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Review of the implementation of Uganda's National Broadband Policy 2018 and proposed interventions

THE REPUBLIC OF UGANDA
MINISTRY OF ICT & NATIONAL GUIDANCE

Review of the implementation of Uganda's National Broadband Policy 2018 and proposed interventions

Acknowledgement

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The research was undertaken by Technology Solutions Africa Ltd under the framework of the project and its deliverables. Technical input, feedback and guidance have been provided by ITU and the Ministry of ICT and National Guidance project team members and experts in government ministries, agencies, institutions, and across Uganda's digital ecosystem.

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Foreword

The **Review of the implementation of Uganda's National Broadband Policy 2018 and proposed interventions** is a vital contribution to our nation's digital transformation agenda. Since its adoption, the National Broadband Policy 2018 (NBP 2018) has provided a foundation for enhancing connectivity, fostering innovation, and driving socio-economic progress. This review offers an invaluable opportunity to reflect on the strides we have made, identify gaps, and chart a course for the next phase of broadband development in Uganda.

Broadband is not just an enabler of technology but a catalyst for economic inclusion and national development. A robust broadband ecosystem empowers citizens, strengthens institutions, and transforms sectors such as education, health, agriculture, trade and tourism. This review underscores the importance of addressing challenges like infrastructure gaps, affordability, and regulatory frameworks while leveraging the successes of the NBP 2018 to accelerate progress toward the Digital Uganda Vision.

The findings of this review highlight the need for bold, coordinated efforts to expand the National Backbone Infrastructure, reduce the cost of access devices, and reform broadband taxation. By prioritizing equitable access, environmental sustainability, and public-private partnerships, we can ensure that the benefits of broadband reach every corner of our country.

As we look to the future, the proposed interventions offer a roadmap for building an inclusive and competitive digital economy. The alignment of these recommendations with international benchmarks and lessons from peer countries demonstrates Uganda's readiness to learn, adapt, and lead. I urge all stakeholders—government agencies, regulators, the private sector, and development partners—to rally behind this strategy and work collectively to deliver on the promise of broadband for all.

This report is a call to action to bridge the digital divide and position Uganda as a regional leader in digital transformation. Let us seize this moment to create a future where broadband is a tool for empowerment, innovation, and shared prosperity.

Hon. Dr. Chris Baryomunsi
Minister of ICT and National Guidance

Foreword

It is my pleasure to present this report under the project 'Technical Assistance and Training to Uganda on National ICT Development Strategy', a collaboration between the Government of Uganda and the International Telecommunication Union, supported by the Global Development and South-South Cooperation Fund and ITU's ICT Development Fund.

Through carefully co-crafted interventions in support of the country's vision to transform Uganda into a digitally enabled society that is innovative, productive and competitive, the project has applied a three-pronged approach focusing on the development of policy recommendations, enabling capacity development, and the implementation of pilot projects.

In recent years, Uganda has witnessed tremendous growth in its digital economy, reflecting broader trends across the Africa region and globally. The increased access to digital technologies, new opportunities that connectivity has brought, and the surge in digital services are fueling rapid advancements on how citizens engage with one another and with vital government services. These developments also bring new challenges, requiring policy-makers and regulators to rethink strategically and build enabling policy and regulatory frameworks that are future-ready and adaptable to this ever-changing landscape. Moreover, digital skills remain essential for citizens to meaningfully participate in the digital space and for professionals to fully leverage the potential of digital technologies in addressing socio-economic challenges. This has been a critical aspect of the implementation of the policy interventions within this project.

Co-created and initiated in support of Uganda's ambitious digital transformation journey, this project stands as an example of how focused and meaningful partnerships can lead to impactful change. We have witnessed the results of the policy interventions and the impact of the significant capacity development in the country. I believe the efforts will continue to impact Uganda's transformation for years to come.

I encourage ITU Member States across Africa and globally as well as development partners to join forces and invest in digital transformation for social and economic growth. The Telecommunication Development Bureau stands ready to continue supporting countries on their digital transformation journeys with impactful project implementation and partnerships that are essential for achieving universal and meaningful connectivity and digital transformation for all.

Dr. Cosmas Luckyson Zavazava
Director, Telecommunication Development Bureau
International Telecommunication Union

Foreword

The **Review of the implementation of Uganda's National Broadband Policy 2018 and proposed interventions** marks a significant milestone in our journey to achieve universal and meaningful connectivity for all Ugandans. This review provides a comprehensive assessment of the progress made under the National Broadband Policy 2018 while presenting targeted recommendations to address the gaps identified. It reflects a collective effort to ensure that Uganda's broadband ecosystem evolves in a way that supports national development goals and aligns with global best practices.

I would like to extend my heartfelt gratitude to the International Telecommunication Union (ITU) for their technical expertise and financial support, which have been instrumental in conducting this review. Their partnership continues to be a cornerstone of our efforts to advance Uganda's digital transformation agenda. I also acknowledge the Global Development and South-South Cooperation Fund (GDSSCF) for its financial contribution which facilitated this critical undertaking.

The technical team at the Ministry of ICT and National Guidance deserves special recognition for their dedication and professionalism throughout this process. Their efforts in stakeholder engagement, data collection, and analysis ensured that the findings of this review are both robust and actionable.

I also wish to acknowledge the input of various stakeholders, government agencies, regulators, private sector representatives, and academia, whose insights enriched this review. Their collaboration underscores the importance of a multi-sectoral approach in addressing the challenges and opportunities within Uganda's broadband landscape.

This review highlights critical priorities, such as the expansion of the National Backbone Infrastructure, the establishment of infrastructure-sharing frameworks, and the development of digital skills and literacy. These interventions are essential for building a resilient broadband ecosystem capable of driving Uganda's socio-economic transformation. The benchmarking studies included in this review also provide valuable lessons from peer countries, enabling Uganda to adapt successful strategies to its unique context.

As we embark on the implementation of the proposed interventions, I call upon all stakeholders to remain committed to ensuring the success of this strategy. Together, we can achieve the vision of a connected, innovative, and inclusive Uganda, where broadband serves as a driver of progress and prosperity for all.

Dr. Amina Zawedde (PhD)
Permanent Secretary
Ministry of ICT and National Guidance
Government of Uganda

Table of contents

List of tables and figures

Tables

Figures

Abbreviations

4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
DQL	Digital Quality of Life
DTR	Digital Transformation Roadmap
DUV	Digital Uganda Vision
EGDI	E-Government Development Index
FTTH	fibre-to-the-home
GDP	gross domestic product
GIS	Geographic Information System
GSMA	Global System for Mobile Communications Association
ICT	information and communication technology
ITU	International Telecommunication Union
IXP	Internet exchange point
NBI	National Backbone Infrastructure
NBP	National Broadband Policy
NDPIII	Third National Development Plan
NDPIV	Fourth National Development Plan
NITA-U	National Information Technology Authority – Uganda
PKI	Public Key Infrastructure
PPP	public-private partnership
UCC	Uganda Communications Commission
UDAP	Uganda Digital Acceleration Project

Executive summary

The review of Uganda's National Broadband Policy 2018 (NBP 2018) is one of the project components of the Government of Uganda and ITU Technical Assistance and Training to Uganda on National ICT Development Strategy project, which is aimed at supporting the development of the information and communication technology (ICT) sector in the country. It is framed under the Digital Uganda Vision (DUV) framework and the Third National Development Plan (NDPIII) in line with Uganda's Digital Transformation Roadmap.

The assignment has entailed the carrying out of a situation analysis of the broadband ecosystem in Uganda, both from international and local perspectives. The analysis has covered ICT contributions to gross domestic product (GDP); mobile network coverage; Internet pricing; traffic and usage patterns, both locally and globally; and assessing how Uganda is ranked among globally tracked ICT indices such as the E-Government Development Index (EGDI), the E-Participation Index, the Network Readiness Index, the GovTech Maturity Index and the Local Online Index.

This was supplemented with the collection of information from stakeholders that had a stake in implementation of the NBP. The gathered information is captured in a matrix that indicates each objective and attendant strategies, the activities undertaken to implement the strategy, as well as the outcomes of those actions, reported level of implementation by the stakeholders, challenges met in the process, and proposed mitigation measures to address them. This culminated in the compilation and presentation of findings, followed by the detailed analysis of the implementation status of the NBP 2018. The conclusion of the reporting on this sub-task elaborated on what this means for Uganda's digital transformation efforts.

Overall, Uganda's digital transformation is on an upward trajectory, driven by the foundational work laid under the NBP 2018. However, to fully harness the potential of digitalization, there is a need for more coordinated efforts to address existing challenges, enhance cybersecurity, promote innovation and ensure sustainable practices. Continued investment and policy refinement will be key to bridging the digital divide and achieving comprehensive and inclusive digital transformation in the country.

The Ministry of ICT and National Guidance has undertaken a number of studies related to the broadband topic, namely: The Consultation on Legislation for Broadband Development in Uganda 2019, the 2020 National Fourth Industrial Revolution (4IR) Strategy[1], Consultation on Spectrum Allocation and Management in Uganda 2021, the National Broadband Infrastructure Baseline Survey and Infrastructure Blueprint 2022, and the National IT Survey 2022. All these documents contained several recommendations that needed to be scrutinized to determine which ones were not already taken on board in existing texts of the DUV, the Digital Transformation Roadmap (DTR) and the Third National Development Plan (NDPIII) and the Fourth National Development Plan (NDPIV). This analysis has indeed been undertaken, and options for taking them on board moving forward have been proposed.

[1] National 4IR Strategy (2020): https://ict.go.ug/site/documents/Executive-Summary-Ugandas-National-4IR-Strategy.pdf

Benchmarking studies were also undertaken on three countries – Kenya, Nigeria and South Africa. These were based mainly on the fact that they are peer nations with similar socio-economic challenges as Uganda, yet they all have better performance on the Digital Quality of Life (DQL) index as elaborated on in detail in the report. The other reason for choosing these three countries is that, after lengthy desktop research, they were the ones that had national documents themed on digital transformation, namely, the Kenya Digital Masterplan 2022–2032, the Nigeria Digital Economy Strategy 2020–2030 and the South Africa ICT Digital Economy Masterplan 2021–2025. Lessons learned from these countries to apply to Uganda's case study have been considered in the analysis.

Finally, an overarching view is presented of the work that has to be done in the ICT sector over the next five years, and the targets that have been set in the Uganda Digital Transformation Roadmap by 2028. This was the basis for the recommendations presented in section 6 of the report. Five high priority areas to focus on to get the maximum results for the sector in 2024–2028 are subsequently presented. The recommendations include:

- Expansion of the National Backbone Infrastructure (NBI) to reach all districts in the country by the National Information Technology Authority – Uganda (NITA-U) as a top priority initiative: This will provide a reliable digital infrastructure for roll-out of enterprise e-services and enhance connectivity (and security) for the private sector and government ministries and agencies that are increasingly offering digital services to the general public.
- The Ministry of ICT and National Guidance and its regulating agencies (Uganda Communications Commission (UCC) and NITA-U) should encourage common utility infrastructure-sharing frameworks that include ICT infrastructure and establish infrastructure-sharing rules and regulations to protect the environment and comply with best practice urban planning guidelines.
- The government should reconsider or reduce some of the taxes levied on imported Internet access devices (laptops, handheld devices and smartphones) to increase affordability for citizens: The government should at least drop the 10 per cent import duty on these devices. The import tax revenue loss will be offset by the increase in imported devices coming into the country.
- Government (via the Ministry of ICT and National Guidance) should strengthen the public–private partnership (PPP) arrangements with the two companies already licensed to do local manufacturing of basic 2G phones to upgrade their capabilities and manufacture basic 4G/5G-compliant basic smartphones with government incentives and support so that these phones are available to the general public at affordable prices negotiated by government and manufacturers.
- Government should reconsider taxation of both voice and Internet access data bundles to enable a larger percentage of the population to access the Internet: The increase in the volume of data bundles sold will offset the reduction of government revenues from this tax reduction decision.
- Special focus should be put on the importance of digital skills training and literacy, which includes ICT infrastructure development in schools, curriculum development for digital skills, e-inclusion systems development, capacity building for digital skills, education content development, and set-up of innovation and research centres.
- Development of a national strategy for artificial intelligence (AI) applications.

1 Introduction

The digital sector represents one of the fastest-growing sectors in Uganda, with positive spillover effects on other sectors of the economy, the combination of which can play a key role in the post-COVID-19 economic recovery. NDPIII, whose major focus and outcome is "Increased household incomes and improved quality of life", prioritizes ICT as the fulcrum of development and as accelerator, amplifier and augmenter of change. The DUV 2040 aims to transform Uganda's society to a modern and prosperous country by 2040. and sets the desired targets for this transformation. The Uganda Digital Transformation Roadmap (DTR) (2023–2028), introduced by the Ministry of ICT and National Guidance, is meant to actualize the aspirations of the Fourth National Development Plan (NDPIV) and those of Vision 2040 for Uganda. Its thrust is to enable the country to attain economic growth and competitiveness, inclusive development and social impact, efficiency and effectiveness in government services, innovation and entrepreneurship, as well as data-driven decision-making, among others.

Since 2018, when the NBP came into force, Uganda has experienced a proliferation of cutting-edge e-services. Some government services – such as e-visa, e-passport and e-tax – are now available online, and there are e-payment platforms where citizens can transact and make payment of bills such as water, electricity and school fees within the comfort of their homes. This saves time, enhances efficiency and improves transparency in the delivery of public services to citizens.

The provision of robust, secure and reliable broadband connectivity, telephony and broadcasting infrastructure plays a pivotal role in extending affordable services closer to citizens and helps to build a strong, healthy, knowledgeable and productive population.

Uganda has accelerated its advancement of the ICT sector and digital transformation in general since the late 2000s through expanding the telecommunication and Internet infrastructure, digitalizing public services, enacting ICT and cybersecurity legislation, and capacity building.

The substantial increase in mobile phone ownership is laying the foundation for Uganda's digital transformation and enabling the rapid take-up of digital services. The country counts approximately 27 million mobile subscriptions, which is a penetration rate of 69.2 per cent of the population, although phone ownership rates are higher among urban residents compared with rural residents. The telecommunication market includes two major private operators (MTN and Airtel) that control market shares (in terms of mobile subscriptions) of 37 per cent and 45 per cent, respectively, and other mobile operators – such as Lycamobile and Uganda Telecom – with market shares below 10 per cent each. The increased access to mobile phones and mobile services in Uganda has enabled the take-up of related services such as mobile banking. The take-up of mobile services has also increased women's rates of financial inclusion over time.

A digital divide persists in Uganda, driven by a range of socio-economic barriers. To ensure that the transformative potential of digital services reaches all, including the most vulnerable, there is a need to address barriers defined by gender, geography, residency status, disabilities and income levels. Only 16 per cent of the total number of mobile phone users have smartphones. Geographically, the wide gap between the Internet penetration rates in urban and rural areas also raises concerns around the urban–rural divide. A gender gap also persists. Only 53.7 per cent of women own phones, compared with 74.5 per cent of men. The gender gap in Internet use is estimated at 25 per cent between men and women, influenced by the lower

socio-economic position and education levels of women. Skills are also an issue, as 75 per cent of Ugandans who do not use the Internet report that they lack the skills to do so.

Affordability remains a key barrier to the take-up of mobile broadband, despite widespread adoption of mobile phones. Mobile devices are the main platform for Internet use (as opposed to fixed access). Affordability of mobile devices appears to be a key barrier; 89 per cent of respondents in the National IT Survey reported that they did not own a mobile phone, citing its cost as the main barrier. Affordability of Internet access data bundles by fixed and wireless broadband service providers is another issue for a significant percentage of the population.

Network coverage is another serious constraint to higher mobile broadband adoption, with sharp regional disparities. While more than 95 per cent of the population is covered by mobile telephony networks (2G), mobile broadband (3G and 4G) geographic coverage is only 50 per cent, with sharp regional disparities, particularly between the northern and western regions and the central region.

