Digital Divides or Dividends? Including Basic Services in Africa's Digitalization Agenda: Evidence from Uganda

John Mutenyo, Faisal Buyinza and Vincent Ssenono

September 2022

Abstract

Digital inclusion is about ensuring the benefits of the internet and digital technologies are available to everyone. Digitally excluded people can lack skills, confidence and motivation along with having limited or no access to equipment and connectivity. The major aim of this study was to undertake an in-depth country study to inform policy makers and development practitioners on the extent of digitalizing basic services in Uganda and its impact on inequality. The study further examines the access to basic digital services, usage, affordability, relevance and participation, in order to gain a holistic understanding of the inclusiveness of digital services in Uganda. Focus was placed on services between governments and citizens, as well as inter-governmental services, which help to increase the wellbeing of the poorest and most vulnerable groups, for example, households below the poverty line, rural populations, youth, women, and people with disabilities.

This collaborative study was therefore set up: i) To take stock of digital basic service interventions in Uganda before and during the wake of the COVID-19 pandemic; ii) To assess how inclusive these interventions are in terms of reaching and improving the wellbeing of poor and vulnerable citizens; iii) To analyse progress in the enabling environment for inclusive digital transformation (including: physical infrastructure, digital skills, regulation, political economy, and institutional capacity) to see where efforts and investments could be prioritized and iv) to extract lessons and best practices for scaling digital basic services and making them more inclusive in order to reach and support those furthest behind.

To achieve the purpose, the study employed a mixed methods approach involving desk review, secondary data analysis, qualitative and quantitative analyses derived from conducting Key Informant Interviews and a survey respectively. Several models were estimated on access to digital services, uses of digital services, frequency of internet use and affordability of internet using the Uganda National Household Surveys.

Findings indicate that Uganda is progressing well in terms of policies and putting the necessary requirements in place to address the challenges of digital divide. This is premised on the fact that Uganda has establishment a data protection office, and it recently launched a portal at media centre for data controllers and processors and for individuals to register. More findings showed that some women do not use the internet because it lacks local content. The different digital uses include national online portal, utility payments, submitting income taxes, registering new businesses, applying for driving permits, applying for passports, payment for motor third party insurance, online birth registration, among others. The most commonly used digital service is mobile money, which is mostly used by individuals in the age group (25-64 years) which falls under working age. By region, central uses mobile money more than the rest of the regions. This is followed by the western, then the eastern and lastly the northern region.

The study recommends that there is need for improved infrastructure investment in electrify connections especially in the rural areas, and expansion of 4G network to cover a large part of the country. These will in turn reduce the investment costs by the private telecom investors, and hence reduce user charges which is one of the key obstacles to solving the digital divide. Also increased awareness campaigns and sensitization to the public are necessary to spur and improve uptake and use of digital services. There is need for deliberate efforts to enhance the ability of Ugandans to acquire knowledge, skills and confidence to safely use digital products and services. Overall, policies should be holistic to include the practical implementation and regulation of new and existing digital services and ensure that they are not just available, but also relevant and useful for enhancing the wellbeing of all citizens.

Acknowledgement

Table of Contents

List of Acronyms

BOU	Bank of Uganda
COMESA	Common Market for Eastern and Southern Africa
CSD	Central securities depository.
EAC	East African Community
EFT	Electronic Fund Transfer
G2C	Government to Citizens
G2G	Government to Government
4G network	Fourth generation of broadband cellular network generation
ICT	Information and Communications Technology
RTGs	Real Time gross settlement systems
MSMEAs	micro small and medium enterprises
NITA- U	National information Technology Authority- Uganda
NSSF	National Social Security Fund
UBRA	Uganda Retirements Benefits Regulatory Authority
UMRA	Uganda Micro Finance Regulatory Authority
UCC	Uganda Communication Commission
URA	Uganda Revenue Authority
NIRA	National Identification and Registration Authority

1. BACKGROUND AND LITERATURE REVIEW

1.1 Background

According to the International Telecommunication Union (ITU), globally there were over four billion internet users at the end of 2019, of which over three billion users were in developing countries. However, in spite of the progress in access to internet and mobile services, many people and businesses remain digitally disconnected. Globally, over three billion people remain unconnected, majority of whom are found in Africa, where only 294 million people had internet access out of a population exceeding one billion people.

The coronavirus pandemic has acted as a catalyst for digital transformation in several sectors such as education, entrepreneurial businesses, social protection, healthcare, tax administration, and inter-governmental services. The communications sector has been more crucial to maintaining connectivity and continuity during the COVID-19 period of social isolation and remote working. The disruption brought by the pandemic has solidified the deep synergies across this sector in an increasingly digitized world. The sector has remained "mission-critical" to keep economies moving under COVID-19 lockdowns in at least three different ways: 1. Providing business-critical connectivity and resiliency; 2. Facilitating work-from-home arrangements; 3. Keeping individuals and societies connected and informed, with access to medical, financial, commercial, and other essential services during mandated social isolation.

According to the World Bank Economic Update on Digital Solutions (2020), it is expected that digital technologies can support the health response and economic recovery of a developing country like Uganda. It is urged that if the available digital health solutions are improved, and using data from mobile network operators, one would expect more effective epidemiological surveillance and outbreak control. In addition, integration of digital technologies with the real sectors such as agribusiness (e.g. expanding e-vouchers for farmers to buy fertilizers and seeds), manufacturing (e.g. adoption of smart manufacturing for safer products standards) and tourism (e.g. stimulating domestic tourism through use of virtual assistants for customized itineraries), could help the economy recover more rapidly.

For the case of Uganda, there has been some efforts towards digitizing certain basic services, for instance tax collection and tax administration by Uganda Revenue Authority, Internet banking by several commercial banks, abolishing of scratch cards while purchasing data or airtime by telephone companies and instead purchasing using mobile money. Other digital services that were propelled by the COVID-19 pandemic are the virtual classes in several education institutions, online shopping and electronic cash-transfers to the vulnerable communities during the Covid-19 lockdowns. The increased use of digital technology during the COVID-19 lockdown, such as mobile money, , utility payments (water, electricity), submitting income taxes, on-line shopping, on-line education, and disease surveillance and monitoring, shows the great potential to faster economic recovery and resilience against similar shocks.

Unfortunately, although there are several benefits that are associated with the digitalization of basic services, such as improving efficiency, improving public accountability and public service delivery, among others, developing countries, particularly Uganda, have not fully embraced the innovation. In Africa, only a few countries including Kenya have made some strides in digitalizing their economies.

Digital inclusion is about ensuring that the benefits of internet and digital technologies are available to everyone. Digitally excluded people (Digital Divide) can lack skills, confidence and motivation along with having limited or no access to equipment and connectivity. The FinScope Uganda 2018 survey that looked at mobile phone ownership as well as access to the internet as indicators of digital connectivity, found that 52% of adults (9.7 million) had mobile phones, while 10% (1.9 million) had access to the internet. Male adults were significantly more likely to have mobile phones (58%; 5 million) than female

adults (46%; 4.6 million). Male adults were also more likely to have access to internet (13%; 1.1 million) than female adults (8%; 0.8 million). Adults living in rural areas were significantly less likely to have mobile phones (46% rural-based adults, i.e. 5 million vs. 70% urban-based adults i.e. 3.1 million), and less likely to access internet than adults living in urban areas (5%, 0.8 million vs. 25%, 1.1 million)[1].

The solution to Digital Divides requires investing in infrastructure, particularly, expanding access to telecom and internet services by the private sector to all communities. Access alone may not be sufficient; it would also require investing in human capital and skills development which in turn requires literacy and critical thinking. Further, there is need for a better business climate that permits competition, not forgetting good governance and good institutions built on accountability and a strong legal framework. Accordingly, there is a need for an extensive study that should investigate the different interventions that have been undertaken, especially since the breakout of COVID-19. Most especially, there is need to understand the impact of these services on gender, urban vs rural, youth vs old, educated vs uneducated and other forms of inequality. In addition, there is need to understand the enabling environment necessary for the success of digital transformation both at national and subnational levels.

1.2. Brief Literature Review

According to the World Development report 2016 on Digital Dividends, the benefits of digital technologies (also known as digital dividends) include promotion of inclusion, efficiency and innovation which lead to faster economic growth, job creation, and better service provision. But realizing these Digital Dividends requires addressing the problem of the Digital Divide.

The Digital Divide refers to differences due to geography, race, economic status, gender and physical ability in accessing information through the internet and other information technologies (IT), as well as in the skills, knowledge and abilities to use information and internet. The World Development Report 2016 on Digital Dividends reports that over six billion people lack access to high speed internet and over four billion do not have access to internet at all.

The process of digitalization involves a range of technological developments, including digital skills, digital public service, Information Communication Technology (ICT) infrastructure, connectivity and the use of the internet (OECD, 2012). Additionally, digitalization is based on the accessibility of huge and voluminous amounts of internal and external cloud data, machine learning activities and data mining for prediction of client behaviour and future markets (Khan, 2016; Gray & Rumpe, 2015).

Generally, in the past decades, there has been substantial progress in terms of digital innovation and transformation. This has been entrenched in the pursuit of new ways for improving economic and social interactions, as well as more effective and efficient systems of organizations (Bobylev et al., 2018). Digital technologies have been shown to promote job creation, boost economic growth and innovation, and improve government services. Further to this, digitalization has transformed local administration into dynamic and flexible organizations in terms of service delivery (Greve, 2012). Hence, digitalization is vital in the quest for democratic administration and can enhance the effective integration of policy programs if institutionalized and internalized by the personnel in public administration (Onyango, 2018). Greater access to technology increases inclusion, efficiency, and innovation hence reducing costs of service delivery. For instance, it is estimated that because of digitalizing its services, Kenya improved public revenue collection and saved the Government US$290million in efficiency gains over four years.[2]

In the last fifteen years, the growth of digital technology, mainly driven by the mobile revolution and associated innovations, has been one of the bright spots for Africa's development. This

---

[1] The Fin Scope Uganda 2018 survey
[2] https://www.businessdailyafrica.com/corporate/Public-sector-digitisation-saves-Sh30bn-in-costs/539550-4145560-4dgua3z/index.html

progress has also raised hope about accelerating the implementation of the SDGs. Today, more than 80% of Africa's adult population has a mobile phone subscription (United Nations, 2019). In several African countries, the digital economy is becoming one of the main drivers of growth, accounting for more than 5% of GDP. Rapid developments in digitalization of most operational processes in African governments have greatly influenced the global economy, public policy, and the whole continent. Specifically, the acceleration of digitalization efforts for development has improved the benefits of the digital economy, skills, income, and growth in jobs (World Trade Organization, 2018). In particular, Banga & te Velde (2018) contend that digital technologies play transformative and enabling roles in sustainable development both in developed and developing countries.

Despite this positive development, digital divides exist in many countries, including Uganda. It is estimated that over 60% of the world's population is still off-line and therefore cannot fully participate in the digital economy, while many advanced economies are facing rising inequality and increasingly polarized labour markets due to the expanding automation (UN Report, 2018). Africa is still the least connected region compared to other regions of the world, with about 28.2% internet coverage and 34% mobile broadband coverage (Songwe, 2019). Few citizens have digital IDs, businesses adopting digital technologies remain the exception rather than the norm, and few governments are investing strategically in developing digital infrastructure, services, skills, and entrepreneurship. To unleash Africa's digital potential, there is need to adapt and harmonize legislations on technology, including intellectual property and data privacy (Ozturk & Ullah, 2021).

In the recent period, the dangers to data privacy have advanced at a quicker pace than the development of regulatory frameworks dedicated to safeguarding the right to privacy, especially in the digital era. There are growing concerns that in several African countries, government agencies and private entities are collecting and processing personal data without adequate data protection frameworks, amidst weak oversight mechanisms and inadequate remedies. Key to note is the continent's model instrument on privacy and data protection, the African Union Convention on cyber security and personal data protection, has been signed by 14 countries and only eight countries had ratified it by June 2020.

For example, Ethiopia has embarked on a national digital identification (ID) biometric based project which it argues will support access to services for citizens and hasten trade relations with other nations on the continent. However, the country has no comprehensive data protection law. In 2020, the government published the draft personal data protection proclamation which is yet to come into force.[3] In Kenya, the data protection Act 2019, which establishes the office of the Data Protection commissioner, also prohibits the sharing of data with their parties without consent of data subjects and requires that individuals are informed when their data is being shared and for what purpose. In December 2020, an amendment to the Central Bank of Kenya Act addresses digital lenders that share personal data of loan defaulters with their third parties could have their licenses revoked. Tactics used by lenders reportedly include calling friends and family, to shame and compel their borrowers to repay the loans.[4]

Uganda passed its Data Protection and Privacy Act, 2019 in February 2019 which provides for protection of citizens' rights to privacy. The Act seeks to protect the privacy of Ugandan citizens (data subjects) by regulating the access, collection, processing, and transfer of data. The Act also empowers data subjects whose personal data has been collected, collated, processed, or stored, the power to exercise control over their personal data including consent to the collection and deletion of personal data. The National Information Technology Authority-Uganda (NITA-U) is mandated as the national data protection authority and maintains the register that lists all institutions, data subjects or public bodies that collect or process personal

---

[3] Juliet Nanfuka, data privacy still a neglected digital right in Africa, Jan 27, 2022(source: www.CIPESA .org)
[4] Ibid

data. The Act aligns with several international conventions including the Universal Declaration of Human Rights where Uganda is a signatory.

