MINISTRY OF ICT & NATIONAL GUIDANCE

A Knowledge and Productive Society driven by ICT & National Ideology

DIGITAL TRANSFORMATION ROADMAP

2023/2024 - 2027/2028

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DIGITAL TRANSFORMATION ROADMAP

2023/2024 - 2027/2028

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ABBREVIATIONS

AI	Artificial Intelligence
AR	Augmented Reality
CDN	Content Distribution Network
DUV	Digital Uganda Vision
DPG	Digital Public Good
ESO	Entrepreneur Support Organization
GDP	Gross Domestic Product
GoU	Government of Uganda
IDES	Inclusive Digital Economy Scorecard
IMT	International Mobile Telecommunications
IT	Information Technology
ICT	Information and Communications Technology
IoT	Internet of Things
KIW	Kampala Innovation Week
LEO	Low-Earth Orbit
LG	Local Government
MDA	Ministry, Department, Agency
MNO	Mobile Network Operator
MoICT & NG	Ministry of ICT and National Guidance
MoLHUD	Ministry of Lands, Housing and Urban Development
MoTIC	Ministry of Trade, Industry and Cooperatives
MSME	Micro, Small and Medium Enterprise
NBI	National Backbone Infrastructure
NCIP	Northern Corridor Integration Projects
NDP	National Development Plan
NITA-U	National Information Technology Authority – Uganda
NIISP	National ICT Initiatives Support Programme
NPA	National Planning Authority
NRM	National Resistance Movement
PKI	Public Key Infrastructure
RAN	Radio Access Network
SDG	Sustainable Development Goals
SFIA	Skills Framework for the Information Age
SME	Small and Medium Enterprises
UCC	Uganda Communications Commission
UCUSAF	Uganda Communications Universal Service Access Fund
UPL	Uganda Posts Limited
UN	United Nations
VR	Virtual Reality
4IR	Fourth Industrial Revolution
E-services	electronic SErvices
B2B	Business to Business
UNDP	United Nations Development Programme
ITU	International Telecommunications Union
STEM	Science, Technology, Engineering and Math
5G	5th generation mobile network
6G	6th generation mobile network
KYC	Know Your Customer
PPDA	Public Procurement and Disposal of Public Assets Authority
APIs	Application Programming Interfaces
CO 2	carbon di¬oxide
DTPWG	Digital Transformation Program Working Group
CSOs	Civil Society Organisations
NGOs	Non-Government Organizations
M&E	Monitoring and Evaluation
BoU	Bank of Uganda
UICT	Uganda Institute of Information and Communications Technology
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoES	Ministry of Education and Sports
NMS	National Medical Stores
OPM	Office of the Prime Minister
PDPO	Personal Data Protection Office
SFIA	Skills Framework for the Information Age

FOREWORD

The Digital Transformation Roadmap, now therefore, builds onto the commitments set under the Digital Uganda Vision by focusing on that that we must do as a country to achieve operational momentum and make great strides that translates paper to action.

Government of Uganda has made huge advancements in both the promotion and implementation of ICT as an enabler for the Digital Transformation in Uganda. This is anchored in Uganda Vision 2040 that was conceptualized to strengthen the fundamentals of the economy by harnessing the abundant opportunities around the country. These opportunities include ICT. The measures to achieve the Vision 2040 aspirations are included in five-year span National Development Plans. The current National Development Plan is heavily focused on increasing investment in ICT as one of the productive sectors able to improve livelihoods, generate employment and produce goods for export substitution as well as import substitution. In order to drive this further within the ICT Sector, the Ministry of ICT and National Guidance developed the Digital Uganda Vision that describes our commitments to ensure we increase our maturity stature in Digital Transformation and provide support to all the sectors of the economy.

The Digital Transformation Roadmap, now therefore, builds onto the commitments set under the Digital Uganda Vision by focusing on what we must do as a country to achieve operational momentum and make great strides that translates paper to action. I am confident that, implementation of this Roadmap will over the next five years set a strong foundation upon which Digital Transformation will accelerate for both public and private sector.

This is a demonstration of further commitment of the Ministry of ICT and National Guidance to support efficient service delivery and responsive cost effective public administration as well as overall social economic transformation.

I thank all stakeholders that have made contributions towards development of this Roadmap.

For God and My Country

Hon. Dr. Chris Baryomunsi, MP
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PREFACE

The Roadmap is the rallying point for optimizing our scarce resources based on cohesion across both public and private sector.

The hallmark of Digital Transformation is the integration of ICT into our ways of life. Over the years, we have seen the positive contributions that we have accrued as a country by adopting ICT as an enabler for service delivery and business. Digital Transformation breaks the traditional barriers of time and distance that were hindering access to services, information and growth of the digital economy. It is based on this that ICT has consistently been earmarked at national development planning level as a priority sector for social economic development. Global ICT related indices and national performance shows us where we have performed well and also the challenges that we face. The Digital Uganda Vision (DUV) identified five pillars and commitments in order to address these challenges. These aspirations are aligned to Uganda's overall Vision 2040.

Therefore, the Digital Transformation Roadmap addresses how we gain operational momentum to attain these aspirations as spelt out in the DUV. The Roadmap is the rallying point for optimizing our scarce resources based on cohesion across both public and private sector. It builds on the earlier gains by focusing our resources on the key enablers that we must implement in order to further unlock economic growth, create a more inclusive and resilient economy.

The Ministry of ICT and National Guidance thanks the Ministry of Education & Sports, Development Partners, and Uganda's thriving ICT community. This Roadmap's strategic vision for Uganda's digital transformation was shaped by your substantial contributions, insights, and participation. I also thank my committed Ministry of ICT and National Guidance personnel. This roadmap was created by your dedication, hard work, and creativity. The UNDP Country Office in Uganda's consistent assistance has helped us strengthen digital transformation. Finally, Centenary Technology Services, your organization's expertise and commitment helped create Uganda's first Digital Transformation Roadmap. We begin a journey that will change our nation's digital landscape forever.

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Permanent Secretary Ministry of ICT & National Guidance
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EXECUTIVE SUMMARY

The ICT Sector is an undeniable enabler for Uganda's social economic growth. The ICT sector continues to grow at an average growth rate of 14.8% and contributes 9% to Uganda's Gross Domestic Product (GDP). The growth is a result of a combination of policy decisions and investments that have led to infrastructure coverage, increased internet penetration and roll out of e-services among others. This demonstrates the potential for ICT to further catalyze social economic growth of the Country. According to the International Telecommunications Union (ITU), a 10% increase in broadband penetration yields 1.4% in GDP growth.

