification Module
SSA	Sub-Saharan Africa
STEM	Science, Technology, Engineering and Mathematics
UBOS	Uganda Bureau of Statistics
UCC	Uganda Communications Commission
UCUSAF	Uganda Communications Universal Service and Access Fund
UDAP	Uganda Digital Acceleration Project
UGX	Uganda Shillings
UN	United Nations
URA	Uganda Revenue Authority
URSB	Uganda Registration Services Bureau
VAT	Value Added Tax