Sub-Saharan Africa is moving towards digitization and has the potential to reach new heights as long as it addresses shortfalls in physical and human capital, as well as weaknesses and gaps in digital governance (Otim, 2018). The region is unlikely to level up its digital game unless governments develop and update their national digitization strategies, ensure regional interoperability of these strategies, and work with foreign partners to add digital provisions to their agreements. As global digitization and trade become increasingly connected and interoperable, the lack of national digital strategies and dearth of digital provisions in frameworks threaten to slow digital transformation (Judd & Mariella, 2021).

The digitalization effort can help to ensure that development touches everyone and that no one is left behind. Unfortunately, this is not the case with Uganda; for instance, the National ID system, locally known as *Ndaga Muntu*, which was designed for national security system, has become a key source of exclusion especially for the poorest and most marginalized such as the women, disabled and those of old age.[5]

Uganda's case presents a feasible context for discerning the role of digitalization in the provision of basic services. Uganda's internet penetration has grown roughly at 25% in the periods 2001 to 2016 (Banga & te Velde, 2018). In addition, Uganda's digital economy has been sluggishly advancing with the growth of ICT as a development pillar in the country's development strategy and the Vision 2040. Uganda also promulgated the National ICT policy, whose purpose was to transform the economy by improving *"livelihoods through ensuring the availability of accessible, efficient, reliable and affordable ICT services"*. Other facets of digitalization also factor in the growth and inclusion of digital payment systems, like mobile money, financial services, the improvement in ease of doing business, and growth of e-government (Banga & te Velde, 2018; Onyango, 2017).

However, in Uganda, digital skills and connectivity that underpin the digitalization process in the mainstream government have suffered serious setbacks due to lack of skilled ICT expertise. Problems with digital skills among most of the population, especially in higher institutions of learning, was evident during the COVID-19 pandemic where several institutions could not easily switch to virtual learning. In addition, there is an extensive digital gap between the urban and rural areas, and challenges with the degree of internet penetration. In 2019, Uganda's urban–rural gap in Internet use was 70 percent, where only nine percent of Ugandans living in rural areas had access to the Internet and about a third (30%) of urban dwellers used it (Gillwald et al., 2019).

All these build a picture of the degree to which digitalization influence basic services, with particular attention to the integration of SDGs policy programs. In Uganda, technological advances like *safeboda* (motorcycle transportation service), have brought significant benefits to consumers, however in some parts of the country, due to network challenges, users must wait for hours or move to raised grounds to get a stable internet connection. Therefore, slow connection speeds and lack of internet access are signs of the digital divide that sets Uganda behind. This study therefore explores the situation regarding digital divides or dividends including basic services in Africa's digitalization agenda for the case of Uganda.

---

[5] Center for Human Rights and Global Justice, Initiative for Social and Economic Rights, and Unwanted Witness (2021), "Chased Away and Left to Die."

2. OBJECTIVES AND METHODOLOGY

2.1. Objective of the study

The major aim of this study was to undertake an in-depth country study to inform policy makers and development practitioners on the extent of digitalizing basic services in Uganda and its impact on inequality. The study further examines the access to basic digital services, usage, affordability, relevance, and participation, in order to gain a holistic understanding of the inclusiveness of digital services in Uganda. Focus was placed on services between governments and citizens, as well as inter-governmental services, which help to increase the wellbeing of the poorest and most vulnerable groups, for example, households below the poverty line, rural populations, youth, women, and people with disabilities.

Therefore, the main goals of this study were:

i) To take stock of digital basic service interventions in Uganda before and during the wake of the COVID-19 pandemic.
ii) To assess how inclusive these interventions are in terms of reaching and improving the wellbeing of poor and vulnerable citizens.
iii) To analyze progress in the enabling environment for inclusive digital transformation (including: physical infrastructure, digital skills, regulation, political economy, and institutional capacity) to see where efforts and investments could be prioritized.
iv) To extract lessons and best practices for scaling digital basic services and making them more inclusive in order to reach and support those furthest behind.

To realize the study objectives, the study provided answers to the following pertinent questions, broken down in three parts, namely:

1) Analysis of the extent to which the conditions for inclusive digital transformation are being met within Uganda.
    a. How does Uganda perform with regard to the following indicators, and how has this changed over time?
        i) Infrastructure development (electricity, mobile, and broadband penetration; the Telecommunications Infrastructure Index (TII).
        ii) Digital literacy (Human Capacity Index (HCI), literacy rates, prevalence of IT skills)
        iii) Regulation (affordability of internet, existence and implementation of data privacy regulations and rights to information laws).
        iv) Institutional capacity (fiscal situation, technical capacity).
        v) The e-Readiness index & the Online Services Index (OSI).

    b. In which areas should investments/policy efforts be prioritized?
    c. Are there other important conditions/indicators to consider for supporting progress towards the goals of continental/national digitalization strategies and enabling transformation of basic services in Uganda?

2) Analysis of the political context surrounding digitalization in Uganda.
    a. Where does digitalization and digitalization of basic services sit on the policy agenda? How is it viewed/discussed/organized among different stakeholders?
    b. Is there a national strategy for digital transformation, and (how) is the digital transformation of basic services addressed in it? If no strategy exists, why not?
    c. Are there issues to do with transparency, openness, censorship, digital security, digital democracy, online civic space, or electoral processes? How do these impact digital transformation processes and outcomes within basic services?

3) Inclusion Analysis of Digital Service Interventions particularly indicators of access, affordability, and connectivity.
   a. What are the main uses of digital services in your organization? (i.e. to improve information, implementation or participation)?
   b. Who was the initiator? Who supported the development and implementation?
   c. What percentage of the population is covered by this intervention in terms of age, gender, education, residence and the like?

2.2. Methodology, Analysis and Findings

2.2.1. Study Design

The study employed both qualitative and quantitative approaches in order to provide more intuition about the challenges of access to digital services, affordability and uses by households and Government. The quantitative methods help to answer the questions such as: which use, how much use, and by who? But leaves the question "why" unanswered, hence the need for the qualitative methods. The quantitative approach relied on Uganda National Household Survey Data (UBOS, 2020) and a personal digital field Survey (December, 2021) conducted by the research team. Quantitative data was analysed using simple tabulations and graphics and basic regression analysis to provide more intuition on the factors that determine digital access and usage in Uganda. In terms of qualitative data, we conducted key informant interviews in order to get accurate and timely data. We developed a KII guide (Appendix II) that was in line with the study questions which we used to collect information from the purposively selected key informant. The key informant interview (KII) was used to conduct qualitative in-depth interviews with stakeholders in the digital and telecom sector. We used voice recorders to compliment notes taking which was later plaid back during transcription.

2.2.2. Design of survey tools

The team developed the survey instruments, which consisted of questions eliciting digital access, usage, cost and affordability among others[6]. The team, as part of the training excise for enumerators stressed the study objectives and why the different questions are being asked stressing the need for objective responses. The overall sample size was determined following Agresti & Finlay (1997) using the formula.[7]

2.2.3. Training, Pre-test, and Field Data collection

Prior to starting data collection, field staff were trained for a period of approximately four days with practical sessions. After the training and briefing thereof, each potential interviewer was required to complete a mock interview. A pilot was conducted in 40 households and the results were used to inform the structuring of the survey questions in the instruments. . The tool was pre-tested with attention paid to clarity of the questions, consistency of responses obtained and the ease with which responses could be elicited. This was meant to help to identify suitable interviewers who were recruited to participate in the survey. The selected interviewers were further familiarised with the questionnaire as well as the mobile device and their mechanics. The enumerators were recruited based on ability to explain the purpose of the survey to the

---

[6] See Appendix 1.

[7] **Sample size=** $(z_{\alpha/2})^2 \left(\frac{(p)(1-p)}{E^2} \right)$, where Z is the value for the 0.05 significance level, p the estimated proportion and E the precision (or sampling error) estimated at 3%. We used p = 0.5 because that is where the confidence interval for the data is widest. From the formula, our sample size was equivalent to, $n = \frac{(1.96)^2 x\, 0.5\, x\, 0.5}{(0.03)^2} = \frac{0.9604}{0.0009} = 1067$ households.

respondent, clarity of communication, conduct, ability to operate mobile device while at the same time engaging the respondent, speed among others.

The structure of the implementation of the survey consisted of 4 mobile field teams, each of which comprised of a driver, a supervisor, and six enumerators. The data collected was electronically sent from the field at the conclusion of interviews for each enumeration area (EA).

2.2.4. Quality control Protocol

During the survey, a multifaceted quality control assurance plan was employed involving mechanisms embedded at each level of the survey implementation process starting at the sampling design, development of survey tools, interviewer recruitment and training, pre-testing, actual field survey, post field data management, data analysis, report writing and dissemination of research findings.

3. ANALYSIS AND FINDINGS OF THE ENABLING CONDITIONS

3.1. Uganda's Performance of the Enabling Indicators

Indeed, there are several contradicting policies, both fiscal and political, that tend to undermine the realization of the aims of Digital Uganda Vision (DUV). For instance, in 2018, government introduced social media and mobile money taxes. A tax of 0.5% was charged on the value of mobile money withdraw transactions. In addition, telecom companies-imposed charges on sending and withdrawing money, and in 2018, a daily social media tax of UGX200 (US$0.06) was introduced on for 60 mobile Apps that included Facebook, Twitter, Instagram, and WhatsApp, among others. But these Apps are the main reason the majority of the mobile phone users subscribe to internet. Most recently, in January 2021 during the Presidential elections, internet was switched off country wide for over two weeks, thereafter, access to several Apps including Facebook, Twitter was restricted. In July 2021, government removed the daily social media tax because people could evade it by use of another App-Virtual Private Network (VPN) but introduced a tax on data purchases.

3.1.1. Infrastructure Development

Infrastructure development is a key requirement for sustainable economic growth in any country. However, Uganda, like most developing countries, significantly faces infrastructure deficiencies. The country's infrastructure, which mainly takes the form of transport, energy, telecommunication, and internet penetration, has improved over time, but it is still not sufficient to meet the country's development needs. Nevertheless, Uganda holds infrastructure development as one of its key priorities. In the recent years, a sizeable proportion of Uganda's national budget is allocated to infrastructure development; nonetheless, the need still outweighs the resources.

3.1.1.1. Telecommunication Infrastructure Index (TII)

Communication infrastructure in Uganda has grown tremendously over the last decade. A vast number of communication innovations have been adopted in the country, including internet usage, digital TV networks, contemporary mobile phone technology, etc. According to a report by Uganda's Ministry of ICT (2015), several sites around Kampala and Entebbe have been connected to the National Backbone Infrastructure to provide them with access to high-speed internet. The UN International Telecommunication Union (ITU) statistics show that, Uganda's Telecommunication Infrastructure Index (TII) index improved from 15.6% in 2018 to 22.8% in 2020. The Telecommunication Infrastructure Index is a composite weighted average index constructed from six sub-indices based on basic infrastructural indicators, which define a country's ICT infrastructure capacity. These sub-indices are: Personal computers per1000 persons; Internet users/1000 persons; Telephone Lines/1000 persons; online population; Mobile phones/1000 persons; and Television sets /1000 persons.

However, the drawback in this sector is that infrastructure development is mainly driven by multinational companies, whose interests are vested in urban area investments, from which they can get a decent return on investment. This leads to inadequate investment in communication infrastructure in Uganda's rural areas hence calling for Government intervention.

3.1.1.2. Access to Electricity

Electricity is a major determinant of a country's economic prosperity. Lack of access to electricity has an enormous impact on the use of emerging technologies, modern economic activities, public service delivery, and standards of living (Blimpo & Cosgrove, 2019). About

15 years ago, Uganda experienced a power crisis, with electricity demand exceeding the available supply by a 2 to 1 ratio due to delayed capacity additions. Currently, Uganda generates a surplus of electricity. The production capacity of 1,254 megawatts as of 2019 (Electricity Regulatory Authority, 2019) is expected to reach 1,800 megawatts if Karuma Dam is completed. Yet Ugandans can only consume about 600 megawatts at peak, mainly because there is a limited national electric grid which does not reach most households.

To address this supply-demand gap, the government put in place the Rural Electrification Strategy and Plan between 2010 and 2015, aiming both to expand the national electric grid and to improve access (Ministry of Energy and Mineral Development, 2018). In 2018, the government launched the Electricity Connection Policy giving customers an offer of electricity connection for just UGX20, 000 (about U.S.$5.50), purposely to increase access to over 60% of households by 2027 (Ministry of Energy and Mineral Development, 2018). But in 2020 there were funding shortages, leading to suspension of Electricity Connection Policy. Therefore, despite these efforts, access to electricity by households is still low, as shown in Figure 1. This is mainly due to the limited grid, high electricity tariffs and connection charges (Nabukeera, 2020; Blimpo, McRae & Steinbuks, 2018).