Cognizant of the potential of ICT, the Ministry of ICT and National Guidance has developed this Digital Transformation Roadmap that identifies the key enablers to achieve the commitments set out in the Digital Uganda Vision. The roadmap therefore focuses on the how to get there whereas the Digital Uganda Vision sets the aspirations aligned to the overall national agenda set in the Vision 2040. The Roadmap is therefore aligned to the DUV pillars and designed to fit in a five year cycle given the dynamic and ever changing ICT landscape. This allows the country to create a firm foundation and also remain responsive to the environment changes.

The purpose of this roadmap is to guide the digital transformation efforts of Uganda, enabling it to capitalize on emerging technologies, enhance economic competitiveness, and improve the lives of our citizens. The document begins by assessing the current digital landscape in our country, the positioning of Uganda internationally and the current state of digital transformation. We acknowledge the rapid pace of technological advancements, changing consumer behaviour, and the need for seamless integration of digital solutions across sectors. The country has made great progress in developing the legal and regulatory environment for digital transformation, developing e-services and cyber security. However, more work is required around integration of e-services, expansion of ICT infrastructure, acceleration of digital skilling, reduction of the cost of internet, increased innovation and the application of emerging technologies.

The roadmap highlights the following key objectives :

PROMOTE DIGITAL SERVICES:

We shall embark on the development of digital and electronic services across the key priority sectors in Government to support the delivery of services to citizens and residents of Uganda.

ENHANCE DIGITAL INFRASTRUCTURE & CONNECTIVITY:

We will invest in the development of robust and reliable digital infrastructure, including high-speed broadband networks, data centres, and cloud computing capabilities. This will ensure widespread access to digital services and enable seamless connectivity across urban and rural areas.

FOSTER INNOVATIONS AND ENTREPRENEURSHIP:

We will create a conducive environment for innovation and entrepreneurship, promoting research and development, startup incubation, and collaboration between academia, industry, and the Government. By nurturing a thriving digital ecosystem, we can drive technological breakthroughs and fuel economic growth.

PROMOTE CYBER-SECURITY, DATA PROTECTION AND PRIVACY:

We will establish a robust framework for digital governance, ensuring data privacy, cyber security, and protection of intellectual property. By fostering trust in digital systems and implementing transparent regulations, we can build a safe and secure digital environment for our citizens and businesses.

EMPOWER DIGITAL SKILLS AND LITERACY:

Recognizing the importance of digital skills in the digital age, we will focus on equipping our citizens with the necessary knowledge and capabilities. We will prioritize digital literacy programs, up-skilling and re-skilling initiatives, and promote STEM education to bridge the digital divide and ensure equal opportunities for all.

To realize our vision and objectives, we have devised a comprehensive implementation plan, which includes the following key components:

DIGITAL SERVICES:

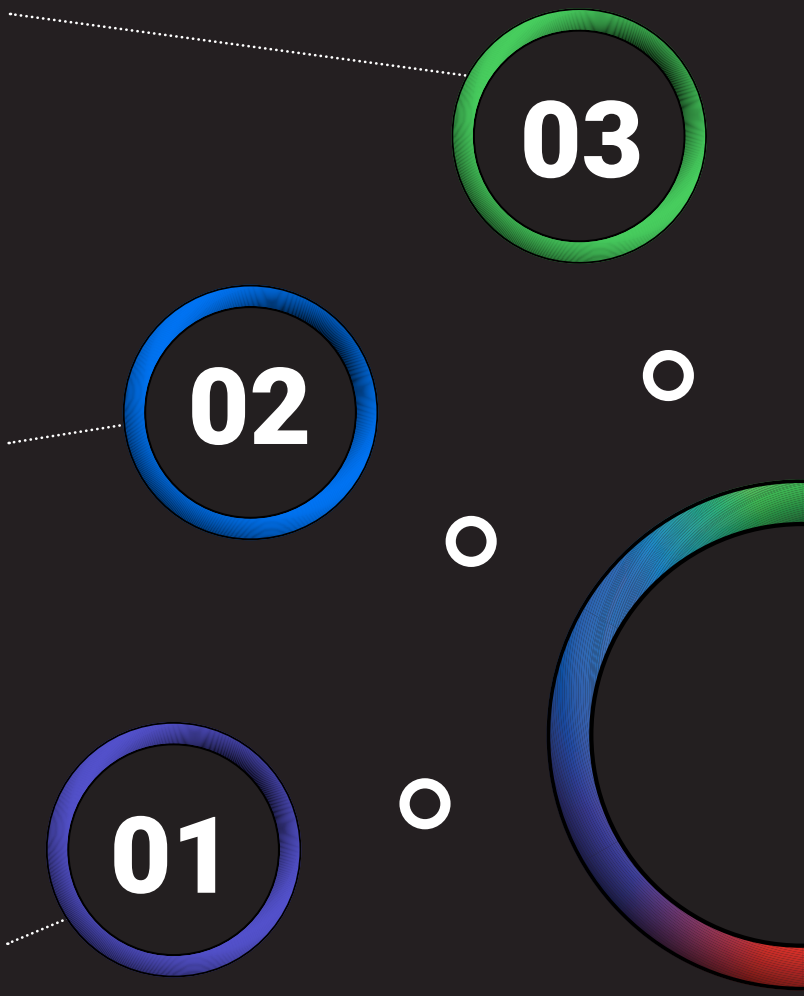
These projects shall include the development of e-services, systems and applications for key priority sectors of the Government and private sector. It also includes standardization of software; implementation of big data and emerging technologies strategies and capacity building and mindset change programs.

INFRASTRUCTURE DEVELOPMENT:

This will involve enhancing and building networks, data centers, shared application platforms and providing equipment for access, use and development of digital services.

POLICY AND REGULATORY REFORMS:

We will review and update existing policies and regulations to align with the digital transformation agenda. This will involve streamlining bureaucratic processes, promoting innovation-friendly policies, and ensuring a level playing field for digital businesses.



INVESTMENT AND FUNDING:

We will allocate significant investments and secure funding from public and private sources to support the implementation of digital initiatives. This will involve creating venture capital funds, providing incentives for digital startups, and attracting foreign direct investment in the digital sector.

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STRATEGIC PARTNERSHIPS:

We will forge strategic partnerships with industry leaders, technology providers, and international organizations to leverage their expertise and resources. Collaborative initiatives will include knowledge sharing, joint research and development projects, and capacity building programs.

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AWARENESS, TRAINING AND ADOPTION CAMPAIGNS:

We will launch comprehensive awareness, training and adoption campaigns to educate citizens, businesses, and government entities about the benefits and opportunities of digital transformation. These campaigns will promote digital skilling and literacy, showcase successful digital initiatives, and facilitate the adoption of digital technologies.