Reviewing the implementation of the Uganda NBP 2018 is crucial for a number of reasons: (a) evaluating the achievements and challenges faced during policy implementation, leading to identification of areas for improvement; (b) assessing whether Uganda is on track to achieve digital transformation; (c) getting insights into the expansion and quality of broadband infrastructure; (d) evaluating efforts to make broadband services affordable and accessible to all, including rural and underserved areas; (e) reviewing initiatives promoting digital literacy, skills development and capacity building; (f) assessing the integration of broadband in e-government services, improving citizen engagement and public service delivery; and (g) probing the effectiveness of the regulatory framework to establish whether it is supportive of broadband growth.

1.1 What is broadband in Uganda?

The NBP 2018 defines broadband as:

... 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.

The Broadband Strategies Toolkit published by the World Bank Group defines broadband as:

... multiple aspects of the network and services, including: 1) the infrastructure or "pipes" used to deliver services to users; 2) high-speed access to the Internet; and/or 3) the services and applications available via broadband networks, such as Internet protocol television (IPTV) and voice services that may be bundled in a "triple play" package with broadband Internet access.

In Uganda, the NBP seeks to achieve the aspirations of the Uganda Vision 2040. The policy emphasizes the role of broadband Internet in the socio-economic transformation process as a critical enabler. This, therefore, calls for high-speed Internet (broadband) infrastructure to be defined and planned for, like any other public utility (such as roads, railways, oil pipelines and power lines), hence the review of the NBP 2018 to address the digital transformation challenges that address industry needs and aim at achieving the targets for the Sustainable Development Goals of the United Nations 2030 Agenda for Sustainable Development.

1.2 Purpose and objectives of the review

The review of the National Broadband Policy 2018 includes the following tasks:

1. Document and share the status of implementation of the Policy to inform the review process;
2. Align the Policy based on recommendations from recent studies by the Ministry of ICT and National Guidance, as well as current global trends;
3. Develop the attendant Implementation and Action Plan, complete with a monitoring and evaluation framework, as well as a communication plan.

1.3 The National Broadband Policy review process

The consultant worked together with the Ministry of ICT and the National Guidance technical team and the key stakeholders to deliver this scope of work. The scope was outlined in the project inception report, which was discussed and approved by ITU and the Ministry of ICT and National Guidance technical teams. The review followed a phased approach method:

Phase I followed three subtasks, namely:

a) Review of recent studies in the sector to extract linkage to the NBP and extract recommendations that can inform the review of the NBP 2018;
b) Data collection from different stakeholders/anticipated implementing agencies (not explicitly mentioned in the NBP 2018);
c) Determination and capture of the level of implementation of each policy objective and attendant strategies.

Phase II comprised three additional sub-tasks that yielded the second deliverable, implementation strategy and action plan for the NBP 2018:

a) Identification of recommendations that were not reflected in pillars, objectives and strategies or interventions in the existing texts of the DUV, DTR or NDPIV;
b) Designing of a time-bound implementation plan;
c) Designing of an attendant results framework.

These two phases were fully executed to yield a report, which was presented at a workshop of stakeholders to collect their comments and input. Subsequently, a workshop report containing the key findings was prepared to be considered in the report.

2 Situation analysis of the National Broadband Policy

The situation analysis of the progress attained over the lifespan of the NBP 2018 (2018–2023) is presented using empirical data in the sections that follow.

2.1 National context

2.1.1 Policy insights and analysis

Uganda has established several key ICT frameworks aimed at fostering digital transformation and enhancing broadband infrastructure. These frameworks include NBP 2018, DUV, NDPIII, DTR 2024/25–2027/28, and the NDPIV now being developed. Each of these frameworks outlines digital transformation targets, objectives and strategies or interventions for the development of the ICT sector. They are expounded on briefly below:

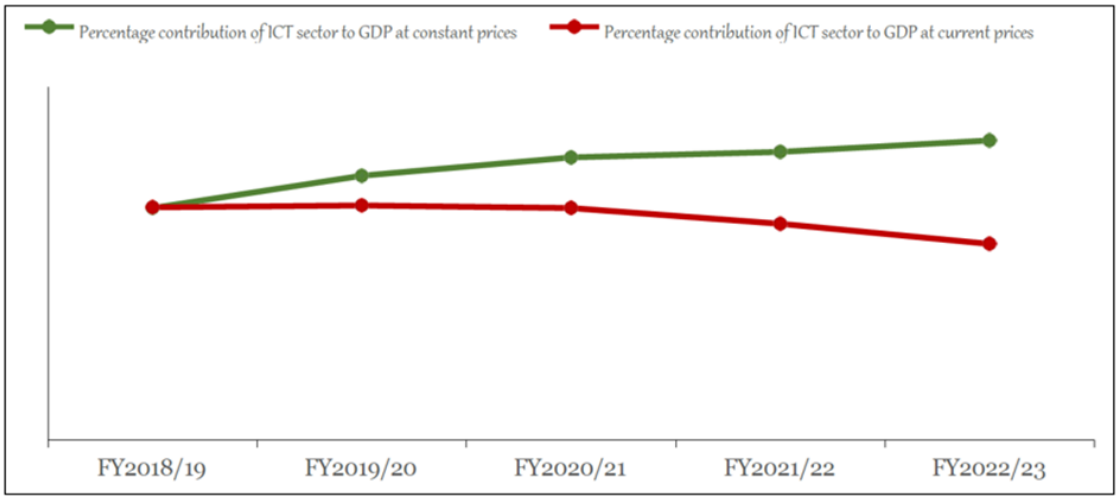
- National Broadband Policy 2018 (NBP 2018): The policy was focused on expanding and improving broadband infrastructure across Uganda. It aims to provide high-speed Internet access to all citizens, reduce the digital divide between urban and rural areas, and stimulate economic growth through improved connectivity. While it sets out important targets, such as increasing broadband penetration and lowering costs, to some extent it falls short in defining precise metrics and deadlines. The lack of a detailed implementation plan and the attendant monitoring and evaluation framework complicate the effective assessment of progress in its implementation over its five-year lifespan.
- Digital Uganda Vision (DUV): The Vision aims to create a vibrant digital economy that benefits all citizens. It envisions a society where digital technologies enable efficient government operations, robust business environments and empowered communities. DUV outlines goals such as universal access to ICT, enhanced e-government services and a competitive digital industry. Despite these ambitious objectives, the Vision lacks specific, actionable steps and timelines, leading to ambiguity in implementation and evaluation.
- The Third National Development Plan (NDPIII) 2020/21–2024/25: The Digital Transformation Programme was aimed at fostering innovation, enhancing ICT skills and vocational development, promoting a development-oriented mindset, increasing government participation in strategic sectors. It also pursued increasing ICT penetration and use of ICT services for socio-economic development, creating more direct jobs in the ICT sector and increasing government services online.
- Digital Transformation Roadmap (DTR) 2024/25–2027/28: The roadmap is designed to guide Uganda's transition to a digitally-enabled society. It focuses on leveraging ICT to drive economic growth, improve service delivery and enhance social inclusion. Key components of the Roadmap include expanding digital infrastructure, promoting digital literacy, and supporting innovation in ICT.
- The Fourth National Development Plan (NDPIV) 2025/26–2029/30 (Draft): The Digital Transformation Programme under NDPIV is premised on the fact that, despite the potential that ICT has, utilization of its services across the country is still limited due to limited network coverage, poor quality services, high cost of end-user devices and services, inadequate ICT knowledge and skills, and limited innovation capacity. It is positioned in such a way that it fosters improvement in availability of digital content and e-products, automation of government processes and inter-agency connectivity, innovation, bridging the gap between industry and academia, and commercialization of research and development. This industry is expected to greatly contribute to the national GDP and creation of employment opportunities.
- The objectives of the Digital Transformation Programme under NDPIV have been crafted to mirror the pillars of the Digital Transformation Roadmap as much as possible:

Digital Infrastructure and Connectivity; Digital Services, Cybersecurity, Data Protection and Privacy; Digital Skills and Literacy; Innovation; and Entrepreneurship. At the time of finalization of this report, the official NDPIV document was still a work in progress as sector working groups were still busy working on the results framework details and other attendant pieces.

2.1.2 ICT sector contribution to GDP

In its contribution to the NDPIII, the ICT sector plays an important role in the economy, and has been one of the most vibrant and fastest-growing sectors since its liberalization in 2010. The percentage contribution of the ICT sector to the overall GDP at constant prices has grown from 2.0 per cent in fiscal year 2018/19 to 2.5 per cent in fiscal year 2022/23 (Figure 1).

Figure 1. Percentage contribution of ICT sector to overall GDP, FY2018/19–FY2022/23



Source: NITA-U.

2.1.3 Mobile network coverage

As of 2023, Uganda's broadband coverage reflects significant advancements in the availability of mobile network technologies. According to the latest data from UCC, 2G coverage in Uganda stands at 99 per cent, providing basic mobile connectivity to the vast majority of the population. This extensive coverage lays a strong foundation for mobile communication across the country.

The 3G coverage has reached 87 per cent, enabling more advanced mobile Internet services such as video streaming and mobile banking, which are essential for both personal and economic activities. This represents a notable expansion from previous years, highlighting the progress in the country's telecommunication infrastructure.

Meanwhile, 4G coverage, which supports high-speed Internet and more data-intensive applications, has expanded to 61 per cent. While this is a relatively smaller percentage compared with 2G and 3G, it marks an important step towards improving Internet speeds and overall digital experience for users in Uganda.

Historically, Uganda's network roll-outs have shown a trend of gradual but steady growth. The introduction of 2G networks laid the groundwork for basic connectivity. The subsequent roll-out of 3G networks significantly enhanced Internet accessibility and utility. More recently, the deployment of 4G networks has focused on improving the quality and speed of Internet

services. These advancements have been driven by both government initiatives and private sector investments aimed at bridging the digital divide and promoting digital inclusion.

2.1.4 International Internet pricing (USD per MB/s)

Government efforts over the policy period 2018–2023 and the launching of additional submarine cables landing at Mombasa have resulted in the landed Internet price to service providers in Uganda being reduced to USD 35 per MB/s by 2023/24 from USD 237 per MB/s in the fiscal year 2017/18, as indicated in Figure 2.

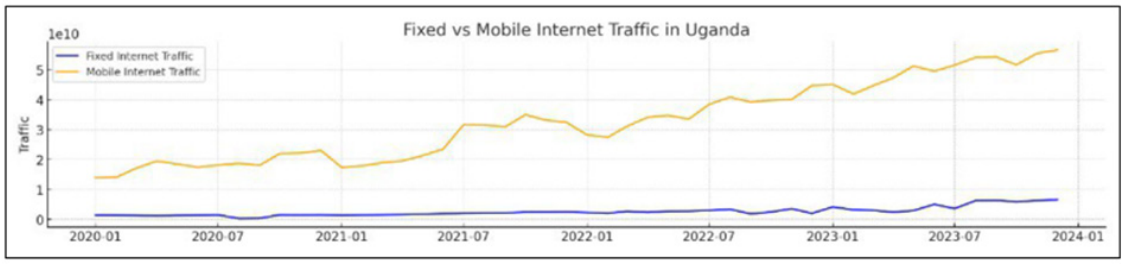
Figure 2. Reduced price of Internet to Government (USD)

Source: NITA-U.

Broadband traffic and usage patterns

Uganda's broadband landscape has seen remarkable growth, particularly in mobile Internet usage, which dominates the market. Analysis of the provided data from January 2020 to December 2023 reveals several key trends and insights.

Figure 3. Fixed vs mobile Internet traffic in Uganda



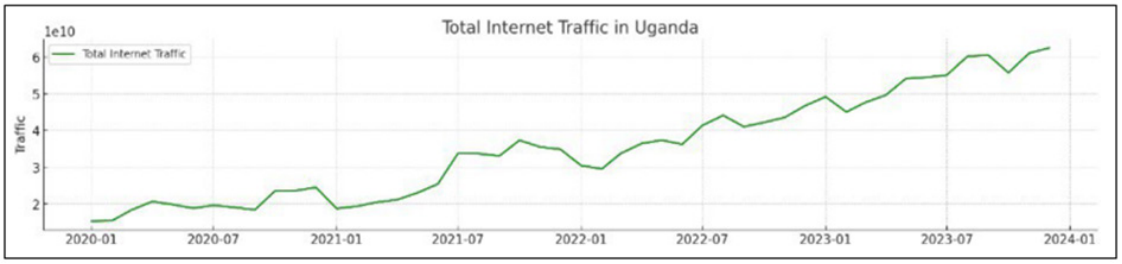
Source: UCC.

(a) Mobile broadband traffic

Mobile Internet traffic consistently represents the largest share of total Internet traffic. For instance, in December 2023, mobile Internet traffic reached 56 572 228 546 units, vastly surpassing fixed Internet traffic, which was 6 590 994 532 units.

This trend underscores the reliance on mobile networks for Internet access across the country.

Figure 4. Total Internet traffic in Uganda

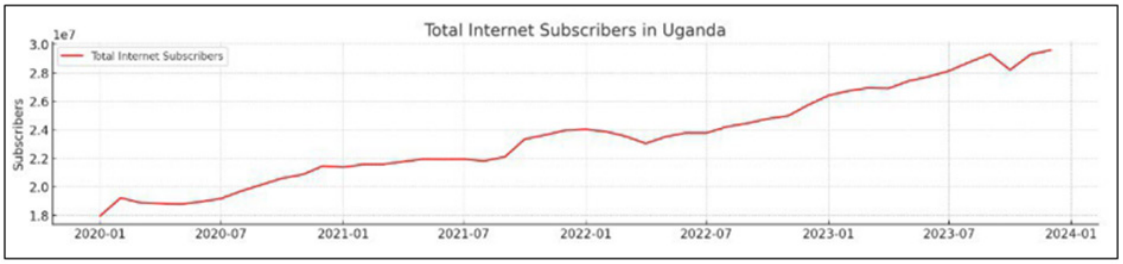


Source: UCC.

(b) Total Internet traffic and subscribers

Total Internet traffic has shown exponential growth, increasing from 15 261 978 290 units in January 2020 to 62 511 913 044 units in December 2023. Correspondingly, the number of Internet subscribers has risen from 17 939 785 to 29 577 334 over the same period, indicating a significant increase in Internet adoption.

Figure 5. Total Internet subscribers



Source: UCC.

Despite the upward trend in subscriptions, broadband access in Uganda is still predominantly through mobile phones, which serve as the primary gateway for Internet connectivity. The UCC reports highlight that over 99 per cent of Internet users in Uganda access the Internet via mobile devices, underlining the centrality of mobile broadband in the country's digital landscape.

2.1.5 Perspectives from private sector service providers

During the study, Chief Technology Officers (CTOs) and representatives of the technical teams of leading operators were consulted to share their inputs on the current state of broadband in the country. The additional observations raised are summarized below:

- High taxes on smartphones and airtime/data are a major setback on the growth of Internet subscribers in the country. As customers aspire for 5G-capable devices, the market prices are out of range for citizens. The issue of over-taxation of digital services and products in Uganda has been critiqued in a number of publications. Notable among them are the CIPESA report on digital taxation in Uganda in 2022[2] and the National Baseline Survey

[2] Collaboration on International ICT Policy for East and Southern Africa (CIPESA), *Digital Taxation in Uganda: A Hindrance to Inclusive Access and Use of Digital Technologies* (March 2022). Available at https://cipesa.org/wp-content/files/briefs/Digital-Taxation-in-Uganda-A-Hinderance-to-Access-and-Use-of-ICTS.pdf.

and Infrastructure Blueprint 2022.[3] According to the CIPESA report, Uganda's ICT sector contributes 9 per cent of the country's GDP, but high taxes on digital products and services hinder universal and affordable access. Average phone subscribers spend only UGX 10 500 (USD 2.8) per month on voice, data and SMS services. Uganda levies a 12 per cent tax on Internet data, an 18 per cent value-added tax, a 12 per cent excise duty on airtime and value-added services, and a 10 per cent import duty on devices.