A recent household survey (UBOS, 2019/20) shows that about half of Ugandans live in zones served by the electric grid, and only a quarter live in households that are connected to the grid. In fact, more households use solar energy instead of electricity from the national grid. Lack of access and connection to the national electric grid is especially common for the poor urban households and rural residents. Availability of reliable energy supply plays a critical role in the social, economic, and cultural transformation of society. The Uganda electricity sector has suffered long-standing supply-side constraints that resulted in suppressed demand and outages.
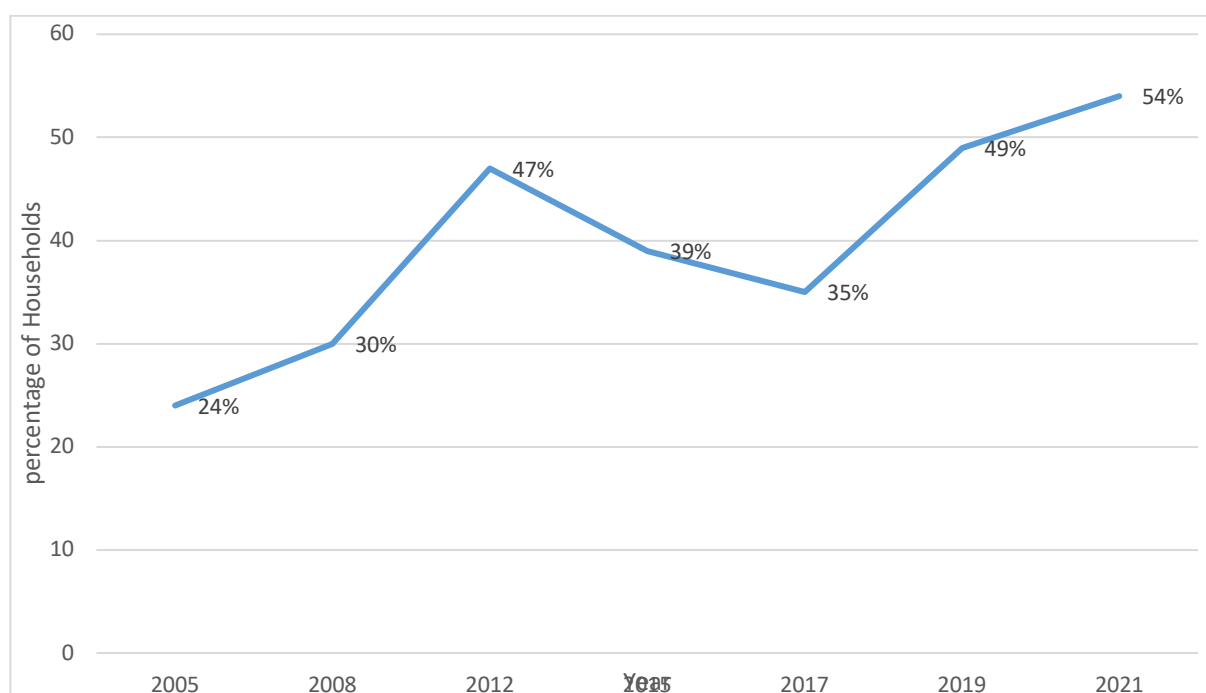

Figure 1: Access to Electricity in Uganda
Source: Computational Statistics using data from UBoS

3.1.1.3. Ownership of Mobile Telephone

The mobile telecom industry in Uganda is a vibrant outfit that offers mobile phone lines, digital data transmission, internet services and mobile money transfers (within and outside the country). According to the national regulator- Uganda Communication Commission's Annual Market report, (FY 2015/2016), Uganda had over 22 million mobile phone lines. The country's communication network flourishes on competition among the major players: MTN and Airtel, which provide both regular and new products and services in a bid to attain market leadership in the industry.

By March 2018, the number of mobile phone users had increased to 24.8 million, a 71 percent penetration rate. As of June 2020, the number of mobile telephone customers were estimated at 25.5 million. The figure had increased to 26.5 million at the end of September 2020 (a 76 percent penetration rate) (UCC, 2021).

3.1.1.4. Broadband penetration

Broadband is a measure of the capacity of Internet connectivity that is reliable and permits real-time delivery of voice, data and video to the end users and meets the increasing demand for internet applications and services. The target is to deliver a minimum of 4 Mbps to end users for internet access.

Broadband coverage in Uganda is still minimal compared to many other least developed African countries; 65% of the connected population covered by 3G and only 17% covered by LTE/4G. Although Section 5(1)(y) of the Uganda Communications Act (2013) encourages infrastructure sharing, this has not been embraced except for network towers. This is reflected in the in high costs of rolling out and maintaining infrastructure, the underutilisation of capacity and high Internet prices. However, the Ministry of ICT and National Guidance has recently developed a national broadband policy where cross-sector ICT infrastructure sharing among operators is a guiding principle and major policy objective. The policy, which aims to eliminate infrastructure duplication, calls on the Ministry to develop appropriate policy and regulatory frameworks and a platform for operators to share broadband infrastructure plans, while the regulator is expected to issue guidelines to avert duplication and enforce the new policy. Operators with national licences are now required to offer communication services across the whole country without discrimination and not to build new infrastructure where it already exists.

Uganda Telecom Market has witnessed strong digital growth in recent years and is expected to have continued growth over the forecast period to 2025. The growth in the industry is mainly due to increasing urban population with rising adoption of the mobile phones that supports 3G, 4G and 5G services across the country. Telecom sector is further expected to have strong growth over the forecast period with rising adoption of Internet of Things (IoT) in the sector that connect with wired and wireless broadband. Some of the 2G networks have already been closed, and all the major 2G/3G platforms are expected to be shut by the end of 2025. By 2029 most mobile connections will be on 5G.

3.1.1.5 The e-Readiness index & the Online Services Index (OSI)

A country's **e-Readiness Index** is a measure of its e-business environment, a collection of factors that indicate how agreeable a market is to Internet-based opportunities. In other words, the country's ability to promote and support digital business and information and communications technology (ICT) services. Since 2000, the Economist Intelligence Unit has been publishing e-readiness ranking for 65 of the world's largest economies of which Uganda does not belong.

On the other hand, **Online Service Index (OSI)** is a composite indicator that measures the use of ICT tools and services by governments in delivering public services at the national level. It examines how digital technologies and innovations are impacting the public sector and changing people's everyday lives. These services are provided over the internet and include social media, cloud services, e-commerce, entertainment (video, gaming, and gambling) and search engines (google and yahoo). The United Nations e-Government Survey 2020 report shows that Uganda's online service index improved from 56.94% in 2018 to 58.24% in 2020, although below Kenya (68%) and Rwanda (62%). Nevertheless, Uganda is in the high online service index bracket since it is above average.

Human Capital Index (HCI) is a measures the expected productivity as a future worker of a child born today. The index depends on education and health and ranges between 0 and 1, where 1 or 100% indicates the benchmark for complete education and full health. The 2020 HCI for Uganda was 54% slightly above Rwanda (53%), but below Kenya (58%).

E-Government has received significant attention, as digital technologies transcend private businesses and serve as a basic source of transformation in government functions. It has the potential to make government operations and processes more transparent and more effective for citizens and businesses, and to provide a variety of benefits for the community at large such as reducing services' time and connecting businesses and citizens to government information at any time (Liikanen, 2003). Quite a number of services have been digitalized, for instance, Ugandan passport, driving permit, Government procurement, tax administration among others. Further Uganda Revenue Authority (URA) offers a number of e- solution to ease the process of paying several URA services such as: URA tax assessments & payments for driving license, renewal of permits, extension of classes, duplicates, police penalties, transfer of ownership, tax identification number (TIN) applications, NIRA services among others. The global ranking for e-participation for 193 countries puts Uganda in the 95th position compared to its neighbors: Kenya (90th), Rwanda (82nd) and Tanzania 98th.

3.1.2. Digital Literacy and Prevalence of IT Skills

In order to facilitate ICT oriented communication advancement, a Government agency; National Information Technology Authority-Uganda (NITA-U), was established in 2009. Among other things, this agency seeks to continually upgrade Uganda's ICT infrastructure, to keep the country in sync with world trends. Information and Communication Technologies (ICTs) have enabled society to evolve towards electronic participation, promoting inclusive online engagement, global exchange of information on government knowledge and innovative civic technology.

However, in Uganda like other developing countries, the digital literacy levels are very low especially in the rural and marginal-urban areas. As part of the Government's efforts to bridge the digital-divide, the Uganda Communications Commission (UCC) has used the Rural Communications Development Fund (UCUSAF) to support school's computer laboratory infrastructure as a platform to provide basic digital literacy skills to the communities around the schools, which has contributed to the reduction of the digital-divide in the country. UCC also embarked on a digital literacy campaign throughout the country with a goal of equipping over one million informal sector people with the digital literacy skills required to boost their businesses.

On the other hand, the Uganda Institute of Information and Communications Technology (UICT) has embarked on providing market-driven ICT skills and training targeting communities countrywide. To that effect, a specialized programme has been designed to upskill citizens by bringing them online and providing digital skills training in their communities.

UCC partnered with UICT to train digital literacy skills to the community members in the unserved and the underserved communities across the country. This cooperation and

collaboration is critical to promoting inclusive ICT access and usage. The first phase under the collaboration had an online training of trainers' (TOT) programme of five hundred participants drawn from 95 districts. The participants were equipped with basic and intermediate digital skills as well as trainer skills. In the second phase, 300 trained agents will in turn impart digital literacy skills to 15,000 people among their local communities in Uganda. The training shall be conducted in a phased approach. The delivery model is expected to be Open, Distance and e-Learning (ODeL).

The major problem however, is that although several Ugandans are interested in learning how to use the internet, they cannot afford the required handsets let alone the high internet costs and the lack of knowledge and skills on how to navigate the Internet once online, amongst others. Our findings highlight that Uganda is especially weak when it comes to technical capacity relating to internet usage which must be addressed as a matter of urgency.

3.1.3. Digital Regulation
3.1.3.1. Affordability of Internet

Digitalization is ongoing, however access to digital technologies remains limited for many Ugandans due to the high costs of mobile services. For instance, in 2019, less than 70% of the adult population had access to mobile phones compared to an average of 84% of the population in other similar countries in the East Africa region. This is exacerbated by high import taxes on handsets, high charges on mobile money withdrawals and restrictions to social media access.

Figure 2 presents the findings from a survey conducted across the country among households about the expenses incurred on internet by different categories of the study sample. Overall, the average expenditure reported was UGX11,000 (US$3.0) per month, and as expected those in urban areas spent more (UGX20,000 or US$5.50) than those in rural areas (UGX7,000 or US$1.90). Also, those in the Central region (including Kampala, the country's capital) spent highest, while the least developed Northern region spent lowest. In terms of age group, individuals in the age bracket 25-64 years incur the highest expenses on internet (UGX22,000) compared to other groups. This reflects the fact that working age individuals are the main users of digital services. However, the findings indicate a gender inequality in digital expenditure, with men spending as much as UGX15,000 (US$4.0) compared to only UGX7,000 ($1.90) by their female counterparts. This, however, may not mean unequal digital utilization because some men usually buy internet bundles for their spouses.
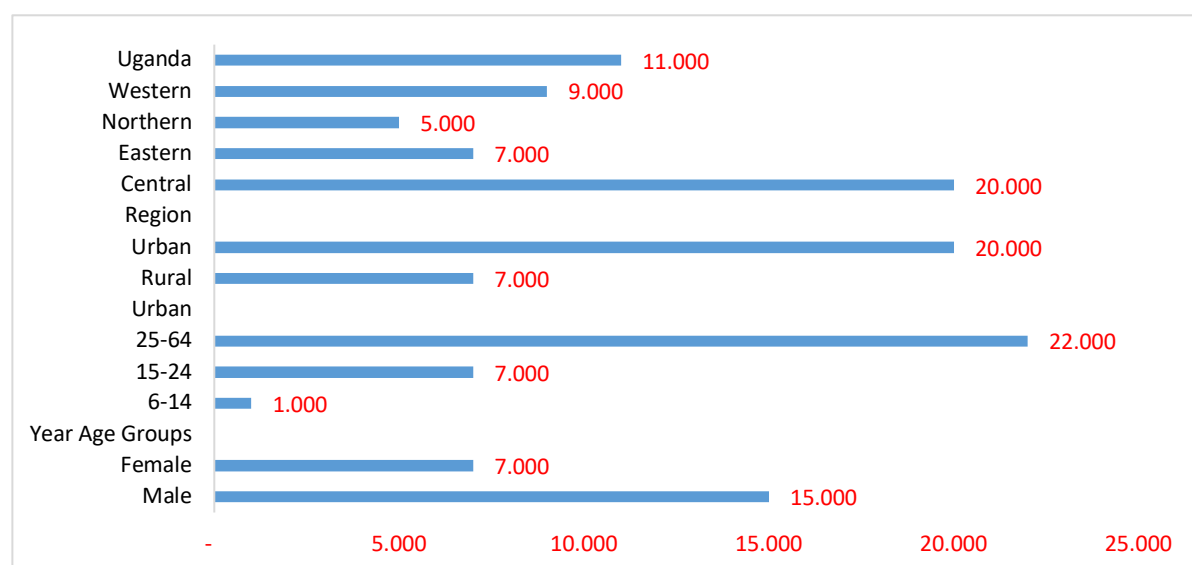
Figure 2: Expenditure on Digital Services
Source: Household Digital Survey January- February 2022

3.1.3.2. Determinants of Affordability of Digital Services

To provide more insight on the affordability of digital services in Uganda, we provide an analysis of the possible determinants of internet use. Table 1 presents the estimated determinants of the expenses on internet. The model results reveal that all other uses of internet increased the expenditure on internet compared to no use the reference category. The results reveal that shopping had the biggest effect (1.236) followed by betting (0.873) and education (0.867) on internet expenditures among households, while social media (0.531) and health (0.577) had the lowest effect on internet expenditure among the sampled households.