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The Digital Transformation Roadmap presents a strategic framework to guide Uganda's digital transformation journey. By prioritizing digital infrastructure, digital services, cyber security and privacy, innovation, skills, and governance, we aim to create a digitally inclusive and thriving society. Through strategic partnerships, investments, and awareness campaigns, we will empower our citizens and businesses to embrace the digital future, ensuring sustainable economic growth and improved quality of life for all.

1.0 DEVELOPMENT CONTEXT

1.1 BACKGROUND

Uganda has since the late 2000s accelerated its advancement of the ICT sector and digital transformation in general through, expansion of the telecommunications and internet infrastructure, digitalization of public services, enactment of IT and cyber legislation and capacity building. This digital transformation roadmap is meant to actualize the Digital Uganda Vision 2040 for Uganda to achieve the following benefits:

ECONOMIC GROWTH AND COMPETITIVENESS:

Digital transformation presents a significant opportunity for Uganda to drive economic growth and enhance its competitiveness on both regional and global scales. By adopting digital technologies and leveraging the power of data and connectivity, Uganda can unlock new business models, increase productivity, and attract foreign direct investment.

INCLUSIVE DEVELOPMENT AND SOCIAL IMPACT:

Digital transformation has the potential to bridge the digital divide and promote inclusive development in Uganda. By focusing on digital literacy programs and up-skilling initiatives, the digital transformation roadmap can empower citizens with the necessary digital skills to participate in the digital economy. Digital technologies can also enhance service delivery in sectors such as healthcare, education, agriculture, and financial services, improving access to quality services for rural communities and vulnerable populations.

EFFICIENCY AND EFFECTIVENESS IN GOVERNMENT SERVICES:

Digital transformation can streamline government processes and improve the delivery of public services in Uganda. By digitizing government operations, implementing e-governance systems, and fostering digital connectivity, the roadmap can enhance administrative efficiency, reduce corruption, and provide citizens with convenient and transparent access to government services.

INNOVATION AND ENTREPRENEURSHIP:

The digital transformation roadmap will provide an enabling environment for innovation and entrepreneurship in Uganda. By promoting digital startups, supporting research and development, and fostering collaboration between academia, industry, and the government, Uganda can nurture a vibrant digital ecosystem. This will encourage the emergence of local digital solutions, drive technological innovation, and create a conducive environment for digital entrepreneurship, job creation, and wealth generation.

DATA-DRIVEN DECISION MAKING:

Digital transformation facilitates the collection, analysis, and utilization of data for informed decision-making in various sectors. By embracing data analytics and artificial intelligence, Uganda can harness the power of data to drive evidence-based policy making, optimize resource allocation, and improve service delivery. The roadmap will prioritize data governance, privacy, and security to ensure the responsible and ethical use of available data for processing.

REGIONAL INTEGRATION AND COLLABORATION:

Digital transformation can strengthen Uganda's position in regional integration efforts and enhance collaboration with neighboring countries. By aligning its digital infrastructure, policies, and standards with regional frameworks, Uganda can facilitate cross-border trade, promote digital connectivity, and participate actively in regional digital initiatives. This will open new markets, expand economic opportunities, and foster regional cooperation in the digital space.

1.2 INTERNATIONAL

GLOBAL ICT DEVELOPMENT INDEX

As per the Global ICT Development Index, Uganda is below the general average of nationwide telephone penetration in Africa of ***74.60 per 100 inhabitants.***

GLOBAL CONNECTIVITY INDEX

On the Global Connectivity Index, Uganda is rated at position ***77 out of 79 profiled countries.*** Uganda's internet penetration rate is at an ***average of 43%***. The number of registered internet users has steadily grown over the years to ***over 20 million***. This shows that internet usage in Uganda has gradually increased year after year.

E-GOVERNMENT DEVELOPMENT INDEX

Uganda's ranking on the E-Government Development Index has improved by ***over 5%.*** This as a result of Government massive effort to embrace e-government for improvement of service delivery efficiency and effectiveness.

GLOBAL INNOVATION INDEX

On the Global Innovation Index, Uganda ranks at ***position 114*** globally and is also ranked amongst ***the top 10*** in the category of least developed countries. This is another positive indicator showing an increase in the development and consumption of ICT services in the country.

GLOBAL CYBER SECURITY INDEX

Uganda ranked the ***72nd*** globally in the Global Cyber security Index ***out of the 182 countries in 2020*** and the ***9th out of 43 in Africa*** with a score of ***69.98% from the 65th rank out of 193 countries in 2018*** and the ***7th in Africa with score of 62.10%.*** Uganda performed fairly well on the legal measures pillar with a score of ***15.64 out of 20 (78.20%),*** followed by cooperative measures with ***15.64 out of 20 (78.15%),*** technical measures with a score of ***14.19 out of 20 (70.95%),*** organizational measures with ***13.65 out of 20 (68.25%)*** and least on capacity development with ***10.87 out of 20 (54.35%)***. In addition to this, Uganda ranks ***62nd on the National Cyber security Index*** globally, ***5th in Africa and 1st in the East African Region.***

WORLD BANK'S GOVTECH MATURITY INDEX

As per the World Bank's GovTech Maturity Index, Uganda's index value increased from ***0.639 in 2020 to 0.858 in 2022*** and as such moved from Group ***B to Group A*** of GovTech leaders. This shows that Uganda has improved across all the four core areas considered in the GovTech Maturity Index. These four core areas cover government systems, public service delivery, digital citizen engagement and govtech enablers.

NETWORKED READINESS INDEX

Uganda ranks ***116th*** on the Networked Readiness Index. This Index consists of four pillars which include technology, people, governance and impact (growth and well-being in society and the economy). Uganda's main strength in this index relates to governance. In addition, this index ranks Uganda as 16th in Africa in the group of low-income countries. This relates to a score above the regional average with specific regard to technology and governance and also outperforms the average in Africa in the areas of access, content, regulation, inclusion and quality of life.
Uganda's area of potential improvement is capacity building that measures awareness campaigns, training, education, and incentives for cyber security capacity development.

THE OVERALL FINDING

The overall finding is that Uganda scores highly on digital policy and regulation and lower across skills, innovation and inclusiveness as well as infrastructure.

INCLUSIVE DIGITAL ECONOMY SCORECARD (IDES)

Uganda is also one of the 4 countries that have been assessed using the Inclusive Digital Economy Scorecard (IDES). The IDES identifies catalyst areas that spur the growth of an inclusive digital economy. A country that undertakes the assessment is able to further identity priority interventions to accelerate a robust digital economy over the domains of policy and regulation, infrastructure, innovation as well as skills. To date, 24 countries have been assessed using the IDES. The latest assessment rates Uganda at ***33% under the skills domain, 77% under the policy and regulation domain, 42% under the innovation domain and 51% under the infrastructure domain.***

1.3 NATIONAL CONTEXT

The National IT Survey (2022) conducted to understand the availability, access, usage, affordability and satisfaction with IT infrastructure, equipment and services amongst individuals, households, Government entities (both central and local government), and businesses identified the following key findings:

MINISTRIES, DEPARTMENTS AND AGENCIES (MDAS)

6% have an internal Enterprise Architecture.