- These taxes result in high costs, perpetuating digital exclusion, especially among the elderly, rural communities, persons with disabilities, youth, refugees and migrants. Costly Internet access hinders innovation, e-commerce and e-governance. The report calls for the Government, civil society and the technology sector to take measures for progressive reform. The operators advocate for the Government to foster manufacturing of affordable smartphones in the country instead of promoting manufacturing of low-end 2G devices. The Government should also be advised to consider supporting smartphone/laptop device financing mechanisms to help more citizens to get connected.
- Satellite access is an upcoming technology that will become operational either in 2025 or 2026. It is an alternative technology for connecting rural areas to achieve total national geographic coverage rather than force this goal in the operator licences.

2.1.6 Broadband access and usage gap analysis

(a) Broadband access usage gaps at the household level

Household broadband usage in Uganda remains limited, with a significant portion of the population lacking access to high-speed Internet at home. The UCC data show that, while mobile broadband usage is prevalent, fixed broadband penetration is less than 1 per cent, indicating that most households do not have direct Internet connections. This low level of household broadband adoption is attributed to high costs, limited infrastructure and a lack of digital literacy among potential users. Consequently, the benefits of broadband for education, health care and economic activities are not yet fully realized.

(b) Mobile Internet pricing to consumers is still high

Uganda's mobile Internet pricing has been relatively stable, but reflects a broader trend observed in many sub-Saharan African countries. According to cable.co.uk, as of 2023, the average cost of 1 GB of mobile data in Uganda was approximately USD 1.50. This places Uganda in the mid-range of mobile data costs in Africa. Despite being higher than in some other regions, efforts to reduce mobile data prices have been consistent, driven by competition among telecommunication providers and regulatory policies aimed at improving affordability and access.

[3] NITA-U, "National Broadband Baseline Survey and Infrastructure Blueprint" (April 2022). Available at www.nita.go.ug/publications/reports/annual-reports/national-broadband-baseline-survey-and-infrastructure-blueprint.

Table 1. Average price of 1 GB of data in USD for Rwanda, Kenya and Tanzania compared to Uganda, from 2019 to 2023 by global rank as of 2023

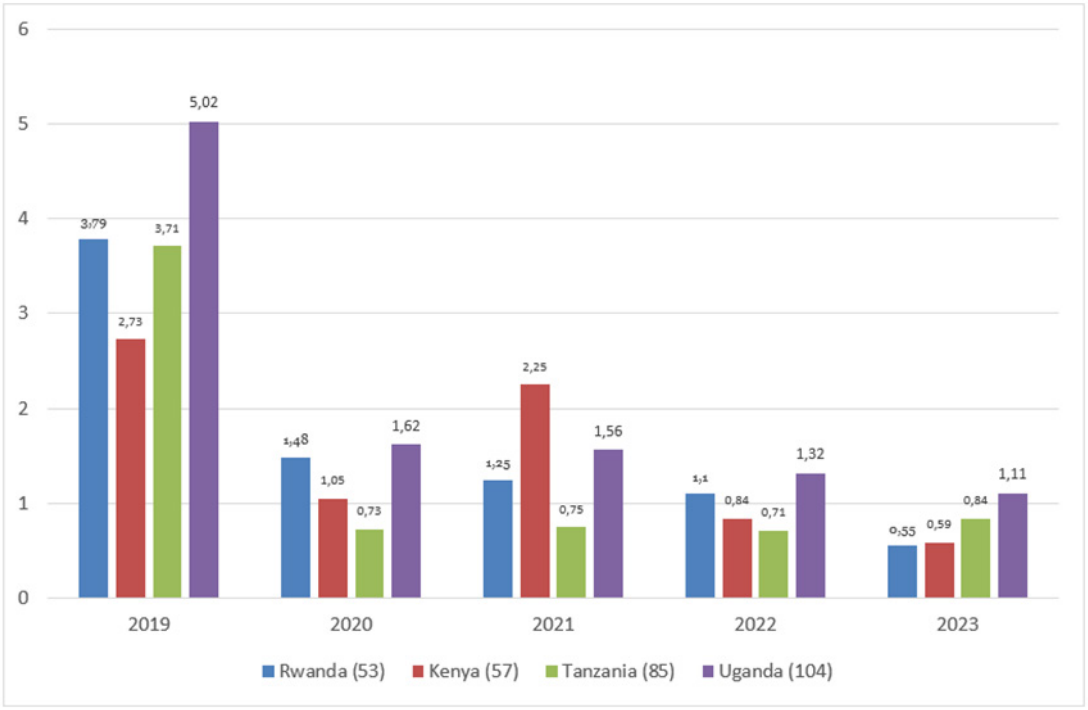
Global rank (2023)	Country	2023	2022	2021	2020	2019
53	Rwanda	0.55	1.10	1.25	1.48	3.79
57	Kenya	0.59	0.84	2.25	1.05	2.73
85	Tanzania	0.84	0.71	0.75	0.73	3.71
104	Uganda	1.11	1.32	1.56	1.62	5.02

Source: Cable.co.uk.[4]

As can be inferred from the numbers in Table 1, the prices in Rwanda, Kenya and Tanzania were lower than those in Uganda for the period 2019–2023, except for one instance in Kenya in 2021, which is highlighted in red, when the price was higher.

The above information is presented graphically in Figure 6 using bar charts and line graphs.

Figure 6. Average price of 1 GB of data in USD for Rwanda, Kenya and Tanzania compared with Uganda from 2019 to 2023



(c) Household Internet pricing is still high

Household Internet pricing, typically involving fixed broadband connections, is considerably higher than mobile Internet pricing. According to data from cable.co.uk, the average monthly

[4] Cable.co.uk, "Global broadband pricing league table 2024". Available at www.cable.co.uk/broadband/pricing/worldwide-comparison/.

cost for fixed broadband in Uganda hovers around USD 50. This high cost is attributed to the infrastructure required to provide fixed-line services and the relatively lower competition in the fixed broadband market compared with the mobile sector.

Fixed broadband services are more prevalent in urban areas, where the necessary infrastructure is more developed. However, the high costs limit widespread adoption among the average households, particularly in rural regions. Despite these challenges, there has been a gradual increase in fixed Internet traffic, indicating a growing but still limited adoption of household Internet services.

(d) Smartphone penetration and pricing

Smartphone penetration in Uganda is a critical factor influencing broadband access and usage. The affordability of smartphones significantly impacts the ability of users to access mobile Internet. However, the pricing of smartphones remains a challenge due to high taxation from the Government. According to recent reports, the Government imposes a tax rate of 40 per cent on imported smartphones, making them relatively expensive for the average consumer. This high taxation rate limits the affordability and penetration of smartphones, thereby affecting the overall mobile Internet adoption rate.

2.2 Regional and global context

The global aspirations for broadband development are largely driven by the targets set by international bodies such as ITU and the Global System for Mobile Communications Association (GSMA). ITU's Connect 2030 Agenda aims to achieve universal and affordable access to ICT for all by 2030, emphasizing the importance of inclusivity, accessibility and affordability.

The United Nations recognizes the transformative power of broadband in driving sustainable development and economic growth. The United Nations Broadband Commission for Sustainable Development has set several ambitious targets for broadband access and usage to be achieved by 2025, and the newly adopted European Union Digital Services Act and Digital Markets Act tackle core concerns in the trade and exchange of illegal goods, services and content online; disinformation; and the dominant market position of global digital platforms. These targets aim to bridge the digital divide, enhance digital literacy, and leverage broadband to achieve broader social and economic goals.

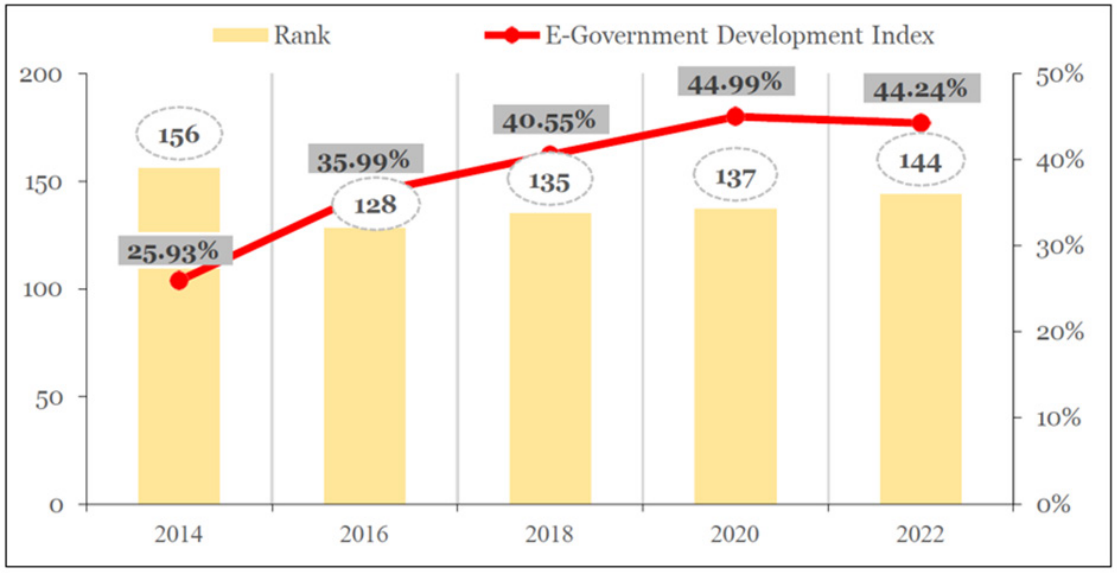
Overall, since 2018, Uganda's ICT performance on the global scale has significantly improved, as measured by the GovTech Maturity Index, E-Government Development Index (EGDI) and E-Participation Index. It's worth noting that the EGDI and E-Participation Index directly measure the availability or accessibility of e-services to citizens, while the GovTech Maturity Index, on the other hand, evaluates the maturity of government technology practices, including the adoption of digital technologies, the effectiveness of digital governance and the utilization of technology to improve government operations.

It should further be noted that these indices are released every two years.

2.2.1 E-Government Development Index

Uganda's EGDI experienced a 23 per cent increase, from 36 per cent in 2018 to 44.24 per cent in 2022. A higher EGDI suggests that more government services are now available online, making it easier for citizens to access information and services without needing to visit government offices, hence saving time and reducing bureaucratic hurdles. This EGDI resulted in a global rank shift from 135 in 2018 to 144 in 2022 among 193 United Nations member States. This decline is partially attributable to changes in the United Nations E-Government survey methodology, leading to a decrease in the average Online Service Index. However, Uganda's EGDI surpassed the average of Africa (40.54 per cent) and that of the low-income grouping (32.33 per cent) in 2022. Furthermore, there was a 57.5 per cent improvement in the Telecommunication Infrastructure Index, rising from 15.7 per cent in 2018 to 24.72 per cent in 2022.

Figure 7. Uganda's E-Government Development Index, 2014–2022



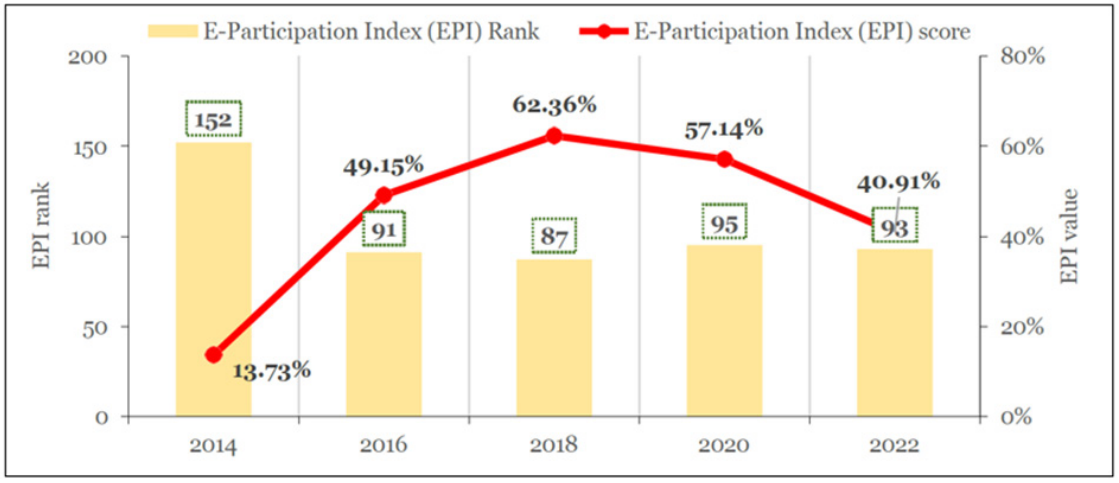
Source: NITA-U.

2.2.2 E-Participation Index

Uganda's E-Participation Index declined from 87th position out of 193 countries in 2018 to 93rd in 2022, achieving a score of 40.91 per cent, down from 63.36 per cent in 2018. Among East African countries, Uganda secured the third position in 2022, following Rwanda and Kenya. This decline underscores challenges in promoting digital inclusivity, citizen engagement and transparent governance.

Therefore, while Uganda is among the countries that are committed to improving the provision of online services and user experiences, the Government's efforts to actively engage the public in e-consultations and other forms of e-participation remain somewhat limited.

Figure 8. Uganda's E-Participation Index, 2014–2022

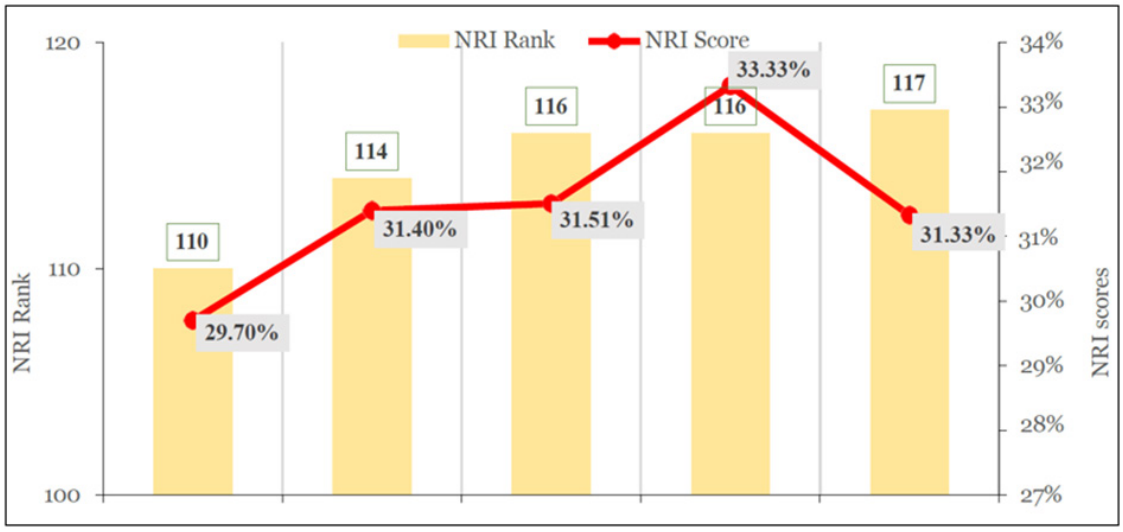


Source: NITA-U.

2.2.3 Network Readiness Index

In the Network Readiness Index 2023, Uganda attained 117th position among 134 economies. The Governance pillar stands out as a notable strength, securing 99th position. However, there is substantial room for improvement in the People pillar, where Uganda placed 131st out of 134. In comparison with East African countries, Uganda holds the 4th position, following Kenya (70th), Rwanda (99th), and Tanzania (104th) in the Network Readiness Index.

Figure 9. Uganda's Network Readiness Index, 2019–2023



Source: NITA-U.