Second, the household wealth status has a significant effect on the amount of money spent on using the internet. The results reveal that as wealth status increases, the expenditure on household internet increases. This means that rich household are likely to use the internet more than their poor counterparts. Therefore, there is need for government to put in place measures to lower the cost of access to internet for inclusive digital usage in the country.

In terms of regions, the estimated results reveal that in comparison to households in the Central region, households living in the Eastern, Northern and Western regions have a lower expenditure on internet. This is expected because the country's capital city Kampala is located in the central region. Regarding the place of residence, the results show that living in urban areas significantly increases internet expenditure by households than living in the rural areas. This means that in order to reduce digital divide, there is need for government to provide digital infrastructure in rural areas in order to reduce the cost of internet in the rural areas.

Table 1: Estimated Determinants of Internet Expenditure among Households

Variables	Coeff	pval
Use of internet (RC: No use)		
Socio media	0.531***	(0.000)
Education	0.867***	(0.000)
Business	0.624***	(0.000)
Phone	0.647***	(0.000)
Health	0.577***	(0.000)
Betting	0.873***	(0.000)
Shopping	1.236***	(0.000)
Wealth Status (RC: Very Poor)		
Poor	0.244***	(0.000)
Non-Poor	0.493***	(0.000)
Rich	0.871***	(0.000)
Very Rich	1.337***	(0.000)
Covid period	-0.046***	(0.002)
Region: (RC: Central)		
Eastern	-0.176***	(0.000)
Northern	-0.381***	(0.000)
Western	-0.110***	(0.000)
Urban area	0.241***	(0.000)
No bank account	-0.499***	(0.000)
Age	0.003**	(0.017)
Age squared	-0.066***	(0.002)
Female	-0.038***	(0.008)
Disability	0.005	(0.927)
Constant	10.833***	(0.000)
F-stat	381.57	(0.000)
Observations	17,989	

R-squared	0.308

Significance level: p-val in parentheses *** p<0.01, ** p<0.05, * p<0.1,
Data source: Household Digital Survey January 2022

3.1.3.3. Existence/Access to Internet.

Generally, there has been an increase in internet connectivity among households with digital devices. Figure 3 shows an increase from zero percent in 2000 (two years after the first telecom company –Celtel established in Uganda), to 24 percent in 2017. This is mainly explained by the fact that at the beginning, the telephone handsets could not support internet connectivity, in addition the telecom companies did not have the internet provision. Also most people in Uganda did not know the uses of the internet.
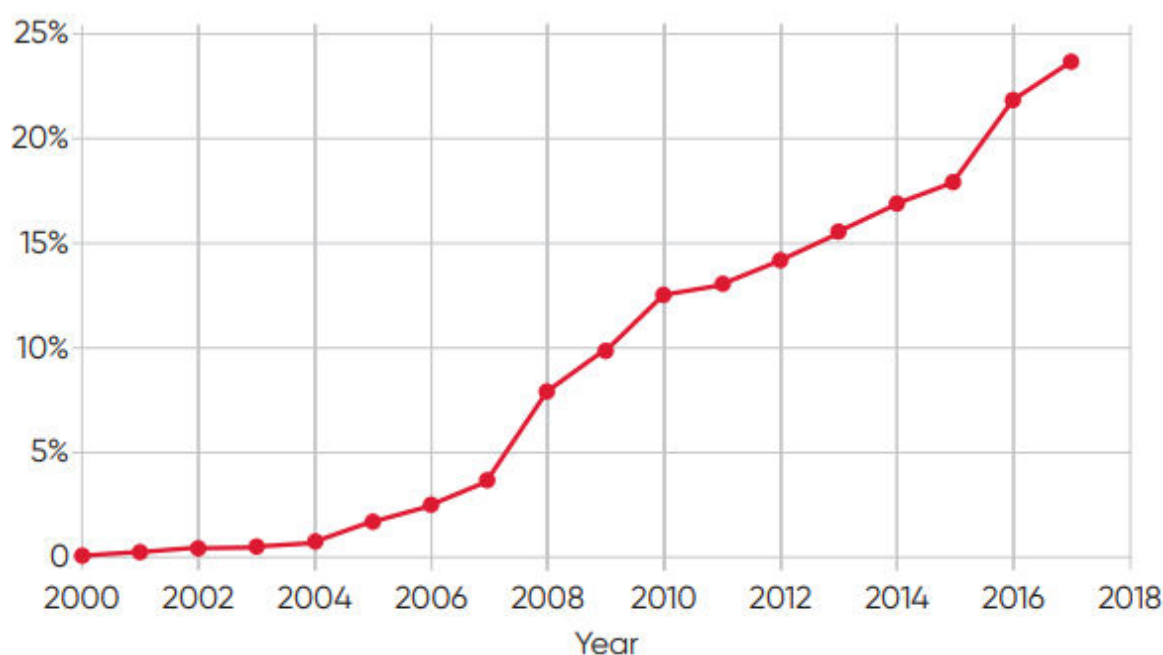
Figure 3: Percentage of the population with internet access in Uganda
Source: Based on data from ITU (2020)

Table 2 shows percentage of persons in communities with internet access in terms of internet point of access (handset), internet café and WI-FI hot spot. Overall, about 16.6% of Ugandan individuals get access to internet by purchasing from the providers using their handsets. This is followed by those who access internet through internet café (2.8%) and lastly through WI-FI hot spot (0.8%). The results further indicate that there is no gender difference in internet access. But there is a significant gap between the urban (48.2%) and rural residents (4.8%). This is a clear manifestation of a digital divide or inequality between the two groups. Similarly, the Central region has the highest internet access (39.5%), followed by the Western region (19.6%), while the Northern region ranks lowest with about 6.9%. This further demonstrates a regional digital divide. There is therefore a need to improve access to digital services in the rural areas and disadvantaged regions, especially the North, for inclusive growth and poverty reduction.

Table 2: Percentage of Persons with Internet Access

	Mobile phone access	Internet café	WI-FI hot spot
Sex			
Male	16.6	2.6	0.8
Female	16.6	2.9	0.8
Year Age Groups			
15-24	16.6	3.0	0.8
25-64	18.1	3.3	1.0
Location			
Rural	4.8	0.2	0.2
Urban	48.2	9.8	2.3
Region			
Central	30.7	7.3	1.5
Eastern	7.4	1.4	0.8
Northern	5.8	1.0	0.1
Western	18.4	0.7	0.5
Uganda	**16.6**	**2.8**	**0.8**

Source: Household Digital Survey, January 2022

Table 3 presents the reasons for not using the internet. In terms of gender analysis, more women (47.8%) reported that they do not need the internet because it is not useful, not interesting and it lacks local content compared to their male counterparts (45.6%). In terms of age group, 50.8% of adults in the age 25-64 years, followed by the young children 6-14 years do not use internet because it is not useful and lacks local content. Also lack of knowledge and skills to use internet is another reason for not using internet was reported across the sample as per the different categorization. In terms of residence, as expected a high percentage (65.8%) of rural individuals reported lack of confidence, knowledge, or skills to use the Internet as one of the major impediments for using internet. About 50.3% of urban individuals cited high cost of the equipment as one of the reasons for not using internet. In terms of regions, too high cost of equipment was highest in the Eastern region (62%), and lowest in the Northern region (34%). Also, cost of the service/internet too high limit interest use more (40.02%) in the Eastern region, and rural areas (28.8%).

Table 3: Reasons for not using Internet

	Do not need the Internet (not useful, not interesting, lack of local content)	Lack of confidence, knowledge or skills to use the Internet	Cost of the equipment too high	Cost of the service/internet too high	Privacy or security concerns	Internet service is not available in the area	Internet service is available but it does not correspond to household needs.	Cultural reasons (e.g. exposure to harmful content)
Male	45.63	62.07	48.82	29.09	5.61	8.19	6.37	5.81
Female	47.76	64.35	47.11	27.68	6.08	8.11	6.54	5.70
6-14	46.05	64.53	43.19	26.28	6.40	7.86	6.04	8.69
15-24	41.11	59.30	53.18	31.20	5.83	8.97	7.00	5.06
25-64	50.82	64.42	49.43	28.67	5.34	7.94	6.54	3.26
Rural	46.57	65.76	47.12	28.83	6.13	9.18	6.62	5.62
Urban	47.31	55.77	50.33	26.86	5.03	5.04	5.96	6.15
Central	49.19	49.93	54.50	21.02	0.97	1.19	1.10	6.25
Eastern	44.68	75.29	**62.53**	**40.02**	6.03	10.76	6.00	4.11
Northern	44.21	70.51	34.19	24.00	7.18	13.83	11.67	5.60
Western	48.36	59.28	39.19	28.09	9.32	7.87	7.85	6.90
Uganda	**46.76**	**63.28**	**47.92**	**28.34**	**5.86**	**8.15**	**6.46**	**5.75**

Source: Personal Digital Survey January 2022

Further in Table 4, we analysed the percentage distribution of individuals with access to mobile money and digital services by gender, age group, residence and regions in Uganda. Overall, about 29% of individual use mobile money, while 29.7% have access to digital financial services. In terms of age group, 58% of individuals in the age group (25-64 years) use mobile

money compared to 24% of individuals in the age group (15-24 years). This is expected because 25-64 age group comprises mostly the working people. Also as expected, the central region has the highest percentage of people with access to mobile money and digital services than the rest of the regions, again an indicator of digital divide.

Table 4: Financial digital inclusion

	Have Access To Mobile Money	Have access to Digital Financial services
Sex		
Male	32.7	33.3
Female	26.0	26.4
Year Age Groups		
6-14	0.0	0.0
15-24	24.3	24.8
25-64	58.6	59.5
Urban		
Rural	24.8	25.2
Urban	41.1	42.0
Region		
Central	42.9	43.5
Eastern	25.4	25.9
Northern	17.9	18.3
Western	27.1	27.6
Uganda	**29.2**	**29.7**

Source: Personal Digital Survey January2022

3.1.3.4. Implementation of Data Privacy Regulations and Rights to Information Laws

Data privacy focuses on defining who has access to data while data protection is about applying restrictions that hinder others from accessing other people's data. Many African countries have set up laws that are privacy unfriendly. For example, there are Internet censorship and surveillance laws in many countries like Ethiopia and Uganda. Some countries do not have any laws pertaining to data protection at all. In this legislative void, countries worldwide are violating their citizens' privacy through activities ranging from conducting extensive surveillance without a legal basis and actively censoring the internet for the failure to protect the privacy of personal data and digital communications. The African Union (AU) in 2014 adopted the African Union Convention on Cyber Security and Personal Data Protection, also known as The Malabo Protocol. Prior to this, data protection had not been captured in the legislations and guidelines of the AU.

The legal regime governing the digital sphere in Uganda includes the Uganda Communications Act, Anti-Pornography Act, Regulation of Interception of Communications Act, Registration of Person Act, the National Information Technology Authority, Uganda Act and the Electronic Signatures Act. These institutions have been active in the regulation of information and data protection. For instance, at the onset of COVID 19, the Ministry of Health moved to dispel rumours of reported confirmed cases of COVID-19, even before one was confirmed in Uganda. In response to this and other incidents of misinformation, the Uganda Communications Commission (UCC) issued an advisory warning to the public against spreading COVID 19-related false information. UCC warned that suspects would be prosecuted for offending the Computer Misuse Act, the Data Protection and Privacy Act and Section of the Penal Code Act Cap. In October 2020, UCC revealed that they had installed a fact checker facility on their website for any member of the public who wished to verify information about anything before sharing it. They also warned that under the Computer Misuse Act, once one forwarded anything using his/her phone, then he/she would legally become an author and creator of that content and liable to prosecution.

Further findings from the Key Informant Interviews (KII) revealed that Uganda is progressing well in terms of policies and putting the necessary requirements in place. This is premised on the fact that Uganda has established a data protection office, and a portal for data controllers and for individuals to register was recently launched at media centre. Key informant at NITA-U noted that registration of data producers, data controllers and processors was still ongoing. In addition, awareness campaigns about data privacy were also ongoing.

Key informant from the Central Bank observed that there is knowledge gap regarding data protection. For instance, very few people are probably aware of data privacy regulations and rights to information. It is for this reason that several organizations are trying to conduct awareness campaigns to ensure that the data protection Act is implemented. For instance, Bank of Uganda (BOU) is working with NITA-U and Uganda communication Commission (UCC). However, internet prices and regulatory issues, plus lack of electricity as key driver to ICT adaption leave a big usage gap in the country.