5% have internal IT interoperability frameworks.

LOCAL GOVERNMENT (LG)

Adoption of ICT is still low with only 5.6% of staff routinely using a computer for work purposes.

61% had internet access.

BUSINESSES AND IMPLICATIONS

One in two businesses (55%) had internet access, and only one in every three businesses had a business website. Among the businesses with internet access, 58% had received orders, while 52% had placed orders for goods and services.

While the use of mobile money is high, businesses largely relied on cash on delivery/ pickup for both sales and purchases. This highlights the need to develop both digital payments and delivery logistics systems to facilitate trade.

HOUSEHOLDS

Household-level internet access is still severely limited, with 94% having no access at all. Consistent with other indicators is the urban-rural digital divide, with 13% of the households in urban areas having a working internet connection compared to 3.2% in rural areas.

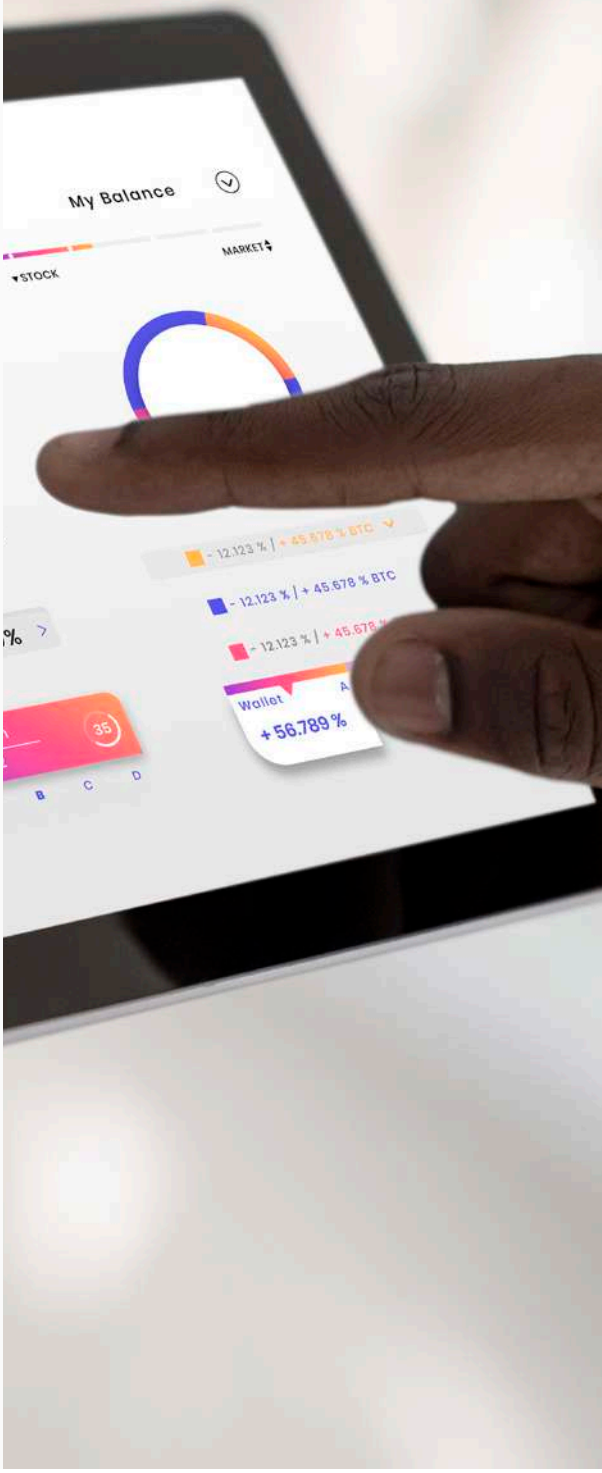
The proportion of households with working landline telephones was only 1%, but those with working mobile phones was 33%, consistent with the historical shift from landlines to mobile phones.

There are still major challenges regarding access to power, a major factor in access to online services. Only 20% of the households nationally have access to the electricity grid (55% for urban and 8% for rural).

INDIVIDUALS

Overall, 74% of all individuals had used a mobile phone in the three months prior to the survey – with the percentage in urban areas (83%) being higher than that in rural areas (71%). A gender divide is also evident, the corresponding percentage for men and women being 80 and 70% respectively. A total of 87% of those who had used phones, owned a mobile phone with the respective figures for rural and urban being 85% and 92%. While a gender divide still exists in phone ownership among those who had used phones, the gap is narrower, with 90% for men and 85% for women.

About half of all individuals (49%) had a registered mobile money account in their names compared to one in 10 individuals (10%) that had a personal bank account, underscoring the high importance of mobile money on an otherwise largely unbanked population.



The latest domestic highlights released by Uganda Communications Commission (Q2, 2022) indicate the following:

TELEPHONE SUBSCRIPTIONS

Fixed and mobile subscriptions grew by more than 690,000 new subscriptions. This translates into an 8% year on year growth in subscriptions.

NETWORK CONNECTED DEVICES

Total number of network connected devices is 36.1 million up from 35 million at the end of March 2022. 40% of new terminals are smart gadgets while the basic feature phones are 60%.

This translates into a 12% year on year growth.

BROADBAND CONNECTIONS

On a year-on-year comparison, the twelve months ended June 2022 recorded 1.9 million new broadband subscriptions. This is an 8% year-on year growth in broadband subscriptions equaling the 8%-year growth in total mobile connections recorded during the same period.