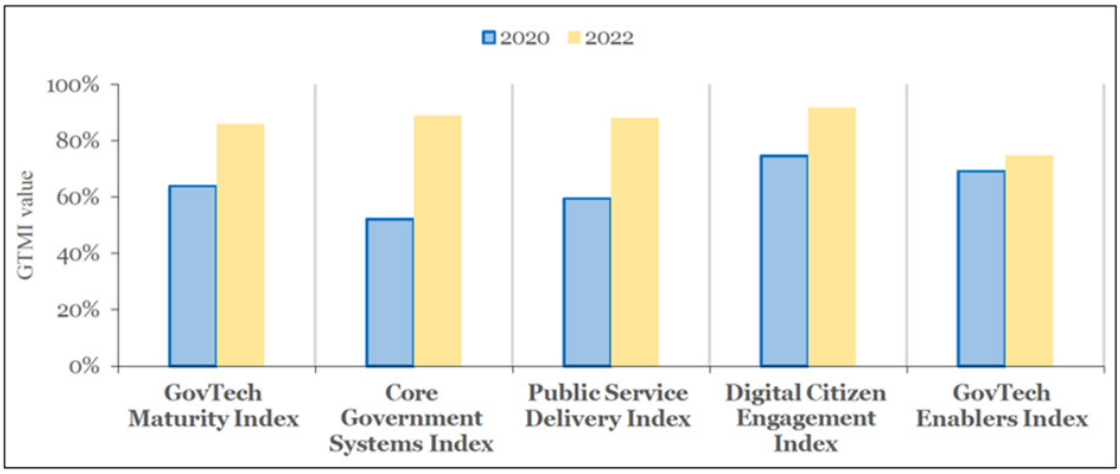
2.2.4 GovTech Maturity Index

The GovTech Maturity Index for Uganda showed a remarkable improvement, from 63.9 per cent in 2020 to 85.8 per cent in 2022.[5] This substantial increase not only positions Uganda above the global average of 55.2 per cent, but also places it in 26th position among 198 countries

[5] The GovTech Maturity Index was first tracked in 2020.

evaluated. Within the East African region, Uganda achieved second position in 2022, trailing closely behind Tanzania.

Figure 10. Uganda's GovTech Maturity Index 2020–2022

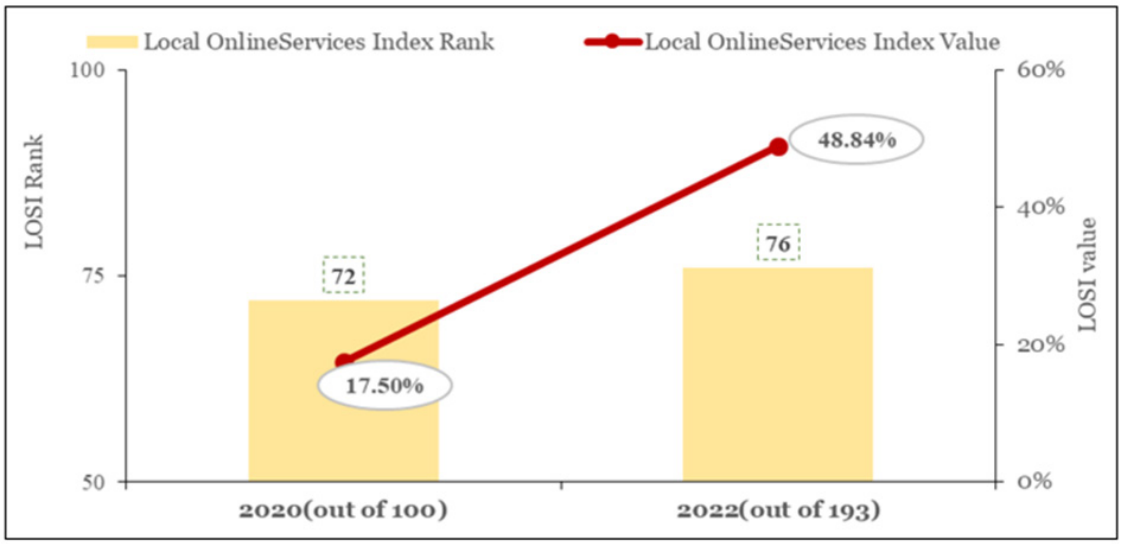


Source: NITA-U.

2.2.5 Local Online Service Index

Kampala experienced an improvement in its Local Online Service Index, from a score of 17.5 per cent in 2020 in 72nd position out of 100 cities to 48.84 per cent, securing 76th position out of 193 cities in 2022.

Figure 11. Kampala's Local Online Service Index, 2020–2022



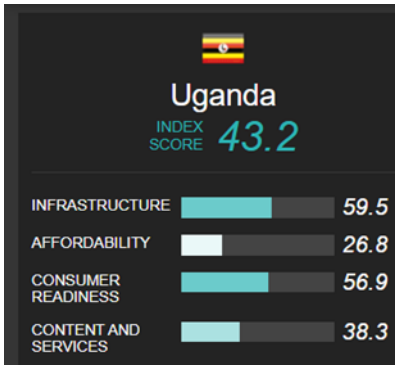
Source: NITA-U.

2.2.6 Broadband access performance

According to the GSMA Mobile Connectivity Index, Uganda's overall mobile connectivity score in 2022 reflects significant progress, but also highlights areas for improvement. The index measures four key enablers: Infrastructure, Affordability, Consumer Readiness, and Content and Services. Uganda's strengths lie in Consumer Readiness and Infrastructure, indicating a

population ready and willing to adopt mobile technology and a growing availability of relevant content. However, content and affordability remain challenges that need addressing to enhance overall connectivity.

Figure 12. GSMA Mobile Connectivity Index, Uganda 2022



Source: GSMA Mobile Connectivity Index, 2022.

In terms of first-mile fibre-optic connectivity, Ugandan Internet service providers have access to a more diverse and competitive array of terrestrial and undersea cable options, and can more quickly migrate between them. This is due to expanding backbone, cross-border and new undersea cable infrastructure around Africa, as well as new investments in network services and carrier-neutral data centres in Uganda and East Africa. As a result, Ugandan networks are able to remain online with only minimal disruption during undersea cable outages. It is also worth noting that a new terrestrial fibre route is opening up via the Democratic Republic of the Congo that will provide Uganda access to the Atlantic sea cable systems and the South African Internet ecosystem. This will provide Uganda with additional redundancy, more competitive pricing and improved performance over time.

3 Status of implementation of the National Broadband Policy 2018

At the outset, ICT sector stakeholders responsible for executing the NBP from 2018 to 2023 were identified. These included the Ministry of ICT and National Guidance; agencies under the Ministry (UCC and NITA-U); other organizations, such as The Uganda Internet eXchange Point (UIXP) and the Capital Markets Authority; and private sector players. Consultations were held with each of these stakeholders to review their tasks under the policy, status of implementation, actions undertaken, challenges and proposed mitigation measures. The results from the different sessions are summarized in the matrix below.

The NBP 2018 policy was comprised of four key objectives and the stakeholder tasks (strategies) are arranged under each objective:

- Objective 1 – Connectivity for all;
- Objective 2 – Affordability and digital inclusion through adoption of alternative broadband infrastructure technologies;
- Objective 3 – Increased broadband roll-out and quality of service improvement through telecommunication licensing reform;
- Objective 4 – Licensing framework.

The following colour scheme indicates the level of achievement for the different tasks under each objective of the policy:

Tasks were completed sufficiently.

Tasks were partially completed.

Tasks were not done.

The detailed table can be found in Annex 1.

3.1 Summary of key findings from National Broadband Policy 2018 policy implementation

The implementation of the NBP 2018 policy objectives has been effective in some areas, while in other areas some work still has to be done. In a number of areas, new technology trends have rendered the tasks unnecessary. It is noted throughout the review that the NBP policy has guided and resulted in significant progress of the ICT sector in general from 2018 to 2023. The implementation results from execution of the policy can be summarized in three groups:

- Key strategies and related tasks that have been completed successfully;
- Key strategies and related tasks that have been partially completed;
- Strategies and related tasks that have not been implemented – some strategies still need to be addressed going forward, but some strategies have been overtaken by events or new technology alternatives.

The achievements and challenges in each of the groups above are summarized below.

1. Completed key strategies and related tasks of NBP 2018 include the following:

    - Passive infrastructure-sharing guidelines and rules were successfully introduced by the regulator (UCC) for all service providers. Currently, all tower masts and related power equipment at all cell sites are being shared by the telecommunication operators. This has resulted in reduced deployment costs of infrastructure, accelerated the roll-out of new networks (3G/4G/5G/fibre-to-the-home (FTTH)) and quickly added new operators in the market. The obligation to share infrastructure is included in all licence agreements as per the UCC 2020 Telecom Licensing Framework.
    - UCC is the regulator of communication services in Uganda, and is the one-stop centre for implementation of the licensing regime and fees payable in line with the 2018 Uganda communications fees and fines regulations. It has adopted a technology-neutral spectrum allocation regime which allows the industry players to be innovative in the deployment of digital infrastructure and roll-out of new services.
    - Various legal frameworks (policies, guidelines and laws) have been developed to implement the NBP 2018, including the UCC 2020 Telecom Licensing Framework, infrastructure-sharing guidelines, National Roaming guidelines, UCC Radio Spectrum Management Guidelines, as well as spectrum band policies to improve the utilization of existing spectrum resources (spectrum re-farming) to roll out new technologies, to name a few.

2. Partially completed key strategies and related tasks include the following:

    - Promoting utility infrastructure sharing among both the private and public sector utility companies and communication sector players to include ICT infrastructure across the country for broadband access: Planning for common utility infrastructure sharing to include ICT fibre infrastructure has started, and needs to be completed, as this will allow for cost-effective and faster broadband access networks.
    - Establishment of local Internet exchange points (IXPs) to ensure that all domestic Internet traffic remains within the country: This is still a work in progress. Projects to set up private IXPs, data centres and roll-out of local Internet services are being done with the support of the Government.
    - Ensuring that all local broadband connectivity for all ministries, departments and agencies/local entities are independent of international Internet connectivity for security and affordability of broadband services: This is not yet achieved.
    - The National Backbone (fibre) Infrastructure: This is yet to connect all districts and government offices in the country. However, NITA-U is continuing to connect the remaining districts under the Uganda Digital Acceleration Project (UDAP) and NBI Phase 5 projects.
    - Promoting and supporting local manufacturing and assembly of broadband access devices/equipment: This is still a work in progress. Two companies have been licensed but are not yet fully operational. A feasibility study has been done for ICT Industrial Park projects, but the Government is still seeking funding for these initiatives that aim to introduce affordable locally-manufactured smartphone devices into the market.
    - Ensuring all government sectors deliver their services online for efficient and sustainable service delivery: This has not yet been achieved. There is still lack of a clear policy on ownership of government systems. There is still continued reliance on foreign vendors who are in control of the government systems, which affects knowledge transfer and misuse of data. The Government also has limited funding for operations and maintenance costs of these systems.
    - Interoperability of all e-government systems through the open access principle and shared services has not been fully realized due to limited funding of the NITA-U

Government Interoperability Framework (GIF) and Government Enterprise Architecture (GEA) project. More work on these projects will be done under the newly approved World Bank-funded UDAP project.

3. Strategies and related tasks that have not been implemented:

- Establishing common international gateways in order to manage all international traffic originating and terminating in the country: This was not done because the new operator licensing regime provided for liberalization of international gateway access to the private sector players.
- Promoting and implementing the National Postcode and Addressing System towards last-mile delivery of services to facilitate e-commerce: This was not done because of lack of funding for the project.
- Promoting and supporting national digital literacy/education initiatives to educate the citizens: This is still a work in progress. Education and training has to be developed and customized for all citizens, including women and girls, persons with disabilities, youths and people in underserved and unserved areas. There are a number of issues, including funding, collaboration/coordination between key stakeholders (Ministry of Education and Sports/Ministry of ICT and National Guidance/development partners), as well as network infrastructure challenges in different parts of the country, among others.
- Promoting local content for citizens to competitively participate both locally and globally in the digital space: This is in its infant stages. Limited funding has slowed the anticipated pace of promotion and development of the local content in the country.
- Adopting the safe use of technologies to ensure the safety, reliability and efficiency in management of resources and trusted information such as public key infrastructure and blockchain technology: This has not been fully implemented because of government budget constraints.
- Promotion of open source and government ownership of source code for all government information systems, software and e-solutions to ensure sustainability and promote innovation: This has not yet started because of security concerns.
- Number portability to empower customers to choose their service provider without the challenge of changing telephone numbers: This was not implemented because feasibility studies deemed it non-viable in the Uganda market due to the high costs of implementation.

3.2 Analysis of the overall implementation of the National Broadband Policy 2018

The Uganda NBP has significantly contributed to achieving its objectives. The policy has helped avert duplication and resource wastage by promoting infrastructure sharing among key stakeholders. This collaboration between telecommunication operators and service providers has led to a more streamlined deployment of broadband infrastructure, ensuring that investments are utilized optimally. The introduction of the Unified Licensing Regime under this policy has also simplified regulatory requirements, encouraging more operators to enter the market and expand their services, thus enhancing overall infrastructure utilization and efficiency.

Additionally, the policy has been instrumental in extending broadband connectivity beyond urban centres to rural and underserved areas. Specifically, initiatives supported by the Universal Service Fund and public–private partnerships (PPPs) have been crucial in this regard, ensuring that remote communities gain access to broadband. These efforts are aligned with the policy's goal to ensure equitable Internet access across the country. Furthermore, by reviewing and

updating the licensing regime, the policy has ensured that telecommunication and broadcast operators' activities are aligned with the strategic objectives of the ICT sector, promoting a more inclusive and sustainable digital environment in Uganda. These efforts have laid a strong foundation for continued progress in broadband accessibility and efficiency.

Observations are shared below regarding overall implementation of the NBP 2018 against the objectives set.

Implementation assessment of the National Broadband Policy objectives includes the following:

Objective 1 – Connectivity for all

Since 2018, Uganda has implemented a multifaceted approach to ensure connectivity for all its citizens, which hinged on infrastructure development, policy and regulatory reforms, as well as PPPs. These efforts have significantly increased broadband penetration, improved service quality and reduced the digital divide in the country. Several outcomes have been registered in line with the underlying strategies, as described below:

- Through engagements with various relevant stakeholders, there has been enhanced recognition by key stakeholders, including Parliament, regarding the need to protect broadband infrastructure. Furthermore, there have been joint industry–security initiatives towards protection of critical infrastructure and the establishment of a specialized court, the Standards Wildlife and Utilities Court, to handle cases related to vandalism of utilities infrastructure, including that of broadband.
- Infrastructure-sharing guidelines were published by UCC in 2019 and since then have been the legal basis for regulation, coordination and harmonization of the development, deployment and sharing of all broadband infrastructure by both private and public stakeholders. Additionally, the Telecom Licensing Framework that came into force in 2020 obliged telecommunication operators to share infrastructure, as this requirement was included in all licences. This has brought about reduced cost of infrastructure deployment by the operators and culminated in an increase in the number of regional Public Service Provider or Telecommunications Services Provider licensees, who are sharing infrastructure and re-selling capacity.
- NITA-U has been providing Internet bandwidth to ministries, departments and agencies/ district local governments through the NBI based on the Strategy for Rationalization of Information Technology Services. The Strategy emphasizes the use of the NBI as the primary vehicle for all government data, Internet and voice services. To date, NITA-U has connected 120 ministries, departments and agencies and 53 district local governments to the NBI. This has contributed to affordable and secure broadband services provided to government entities. Despite this progress, the NBI coverage across the country is still limited in some parts of the country, which hinders connection of more government entities. However, under the planned UDAP–GovNet and NBI Phase 5 projects, NITA-U plans to further roll out the NBI to all district headquarters across the entire country.

Objective 2 – Affordability and digital inclusion through adoption of alternative broadband infrastructure technologies

The proliferation of mobile broadband has played a critical role in increasing digital inclusion with the majority of Ugandans accessing the Internet through mobile devices. The expansion of 3G and 4G networks by mobile operators (MTN Uganda and Airtel Uganda) has made Internet access more affordable and widespread.