3.1.4 Institutional capacity: Fiscal situation and Technical capacity

The infrastructure framework and governance of the ICT sector in general and broadband is divided into four roles namely:

i.   Oversight function,
ii. Policy formulation and coordination
iii. Policy implementation
iv. Regulation.

The different institutions together with their responsibilities are represented in the Figure 4.
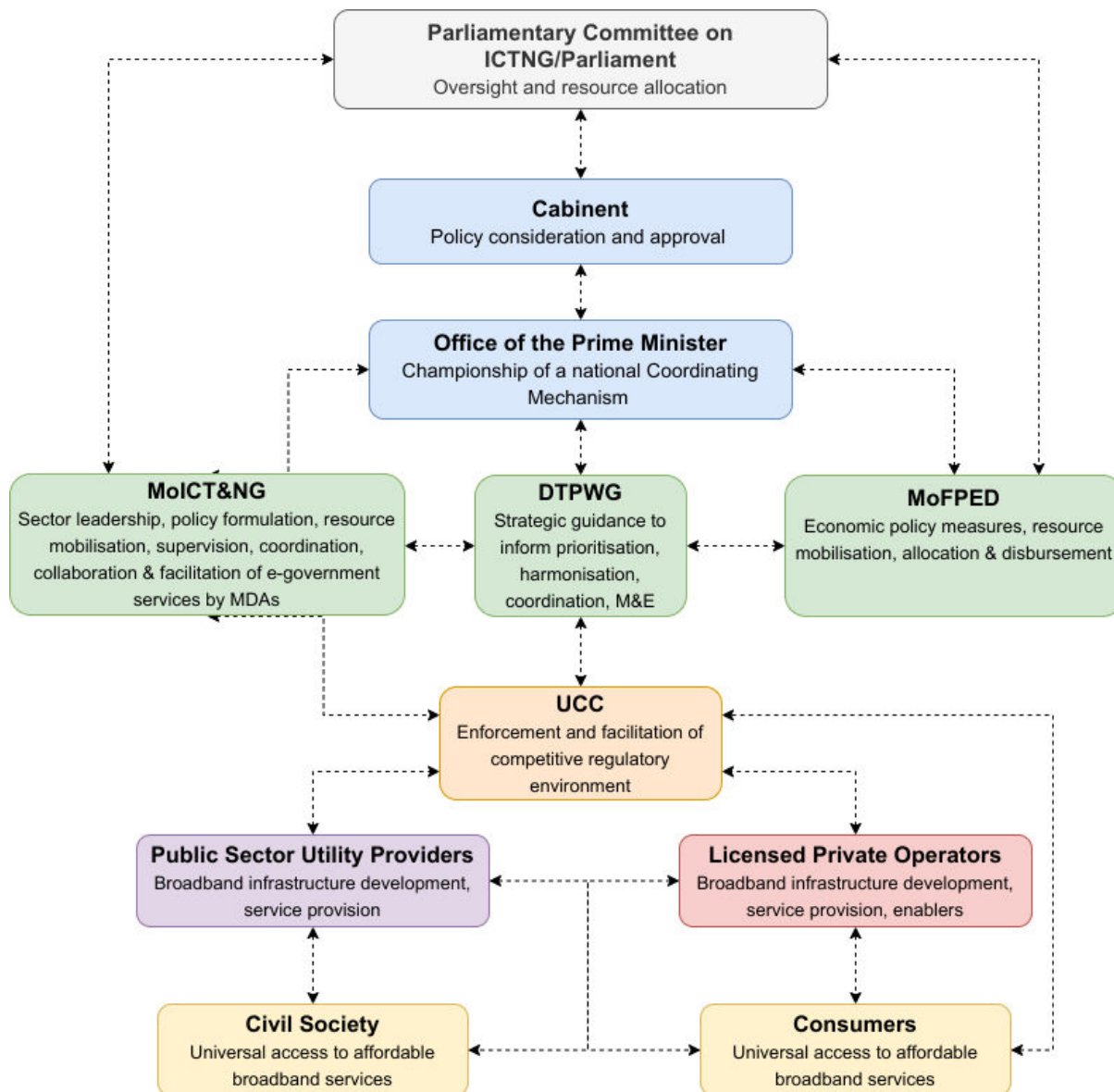
Figure 4: Rationalized Institutional Framework for Uganda's Ecosystem

Source*: Adopted from Ministry of ICT and National Guidance: National Broadband Baseline Survey and Infrastructure Blueprint.*

Specifically, however, The Ministry of Information, Communication Technology and National Guidance (MoICT &NM), provides strategic and technical leadership, overall coordination support and advocacy on all policy matters, laws, regulation and strategy for ICT sector. While as the Digital Transformation Working Group (DTPWG), provides strategic guidance and checks and balances. On the other hand, National information Technology Authority- Uganda (NITA-U), is mandated with coordinating of e-government services provided by all MDAs. And Uganda Communications Commission (UCC), is the regulatory body of all communication networks (TV, radio, Telecom companies and internet providers, social media networks etc. Although considered to be independent, it majorly works on behalf of Uganda Government.

In addition, findings from key informant interviews with UCC revealed that Uganda's performance regarding digital institutional and technical capacity has improved greatly however, the major problem is implementation has an impact on "the overall developments in ICT" infrastructure in the country.

Also a respondent from the Central Bank observed that institutional capacity especially in the financial sector is growing, because formerly there were no relevant national payment systems which regulate institutions that are technology driven, but by 2022, there are 14 such companies and are under the supervision of the Central Bank. He further revealed that, the country no longer relies so much on external support. Instead there are companies within the country that can design digital solutions that can be utilized. There are a number of innovation hubs in the country, which train the youths and then they develop solutions for companies.

The KII findings further revealed an increased uptake of ICT. The UCC respondent revealed that Government ministries are increasingly embracing ICT in the delivery of their goods and services for efficiency. ICT has been applied for example in terms of deployment, and appraisals. And there has been a mass roll out of services during COVID 19 such as, Social Protection through use of mobile money, virtual meetings in most of Government MDAs, instead of physical meetings. Also a lot of training is being undertaken to empower staff in the different MDAs and district local governments in order to strengthen and enhance uptake of ICT. This is done periodically where certain groups are bundled then trained on the basics of ICT so that they are more efficient.

3.2. Regulation and Institutional Capacity

3.2.1. Conditions for supporting National Digitalization in Uganda

While the Ugandan market is regarded as one of the most dynamic markets in Africa in terms of the number of operators, it remains highly concentrated, rendering competition suboptimal. Airtel and MTN together control about 90% of the Ugandan market, with the former being the dominant player. The telecom market, which is a duopoly between MTN and Airtel, has kept other operators remaining marginal and forced several others like Warid, Vodacom, Africel and K2 to exit or be absorbed by the two dominant companies. This has made it difficult for smaller operators to compete with larger operators and gain market share. The larger players are profitable enough to reinvest in their networks and to extend their coverage and improve quality of service, which in turn allows them to attract more customers seeking a higher quality of service. The price wars have led to Uganda sitting in the top 20 out of 49 African countries on the 1GB RIA African Mobile Pricing Index. There are also fears that the duopoly market could easily become a cartel resulting into higher prices. Government therefore needs to provide an enabling environment to any new digital player.

3.2.2 Analysis of the Political Agenda Surrounding Digitalization in Uganda.

According to the Ministry of Information, Communication Technology and National Guidance (MoICT & NM) Sector Strategic and Investment Plan, 2015/16 – 2019/20, the Ministry plans to undertake the following strategic interventions:

   i)   Review National ICT Policies to address requirements in the priority areas of research and development, ICT convergence, human capital development, and ICT exports.
   ii) Develop, regularly review, and enforce regulations and standards.
   iii) Strengthen the enforcement mechanism of laws, regulations, and standards.
   iv) Review Spectrum Management Framework to facilitate realization of the broadband goals.
   v)   Develop and implement a policy and legal framework for multi-sectorial infrastructure deployment and sharing.
   vi) Finalize the development and implementation of the Data Protection and Privacy Bill and develop Information Security legal framework.
   vii) Finalize the development of the National Broadband Policy and Strategy as well as its implementation framework.
   viii) Review and implement the policy for the postal sector to encompass opportunities offered by e-Government and e-Commerce.
   ix) Develop and implement a cross-cutting M&E framework for the ICT Sector.
   x)   Develop a Strategy for increasing access of ICT devices & services to Special Interest Groups.

xi) Develop and implement an Open Source Policy and strategy for Uganda.

Indeed, digital agendas have become increasingly central to national policies and plans that aim at responding to the challenges of the future. The Strategy builds on initiatives and frameworks such as the Policy and Regulatory Initiative for Digital Africa (PRIDA). It is premised on belief that the ICT sector has various opportunities for transforming the country. These include income generation, job creation, and improvement of service delivery and reduction of the cost of doing business, thereby increasing the country's competitiveness. This, therefore, calls for increased public and private investment in the sector. The sectors that the Strategy seeks to transform digitally, are trade and financial services, governance, education, health, agriculture, and ICT itself. Cyber security, privacy, and personal data protection are all cross-cutting themes.

3.2.3. National Strategy for Digital Transformation of Basic Services

Uganda just like other countries has embraced the adoption of digitalisation agenda as a national strategy for digital transformation. Among the key focus areas of the Ministry of Information, Communication Technology and National Guidance (MoICT &NM) Sector Strategic and Investment Plan, 2015/16 – 2019/20, is digitalization of Government processes and increased utilization of ICT across the entire economy to improve the efficiency, and effectiveness in service delivery, increase productivity with a view of increasing economic growth. However, for this to be realized, there are key elements that need to be addressed in an integrated manner such as; access to digital infrastructure, affordability and quality of ICT services, provision of basic to advanced digital skills, and limited innovation capacity. A programmatic approach has been adopted to address these bottlenecks under the Digital Transformation Programme (DTP) and the Program Implementation Action Plan (PIAP), which highlights the activities and resources that will be required. It outlines the key interventions and corresponding outputs such as:
i) Increased access and usage of ICT equipment and devices for example increased tele-density (number of telephone lines per 100 people) from 63.7 to 90.
ii) Increased employment in the ICT sector from 1.3million to 3million people.
iii) Increased annual ICT growth to 20%.
iv) Overall improvement of Uganda's ranking on global ICT indices.
v) Improved access to high speed broadband services to facilitate communications, economic activities and service delivery. The target is to improve broadband access from 512Kbps to 5Mbps and 30Mbps for rural and urban households respectively.

This DTP seeks to promote the use of ICT in the entire economy and society through: (i) deployment of secure, integrated and cross sector infrastructure; (ii) developing and promoting usage of quality communication and e-services, (iii) digital inclusion and citizen participation; (iv) ensuring standardization and interoperability of systems; (v) enhancement of national cyber security (vi) promoting innovation and commercialization of ICT products; (vii) enhancing digital literacy and developing skills; (viii) supporting development and uptake of emerging technologies such as Fourth Industrial Revolution Technologies; and (ix) process re-engineering and automation for end-to-end government business and service delivery. Therefore, the overall goal of the programme is to increase ICT penetration and use of ICT services for social and economic development.

3.2.4. Digital Transparency, Censorship, Democracy, and its Impact on Digital Transformation Processes

Over the past two decades, the civic landscape in Uganda has gone through several changes that have shaped its impact, influence and perceptions both in positive and negative ways. These have run alongside increased awareness about human rights, as well as the growth in availability and reliance on information and communication technology (ICT). Regressive laws have threatened the civic space, often being used selectively at critical times, such as in the lead-up to elections. Their presence remains a potential threat to the expansion of the work of civic actors.

Civic space has adapted over the years, in line with state actions and laws. However, this has not kept civic actors safe from various forms of suppression tactics such as trumped-up charges, arrests, harassment, blocking of websites and intimidation aimed at stifling their work. Ultimately, the closing and opening of civic space is not uniform and does not affect everyone equally. Where some spaces are closed or more threatened (e.g., media and some civic actors, such as LGBTI groups).

For instance, in 2006, the government ordered internet service providers (ISPs) to block access to a website that published anti-government stories, *radiokatwe.com*. It accused the website of publishing 'malicious and false information against the ruling party NRM and its presidential candidate'. This happened in the same year that the first multiparty elections were held in Uganda.

In 2013, the Uganda Communications Act was introduced. It enabled the communications regulator to 'monitor, inspect, license, supervise, control, and regulate communications services' and to enforce compliance relating to content. By 2013, the state announced that it would monitor social media users, 'who are bent to cause a security threat to the nation' (CIPESA 2013), reigniting language used upon the introduction of the 2002 Anti-Terrorism Act and the Regulation of Interception of Communications Act of 2010. Both acts had elevated the surveillance powers of the State, reinforcing a culture of self-censorship online and raising surveillance concerns among civil society.

On the positive side however, digital services such as the e-government procurement system which involve online submission hence no interaction with the physical persons in the process of procuring, provides an avenue for transparency. This creates trust and fairness in the system.