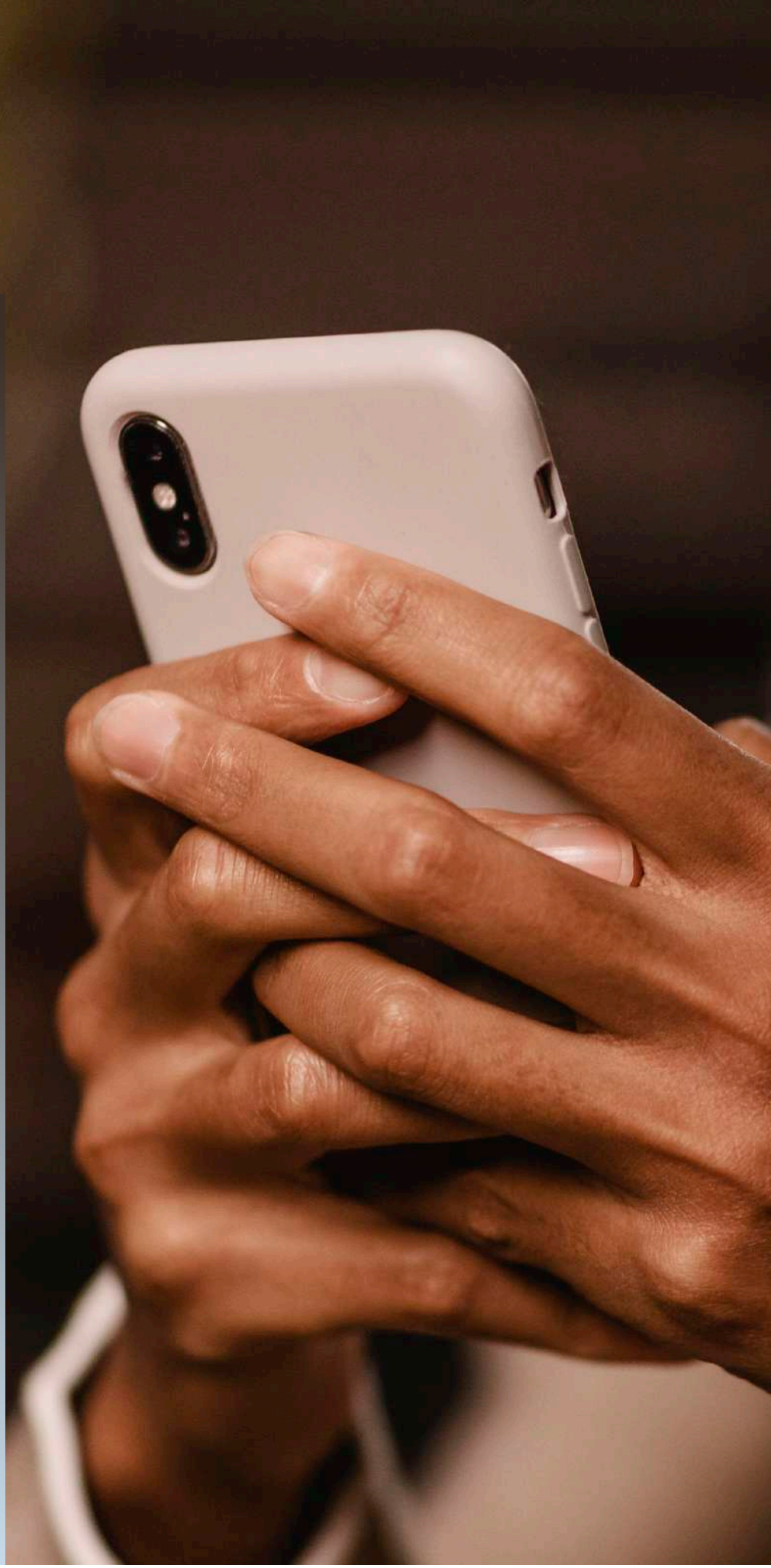
In terms of penetration, the 23.7 million broadband subscriptions translate into a broadband penetration of 55 internet connections for every 100 Ugandans.

MOBILE AND ELECTRONIC MONEY SUBSCRIPTIONS

Of the 40.7 million digital wallets, 36.9 million wallets were Mobile Network Operator (MNO) -mobile money wallets linked to MTN Uganda, Airtel Uganda and UTL.

Non-MNO linked digital wallets accounted for 10% of total wallets with a total count of 3.8 million wallets administered by licensed non-MNO Payment Service Providers.

The value of mobile money transactions grew from UGX 5.46 trillion in 1Q22 to UGX 5.99 trillion in 2Q22.



1.4 CONTRIBUTION OF ICT TO GROSS DOMESTIC PRODUCT

The contribution of ICT to Gross Domestic Product (GDP) is estimated at 9% significantly contributing to national revenue. In addition, the proportion of employment in the ICT sector is 2.3 million people. The growth in ICT's contribution to GDP is attributed to considerable initiatives made by both Government and private players in expansion of infrastructure coverage, development of e-services among others. According to National Planning Authority (NPA), the information and communications services continued to grow at an average growth rate of 14.8%. However, contribution from other activities such as computer programming as well as the ICT trade and manufacturing industries remained low.

1.5 DIGITAL UGANDA VISION 2040

The Government of Uganda (GoU) through the Ministry of ICT and National Guidance developed the Digital Uganda Vision (DUV) to guide interventions for a digitally enabled society that is consistent with 'a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years.'

The development of the DUV took into consideration the following national cyber related laws, regulations, policies, strategies and national related strategic plans:

a) NRM Manifesto.
b) All ICT related laws and regulations enacted after 2014.
c) All ICT policies, plans, guidelines and strategies put in place after 2014.
d) Uganda Vision 2040.
e) National Development Plan III.

Cognizant of Uganda's commitments at the global, continental and regional level, the DUV further considered the following:

a) Uganda's progress on achieving the Sustainable Development Goals.
b) Africa Agenda 2063.
c) East Africa Vision 2050.

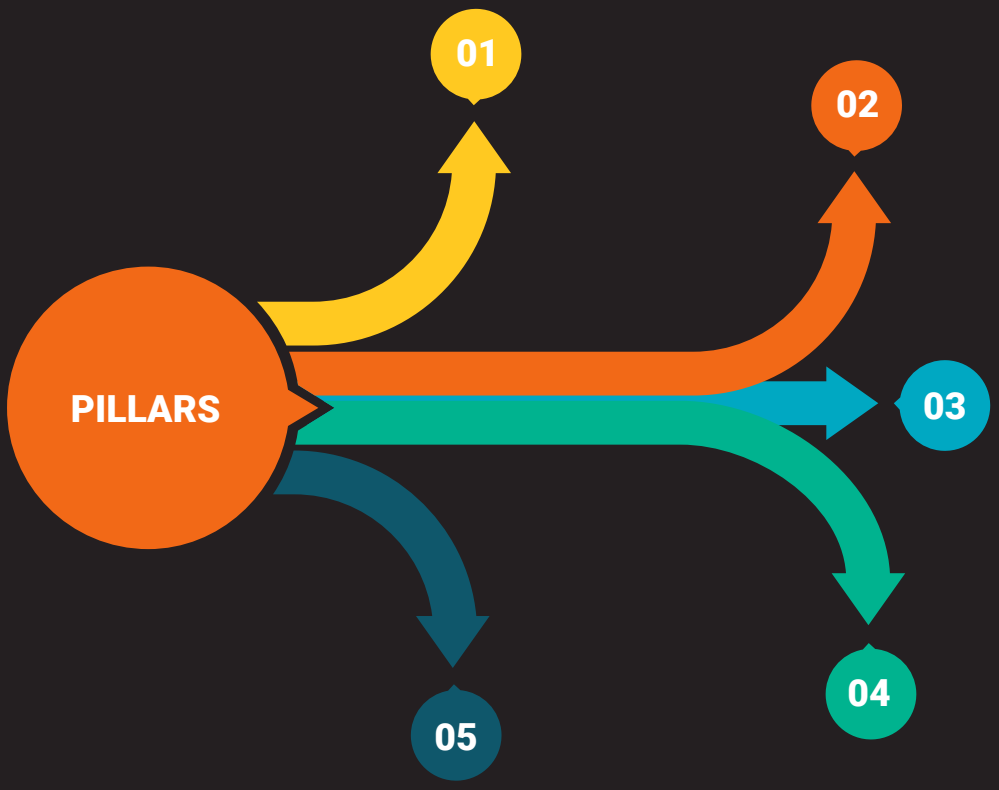
Taking the above into consideration, the DUV identified five pillars that are critical in attaining the vision of transforming Uganda into a modern and prosperous country within 30 years. The five pillars are noted below :