Furthermore, to consolidate gains in digital inclusion, the Government, along with various non-governmental organizations and international organizations, has implemented some programmes to enhance digital skills among Ugandans. These programmes have helped individuals make better use of the Internet for education, business and personal development. A more comprehensive national digital skills education campaign is still required to achieve results in this area.

Overall, the strategies under this objective have been implemented as discussed below:

- To ensure efficient and complementary broadband Infrastructure deployment, Uganda has adopted a technology-neutral licensing regime, which has facilitated the industry to be innovative in the deployment of digital infrastructure and roll out a variety of services. Furthermore, Uganda has adopted spectrum band policies that provide flexibility for re-farming by the operators to facilitate adoption of spectrum-efficient technologies. This has resulted in increased connectivity with increased fibre technology utilization, even at the private home level. This has also further enabled the introduction of 4G and 5G technologies.
- To promote and support digital literacy in the country, UCC has been implementing a digital skilling and basic literacy programme targeting all categories of society, including the marginalized and underserved communities, with over 5 million Ugandans benefiting from this programme. Furthermore, NITA-U has extended broadband connectivity to 20 universities, 49 tertiary schools and 29 secondary schools through the NBI. Subsequently, the Ministry of Education and Sports, in partnership with the United Nations Children's Fund (UNICEF) and NITA-U, introduced the e-learning platform named KOLIBRI in 17 districts and 49 secondary schools across the country.
- To incentivize local manufacturing and assembly of broadband-enabled devices and equipment, so as to attain affordability, two companies, Engo Holdings of Simi Mobile and Mione Electronics, have been licensed by the Uganda Investment Authority to manufacture and assemble phone devices in Uganda.
- To support the integration of government systems, the Government Interoperability Framework (GIF) and Government Enterprise Architecture (GEA) were developed and approved. They have since been rolled out in two entities (Ministry of Local Government and Ministry of Health), which has enabled them to revise their own frameworks. Most significantly, this framework has guided the roll-out of the Data Sharing and Integration Platform, code-named "UgHub", which has contributed significantly to a reduction in turnaround time in delivering critical government services by leveraging data sharing through the hub.
- Using the favourable enabling environment of the NBP 2018, NITA-U has supported entities to create end-to-end digital channels by developing a Mobile-Based Digital Authentication and e-Signatures Solution, code-named "UgPass", by leveraging the power of Public Key Infrastructure (PKI). This is currently being rolled out with four services already on-boarded for digital signature applications. It's worth noting that this solution is significantly contributing to the reduction in the digitalization gap by ensuring end-to-end digitalization of processes, as well as enhancement of security of electronic transactions.

Objective 3 – Increased broadband roll-out and quality of service improvement through telecommunication licensing reform

As guided by the National Broadband Policy, In June 2020, UCC introduced a Unified Licensing Regime, a reform that streamlined the licensing process by consolidating various licences into a single unified license, reducing regulatory burdens for telecommunication operators. This has allowed operators to offer a range of services under one licence, fostering competition and encouraging investment in broadband infrastructure. This reform has significantly contributed to

increased broadband penetration, improved service quality, a competitive market environment and increased technological innovation in the country.

This objective has been implemented as discussed below:

- In order to operationalize the strategy for 90 per cent geographical coverage within five years (i.e. by 2023), UCC has included the coverage obligation within the licence agreement of all National Telecommunication Operator licensees who periodically provide their roll-out plans and report on progress being made towards achievements of the set roll-out targets. This has resulted in increased coverage and connectivity across the country.
- Consistent with the NBP 2018, hoarding of spectrum in Uganda is illegal and UCC has put in place various regulatory frameworks to promote innovative use of scarce spectrum to deliver communication services. These include: the Uganda Communications Radio Spectrum Management Guidelines; band policies for 700 MHz, 2300 MHz, 3300 MHz and 3500 MHz to facilitate deployment of new technologies; guidelines for access and use of the lower part of the 6 GHz band for fixed wireless; Framework for Satellite Communication; and guidelines for utilization of the 2.4 GHZ band for wireless access systems/networks in Uganda.
- This has contributed to increased coverage of communication services, improved quality of broadband services and provision of a variety of broadband services to consumers. It has also enhanced adoption of broadband as a mechanism for delivery of other consumer services such as broadcasting, education and health, among others.
- To enable customers to have seamless access and coverage, irrespective of their network, the National Roaming Guidelines were developed and adopted by the industry, with implementation ongoing based on commercial arrangements between operators. This has enhanced access to communication services in underserved areas, improved utilization of infrastructure to facilitate consumer choices and improved competition in the market.
- To mitigate capital flight and rip other benefits of local content opportunities that come along, listing under the Capital Markets Authority is now a mandatory requirement for all national telecommunication operators, as per the Licensing Terms and Conditions contained in the licensees. As a result, major operators Airtel and MTN Uganda have listed on the Uganda Securities Exchange, which has enabled local ownership of shares by Ugandans.

Objective 4 – Licensing framework

To provide for a structured renewal framework for the licensees, taking into consideration the roll-out obligations, quality of service and technological developments, UCC developed and is implementing the 2020 Telecom Licensing Framework that, among others, spells out obligations for the operators. Subsequently, all telecommunication operators in the country have been licensed under this framework.

Implementation challenges

The implementation of Uganda's National Broadband Policy 2018 faced several challenges, including:

- High costs of deploying ICT infrastructure across the country;
- Limited coverage of the NBI, hindering connectivity for government entities;
- Lengthy public–private partnership (PPP) onboarding processes and limited funding, which hinder local content promotion and system ownership, while high operational costs and uncompetitive practices affect service quality;

- Limited government funding for some of the initiatives that were not implemented;
- High taxation on access devices and ICT services by the Government, which limits the usage of broadband services because of affordability.

Implications for Uganda's digital transformation progress

Uganda's implementation of the National Broadband Policy (NBP) has made significant progress in expanding digital infrastructure, improving digital services and advancing digital skills. Key achievements include increased broadband penetration, the roll-out of 3G/4G wireless network technologies, and the digitalization of government services through initiatives such as UgPass and UgHub. However, challenges such as high infrastructure costs, limited NBI coverage and reliance on foreign vendors for government systems continue to hinder full realization of these gains.

Uganda's digital transformation progress under the NBP 2018 reflects both significant achievements and ongoing challenges. While digital infrastructure, services and skills have seen notable advancements, cybersecurity, data protection and innovation face ongoing challenges due to fragmented implementation and regulatory gaps.

The push for local device manufacturing and the planned National ICT Industrial Park represent positive steps towards fostering digital entrepreneurship, but these efforts need acceleration and greater government support. Moreover, environmental sustainability and systematic experimentation require more focused strategies to ensure long-term digital growth that aligns with national development goals.

Overall, Uganda's digital transformation is on an upward trajectory, driven by the foundational work laid under the NBP 2018. However, to fully harness the potential of digitalization, there is a need for more coordinated efforts to address existing challenges, enhance cybersecurity, promote innovation and ensure sustainable practices.

4 Review of recent studies to extract recommendations

The following documents were used as key references to support the assessment:

(a) Consultation on Legislation for Broadband Deployment in Uganda, 2019;
(b) National Strategy on the Fourth Industrial Revolution (4IR), 2020;
(c) Consultation on Management and Allocation of Spectrum in Uganda, 2021;
(d) Uganda National Broadband Baseline Survey and Infrastructure Blueprint, 2022;
(e) National IT Survey, 2022;
(f) Digital Transformation Roadmap, 2023.

A summary of the contents of each of these documents is presented below:

(a) Consultation on Legislation for Broadband Deployment in Uganda, 2019

The 2019 Consultation concentrated on three main areas – rights of way, joint infrastructure construction and the universal service plan – drawing from the Republic of Korea's telecommunication market experience. Emphasizing cost-effective practices, it suggests a comprehensive legal framework for rights of way, incorporating detailed guidelines in relevant laws such as the UCC Act and the Land Act. The study also advocates for jurisdictional coordination via an interministerial committee to streamline efforts among various governmental bodies.

Addressing transparency, it proposes a Geographic Information System (GIS) platform for systematic planning, obligating telecommunication providers to update it as a licensing condition. Encouraging facility sharing and joint construction, the recommendation entails establishing a council for joint construction among operators and minimizing disputes through clear rules. For universal service, the focus lies on specifying minimum speeds and maintaining technology neutrality, primarily targeting public facilities for broadband access, with fibre-optic connections funded by the Government and mobile broadband for widespread coverage in the long term.

In summary, the Consultation underscores legal frameworks, transparency measures and collaborative efforts to enhance broadband deployment in Uganda, ensuring efficient utilization of resources and equitable access to digital services, with a focus on both short-term efficiency and long-term universality.

(b) National Strategy on the Fourth Industrial Revolution (4IR), 2020

The Strategy document highlights connectivity and regulation among the prerequisites and critical enablers in realizing 4IR opportunities. It identifies desired outcomes and actions needed to achieve the objectives for each of its critical enablers. It also identifies which stakeholders must be responsible for these actions and the time-frame in which they should be delivered.

Connectivity is envisaged to enable the population to participate fully in the 4IR economy by establishing cost-effective and fast interaction between the digital and physical worlds. Connectivity objectives include improving network access in terms of speeds, urban and rural coverage, and affordability; access to physical technologies in terms of affordability, adoption and use; and promoting the adoption of cloud computing services.

The Strategy suggests objectives that will spearhead the adoption of regulatory agility given the pace of innovation in the 4IR, resulting in the emergence of entirely new business models. Outcomes and actions are suggested for the following objectives: agile governance; closing regulatory, legislative and strategic gaps; and data legislation and regulation.

(c) Consultation on Allocation and Management of Spectrum in Uganda, 2021

This document offers comprehensive policy recommendations tailored for Uganda's spectrum management, focusing primarily on mobile operators. It emphasizes three key areas: spectrum management, emerging technologies and spectrum pricing. To enhance mobile broadband penetration, the report advocates for expanding network coverage, suggesting obligations on operators to construct 4G or 5G networks when allocating additional spectrum, or stimulating competition to encourage network investments.

The document also underscores the importance of accommodating emerging technologies such as 5G and Wi-Fi 7, urging the Government to create a diverse spectrum portfolio and adopt flexible allocation policies. Recommendations also extend to spectrum pricing, emphasizing the necessity of clear policy principles, evaluating spectrum costs relative to operator revenue, and considering auction mechanisms to ensure efficient spectrum allocation. By drawing from international best practices, the report provides a strategic roadmap for Uganda's spectrum policies to facilitate technological advancement and enhance mobile connectivity across the nation.

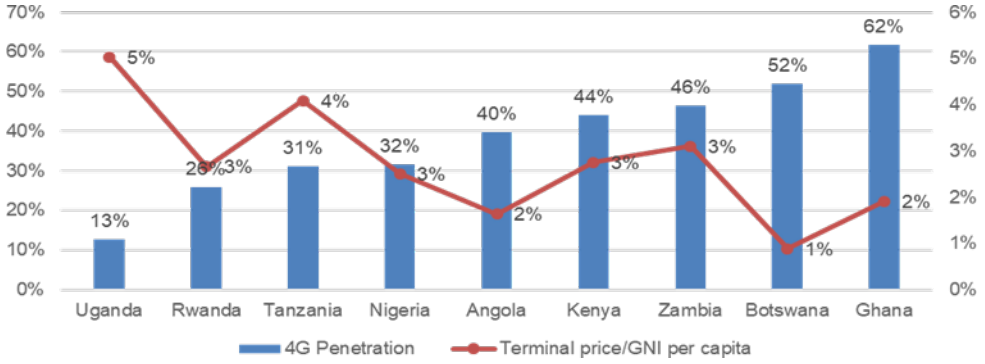
(d) Uganda National Broadband Baseline Survey and Infrastructure Blueprint, 2022

This study report presents findings on Uganda's national broadband landscape and proposes a 10-year National Broadband Infrastructure Blueprint spanning the years 2022–2032. Employing a broadband value chain model, the study identifies gaps and weaknesses within the broadband ecosystem across six segments, including content rights, online services, enabling technologies and services, connectivity, user interface, and a newly proposed broadband demand segment. Highlighting connectivity as the primary challenge, with only 29 per cent of the population within 10 km reach of a fibre node, compared with 41 per cent in Kenya, the report emphasizes the need for strategic interventions.

The proposed interventions encompass broadband policies, legal and regulatory frameworks, institutional arrangements, spectrum management and infrastructure development over the next decade. Stressing the importance of coordinated efforts among government stakeholders, the report advocates for collaborative action to assign clear roles in institutional settings and ensure fair competition, consumer protection and equitable access. Additionally, the development of the Uganda Broadband Portal is highlighted as a crucial analytical tool for visualizing coverage, identifying gaps, estimating costs and facilitating continuous data updates to inform decision-making and address connectivity challenges effectively.

Each segment of the proposed broadband value chain is subject to its own laws, rules and regulations, implemented by different bodies. As can be seen in Figure 13 compared to other African countries, Uganda has the highest terminal device price to Gross National Income ratio, which culminates in 4G capable devices being more expensive (less affordable) for Ugandan citizens than for those in the other countries considered.

Figure 13. Cost of 4G enabled devices/terminals to GNI per capita



(e) National IT Survey, 2022

The IT Survey 2022 conducted by NITA-U offers a comprehensive assessment of Uganda's ICT infrastructure, equipment, services accessibility, usage, affordability and satisfaction levels across various sectors, including individuals, households, government ministries, departments and agencies, local government administrations (LGAs) and businesses. By analysing data from diverse sources – including ministries, departments and agencies, districts, households and businesses – the Survey provides insights into national, rural–urban and regional ICT dynamics. Notably, it identifies affordability-related disparities – such as rural–urban, gender and income-based divides – shedding light on critical areas for improvement.

The survey's recommendations focus on enhancing broadband implementation and access, emphasizing the importance of comprehensive ICT policies, increased computer penetration and addressing Internet access costs through collaborative efforts between the Government and the private sector. It underscores the significance of Uganda's National Strategy on 4IR in leveraging technology for operational efficiency and public service delivery. Additionally, the survey advocates for addressing data-sharing barriers, enhancing cybersecurity awareness, extending fibre-optic infrastructure, and promoting solar power access in rural areas to facilitate broader inclusion and enable e-commerce opportunities for businesses. It also stresses the need for nationwide interventions to improve ICT literacy and government service utilization, as well as targeted training for businesses to capitalize effectively on e-commerce platforms. These recommendations serve as a strategic roadmap for policymakers and stakeholders to drive inclusive and sustainable ICT development in Uganda.

(f) Digital Transformation Roadmap, 2023

The Ministry of ICT and National Guidance with support from the United Nations Development Programme (UNDP), undertook a project to develop a Digital Transformation Roadmap for Uganda. The roadmap has been developed as an implementation tool towards achieving the objectives of the Digital Uganda Vision. The Digital Transformation Roadmap aims to strengthen the implementation of enabling policies and laws to accelerate Uganda's Digital Revolution and provides an overarching implementation framework for a well-connected Uganda that delivers on the opportunities presented by various technologies.

4.1 List of recommendations and actions extracted from the recent studies

The documents that have been reviewed contain various recommendations – which fall under the pillars of Broadband Infrastructure; Digital Services/E-Services; Digital Skills; Cybersecurity, Privacy and Data Protection; and Research and Innovation – most of which are reflected in the Vision 2040 Aspirations and pillars of the Digital Transformation Roadmap. They are presented below:

4.1.1 Broadband infrastructure recommendations

1. Expand national backbone infrastructure coverage to reduce transaction costs.
2. Prioritize last-mile connectivity to enhance universal access:
    a. Fibre connection to local government offices;
    b. Roll out high-speed broadband and alternative access options (fibre-to-the-home, satellite access, etc.);
    c. Connect public facilities to fibre (schools, hospitals, etc.);
    d. Promote 5G coverage;
    e. Facilitate sharing and joint construction of infrastructure;
    f. Develop infrastructure co-deployment and sharing guidelines.
3. Create a GIS platform in Uganda to enable the Ugandan Government to systematically plan and execute national utility projects in a more efficient manner.
4. Ensure availability of affordable devices.
5. Address high device and service costs (local manufacturing).
6. Maintain technology neutrality for universal service.
7. Develop a critical infrastructure act to facilitate the protection of critical infrastructure (which includes broadband infrastructure).
8. Make it a policy requirement that all public infrastructure projects include broadband facilities.
9. Develop the rights-of-way legal framework (including wayleaves access) to ease installation of broadband facilities.
10. Provide for access to land and facilities for the public good in relevant acts (to support broadband infrastructure).
11. Create an interministerial committee to coordinate broadband infrastructure development.