4.0. MAPPING OF DIGITAL SERVICE INTERVENTIONS IN UGANDA BETWEEN GOVERNMENTS AND CITIZENS (G2C) AND INTER-GOVERNMENTAL (G2G) SERVICES

4.1. Distribution of Interventions between Location, Sectors, Providers.

Our discussion with some stakeholders revealed that there is a lot of e-business (e-learning, e-commerce and e-government) going on in the country. Several Apps have been developed by different parties for various purposes ranging from business, travel, health and education, among others. Where people no longer need to carry hard copies, instead all one needs is to apply online. The moment one enters his or her National Identification Number (NIN) into the system, almost all information about that person appears. Digital innovations are, however, scattered among individuals, firms, government departments and nationals.

E-Governance:

The COVID-19 pandemic was an eye opener to remote running of government businesses. Several government meetings in various ministries, departments and agencies (MDA) were conducted online hence saving government and companies huge sums of money that would have otherwise been spent during physical meetings. Indeed due to the enormous benefits that accrue from virtual meetings such as flexibility, cost cutting and convenience especially to shareholders living outside the country, Stanbic Bank-Uganda Ltd has agreed to hold hybrid (both physical and online) annual general meeting (AGM). Stanbic Bank argued that, "virtual option could provide listed companies with an opportunity to save and invest the money elsewhere"[8]. Several other companies such as capital markets authority, Uganda securities exchange, UMEME are considering legalizing hybrid meetings. To-date, several MDA and private companies use blended approach during meetings, workshops and conducting any other businesses.

E-Learning:

E-learning in Uganda's academic institutions started during COVID-19 lockdowns. During the first lockdown that started in March 2020, several private institutions started organizing virtual learning using zoom. Later the Ministry of Education developed reading materials that were sent to districts to be circulated to primary and secondary schools. Unfortunately they were insufficient in that they could not be provided to all schools. Thereafter, the ministry sent soft copies to schools which were then distributed to learners through emails and WhatsApp contacts of their parents. The Ministry of education and several privately owned TV stations also conducted online teaching particularly for primary and secondary levels on TV stations. Universities and other higher institutions of learning also joined the online learning using zoom, WhatsApp, circulating reading materials to students through emails and you-tube videos and institutions' websites.

The exercise however, faced several hurdles which included:

   i)   Lack of internet devices (laptops, smartphones etc.) by both parents and learners.

---

[8] https://www.monitor.co.ug/uganda/business/finance/virtual-agms-might-replace-physical-meetings-post-covid-1904288

ii) Several learners could not afford internet bundles that would last for the duration of the lessons, hence most learners used to drop off in the middle of a lesson.

iii) Due to increased demand, there was always poor internet connectivity in most parts of the country, let alone lack of connectivity in some parts of the country.

This practice has since stopped in most primary and secondary schools, but still running though at minimal levels in some other institutions especially universities. Several universities have permitted the use of both physical and online/virtual (commonly referred to as blended learning), during lessons, examinations and Viva-voce.

Digital social protection:

It was also during the COVID-19 lockdown that Government sought to use digital social protection. Social protection is a public or private intervention that reduces individual's risk to vulnerability by enabling individuals who would otherwise be excluded to acquire basic needs and services such as food, health and shelter, hence preventing income insecurity and social deprivation. Social protection is categorized into two namely:

i) Social security; this prevents income shocks from affecting individual consumption. It can be achieved through:
- Direct income support also known as social assistance which involves regular cash or in-kind transfers.
- Social insurance; this is achieved through regular savings and is aimed at mitigating life processes such as retirement and risks such as loss of employment, and ill health.

ii) Social care and support services that are aimed at empowering the vulnerable individuals who cannot care for themselves.

During the COVID-19 lockdowns, the social protection responses that were employed included direct income support (social assistance), social insurance and social care and support services. During the first lock down that started on 30th March 2020 and lasted 9 weeks, government distributed food (6kgs of maize flour and 3kgs of beans), to each member of poor households in Kampala, Wakiso and Mukono districts. In the second lockdown, there were tougher movement restrictions and for that matter food distribution was dropped and replaced by cash-transfer of UGX100,000 (US$26), using mobile money. This measure however, had a lot of short comings where several beneficiaries were not part of the targeted population.

There were also Private digital social protection efforts during the lockdown. For instance, Commercial banks particularly Stanbic Bank encouraged digital banking by scrapping fees on payments for utilities, television, taxes for the period of one month. Also telephone companies MTN and Airtel removed fees on mobile money transfers. In addition, these companies introduced the "work from home" data bundle to encourage working online and maintain social distance.

Other e-services:

An official from the UCC noted that several e-services are provided to citizens, including e-passport, driving permit, and e-government procurement systems.

Government has further developed a digital system that is aimed at helping farmers with provision of farm inputs. An official from UCC intimated that through a collaboration with the Ministry of Agriculture and Animal husbandry, UCC supports agriculture in developing the agro-input traceability system. This is aimed at supporting the farmers by ensuring that the beneficiary registers at the beginning of the planting season. Farmers are advised to form

groups through which Government can provide support with farm inputs such as seeds, fertilizers, chemicals, but UCC can trace where the supplies are and how they have been utilized. We should however note the, issues of affordability of both devises and internet, digital literacy, awareness, remain a big challenge to achieving a digitalized society.

E-governance is also manifested in a number of forms. For instance, the key informant from the Central Bank revealed that, Uganda's Central Bank is promoting the use of Real Time Gross Settlement Systems (RTGS). This is mainly for high value low volume transaction. It is used for government payments, but even private individuals can use it. There is also the Central Securities Depository (CSD). Unlike in the past where a potential buyer of treasury bills, needed to visit the Central Bank and then would receive a certificate upon purchase, currently, a system has been developed which interfaces with commercial banks which in turn are allowed to do primary issuance of the securities on behalf of their clients. So, what one needs, is to visit his/her commercial bank and open a CSD account and the securities are electronically obtained.

4.2. Integrating Data, Delivery Mechanisms and Management across Sectors

Data integration is a combination of technical and business processes used to combine data from different sources to answer important questions. This process generally supports the analytic processing of data by aligning, combining, and presenting each data store to an end-user. Data integration allows organizations to better understand and retain their customers, support collaboration between departments, reduce project timelines with automated development, and maintain security and compliance.

During our discussion with officials from the Central Bank and UCC, it was revealed that NITA-U had come up with a payment gateway which was yet to be licenced by the Central Bank. Similar innovations are taking place in Ministry of Internal affairs with e-passports, Uganda Revenue Authority (URA) with e-tax administration where information is centrally obtained from NIRA upon entering one's NIN number. Other applications of centralized information include Agent-banking, Utility payments, Motor Third party Insurance payments and TIN registration. Additionally, it was revealed that UCC is currently finalizing the open data policy. It is believed that unless data is confidential, it should be available not only to UCC but also for other researchers who can make very meaningful insights around it.

4.3. Role of Private Digital Interventions

Mobile technology can easily reach and be adopted among all geographies/locations, income levels and cultures, enabling access to basic services where traditional means may not easily reach. Digital transformation is underway in Uganda, as evidenced by the growing number of people accessing digital content and services. Undoubtedly, there is a profound impact on the country's socio-economic development, with digital platforms beginning to provide access to life-enhancing services while improving productivity and efficiency across key sectors of the economy. Mobile technology has enabled access to basic services where traditional means have often failed, including financial services (specifically mobile money), e-commerce or online shopping, access to health information, education, and clean energy. Several Apps have been developed by the private sector in various sectors such as 'SafeBoda and Uber' (social media Apps developed privately and used for searching for a nearest motorcycle transport locally known as *boda-boda* and taxi respectively), in the transport sector.

Another private sector innovation is the 'Jaguza Tech'; a digital application where information on livestock market prices, farming methods and solutions about livestock diseases are packaged into a Mobile App that can be accessed by farmers at real time. This innovation is

supported by Government although there is still a funding gap coupled with awareness problem among the population.

The private sector has several systems running, the problem however, is they factor in their capital expenditure and thereby making the systems very expensive. For this reason, Government through the Central Bank has decided to develop a National Switch so that there is a centralized system that shall be run like a public good. It should therefore be noted that Mobile technology is key for digital transformation and is the primary form of internet connectivity for many people in the country. In addition, mobile platforms such as mobile money and cellular Internet of Things (IoT) are enabling the creation, distribution, and consumption of a range of digital services across the country.

5.0. INCLUSION ANALYSIS OF DIGITAL SERVICE INTERVENTIONS IN UGANDA

In line with global commitments to improve digital inclusion and to realise the Sustainable Development Goals for 2030, the Government of Uganda has committed the country to developing a digital vision for Uganda. It aims to build a digitally enabled society that is secure, sustainable, innovative, and transformative in order to create a positive social and economic impact through technology-based empowerment.

The Digital Uganda Vision provides an all-encompassing framework that responds to the national Vision 2040 by providing a unified ICT policy direction. It also provides the Government's integrated policy and strategic framework to show how information and communication technologies (ICT) can empower Ugandan citizens and achieve the goals of universal inclusion, sustainable development, economic progress, and poverty eradication through digital innovation.

In Figure 5, we present the findings from a survey about digital inclusiveness. The findings reveal that on average, 5.3% of Ugandans used internet in the last 30 days prior to the survey while only 2.2% of Ugandan had used a computer in last 3 months prior to the survey. In terms of gender, more men (6.5%) compared to women (4.2%) had used internet in the last 30 days. Similarly, more men (3%) than women (1.5%) had used a computer in last 3 months, respectively. By age group, more working age individuals (9%) compared to the young ones (6.8%) used internet in the last 30 days prior the survey. In terms of residence, 13.4 % of those in the urban communities used internet compared to only 2.3% of those in the rural areas. In terms of regions, the Central region had the highest users of internet and computers respectively, (12.7% and 5%), followed by the Eastern region (2.5% and 1.3%), and the Western (2.5% and 0.8%) and least in Northern (2.3% and 1.3%). These findings show that digital divides take various forms: gender, age, residence and location. Hence more efforts to bring about digital inclusion are required.
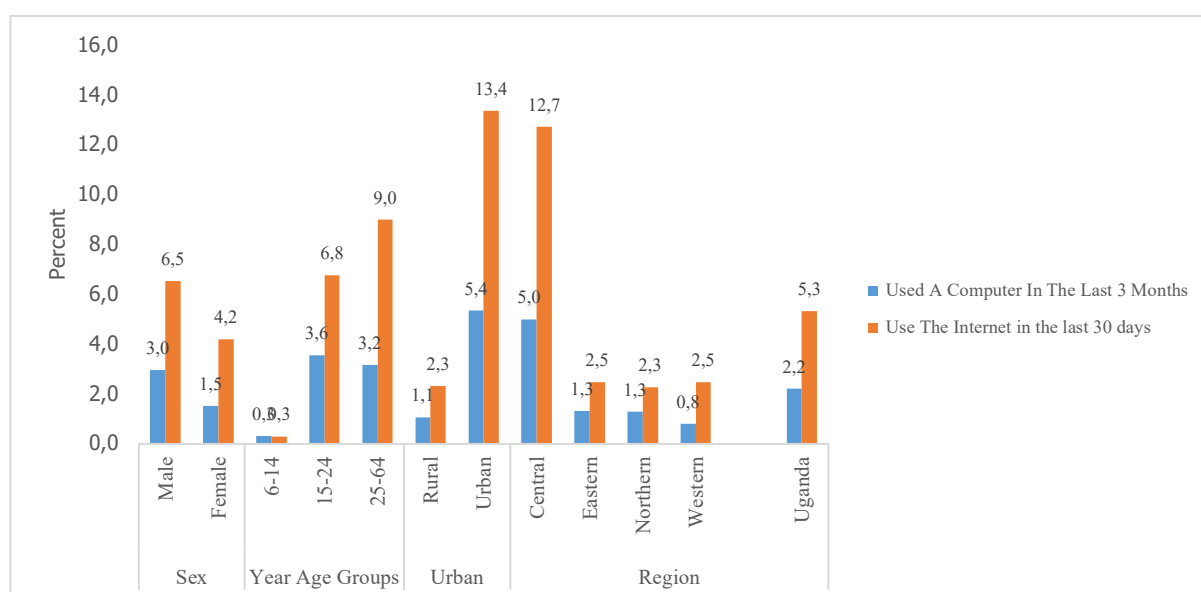
Figure 5: Access to computers and Internet by households by region
Source: *Personal Digital Survey January 2022*

Table 5, contrasts interventions by the public and private sector regarding digital inclusiveness. We provide two innovations namely: Real Time Gross Settlement Systems (RTGS) which is public and Jaguza Tech (U) Ltd which is a private one. The table provides summary information about the initiator, the purpose of the innovation, the coverage/inclusiveness and potential for exclusion.