Pillar 1:

Digital infrastructure and connectivity which aims to establish Integrated Digital infrastructure that entails; having sufficient capacity to cater for the current and future demands.

Pillar 2:

Digital services which include the delivery of information including data and content across multiple platforms and devices such as web or mobile. This pillar seeks to promote the identification, development and implementation of citizen, business, Government and employee centric e- Services.



Pillar 3:

Cyber-security and data protection and privacy which provides assurance that digital services are safe, secure, protected, and trusted when in use.

Pillar 5:

Innovations and entrepreneurship, which focuses on commercialization of local innovations and establishment of local ICT businesses. Local innovations include ICT systems, products and content.

Pillar 4:

Digital Skills which focus on building a digitally enabled society that is agile and able to adapt to emerging technologies and trends. It also looks at promotion of digital literacy and ICT professional development for the current and future industry needs.

With the implementation of the Digital Uganda Vision, the following outcomes are expected by 2040:

The outcomes will have a positive impact on enhancing Uganda's performance in various global ICT and Digital Economy related indexes.

Based on the above, the DUV spells out the aspirations for a digitally enabled society in Uganda. In order to gain operational traction, the Ministry of ICT and National Guidance identified the need for a digital transformation roadmap, anchored to the DUV, with a focus on a responsive drive to achieve the desired outcome.

2.0 DIGITAL TRANSFORMATION ROADMAP

The DUV described the ends, and the digital transformation roadmap focuses on the means to catalyze. The roadmap therefore identifies key interventions at the operational level mapped to the DUV pillars as a strong foundation to leapfrog growth.

2.1 PILLAR ONE: DIGITAL INFRASTRUCTURE AND CONNECTIVITY

The National Broadband Baseline Survey (2022) identified the gaps for improvement of the broadband value chain in Uganda. The key issues identified correlate with the performance of the country in the various indices related to ICT infrastructure. These issues cut across three stages of the broadband value chain as noted below:

The first focusing on the first mile shows that international connectivity to neighboring countries is adequate. However, the study identified room for growth given the landlocked nature of the country and the opportunity to act as a hub for neighboring countries on connectivity.

The second focusing on the middle mile shows a lot of limitations. The middle mile includes national backbone, data centers, internet exchange points, content distribution networks which are important components for driving increased usage of internet-based services and applications. As such, access to fiber nodes (where users can be connected) is limited with only 29% of the population living within 10km of such nodes.

The third focusing on the last mile shows significant challenges. Broadband adoption is low despite good broadband coverage and relatively fast speeds. Whereas over time, the cost of data for end users and organizations has reduced, affordability was identified as a challenge. The survey reported that mobile broadband is cheap in absolute terms but not affordable in relative terms for the masses. In addition, smart phone penetration is still low with over 70% of connected phones categorized as feature/basic phones. Another aspect of last mile is the current limitations in the use of traditional postal addresses which creates challenges in delivery of physical goods and e-trade logistics. In addition, the survey identified limitations that cut across broadband policies, legal and regulatory overlaps and complexity, spectrum licensing as well as investments in Radio Access Networks and Fiber.

In order to address the above limitations, the following are the key enablers to achieve significant growth for the country as relates to infrastructure and connectivity:

MAPPING TO DUV INTERVENTIONS ON DIGITAL INFRASTRUCTURE AND CONNECTIVITY

a) Implement an ICT enabling policy framework.
b) Coordinate (across and within countries, within government and with private sector).
c) Conduct routine cost benefit analyses on suitability of installation of new edge infrastructure.

ROADMAP ENABLERS

Rationalization of broadband policies and establish a single policy source.

Adopt the Radio Spectrum Management Policy.

Develop guiding principles for spectrum allocation to enable a balance among the desired outcomes of increasing broadband access at prices affordable to consumers; ensuring fair competition; eliminating hoarding; and ensuring efficient utilization.

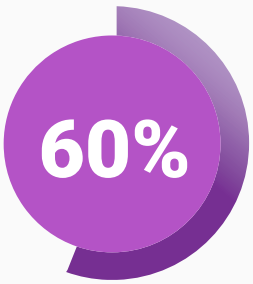
Expand the National Backbone Infrastructure (NBI) to reach all districts. The earlier survey mentions that extending fibre access is necessary because high bandwidth applications, especially video, require fibre backhaul to operate effectively. Microwave links can be used, especially in rural areas, but as demand grows, microwave will be increasingly congested and is not a long-term solution to high density population areas. Fibre is also generally more reliable than microwave in inclement weather. This will further provide a reliable digital rail for roll out of enterprise e-services and enhance connectivity (and security) for large footprint agencies that are increasingly getting digital such as the Electoral Commission, National Identification and Registration Authority. In addition, this will support Uganda's commitments under the Northern Corridor Integration Projects (NCIP) to facilitate interconnection of national networks in order to ensure cross border and international connectivity aimed at achieving ubiquitous broadband services in the region.

- Develop facilities sharing regulations.
- Enforce existing fair competition regulations.
- Enhance capacity (compute and storage) for the Government Cloud.
- Design alternative spectrum models to encourage innovation.
- Support community networks through tools such as license exempt spectrum.
- Create a social purpose International Mobile Telecommunications (IMT) spectrum license to support community operated cellular networks.
- License Low-earth Orbit (LEO) technology to provide backhaul for small wireless operators to hep bridge the digital divide.
- Develop an investment plan to roll out fibre [New technologies such as 5G (and soon 6G) demand significant bandwidth that alternatives cannot supply].
- Subsidize the expansion of the Radio Access Network (RAN) site roll out after the connection of all districts to fibre.