4.1.2 Digital services/e-services recommendations

1. Promote the implementation of Uganda's National Strategy on 4IR to enhance medical supply chains, improve the quality of primary health care, extend health information system interoperability and improve agricultural productivity, supporting downstream value addition in agro-processing.
2. Digitalize acquisition and distribution of agricultural market information.
3. Promote digitalization and e-commerce of women-led businesses to facilitate access to business support services.
4. Develop a national e-commerce strategy; streamline logistics and courier operations; optimize the use of the government payment gateway to promote e-commerce, etc.

5. Develop eService access points for citizens in the districts by promoting digitization of government records.
6. Review and automate integrated end-to-end government business and service delivery.
7. Develop single identifiers and shared digital registries (to improve e-services).
8. Position Uganda Institute of Communication Technology as the preferred trainer for all ministries, departments and agencies, and local governments that require ICT-related training courses.
9. Build capacity for ICT cadre and policy-makers in Government.
10. Develop a digital mindset change programme for better adoption of e-government.

4.1.3 Digital skills recommendations

1. Develop and implement a national digital skills formation framework.
2. Develop and implement a digital skilling pilot programme.
3. Develop a national digital skills framework and digital skills curriculum at all schooling levels.
4. Invest in AI literacy and research to empower people to effectively use and interact with AI systems.
5. Develop internal ICT skills within ministries and government departments.
6. Implement education and training programmes to equip Ugandans with the skills and knowledge required for digital jobs.
7. Provide hands-on digital skills among women and other vulnerable groups in rural areas for access to financial, agricultural and other critical services.
8. Conduct country-wide digital literacy and e-awareness campaigns to encourage more uptake of the digitalization services across the country.
9. Promote awareness and user ICT skills, which are still very limited among the general population.
10. Promote institutional digital literacy programmes.
11. Promote local content and applications development.
12. Increase collaboration with relevant associations to create and grow centres of excellence on use of emerging technologies.

4.1.4 Cybersecurity, data protection and privacy recommendations

1. Foster a safe and trusted digital economy by building appropriate cybersecurity and data protection capabilities.
2. Expand cybersecurity investments.
3. Enhance security of digital online services.
4. Enhance threat preparedness and response.
5. Enhance national and sectoral incident response and information sharing.
6. Ensure protection of privacy of personal data.
7. Enhance protection of national critical information infrastructure.
8. Enhance and enforce compliance with the Personal Data Protection and Privacy Act.
9. Raise public cybersecurity awareness.

10. Enhance monitoring, enforcement and compliance with cybersecurity, data protection and privacy standards.
11. Strengthen cybersecurity through development and awareness of the national cyber threat intelligence platform, and nationwide sensitization campaigns for users of ICTs.
12. Promote protection of intellectual property rights.

4.1.5 Research and innovation recommendations

1. Support development and commercialization of local ICT products.
2. Develop innovation and incubation centres, and promote utilization of innovation test beds to increase uptake of digital services.
3. Enhance the National ICT Innovation Hub under the Ministry of ICT and National Guidance.
4. Champion access to government e-services and Application Programming Interfaces through UgHub by the private sector.
5. Ensure sustainability of digital national projects through enhancing the Hub structure.
6. Enhance support for growth of the start-up ecosystem by creating digital centres of excellence.
7. Enhance access to funding for start-ups.
8. Initiate and fund pilot projects for the adoption of innovative solutions.
9. Establish a Data and AI Ethics Council to act as a "steward" of the AI Ethics Principles and to coordinate independent research into best practices and standards for the ethical application of data and AI technologies.
10. Promote relevant innovation-related cooperation with the private sector and development partners.
11. Increase and coordinate the commissioning of digital government-related research and development activities across the country.
12. Develop a National AI Strategy that will provide guidance on the social value, societal unity and social impact arising from the use of AI and other data-driven technologies.

4.2 Analysis and way forward

On completion of the review of these recent government studies mentioned above, the latest draft of the NDPIV concept note under development was also reviewed. While most of the recommendations above have been catered for, there are some missing interventions. It is suggested that they be evaluated for inclusion in the scope of work of the NDPIV. The recommendations can also be included in ongoing digital transformation work – for example, the World Bank-funded Uganda Digital Acceleration Project (UDAP).

Table 2. Recommendations that are missing under the current NDPIV scope

Pillar or NDPIV Subprogramme	Missing recommendations or interventions under the NDPIV
Digital Infrastructure	• Create a GIS (Geographic Information System) platform in Uganda to enable the Ugandan Government to systematically plan and execute national utility projects in a more efficient manner. • Create an interministerial committee to coordinate broadband infrastructure development.
Digital Skills	• Invest in AI literacy and research to empower people to effectively use and interact with AI systems. • Promote local content and applications development. • Develop a National AI Strategy that will provide guidance on the social value, societal unity and social impact arising from the use of AI and other data-driven technologies.

Table 2. Recommendations that are missing under the current NDPIV scope (continued)

Pillar or NDPIV Subprogramme	Missing recommendations or interventions under the NDPIV
Cybersecurity, Data Protection and Privacy	• Strengthen cybersecurity through development and awareness of the national cyber threat intelligence platform and nationwide sensitization campaigns for users of ICTs. • Promote protection of and national guidance on intellectual property rights of ICT.
Research and Innovation	• Enhance access to funding for start-ups. • Establish a Data and AI Ethics Council to act as a "steward" of the AI Ethics Principles and to coordinate independent research into best practices and standards for the ethical application of data and AI technologies. • Promote digitalization and e-commerce of women-led businesses to facilitate access to business support services. • Position Uganda Institute of Communication Technology as the preferred trainer for all ministries, departments and agencies and local governments that require ICT-related training courses.

5 Benchmarking country report

5.1 Criteria used for identifying countries for benchmarking

The Digital Quality of Life (DQL) index[6] was used to identify countries suitable for benchmarking against Uganda's Digital Transformation Agenda. The Index is published by Surfshark,[7] a virtual private network (VPN) service provider. It provides insights into factors that impact a country's digital well-being, from which areas that should be prioritized for future improvement can be identified.

The 2023 DQL report is an output of a study on the digital well-being across 121 countries, which constitute 92 per cent of the global population. It offers a unique perspective into a given country's digital quality of life according to five pillars: Internet affordability, Internet quality, electronic infrastructure, electronic security and electronic government.

Subsequently, a number of countries were reviewed, and the following were selected for the benchmarking: Kenya, Nigeria and South Africa. The main criterion for why these countries were chosen is that they all rank significantly higher than Uganda on the DQL index and in all its five pillars. The data in Table 3 show this.

Table 3. DQL index comparison table for benchmarked countries

Country	Rank/DQL Index	Internet Affordability Pillar Rank/ Index	Internet Quality Pillar Rank/ Index	E-Infra-structure Pillar Rank/ Index	E-Secu-rity Pillar Rank/ Index	E-Govern-ment Pillar Rank/ Index
Uganda	107/0.3041	116/0.0072	108/0.0528	112/0.0808	81/0.0734	94/0.0898
Kenya	76/0.4201	97/0.0148	92/0.0626	68/0.1436	65/0.0836	75/0.1153
Nigeria	88/0.3762	108/0.0099	62/0.0720	93/0.1187	73/0.0775	88/0.981
South Africa	72/0.4358	52/0.0363	63/0.0719	94/0.1184	72/0.0784	61/0.1306
Global average	0.4864	0.0393	0.0753	0.1424	0.1023	0.1271

The second criterion for identifying these countries for benchmarking is that they all have a better GDP per capita than Uganda according to the World Bank GDP per capita country rankings published in 2023,[8] implying that their economies are performing better than that of Uganda. Table 4 presents the figures for the four countries.

[6] Available at https://surfshark.com/dql2023/insights.
[7] Available at https://surfshark.com/dql2023/insights.
[8] Available at https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ZG.

Table 4. GDP per capita for benchmarked countries

Country	GDP per capita 2023
Uganda	1 014.2
Kenya	1 949.9
Nigeria	1 621.1
South Africa	6 253.2

The other criteria for choosing Kenya, Nigeria and South Africa are as follows:

- All three countries have digital economy strategies/master plans – The Kenya National Digital Master Plan 2022–2032,[9] the Nigeria Digital Economy Policy and Strategy 2020–2030,[10] and the ICT and Digital Economy Masterplan for South Africa[11] for the period 2021–2025 – which are suitable for comparison with the Uganda Digital Transformation Roadmap to learn best practices.
- All three countries, like Uganda, are in the sub-Saharan region, sharing similar economic and development challenges, though not necessarily to the same degree.
- Each country has unique national priorities in their documents, offering a best practices benchmark for Uganda.
- Kenya, Nigeria and South Africa share certain similarities with Uganda in terms of population demographics and development challenges, making their experiences relatable.

Table 5. Benchmarking the Uganda DTR pillars with Kenya, Nigeria and South Africa

No.	Uganda Digital Transformation Roadmap 2024/25–2027/28	Kenya National Digital Master Plan 2022–2032	Nigeria Digital Economy Policy and Strategy 2020–2030	ICT and Digital Economy Masterplan for South Africa 2021–2025
1	Digital Infrastructure	Infrastructure	Development Regulation	Physical Technology Production
2	Digital Services	Digital Government Services, Products and Management	Digital Literacy and Skills	Transformative Technology Applications
3	Cybersecurity, Data Protection and Privacy	Digital Skills	Solid Infrastructure	Digitally Platforms

[9] Available at https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf.
[10] Available at https://ndpc.gov.ng/resources/#flipbook-df_2421/1/.
[11] Available at www.ellipsis.co.za/wp-content/uploads/2021/08/Digital-Economy-Masterplan-22-Feb-2021v1_updated.pdf.

Table 5. Benchmarking the Uganda DTR pillars with Kenya, Nigeria and South Africa (continued)

No.	Uganda Digital Transformation Roadmap 2024/25–2027/28	Kenya National Digital Master Plan 2022–2032	Nigeria Digital Economy Policy and Strategy 2020–2030	ICT and Digital Economy Masterplan for South Africa 2021–2025
4	Digital Skilling	Digital Innovation, Entrepreneurship and Business	Service Infrastructure	Digitally-traded Services
5	Innovation and Entrepreneurship	Policy, Legal and Regulatory Framework	Digital Service Development and Promotion	Digital Inclusion (covers Infrastructure)
6	Systematic Experimentation	Research and Development	Soft Infrastructure (Cybersecurity, Data Protection and Privacy)	Digital Skills for Work
7	Preserving the Environment	Data Protection and Cybersecurity Management	Digital Society and Emerging Technologies	Responsive Governance (covers data security, agile approaches to regulation and regulatory blockages to emerging technologies)
8		Emerging Technologies	Indigenous Content Development	Innovation and Competitiveness
9				Government Digitization

5.2 Lessons learned from each benchmarked country for Uganda

5.2.1 Kenya: Kenya National Digital Masterplan 2022–2032

According to its authors, the Kenya National Digital Masterplan 2022–2032 reviewed and consolidated ICT initiatives into one 10-year plan to become a single point of reference for all government ICT plans. It aims to provide a holistic and coordinated approach to ensure the alignment and optimization of ICT resources with changing needs. It attempts to reduce implementation and operation costs through an elaborate Implementation Plan with an attendant Coordination Framework.

The conceptual model has eight strategic themes. Four of these are referred to as pillars and are Digital Infrastructure; Digital Products, Services and Data Management; Digital Skills; and Digital Innovation, Enterprise and Digital Business. In addition, there are two strategic themes that cut across all the pillars: Data Protection and Cyber Management, and Emerging Technologies. Finally, there are two foundational themes; Legal, Policy and Regulatory Framework; and Research and Development. These are by and large the same as the pillars of the DTR. However, the Emerging Technologies pillar is specific on the technologies of the 4IR, while the Policy and Regulatory pillar captures those policies and laws that need to be reviewed and amended to

cater for the strategies that are not catered for under the existing Policy and Legal framework. Each pillar is presented with its detailed situation analysis, expected outcomes, strategies and key performance indicators for ease of monitoring its implementation.

Observations and recommendations for Uganda

Kenya has more or less the same pillars as those in the Uganda Digital Transformation Roadmap, except for the following:

1. Kenya has a separate pillar on Emerging Technologies. Inasmuch as Uganda already has a National Strategy on 4IR – Pillar 6 in the DTR (Systematic Experimentation) – it focuses only on AI. There is need to borrow a leaf from Kenya and create a new pillar on Emerging Technologies, or beef up the Systematic Experimentation pillar to encompass all emerging technologies, or alternatively, reference the National Strategy on 4IR in the DTR and call for its full implementation.
2. The only amendment of law mentioned in the DTR is that of the definition of "critical infrastructure" in the Communications Act, which is being reviewed by UCC to include broadband infrastructure. However, Uganda can borrow a leaf from Kenya and in the next review of the DTR, look at other relevant policies and laws, and address them under a policy and regulatory framework pillar.

5.2.2 Nigeria: National Digital Economy Policy and Strategy 2020–2030

According to its authors, the Nigeria National Digital Economy Policy and Strategy was developed to reposition the Nigerian economy in order to take advantage of the many opportunities that digital technologies provide. This was in line with the vision of diversifying the economy of Nigeria away from dependence on the oil and gas sector.

Following its creation, the priorities assigned to the Federal Ministry of Communications and Digital Economy were the development and implementation of a digital economy policy and strategy for Nigeria. The Digital Economy Policy and Strategy is based on eight pillars: Developmental Regulation, Digital Literacy and Skills, Solid Infrastructure, Service Infrastructure, Digital Services Development and Promotion, Soft Infrastructure, Digital Society and Emerging Technologies, and Indigenous Content Development and Adoption.

One thing to note is that each pillar has a detailed situation analysis on the basis of which its objectives are derived. It also has an implementation strategy containing those things that should be done to achieve its implementation.

Observations and recommendations for Uganda

The pillars of the National Digital Economy Policy and Strategy are by and large similar to those of the Uganda Digital Transformation Roadmap, save for the following:

1. Nigeria has interestingly broken down the Infrastructure pillar into two – namely, the Solid Infrastructure pillar and the Service Infrastructure pillar. The former encompasses acceleration of the penetration of affordable and quality broadband Internet in the country, fostering broadband usage, ensuring the rapid development of a broadband policy support and implementation framework, harmonizing physical infrastructure planning and deployment to include planning for telecommunication services, and supporting the proliferation of data centres across the country. The latter, on the other hand, encompasses implementation of the approved e-government master plan, adoption of digital platforms, digital platforms for extraction and warehousing of anonymized big data for the public good, and creation and use of digital platforms in the private non-governmental sector.

Uganda could assess whether this kind of Infrastructure pillar nomenclature could be helpful moving forward.

2. Nigeria also has a separate pillar on Indigenous Content Development and Adoption, which targets giving preference to digitally skilled Nigerians for government-funded projects. This is indeed an important incentive for local innovators and entrepreneurs. There is need for Uganda to borrow a leaf from Nigeria and incorporate a similar pillar in the next iteration of the DTR.

5.2.3 South Africa: ICT and Digital Economy Masterplan for South Africa 2021–2025

According to the authors, the Masterplan was drafted at a time of fundamental change in South Africa, as digital technologies become mainstream and the world adjusts to the effects of the COVID-19 pandemic. It aimed to provide a blueprint for developing a national priority of digital empowerment. It was a mechanism for government to mobilize its social partners and move towards implementation of its policies.