Table 5: An Analysis of inclusiveness of Digitalized Basic Services

Study question	Public Intervention; Financial sector digital services (Real Time Gross Settlement Systems-RTGS)	Private Intervention: Jaguza Tech (U) Ltd.
i. For which main purpose is the intervention (e.g. to improve information, implementation, or participation)?	This is mainly for high value transactions. It is mainly used for government payments due to its efficiency in the financial sector.	Jaguza Tech was designed to assist livestock farmers to track their animals about their feeding behavior, disease control, managing stock and marketing.
ii. Who was the initiator? Who supported the development and implementation?	This was initiated by the Central Bank; One of the core functions of the Central bank is to maintain safe and efficient payment systems for effective transmission of monetary policy. The project was funded by the Government of Uganda	The initiators/founders were two: Mr. Ronald Katamba and Ms. Christine Kiiza. They obtained support from Ministry of ICT and National Guidance, URSB and National Council for Science and Technology.
iii. What percentage of the population is covered by this intervention? What is their profile (location, gender, age, socioeconomic status)? Has this changed since the introduction of digital technologies? If yes how?	The entire banking/financial sector covering both gender male and female, all age groups and all social economic statuses	The project is in five countries: Uganda, Mozambique, Namibia, Fiji and South Africa serving a total population of 55,000 of these 18,000 are found in Uganda. In Uganda, it covers five districts (Kayunga, Mubunde, Palisa, Kiruhura and Ssembabule). Among those served in Uganda 26% are women and 14% are youth. The project collaborates with farm managers, owners and Veterinary doctors, extension workers and researchers.
iv. (How) is the potential for exclusion explicitly addressed (e.g. through local context assessment, participatory design, targeting/eligibility criteria or outreach/training)?	1. Financial literacy needs to be increased to bring the excluded groups of people on board. 2. Improving infrastructure development particularly, connectivity, collaborative arrangements with development partners so that they can take some pilot activities in those excluded areas.	Exclusion: In a bid to reduce exclusion, the project organizes training of farmers and veterinary doctors who are mobilized by the District Agriculture Officers. In addition, they provide information through social media such as twitter, Facebook, WhatsApp and website. Also through referrals of participating farmers to new ones. The project is open to all those interested, no age, gender or other forms of discrimination. In addition it conducts other tusks such as marketing and bringing the Veterinary doctors on the platform some sort of advertising them.

| v. How does the intervention affect access, usage, and affordability of the service, as well as safety and participation? Can this be linked to changes in poverty, inequality and other development outcomes? | The intervention is intended to improve efficiency in the financial sector hence reduce transaction costs which in turn will reduce poverty and lead to job creation.
The use of mobile money technology has created many jobs for the youth. | The project has contributed greatly to poverty reduction through increase in productivity hence more returns. In addition, more people such as veterinary doctors, agents especially the youth are hired hence job creation. As noted earlier, the project is still new, young and small. It covers only five out of over 140 districts in Uganda. It intends to scale up but constrained by financial resources. |

6.0. CONCLUSION AND RECOMMENDATIONS

6.1. Concluding Reflections

The study established that the youth can play a big role in the development of Uganda given that they constitute over 60% of the population. Accordingly, any intervention should be packaged in such a way that it encourages their participation for instance issues concerning local content is important. For the youth, interventions that involve things like businesses processes outsourcing which keeps the youth busy could be of importance. Creation of business centres in the different parts of the country similar to one at Statistics house could help the youth in terms of employment creation where they could work in shifts. So instead of telecom companies like MTN, Airtel and other utility companies like UMEME, National water and sewage cooperation and the pay- TVs establishing own call centres, they can outsource from these business centres. These business centres could evolve into a national ICT park.

It was also established that innovative digital interventions that provide health solutions can offer an opportunity to undertake holistic disease surveillance and monitoring for instance through geo-tracking applications, leverage digital data and analytics from public systems to strategically allocate resources and pre-empt outbreaks, disseminate public health messages and guidelines (e.g., through SMSs) and improve inventory management of medical supplies. This can benefit all social groups including the poor, youth and other vulnerable groups.

Also there is a lot of digital divide especially among the youth, women, the less educated and those in the rural areas in Uganda. It was therefore noted that in order to improve the basic services for the youth, the poor and vulnerable, several deliberate efforts should be undertaken by Government, for instance organizations like NIRA should identify the above categories especially those with disabilities (PWD) during registration so that the service providers can develop specific digital packages for them.

Regarding digitalization reforms that would help in addressing gaps in access, affordability and usage, it was established that, there is a duopoly in Uganda' telecommunication between MTN and Airtel. This duopoly system can be exploitative to the consumers especially when the players collude and form a cartel. Accordingly, a regulatory framework that introduces a conducive environment for competition could bring down user charges hence reducing the digital divide among the different age groups, gender and social economic groups. Another major hindrance to access is enshrined in Uganda's constitution which defines consent age to be 18 years. Accordingly, youth below 18 years are allowed to own a mobile phone, open up a bank account and the like. But the current generation of youth aged 14 to 18 years are very productive and IT literate much more than several adults. In addition the IT of things (IoT) needs to be encouraged and developed because it is no longer a luxury but necessity. This could therefore call for revision of the consent age downwards.

Further it was established that lack of consumer awareness was another major cause of the gaps in access, affordability and usage for different population groups. Therefore, it is necessary to increase and equip the consumers with the required knowledge about the different aspects of the products and services they are consuming including online entrepreneurship. This can increase consumer confidence since they are able to make informed decisions.

The other digital reform that needs to be put place is consumer protection. Consumer protection is an important aspect that needs to be addressed because if consumers are not protected then they may not have the confidence to use the service or product.

In addition, accessibility of the digital services needs to be addressed because it is lacking among various social groups in Uganda. Digital accessibility is the process of making digital products such as websites, mobile apps and other online tools accessible to everyone. Digital accessibility is crucial for creating a truly inclusive world for everyone. Infrastructure development, expansion of the national backbone, swift shift to 4G and perhaps 5G networks are all paramount for promoting digital inclusion and ultimately digital dividends.

There is also continuous need to have well designed and deliberate projects geared towards the under and unserved populations. Such as rural electrification and road infrastructure. These efforts are ongoing but a slow pace, yet once these infrastructure are establishes, they would encourage private sector investment particularly telecom companies to access the hard- to reach areas since it will reduce the investment costs. This will in turn solve the problems of accessibility and affordability.

Below, we summarize the lessons and best practices for managing the transition to more digitalized basic services for inclusive development:

a) Increased consumer awareness to equip the consumers with the required knowledge about the different aspects of the available digital services and products.
b) Increased accessibility of the digital services by establishing access points through infrastructure development around the country.
c) Putting in place consumer protection regulations.
d) Service providers need to design deliberate projects geared towards the under and unserved populations.
e) Increasing financial literacy to bring the excluded groups of people on board.
f) Improving digital inclusion calls for development of infrastructure to facilitate wider access, availability and affordability as well as creating the content to support greater and beneficial engagement.
g) Additionally providing active learning support to build digital literacy and skills is equally important because it enhances enthusiasm for digital usage.
h) The government should establish mechanisms to tame misinformation and disinformation. This is best achieved through collaboration with key stakeholders and not through the stifling of free expression.

6.2 Recommended Areas of Investments

Adoption and use of digital technologies are usually hampered by several barriers which may include some combination of a lack of high-quality and affordable infrastructure; a lack of trust in digital technologies and a shortage of the relevant skills needed in the digital economy. Basing on our discussions with key informants, we propose the following recommendations and areas of emphasis:

i) *Infrastructure development:* It is essential that the government invests in the development of digital infrastructures to meet current and future demand and help bridge digital divides. The household digital survey showed that there is a significant gap between the urban and the rural in terms of access to digital services. There is need for Government commitment to increase bandwidth and manage congestion; ensure the continuity of

critical public services; prevent and mitigate cyber risks, as demand for services such as health care, mobile payments, food delivery, and e-commerce increase.

ii) *National switch for the financial sector.* There is need for the Central Bank to fast-track the developing of a national switch which will act as a centralized system that shall connect all the different platforms and speed up the process of transactions between the bank operators.

iii) *Internet connectivity.* Broadband coverage in Uganda is minimal, compared to many other least developed African countries. Only 17% of the mobile telephone users are covered by LTE/4G. There is need for efforts to assess and address the key barriers to the deployment of high-speed networks and services. UCC should encourage and enforce infrastructure sharing, to lower the internet costs.

iv) *Rural Electrification:* Government should embrace rural electrification to ensure people have access to grid electricity as it is a key driver of ICT adaption and utilization.

v) *Collaboration between different Government Agencies.* There is need for sharing of information and data among the different government agencies such as National Identification and Registration Authority (NIRA), Ministry of Internal Affairs, Uganda Revenue Authority (URA), Ministry of Health and perhaps the private sector especially the banks. Digital technologies cut across many areas and require a variety of sectors to work together, including collaboration and partnerships between public and private players.

vi) *Digital financial literacy.* There is need for deliberate efforts to enhance the ability of Ugandans to have the knowledge, skills, confidence, and competencies to safely use digital financial products and services. Therefore, affordable access to internet and increased digital literacy should be part of a deliberate move by Uganda government to ensure that citizens can use digital services, the three speakers agreed.

vii) *Innovations:* This is a practical implementation of ideas that result in the introduction of new goods or services or improvement in the existing ones. More investments should be channeled to universities towards innovations that are impactful to society. In addition, there is need for establishment of testing hubs and incubation centers.

viii) *Infrastructure development.* There is need for Government to extend the back born infrastructure to Local Governments, schools, and health centers. Little has so far been done to some government entities, but there is need for support in that area.

ix) *Enhancing Cybersecurity: T*here is need for effective cybersecurity to ensure resilient and secure e-government systems. Cybersecurity is also paramount to ensure that citizens' private data and sensitive information are protected from potential cyberattacks while at the same time ensuring data privacy rights are not impeded.

x) *Awareness campaign.* Sensitization, awareness of most of the digital services is still limited. Note that awareness campaigns will results into attitudinal and behaviour change in communities, and any ICT driven innovations would yield better results on the various social and economic demographics.

References

Ahina Mama wa Africa (2020). The State of Social Protection in Uganda in response to COVID-19.

Blimpo, M. P., & Cosgrove-Davies, M. (2019). *Electricity access in Sub-Saharan Africa: Uptake, reliability, and complementary factors for economic impact*. World Bank Publications.

Blimpo, M., McRae, S., & Steinbuks, J. (2018). Why are connection charges so high? An analysis of the electricity sector in Sub-Saharan Africa. *An Analysis of the Electricity Sector in Sub-Saharan Africa (April 16, 2018). World Bank Policy Research Working Paper*, (8407).

https://pctechmag.com/2020/07/ugandas-online-service-index-improves/

Ministry of Energy and Mineral Development (2018).

Ministry of Information, Communication and Technology and National Guidance (2015). Sector Strategic and Investment Plan 2015/16-2019/20.

Nabukeera, M. (2021). Performance of the telecommunication companies in Uganda during COVID–19 times.

Sadik-Zada, E. R., Gatto, A., & Blick, N. (2022). Rural Electrification and Transition to Clean Cooking: The Case Study of Kanyegaramire and Kyamugarura Solar Mini-Grid Energy Cooperatives in the Kyenjojo District of Uganda. In *Sustainable Policies and Practices in Energy, Environment and Health Research* (pp. 547-562). Springer, Cham.

Sebyala, N. M. (2020). The Performance of the Free Electricity Connection Policy in Uganda.

UBoS, (2016). Uganda bureau of statistics sector strategic plan for statistics.

United Nations Capital Development Fund (UNCDF, 2021), Inclusive Digital Economy Scorecard (IDES) Report.

World Bank. (2016). *The Uganda Poverty Assessment Report 2016: Farms, Cities and Good Fortune-Assessing Poverty Reduction in Uganda from 2006 to 2013*. World Bank.