In addition to the above, the following are necessary to enhance the soft infrastructure requirements:

- Development of a National Public Key Infrastructure (PKI) strategy to support trust in use of e-services across public and private sector.
- Regulatory interventions to incentivize network operators to peer at the Uganda Internet Exchange Point.
- Regulatory interventions to recognize, promote and attract Content Distribution Networks (CDNs) and Cloud Providers to establish Data Centers or Points of Presence in country.
- Enhance and re-purpose use of regional postal outlets as e-service delivery points.
- Develop the digital addressing platform to enable last mile delivery of physical goods, parcels and documents which is a missing link and one of the challenges in e-commerce.
- Develop the national spatial data infrastructure to provide trusted geospatial data for government and business.
- Establish a national payment switch that connects different payment networks and allows for interoperability of payment instruments and bank accounts.

The above enablers will contribute to the following outcomes by 2028:



Internet penetration

Broadband coverage in the country

2.2 PILLAR TWO: DIGITAL SERVICES

Government of Uganda has implemented several initiatives to promote and grow use of Digital Services. These initiatives cut across legal and regulation that provide for the legality of the use of ICT to deliver services, use of shared infrastructure such as the Government Cloud and integration hub as well as operational guidance and strategies to drive an interconnected Government and promote data sharing.

The latest operational guidance has led to the development of the GoU Enterprise Architecture that describes the main principles, models, building blocks and general guidelines for implementation of digital services for citizens, businesses and public administration. As such, Uganda has an adequate legal and policy environment to support digital services. Government has undergone a tremendous transition in how it leverages ICT to improve internal efficiency and also how it delivers its services. As a result, Government has over 236 Information Systems with over 140 ICT driven innovations. The estimate in percentage increase for the growth in number of automated systems in Government over the last six financial years is over 500%. However, requirements concerning performance measurement of services is fragmented or inadequate.

The quality of information services is uneven across sectors. Although, there is an increase in active e-services, re-use of data is still siloed even with sectors which negatively affects the realization of the 'once-only' principle. This is largely driven by institutional stone walls and traditional procedures that leads to low trust in accuracy and quality of data. This hampers quick decision making and wastage of funds in maintenance of multiple information systems as well as fatigue amongst users on uncoordinated data collection initiatives. Basically, the findability, quality and speed of use of data for decision-making and planning with analytical support is inferior.

Furthermore, limitations in accessing the Identification Registry for KYC (Know Your Customer) purposes has increased the cost and duration for onboarding a user. The next level of focus should be on harmonized implementation as well as enhancing the experience and responsiveness for digital services.

Based on this, the following are the key enablers to achieve significant growth for the country as relates to digital services:

MAPPING TO DUV INTERVENTIONS ON DIGITAL SERVICES

a) Review and automate integrated end to end government business and service delivery processes.

b) Facilitate access to and utilization of e-Governance services including e-cities.

c) Promote citizen awareness, engagement and participation.

ROADMAP ENABLERS

Development of single identifiers, shared digital registries and related catalogue of information systems and services within sectors to promote data exchange, meta data management. The digital registries will act as sources of truth within sectors to reduce on duplication of efforts and also eliminate data silos as well as promote the 'once-only' principle.

Development and implementation of a citizen e-service co-creation strategy that will drive user focus engagement and include citizens in the design and enhancement of digital services.

Development and implementation of the National Big Data Strategy.

Each MDA to develop a minimum of three flagship integrated e-services to enable roll out of e-services across all NDPIII programs compliant with e-service regulation and standards drawn from the Sector ICT interventions listed in the DUV.

Establishment of a testing and certification scheme for software to ensure that quality standards are met and our services are exportable.

Capacity building for ICT cadre and policy makers in Government to ensure Government has in place the right competencies to drive the digital transformation agenda.

Development of a digital mindset change program to increase appreciation and support for digital services amongst the top management layer of MDAs and LGs and adoption of the digital first fast for service delivery as well as promote data governance.

Promote and ensure continual enhancement of digital shared services.

Improve access to KYC digital services to enable ease in roll out of digital services that require user identification.

Develop a Digital Service Standard that will promote enhanced user experience (user centric) and mandate service performance metrics to drive continual improvements and also increase transparency and accountability The Standard will also provide for principles related to:

a) Digital access and inclusion of people with disabilities;
b) Needs of people with poorer digital skills/ low digital literacy; and
c) Needs of diaspora that need to access e-services back home.

The above enablers will contribute to the following DUV outcomes by 2030:

85% Of government services online.

85% Of transactions conducted through the shared public service delivery system.

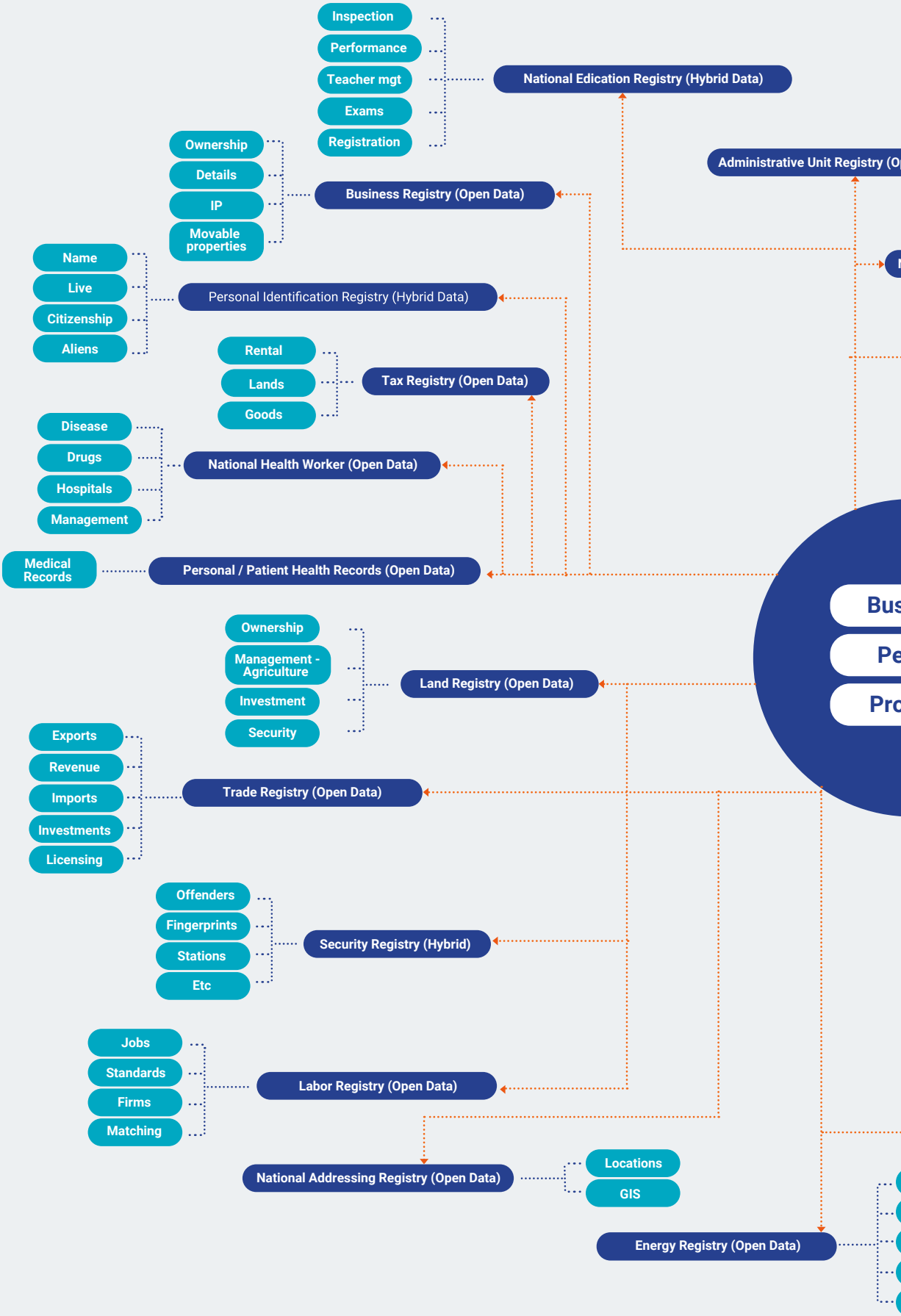
50% Increased transactions on automated end to end government business processes.