The Masterplan's vision is for all South Africans to be digitally empowered to create and participate in technology-enabled opportunities that drive inclusiveness, employment and economic transformation across cities, towns and provinces.

Section 1 of the document sets out the aspirational vision of what the digital economy could deliver in South Africa over the period 2021–2025. Section 2 sets the stage by reviewing South Africa in the digital age and putting forward a framework for achieving the objectives of inclusive growth, job creation and transformation. Section 3 identifies four digital economy big bets that hold the greatest potential for delivering these objectives. Section 4 unpacks five critical enablers which must be in place for these big bets to pay off. Section 5 tackles the task of coordinating a complex digital ecosystem to deliver on the five critical enablers. Lastly, section 6 summarizes the key actions that must be taken across three time-frames: quick wins, medium-term priorities and long-term investments.

The pillars of the Masterplan fall into two categories: Digital Economy Big Bets, encompassing Physical Technology Production, Transformative Tech Applications, Digital Platforms and Digital Traded Services; and Critical Enablers for the Digital Economy, encompassing Digital Inclusion, Skills for Work, Responsive Governance, Innovation and Competitiveness and Government Digitization. For each pillar, a thorough situation analysis is provided, followed by articulation of the interventions to implement the pillar, concluding with the statements "What South Africa can win on each objective under the Pillar".

The organization of the document is different from that of Uganda, Kenya and Nigeria, but at the end of the day, the same themes are evident therein.

Observations and recommendations for Uganda

1. Uganda could borrow a leaf in the way the authors of the South African document have articulated the situation analysis for each pillar probing for business opportunities, both at home and internationally. Their focus was business stimulation and promotion, economic growth and job creation.
2. Uganda could also consider articulating what the country could win by implementing the strategies under each objective of every pillar at the next review of the Digital Transformation Roadmap.

6 Key study recommendations and conclusion

The assessment of the execution of the National Broadband Policy 2018 (2018–2023) has included the review of government strategy and policy documents and benchmarking studies against three countries' broadband policies and strategies. In the different sections of the report, the findings, identified gaps and existing challenges have been presented. It is indeed fitting that we present some key recommendations to the Government, and the Ministry of ICT and National Guidance in particular, which will accelerate the expansion of broadband access across the country. The Ministry of ICT and National Guidance has set up an enabling and regulatory environment and the necessary process documents that highlight the key targets and critical enabler activities required over the next five years. Nonetheless, five key priority areas were selected for the Government to focus on to drive the digital transformation roadmap faster and more effectively.

6.1 Rationale for recommendations

As the Government of Uganda plans to roll out the Fourth National Development Plan (NDPIV), the following issues have been identified as limiting the growth of ICT services in the national economy:

1. Limited network coverage across the country;
2. Poor quality of services;
3. High cost of end-user devices and services;
4. Inadequate ICT knowledge and skills of the population; and
5. Limited innovation capacity in the workforce.

More work is required around integration of e-services, expansion of ICT infrastructure, acceleration of digital skilling, reduction of the cost of Internet access, increased innovation and the application of emerging technologies.

The Government has set the national targets in Table 6 to be achieved by 2040, as published in the Digital Transformation Roadmap.

Table 6. Digital Transformation Roadmap targets to be achieved by 2040

Digital transformation target	Percentage to be achieved by 2040
Household connectivity	90%
Connectivity for all government institutions (both central and local government)	90%
Connectivity to small and medium-sized enterprises and other private institutions	90%
Broadband coverage by geography	90%
Citizens accessing services online	90%
Government services online	90%
Government services integrated and interoperable	90%

Table 6. Digital Transformation Roadmap targets to be achieved by 2040 (continued)

Digital transformation target	Percentage to be achieved by 2040
Institutions with cybersecurity safeguards in place	90%
Compliance with data protection and privacy laws and standards	90%
Digital literacy citizenry	90%
Industry skills requirements addressed	70%
Utilization of local ICT products and services by government and the private sector	60%

The Uganda Digital Transformation Roadmap 2023/24–2027/28 outlines five main objectives (pillars) and related critical enabler activities over the next five years as follows:

- Objective 1: Digital Infrastructure and Connectivity – Aims to establish integrated digital infrastructure that entails having sufficient capacity to cater for the current and future demands of the population.
- Objective 2: Digital Services – Includes the delivery of information including data and content across multiple platforms and devices such as web or mobile. This pillar seeks to promote the identification, development and implementation of citizen-, business-, government- and employee-centric eservices.
- Objective 3: Cybersecurity, and Data Protection and Privacy – Provides assurance that digital services are safe, secure, protected and trusted when in use.
- Objective 4: Digital Skills and Literacy – Focuses on building a digitally enabled society that is agile and able to adapt to emerging technologies and trends. It also looks at the promotion of digital literacy and ICT professional development for future industry needs.
- Objective 5: Innovations and Entrepreneurship – Focuses on commercialization of local innovations and establishment of local ICT companies. Local innovations include ICT systems, products and content.

The detailed enabler activities are described in detail in the roadmap document.

Based on this roadmap, the government targets for each objective listed in Table 7 have been established to be achieved by 2028 by the ICT sector.

Table 7. Digital Transformation Roadmap targets to be achieved by 2028

Digital Transformation Roadmap targets (2028)	Objectives
I. Digital Infrastructure and Connectivity	• 60% Internet penetration across the country • 90% broadband coverage across the country

Table 7. Digital Transformation Roadmap targets to be achieved by 2028 (continued)

Digital Transformation Roadmap targets (2028)	Objectives
II. Digital Services	• 85% of government services online • 50% Increased transactions on automated end-to-end government business processes • 75% of public entities that have e-services compliant with the Enterprise Architecture Framework • 50% enhanced citizen participation and inclusion
III. Cybersecurity, Data Protection and Privacy	• 75% of entities with access to adequate and relevant capacity for increased operational and responsive cybersecurity • 75% of public entities in compliance with the National Information Security Framework • 75% of all entities in compliance with data protection and privacy legal and regulatory framework • 85% Enhanced protection of National Critical Information Infrastructure
IV. Digital Skills and Literacy	• Develop and implement a national digital skills formation framework that also caters for people with disabilities and girls
V. Innovations and Entrepreneurship	• Increase to 282 the number of ICT innovation products developed and commercialized • Increase in Digital Centres of Excellence in the productive centres of the country • Strengthened partnerships for knowledge sharing

It is noted that there are many proposed initiatives and planned interventions in the ICT sector, as outlined in the NDPIV, DTR and other government documents. However, five priority areas were selected for consideration for implementation by the Ministry of ICT and National Guidance and the stakeholders in the ICT sector to focus on in order to quickly achieve some of the key targets outlined above.

6.2 Recommendations

Digital infrastructure and connectivity area

1. Middle-mile infrastructure focus

The middle mile includes national backbone, data centres, Internet exchange points (IXPs) and content distribution networks, which are important components for driving increased usage of Internet-based services and applications.

The expansion of the NBI to reach all districts in the country by NITA-U is put forward as a top priority initiative. This will provide a reliable digital infrastructure for the roll-out of enterprise e-services and enhance connectivity (and security) for the private sector and government ministries and agencies that are increasingly offering digital services to the general public. Support and incentives must be given to private sector players who are also rolling out additional fibre backbone infrastructure across the country to support their services, as this provides redundancy of access in the districts.

Through the consultation, it has become clear that the Government has secured funding for this work from the World Bank for the three-year UDAP–GovNet and planning activities by government teams are under way. The UDAP project funding focuses on three main components and projects:

- Expanding digital connectivity in selected areas;
- Enabling digital transformation of the Government;
- Promoting digital inclusion of host communities and refugees.

However, there is a need for accelerating the selection of private sector companies (procurement process) to do the work across the country in order to meet the desired targets by 2028. Special focus must be made to connect schools, government offices, hospitals and other public facilities in all districts. The UDAP targets include 900 administrative units and 600 hospitals and some schools. In order to cost-effectively add middle-mile infrastructure projects, the Ministry of ICT and National Guidance needs to advocate for a common utility infrastructure-sharing framework with other public utility stakeholders and joint deployment of new infrastructure projects to include ICT backbone infrastructure.

2. Last-mile infrastructure focus

Last-mile connectivity in the country has significant challenges that must be addressed. They include limited fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) access, affordability of FTTH services, affordability of smartphones and related mobile access data bundles, to name a few. There are currently a number of private sector service providers attempting to install FTTH networks in Kampala and other urban areas, but this is all happening in an uncoordinated manner, leading to a lot of trench digging along city streets and residential roads. In addition, service providers are also erecting numerous poles carrying fibre on a number of streets. This is having a visual impact on cities across the country and Government intervention is needed to establish rules and regulations for these players.

It is recommended that the Ministry of ICT and National Guidance and its regulating agencies (UCC and NITA-U) encourage common utility infrastructure-sharing frameworks for these service providers, and establish infrastructure-sharing rules and regulations to protect the environment and comply with best practice urban planning guidelines.

Last-mile connectivity is a critical component of the digital infrastructure expansion strategy, so the Government should provide incentives and support to the private sector service providers that are investing in creating these last-mile networks.

It is noted that over 90 per cent of Internet access is currently done by mobile broadband access. While FTTH access is preferred in the long run, the Government must continue to support the mobile broadband ecosystem in the meantime. The key challenges already mentioned in the report are affordability of 4G/5G-capable smartphones and the high costs of data bundles being offered to the general public. The Ministry of ICT and National Guidance and the regulating agencies must take the lead in addressing these two urgent issues, as they directly impact the progress of meeting the digital transformation targets discussed above.

3a. Affordability of digital devices (smartphones, laptops and handheld devices) for Internet access

Uganda's 4G smartphone penetration is only 13 per cent, far lower than that of other countries. One of the main reasons is that smartphones are often not affordable for Ugandans.

According to the device tax analysis for each country, the import taxes of Uganda's devices are still high and is a key factor affecting the device affordability.

Table 8. Taxation on devices and their breakdown across African countries

Country	Import duty	Value-added tax	Other tax	Total import tax for smartphone
Uganda	10%	18%	2%	30%
Rwanda	0%	18%	5%	23%
South Africa	0%	15%	10%	25%
Zambia	0%	16%	0%	16%
Angola	2%	14%	2%	18%
Nigeria	10%	8%	0%	18%
Ghana	10%	15%	8%	33%
Mozambique	8%	16%	0%	24%
Malawi	0%	17%	0%	17%

Based on the above data and other insights that have been discussed in this report, it will be difficult for the Government of Uganda to meet some of the digital transformation roadmap targets without addressing the affordability of Internet access devices. A total of 90 per cent household connectivity or 90 per cent of the citizens accessing services online cannot be achieved by 2028 when the citizens cannot afford the devices.

It is recommended that:

1. The Government reconsider or reduce some of the taxes levied on imported Internet access devices (laptops, handheld devices and smartphones) to increase affordability for citizens. The Government should at least drop the 10 per cent import duty on these devices. The import tax revenue loss will be offset by the increase in imported devices coming into the country.
2. The Government (via the Ministry of ICT and National Guidance) should strengthen the PPP arrangements with the two companies already licensed to do local manufacturing of basic 2G phones to upgrade their capabilities and manufacture basic 4G/5G-compliant basic smartphones with government incentives and support, so that these phones are available to the general public at affordable prices negotiated by the Government and the manufacturers.

These recommendations, if adopted, may accelerate the addition of new subscribers and justify the private sector investments in 5G network roll-out that is on the horizon. Currently, the key limitation is the small number of 5G-capable devices on the networks, resulting in the low number of subscribers on 5G networks already running in the country.

3b. Affordability of data bundles/plans for Internet access for consumers

The mobile Internet access prices to consumers offered by operators in the daily/weekly/monthly data bundles are also not affordable to a large segment of the population. As an example, a 1GB monthly data bundle for Internet access price to the consumer was UGX 45 000 in 2013, UGX 10 000 in 2019 and UGX 5 000 in 2023. While there has been a significant reduction of pricing over the last 10 years, due to technology evolution from 2G to 4G wireless networks, it is still not affordable for the average citizen in Uganda.

The Government includes a levy tax of 12 per cent and a value-added tax of 18 per cent in the price of the data bundle. As the country strives to increase broadband access and offer government and private services online for the mass population, there is strong reason to reduce or eliminate the taxes on Internet access prices.

It is recommended that the Government reconsider taxation of both voice and Internet access data bundles to enable a larger percentage of the population to access the Internet. The increase in the volume of data bundles sold will offset whatever reduction of government revenues result from this tax reduction decision.

4. Digital skills and literacy focus

In parallel to the development of the Digital Transformation Roadmap, the Ministry of ICT and National Guidance collaborated with the Ministry of Education and Sports to develop the Pilot Digital Skills Acceleration Programme 2023/2024–2025/2026. It is recommended that this collaboration be reinforced and pursued further in the following areas:

- ICT infrastructure development

A key priority needs to be the expansion and enhancement of ICT infrastructure, including network readiness and connectivity up to the school and classroom levels. This involves mobilization of funding to invest in fast and secure Internet connectivity, last-mile infrastructure and ICT equipment to all educational institutions. By bridging the digital divide, students and educators across the country will be able to fully harness the benefits of digital technology for learning and teaching. Connecting all schools in the country is a huge task that needs special focus and monitoring.

The breakdown by school type and level is shown in Table 9, with data from Ministry of Education and Sports for 2024.

Table 9. Breakdown of Ugandan schools by level and whether they are government or private

Level	Government	Private	Total
Pre-primary	0	22 810	22 810
Primary	12 579	31 302	43 881
Secondary	1 443	6 051	7 494
Certificate	169	1 170	1 339
Diploma	51	69	120

Table 9. Breakdown of Ugandan schools by level and whether they are government or private (continued)

Level	Government	Private	Total
Degree	13	42	55
International	0	93	93

At the time this report was compiled, information from NITA-U was that the number of schools to be covered under UDAP was not yet clearly established. A survey is planned to come up with the details for the education sector, but what is clear is that UDAP will cover only a fraction of the schools. The effort to secure funding for the remaining schools that will not be covered has to be sustained by both the Ministry of ICT and National Guidance and the Ministry of Education and Sports.

- Curricula development for digital skills

The integration of digital skills into curricula is essential for preparing students for success in the digital economy. New curricula will have to be developed to incorporate internationally benchmarked digital literacy, computational thinking, coding and other relevant skills into core subjects and elective courses. By embedding digital skills into formal education programmes, educational institutions will be enabled to ensure that students graduate with the competencies needed for future academic and career success.

- E-Inclusion systems implementation

The development and implementation of e-Inclusion systems is essential for ensuring equitable access to digital resources and opportunities for all learners and education stakeholders. These systems will address barriers to access – such as geographical remoteness, disability and socio-economic status – by providing inclusive and accessible digital solutions tailored to diverse needs.

- Capacity building for digital skills

Another key priority has to be that of conducting capacity development initiatives that focus on equipping teachers, students and other education stakeholders with the digital skills necessary to thrive in the digital age. Training programmes, workshops and certifications will have to be offered to enhance proficiency in areas such as digital literacy, information technology and online pedagogy. The thrust here will be to effectively leverage technology for learning, teaching and professional development.

- Educational content development

The creation and implementation of educational content for digital skills will enrich teaching and learning experiences across various subjects and disciplines. Digital resources – including interactive multimedia materials, e-books and virtual labs – will have to be developed to supplement traditional textbooks and enhance student engagement and comprehension. By leveraging digital content, teachers will be able to personalize learning experiences and cater to diverse learning styles and preferences.

- Innovation and research centres

The establishment of innovation and research centres will serve as hubs for creativity, collaboration and experimentation in the education sector. These centres will facilitate the development of innovative solutions, technologies and pedagogies to address emerging challenges and opportunities in education.

5. National strategy for Artificial Intelligence

The Government would be well placed to consider preparing strategic documents as guidance on how to use new emerging technologies in our evolving digital economy. Some work has already been done by the Government on Uganda's National Strategy on 4IR. In this regard, it is timely for the Ministry of ICT and National Guidance to develop a National Strategy for Artificial Intelligence application in the economy and society as soon as possible. Use of AI and many AI applications are already knocking on the door of the economy, and the roll-out of this technology has to be carefully managed by the Government. It is noted that several countries have already published their national strategies to guide them on how to introduce this technology in their economies.