Appendix 1. Digital Survey questionnaire

Uganda Digital Dividend Survey
2022

SECTION 1A: HOUSEHOLD IDENTIFICATION PARTICULARS			
1. Stratum:			
2. District Name and Code			
3. Rural/Urban (*Urban =1; Other Urban =2; Rural =3*)			
4. County/Municipality			
5. Sub-County/Division/Town Council			
6. Parish/Ward			
7. EA Name and Code			
8. LC Name			
9. Household Serial Number			
10. Household Sample Number			
11. Name of Household Head			
12. Telephone Contact of the Household			
13. Location Address of Household:			

SECTION 1B: STAFF DETAILS AND SURVEY TIME

1. NAME OF INTERVIEWER:					CODE	
		DD	MM		YYYY	
2. DATE OF INTERVIEW:						
				H	H	M	M
3. START TIME						
4. END TIME						
5. NAME OF SUPERVISOR:						
		DD	MM		YYYY	
6. DATE OF INSPECTION BY SUPERVISOR:						

SECTION 2: GENERAL INFORMATION ON HOUSEHOLD MEMBERS (Ask for a complete list of Household members)

PID NO	We would like to make a complete list of household members in the last 12 months including guests who slept here last night and members that left the household permanently. **PROBE** Just to make sure that I have a complete listing: a) Are there any other persons such as small children or infants that we have not listed? b) Are there any other people who may not be members of your family such as domestic servants, lodgers or friends who usually live here? c) Are there any guests or temporary visitors staying here, or anyone else who stayed here last night, who have not been listed? **IF YES,** what are their names? **Name**	Sex 1= Male 2= Female	What is the relationship of [NAME] to the head of the household? 1= Head 2= Spouse 3= Son/daughter 4= Grand child 5= Step child 6= Parent of head or spouse 7= Sister/Brother of head or spouse 8= Nephew/Niece 9= Other relatives 10= Servant 11= Non-relative 96= Other (specify)	What is the residential status of [NAME]? 1=Usual member present 2= Usual member absent 3=Regular member present 4=Regular member absent 5=Guest 6=Usual member who left household more than 6 months ago 7=Left permanently/died **(FOR CODES 5 – 7, END INTERVIEW AT COL.5)**	FOR CODES 1 – 4 IN COLUMN 5					
					How old is [NAME] in completed years? **IF LESS THAN ONE WRITE 00**	What is [NAME'S] exact date of birth?			What is [NAME'S] religion?	What is [NAME'S] tribe?	**FOR ALL PERSONS AGED 10 YEARS AND ABOVE** What is the present marital status of [NAME]? 1= Married monogamous 2= Married polygamous 3= Divorced/ Separated 4= Widow/ Widower 5= Never married >> Col 12
						DD	**MM**	**YYYY**			
(GI1)	(GI2)	GI3	(GI4)	(GI5)	(GI6)	(GI7A)					(8)

SECTION 3: Employment status (For only Usual and Regular household members)

PID NO	FOR ALL PERSONS AGED 10 YEARS AND ABOVE		IF CODES 1-6 IN COL (12)	
	Activity status		**Kind of activity (Industry)**	**Occupation**
	During the last 7 days, what was [NAME'S] MAIN activity status? 1=Employer 2=Own Account Worker 3=Government Employees 4=Private Employees 5=Unpaid Family workers 6=Has job/enterprise but did not work 7=Not worked for at least one hour but looked for work (**>> COL 15**) 8=Not working and not looking for work (**>> COL 15**) 9=Domestic Worker (**>> COL 15**) 10=Full Time student (**>> COL 15**) 11=Too young/Too old (**>> COL 15**) 12 = Disabled to work 96=Others (specify) (**>> COL 15**)		During the last 7 days, what was the MAIN Sector of employment for (NAME)? 1=Agriculture, forestry 2=Fisheries 3=Mining and Quarrying 4=Manufacturing 5=Electricity, Gas and Water 6=Construction 7=Sales and Services 8=Hotels and Restaurants 9=Transport, storage and communication 10=Public administration 11=Education 12=Health and Social work 13=Financial Intermediation 14=Other Service activities 96=Others	During the last 7 days, What was [NAME'S] occupation? 1=Legislators & Managers 2=Professionals 3=Technicians & Associate professionals 4=Clerks 5=Service workers &sales workers 6=Agriculture & fisheries 7=Crafts & related workers 8=Plant & machinery operator & Assemblers 9=Elementary Occupation 10=Armed forces
(1)	**(2)**		**(3)**	**(4)**

SECTION 4: EDUCATION (For only Usual and Regular household members 3 Years and above)

PID NO	RECORD ID CODE OF PERSON RESPONDING FOR [NAME]	Can [NAME] read and write with understanding in any language? SEE CODES BELOW	Has [NAME] ever attended any formal school? 1= Never attended 2= Attended school in the past (>> COL 6) 3= Currently attending school (>> COL 9)	What is the MAIN reason [NAME] has not attended school? SEE CODES BELOW [>> NEXT PERSON]	What was the highest grade that [NAME] completed? SEE CODES BELOW	In which year did [NAME] complete that grade? YYYY	Why did [NAME] leave school? SEE CODE BELOW [>> NEXT PERSON]	What grade was [NAME] attending in [THE LAST COMPLETED SCHOOL YEAR]? SEE CODES ON THE RIGHT	What grade is [NAME] currently attending? SEE CODES ON THE RIGHT	CODES FOR COLS 9 AND 10: *GRADE ATTENDED LAST YEAR AND GRADE CURRENTLY ATTENDING* 00=Had not begun school last year 01=Attending nursery, kindergarten etc (lower than P.1) 10=Attending P.1 11=Attending P.2 12=Attending P.3 13=Attending P.4 14=Attending P.5 15=Attending P.6 16=Attending P.7 30=Attending S.1
ED01	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	31=Attending S.2
										32=Attending S.3
										33=Attending S.4
										34=Attending S.5
										35=Attending S.6
										40=Attending post primary/junior specialized training or certificate or diploma
										50=Attending Post-secondary Specialized training or diploma
										60=Attending Degree and above
										88=Did not attend last year
										98=Don't Know

CODES FOR COLUMN 3
1= Unable to read and write
2= Able to read only
3= Able to read and write
4= Uses Braille

CODES FOR COLUMN 5
01= Too expensive
02= Too far away
03= Poor school quality
04= Had to help at home
05= Had to help with farm work
06= Had to help with family business
07= Education not useful

08= Parents did not want
09= Not willing to attend
10= Too young
11= Orphaned
12= Displaced
13= Disabled
14= Insecurity
96= Other (specify)

CODES FOR COL 6:
10=Some schooling but not completed P.1
11=Completed P.1
12=Completed P.2
13=Completed P.3
14=Completed P.4

15=Completed P.5
16=Completed P.6
17=Completed P.7
21=Completed J.1
22=Completed J.2
23=Completed J.3
31=Completed S.1
32=Completed S.2
33=Completed S.3
34=Completed S.4
35=Completed S.5
36=Completed S.6
41=Completed post primary/junior specialized training or certificate or diploma

51=Completed Post-secondary Specialized training or diploma
61=Completed Degree and above
98=Don't Know

CODES FOR COLUMN 8
01=Completed desired schooling
02=Further schooling not available
03=Too expensive
04=Too far away
05=Had to help at home

06=Had to help with farm work
07=Had to help with family business
08=Poor school quality
09=Parents did not want
10=Not willing to attend further
11=Poor academic progress
12=Sickness or calamity in family
13=Pregnancy
14= Physical and communication inaccessibility
96=Other (specify)

SECTION 5: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ISSUES FOR PERSONS 10 YEARS AND OVER

PID NO	Does [NAME] own a mobile phone at present? 1= Yes, ordinary phone 2= Yes, smart phone 3=Both ordinary and smart phone 4= No	Did [NAME] use a mobile phone in the last three months? 1= Yes, ordinary phone 2= Yes, smart phone 3=Both ordinary and smart phone 4= No	Did [NAME] use internet in the last three months? 1=Yes 2=No>> Next section 98=Don't Know >> Next section	From which of the following location(s) did [NAME] use the Internet? **READ OUT** A= At home B= At work C= Place of education D= At another person's home E= At community Internet access facility F= Commercial Internet access facility G= Via a mobile cellular Telephone Record 1 for Yes and 2 for No against each option **[NEXT PERSON]**	Which of the following services does [NAME] use the internet for? READ OUT A= Social networking >> Next section B= Academic work >> Next section C= Electronic commerce (Business) D= Telephoning >> Next section E= Health related information >> Next section F=Online gaming >> Next section X= Other (specify) >> Next section Record 1 for Yes and 2 for No against each option	What types of goods or services were bought or ordered over the Internet for private use in the last 3 months? Please tick all that apply. 1=Books, magazines or newspapers 2=Clothing, footwear, sporting goods or accessories 3=Computer equipment or parts (including peripheral equipment) 4=Computer or video games 5=Computer software (includes upgrades and paid apps; not games) 6=Cosmetics 7=Financial products (including shares and insurance) 8=Food, groceries, alcohol or tobacco 9=Household goods (e.g. furniture, toys, etc.; excluding consumer electronics) 10=ICT services (excluding software) 11=Medicine 12=Movies, short films or images 13=Music products 14=Photographic, telecommunications or optical equipment 15=Tickets or bookings for entertainment events (sports, theatre, concerts, etc.) 16=Travel products (travel tickets, accommodation, vehicle hire, transport services etc.)	How did you pay for the goods or services bought over the Internet for private use in the last 3 months? Please tick all that apply. 1=Cash on delivery 2=Credit card online 3=Debit card or electronic bank transfer online 4=Mobile money account (account connected to the mobile number) 5=Prepaid gift card or online voucher 6=Points from rewards or redemption program (e.g. Air Miles) 98=Other (e.g. bank check by post, etc.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

38

SECTION 5: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ISSUES FOR PERSONS 10 YEARS AND OVER

PID NO	Are you aware of any government services available online such as URA online services, Driving permit, Passport, wealth declaration, teacher verification, online registration, Accessing UNEB results, etc ? *1=Yes* 2=No<<Section 2F	Have you used any of e-government services in the past 12 months? 1=Yes 2=No<<Section	Considering your most recent interaction, how satisfied were you with the e-government service that you used? 1= Very dissatisfied 2= Dissatisfied 3= Not sure 4= Satisfied 5= Very satisfied
(1)	(2)	(3)	(4)

SECTION 6: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ISSUES

Asset rosters	Does the household own or have access to [ASSET] at present? 1=Yes 2=No	Thinking about access to information, can you rank the 3 most used sources of information for members of the household? 1=Radio 2=Television 3=Newspapers 4=Phone 5=social media 6=Friends and relatives 96=Others, specify		
(1)	(2)	(3_1)	(3_2)	(3_3)
Radio		Rank1	Rank2	Rank3
Television				
Newspapers				
Bicycle				
Mobile phone				
Social media				
Computer				

Appendix 2. The KII Tool

`**Key Informant Interviews Guide for digital service provision**

1. Context Assessment

1.1 How does Uganda perform with regard to implementation of data privacy regulations and rights to information laws?

1.2 How does Uganda perform with regard to institutional capacity/technical capacity regarding digitalization?

1.3 In which areas should investments/policy efforts be prioritized to ensure inclusive digital services?

1.4 What efforts need to be undertaken to promote inclusive digitalization in the country?

1.5 What are the major concerns of digital transparency, openness, censorship, digital security, digital democracy, online civic space or electoral processes in the country?

1.6 To what extent is your organization implementing the Uganda National Digital strategy?

2. Mapping of Digital service Interventions

2.1 What are the inter linkages between government agencies regarding digitalization?

2.2 What digital services/interventions have been put in place by government/your department for service provision to the public in this era of e-commerce?

2.3 Are there efforts of integrating data, delivery mechanisms and data management/sharing across sectors (Government to citizens G2C, or Intergovernmental G2G) services?

2.4 Are there any private digital interventions that could potentially be scaled up for government services?

3. Inclusion Analysis of Digital Service Interventions

3.1 What are the main uses of digital services in your organization? (i.e. to improve information, implementation or participation)?

3.2 Who was the initiator? Who supported the development and implementation?

3.3. What percentage of the population is covered by this intervention?

3.4 For those who are excluded, what plans/efforts are in place to bring them on board?

3.5. Does the intervention have effects on changes in poverty and inequality?

General Concluding Questions:

3.6. Which digital reforms are most conducive to improving basic service provision for the youth, poor and vulnerable in Uganda?

 3.7 Which digital reforms would best help to address gaps in access, affordability and usage for different population groups?

PART 2. Mapping of digital service interventions

2.1 Mapping of digital basic services in Uganda, focusing on services between governments and citizens (G2C) and inter-governmental (G2G) services.

2.2 How are interventions distributed in terms of location, sectors, providers/stakeholders, the types of technology used? What other trends are apparent?

2.3 Are developments currently at the project/city level, or more system-wide/scaled up?

2.4 Is there a focus on integrating data, delivery mechanisms, and management across programs/sectors?

2.5 In the absence of well-developed G2C and G2G services – are there any other digital-interventions (more private) that manage to reach a large number of citizens that could potentially be scaled up and used for government services?

PART 3. Inclusion analysis of digital service interventions

4) **Analysis of the inclusiveness of digitalized basic services in Uganda.**
(Interviewer should choose a few good examples from the mapping exercise to help answer the following)

 i.   For which main purpose is the intervention (e.g. to improve information, implementation, or participation)?

 ii.   Who was the initiator? Who supported the development and implementation?

 iii. What percentage of the population is covered by this intervention? What is their profile (location, gender, age, socioeconomic status)? Has this changed since the introduction of digital technologies? If yes how?

 iv.   (How) is the potential for exclusion explicitly addressed (e.g. through local context assessment, participatory design, targeting/eligibility criteria or outreach/training)?

 v.   How does the intervention affect access, usage, and affordability of the service, as well as safety and participation? Can this be linked to changes in poverty, inequality and other development outcomes?

Concluding reflections:
- Which digital interventions (or aspects of interventions) are most conducive to improving basic service provision for the poor and vulnerable in (country)?
- Which reforms would most help to address gaps in access, affordability and usage for different population groups? How could successful programs be made more accessible and cost-effective at a broader scale without excluding vulnerable groups?
- What are the lessons and best practices for managing the transition to more digitalized basic services (from a government / donor perspective?) How can policymakers help to form a stronger link between digitalization and inclusive development?

END

Thank you for your time, stay safe!

Appendix 3: List of Key Informants:

Mr. Ronald Katamba, Director and Founder Jaguza Tech U Ltd.
Ms. Christine Kihunde Kiiza, Co-founder Jaguza Tech U Ltd.
Mr. Ronald Obita, Director Planning Research and Development NITA Uganda.
Mr. Baker Barikujja; Manager Licencing and Legal Affairs, Personal Data Protection Office.
Mr. Hannington Obanga Officer Research and Development UCC
Mr. Mackay Aumo, Director National Payments Systems Central Bank of Uganda