An AI national strategy will provide a guiding framework for development and implementation of AI technologies in the public and private sectors. It will also address the required legal framework to support the growth of AI applications in government and business. The national strategy should focus on, among others:

- Capacity building in schools, colleges and workplace (AI education and training);
- Building a local talent pool of AI professionals;
- Participation in international collaborations with development partners on AI, and attending international and regional AI conferences;
- Promoting responsible and ethical use of AI in education, and the private and public sectors;
- Identifying the target sectors that will benefit from AI applications such as education, health care, agriculture, etc.;
- Encouraging research and development and innovation projects in AI technologies.

Annex 1

Matrix presenting information from stakeholders implementing the Broadband Policy

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
1	a) Classify broadband infrastructure as a public utility just like transport, energy and water in order to avert duplication	Engagements were held with different stakeholders including: - Telecom infrastructure providers, MNOs, KCCA, Ministry of Works and Transport, Ministry of ICT and National Guidance, NRA, Parliament of Uganda, and MoFPED towards joint planning and deployment by utility providers UCC led the effort to enforce passive infrastructure sharing frameworks among service providers which are now in effect. Current focus is now on encouraging the service providers to share fibre infrastructure that is being rolled out across the country. Vandalism of communications infrastructure has been identified as the major issue. Engagements were held with the Judiciary and Law Enforcement sector, to address cases involving vandalism of communications infrastructure	Planning for common utility infrastructure sharing to include ICT fibre infrastructure has started. Establishment of a specialized court, i.e. the Standards Wildlife and Utilities Court to handle cases related to Utilities infrastructure that includes communication		Full implementation of the common utility infrastructure sharing framework among all stakeholders to reduce on the cost of deployment of fibre network infrastructure.
	b) Integrate broadband infrastructure in the planning and development of physical infrastructure such as roads, railways, energy and pipelines	As in a) above	As in a) above		As in a) above.

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	c) Regulate, coordinate and harmonize the development, deployment and sharing of all broadband Infrastructure (both private and public) among all stakeholders (UCC)	Passive Infrastructure sharing guidelines (tower masts) were issued and since then, they are being implemented by the Telecom Operators Obligation to share infrastructure is included in all License agreements as per the 2020 Telecom License framework	Reduced cost of infrastructure deployment among the operators Increase in number of regional PSPS, who are sharing infrastructure and re-selling capacity		
	d) Establish Internet exchange points and ensure that all domestic traffic remains within the country	Government maintained a competitive market environment with minimal regulatory friction for IXPs and network operators. Promoted metro, backbone, and cross-border fibre development. Encouraged infrastructure sharing; supported private sector IXPs; and facilitated the deployment of a private sector carrier-neutral data centre.	An increasingly diverse array of local, regional, and international networks interconnect in Uganda. Local hosting capacity significantly upgraded. New investments in network, content, and services. High performance e-gov services. Significantly lower wholesale and retail Pricing for Internet bandwidth.		High taxes suppress demand for local Internet services and hinders new investments. High taxes threaten the viability of smaller network operators which are a key driver of competitive market forces and a key attraction for content and service providers at local IXPs and data centres. Taxes now account for over 50% of the total cost of service. This includes an 18% VAT, 18% Reverse VAT, and 12% Excise Duty. Investing and doing business in Uganda remains challenging.

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	e) Establish common international gateways in order to manage all international traffic originating and terminating in the country	UCC Licensed service providers of international access with virtual landing sites in Uganda. UCC Developed a framework on satellite communication providing for landing rights.	Improved security capability by setting up connections to gateways of all licensees		The licensing regime provides for liberalization of international gateway access and Technology neutrality. Hence, establishment of International gateways has been overtaken by developments in the sector. However, from the National Security perspective, there may still be a need.
	f) Ensure that all local broadband connectivity for all ministries, departments and agencies /local entities are independent of international internet connectivity. It is critical for both security and affordability of broadband services	NITA-U provides Internet Bandwidth to ministries, departments and agencies/ district local governments through the NBI based on the Strategy for Rationalization of Information Technology (IT) Services which was approved by Cabinet in 2012. The Strategy emphasizes the use of the NBI as the primary vehicle for all Government Data, Internet and Voices services. To date, NITA-U connected 120 ministries, departments and agencies and 53 district local governments to the NBI.	Affordable and secure broadband services provided to government entities		The NBI coverage across the country is still limited which hinders connection of more government entities to the NBI. However, under the UDAP and Phase 5 projects, NITA-U intends to further roll out the NBI across the entire country.
	g) Develop a one-stop centre concept to streamline the licensing regime and fees payable for development and use of ICT infrastructure	UCC is the regulator of communication services in Uganda and remains the one stop centre for implementation of the licensing regime and fees payable in line with the 2018 Uganda Communications fees and fines regulations	Licensing has been streamlined, as UCC has adopted Technology neutral policy which is user friendly to the service providers		Illegal operators are now handled through routine sector compliance monitoring and enforcement procedures

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	h) Promote and implement the National Postcode and Addressing System towards last mile delivery of services to facilitate e-commerce	Standards for use of post offices as e-government outlets have been developed. Survey of available ICT and Physical infrastructure has been done.	Awareness about the potential of postal offices to provide government services.		Lack of funds to develop digital addresses to facilitate last mile delivery to homes. Funds should be provided through GOU and Development partners
	i) Develop appropriate legal frameworks to implement the policy (UCC)	Various frameworks have been developed and these are under implementation. These include: • 2020 Telecom License Regime • Infrastructure sharing guidelines. • National Roaming guidelines • Band policies to improve the utilization of existing spectrum resources and facilitate more opportunities.	Introduction of modern technologies with better broadband speeds and improvement in quality of service. Improvement in reach (coverage), access to and utilization of broadband services. Reduction in tariffs.		Performance and the slow pace of compliance of government entities. High level of taxation of the sector which impacts the realization of some objectives. Policies and practices in other sectors that impact the cost of provision of Services, for example electricity, in which the sites are billed as individual users rather than a network. Fluctuating cost of fuels and global inflation. The Electricity Roll-out plan should be harmonized with the Broadband Policy.

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
2	a) Adopt the right technology mix (hybrid) to ensure efficient and complementary broadband Infrastructure deployment	Uganda is implementing a technology neutral licensing regime, which facilitates the industry to be innovative in the deployment of a digital infrastructure and roll out a variety of services. Adopted band policies that provides flexibility for spectrum refarming by the operators to facilitate adoption of spectrum efficient technologies	Increased connectivity Introduction of 4G and 5G technologies Increased fibre technology utilization; fibre to the home deployment.		Conflict between technological and other national interests such as security and fiscal policy. Global inflation Readiness to be able to implement the possible use cases and provide market.
	b) Promote and support digital literacy/education to equip all citizens irrespective of their education status (Literate or illiterate) with basic digital competencies (UCC), (NITA-U)	UCC has been implementing its digital skilling and basic literacy program that covers the following categories of society; a) Women and Girls b) Persons with disabilities c) Youth and SMEs d) Members of the community members e) Members in underserved and unserved areas As a result, over 5 million Ugandans have benefitted from this skilling program. NITA-U has extended broadband connectivity to 20Universities, 49 Tertiary 29 Secondary schools through the NBI. The Ministry of Education and Sports in partnership with UNICEF and NITA-U implemented e-learning platform named KOLIBRI in 17 districts and 49 secondary schools across the country. Platform	Increased level of digital literacy among Ugandans 23,311 learners in primary, secondary registered on platform E-learning platform enrolled in 465 schools		Limited funds Need for a collaborative approach involving all stakeholders such as the Ministry of Education and Sports, MNOS, UCC, International Partners etc., in promotion of digital literacy across all the levels of digital literacy Limited capacity of schools to embrace digital channels for learners Limited network infrastructure coverage across the country Limited content generation with new curriculum

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Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achieve-ment level (colour code)	Challenges if any & Proposed Mitiga-tion Measures
	c) Promote and support local manufacturing and assembly of broad-band enabled devices/equipment locally so as to make them affordable and of good quality	Two companies licensed have been licensed by the Uganda Investment Authority to manufacture and assemble smart devices in Uganda. These include: a) Engo Holdings (Simi Mobile) b) Mione Electronics in Mbale. UCC has facilitated this process through: i. Granting no objections to manufacture and assemble mobile devices ii. Granting type approval of the devices in line with the Uganda Communications Act 2013 and regu-lations The Government of Uganda allocated land to NITA-U at Lunyo in Entebbe to establish a National ICT Park through a PPP. To date a feasibility study has been completed and a Private Investor has been identified to set up the Park. Once established it will cater for innovation in ICT among others (devices, software, BPO/ITES etc.)	A reduction in low end smart phone devices. Local assembly of affordable ICT devices promoted		Access to afford-able smart phone devices. Encourage local assembly of Smart Phone devices in Uganda. Need for extension of National Expand Electricity grid to areas with-out, as this has a repeal effect on device uptake Lengthy processes of on- boarding PPP

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	d) Promote local content for citizens to competitively participate both locally and globally in the digital space	The Government of Uganda allocated land to NITA-U at Lunyo in Entebbe to establish a National ICT Park through a PPP. To date a feasibility study has been completed and a Private Investor has been identified to set up the Park. BPO/ITES companies supported with subsidized Internet, electricity and space. Technical support provided to the same companies. The draft Open-Source Software Strategy and Action Plan are in place.	Establishment of the ICT Park and provision of support to BPO/ITES companies has catalysed the promotion of local content production and utilization.		Limited funding has handicapped the anticipated pace of promotion of the local content.
	e) Ensure all government sectors deliver their services online for efficient and sustainable service delivery	A review of all the NDPIII programs was done to map existing ICT solutions and identify those that can be implemented to solve the challenges and gaps identified. These were subsequently integrated within the NDPIII. Within the NDPIII period, NITA- U has supported the automation/digitization of thirty- four (34) processes to enable sectors deliver their services online for efficient and sustainable service delivery.	Improved efficiency and effectiveness in government service delivery with reduced turnaround time for government services like the driving permit and passport.		Lack of a clear policy on ownership of government systems. We continue to rely on vendors who are in control of our systems which affects knowledge transfer, misuse of data. Limited funding for operations and maintenance of these systems. To remedy these challenges: There is need to develop a policy on ownership of government systems to guide entities Building of internal capacity through knowledge transfer to the internal team by the service providers.

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	f) Ensure interoperability of all e-government systems through open access principle and shared services	To support the Integration of Government systems, the Government Interoperability Framework (GIF) and Government Enterprise Architecture (GEA) was developed and approved in the FY 2021/22. Furthermore, the Interoperability Framework was rolled out to two (02) entities (Ministry of Local Government and Ministry of Health) which has enabled them to revise their own frameworks.	Reduced turnaround time in delivering government services like driving Permits and passports through data sharing on the UGhub platform.		Limited budget to popularize the framework. Under the Uganda Digital Acceleration Project (UDAP), the framework will be updated and further engagements conducted across all sectors to support development of their own frameworks
	g) Adopt the safe use of technologies to ensure the safety, reliability and efficiency in management of resources and trusted information such as Public Key Infrastructure and Blockchain technology	To enable Government agencies and businesses to create truly end- to-end digital channels by providing digital certificates for natural persons and qualified electronic seals for legal entities, a Mobile based Digital Authentication and e-Signatures Solution (UgPass) leveraging the power of PKI was developed and currently being rolled out. Four services have since been on-boarded for digital signature.	Contributed to the reduction in the digitalisation gap by ensuring end to end digitalisation of processes Enhanced security as no one can copy to sign another person's Signature		The **UgPass** service is expensive as it is using PKI as a rented service. PKI also has so much it can offer but government is only paying for **UgPass** services. To mitigate this challenge, Plans are under way to build a national PKI that will enable more trusted and secure services
	h) Promote open source and government ownership of source code for all government information systems, software and e- solutions. This will ensure sustainability and promote innovation	The draft Open-Source Software Strategy and Action Plan are in place	Enhanced sustainability of newly rolled-out systems in government		Little progress was made because of security concerns. Proposed mitigation measure is to undertake deliberate actions to build capacity and sensitize stakeholder to embrace open source.

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Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
3	a) National coverage – Every operator that seeks a national operator license must be able to cover the entire geographical place of Uganda so as to enable universal access, promote effective competition and quality of service	The broadband policy provides for 90% geographical coverage within 5 years. To this end, UCC has done the following: (a) Included the coverage obligation within the license agreement of all NTOs (b) Mandated all NTOs to periodically provide their roll out plans and report on progress being made towards achievements of the said roll out targets (c) Monitor coverage of the respective NTOs in line with their license obligations	Increased coverage and connectivity		Absence of complementary infrastructure and services e.g. electricity, road network, etc. that support network roll out and reduce the costs of operation High cost of equipment and inputs for deployment of passive infrastructure High electricity tariff, that translates to high operational costs especially in areas that are not commercially viable

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	b) Outlaw hoarding of spectrum and enable realization of economic value of the spectrum through spectrum re- farming	Hoarding of spectrum is illegal in Uganda. UCC has put in place various regulatory frameworks to promote innovative use of scarce spectrum to deliver communication services. These include; The Uganda Communications Radio Spectrum Management Guidelines Band policies for 700 MHz, 2300 MHz, 3300 MHz and 3500 MHz to facilitate deployment of new technologies Guidelines for access and use of the lower part of the 6 GHz band for fixed wireless Framework for Satellite Communication in Uganda Guidelines for utilization of 2.4 GHz band for wireless access systems/ networks in Uganda These documents are available on the UCC website. UCC further monitors the utilization of spectrum in line with the assignment conditions	Increased coverage of communication services Improved quality of broadband services A variety of broadband services made available to consumers of communication services Adoption of broadband as a mechanism for delivery of other consumer services e.g. broadcasting, education, health, government, etc.		Quality of Service of broadband services Increased cost of monitoring equipment
	c) Ensure National Roaming is in place to enable customers to have a seamless access and coverage irrespective of their network	National Roaming being implemented. National Roaming Guidelines developed and adopted by the industry. Implementation is under way based on commercial arrangements between operators	Access to communication services in underserved areas Improved utilisation of infrastructure to facilitate consumer choice Improved competition in the market		Regulator (UCC) will continue to monitor the compliance by the operators

(continued)

Obj. N0	Strategy	Actions undertaken	Outcome	Reported Achievement level (colour code)	Challenges if any & Proposed Mitigation Measures
	d) Ensure Number Portability is in place to empower the customers to choose their service provider without the challenge of changing telephone numbers	National Consultation undertaken among industry being undertaken by UCC. Additional consultation being held at the EAC level under the East African Communications Organization (EACO)			Consultations revealed the non-viability of MNP in Uganda due to High cost of implementation of MNP vis-a vis benefit to intended consumer.
	e) Provide for a structured renewal framework for the licensees taking into consideration roll out obligations, quality of service and technological developments	UCC developed and is implementing the 2020 Telecoms Licensing Framework that among others, spelt out obligations on the operators, to ensure provision of a variety of quality services to Ugandans	All telecom operators have been Licensed under the Telecom framework.		None
	f) Make Local Listing a licensing requirement for all telecom operators so as to mitigate capital flight among other benefits of local content opportunities that come along	Local listing is now mandatory	Upon receipt of the licences, MTN and Airtel listed their shares in 2021 and 2023 respectively. This resulted into MTN listing 13% shares and Airtel 7% MTN listed the remaining 7% in May 2024. Lycamobile still has to list.		Conclusion of Lycamobile listing still a challenge. CMA working with Lycamobile management to conclude the listing.
4	a) Review the licensing regime for the Telecom and Broadcasting operators to ensure that their operations are in line with the ICT sector objectives	UCC and Service Providers have no open issues regarding the Licensing regime at this time	Existing licensing regime adequate		None

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