75% Of public entities that have e-services compliant with the Enterprise Architecture Framework.

50% Enhanced citizen participation and inclusion.

Mind Map for E-services and the development of single Registries

In the Digital Transformation Roadmap, priority services and registries have been identified for digitization and integration. These e-services and registries have been selected based on two key strategic documents; the priority sectors in the National Development Plan 2020/21 - 2024/25 and the key interventions in the Digital Uganda Vision .


Inspection
Performance
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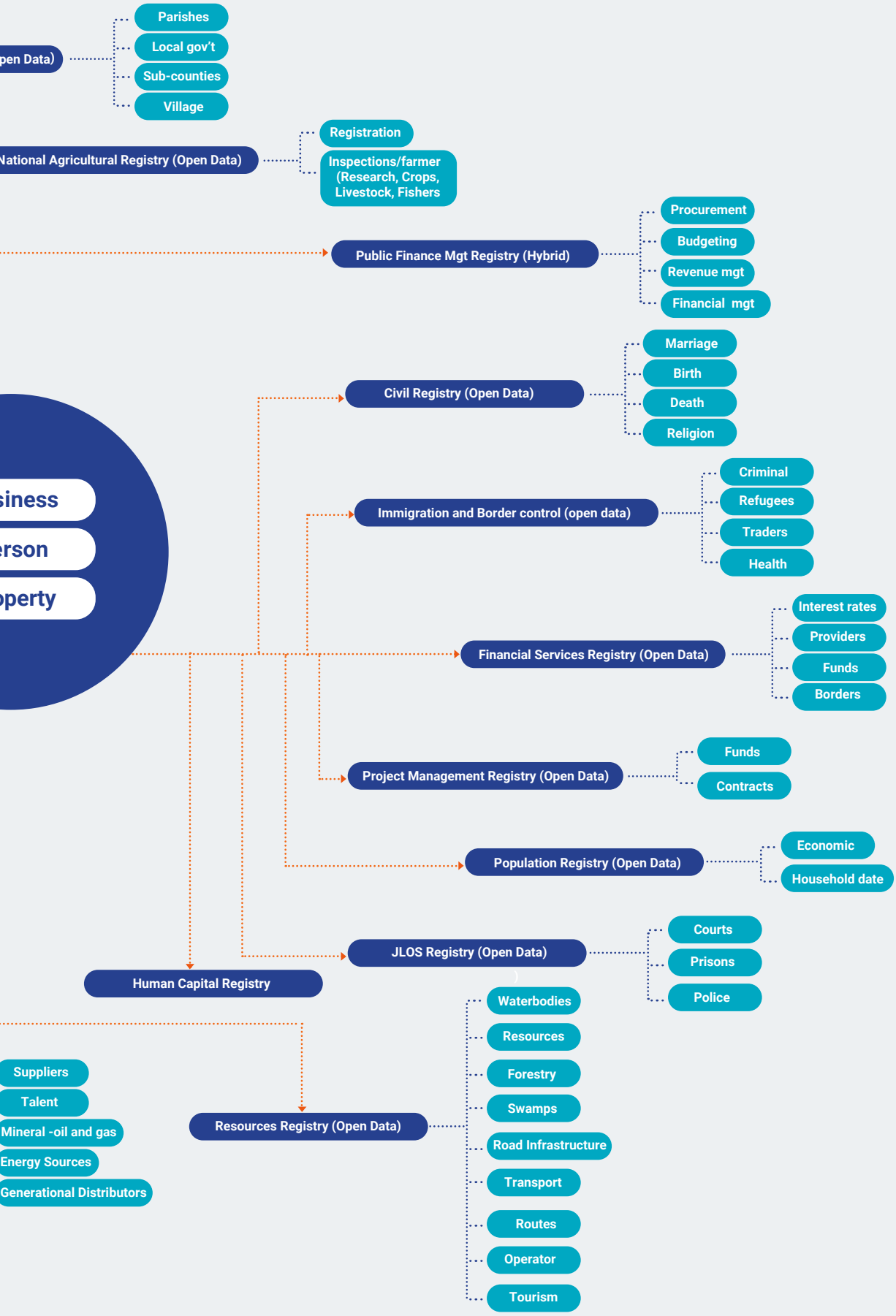

Parishes
Local gov't
Sub-counties
Village
Registration
Inspections/farmer (Research, Crops, Livestock, Fishers
Procurement
Budgeting
Revenue mgt
Financial mgt
Public Finance Mgt Registry (Hybrid)
Marriage
Birth
Death
Religion
Civil Registry (Open Data)
Criminal
Refugees
Traders
Health
Immigration and Border control (open data)
Interest rates
Providers
Funds
Borders
Financial Services Registry (Open Data)
Funds
Contracts
Project Management Registry (Open Data)
Economic
Household date
Population Registry (Open Data)
Courts
Prisons
Police
JLOS Registry (Open Data)
Human Capital Registry
Waterbodies
Resources
Forestry
Swamps
Road Infrastructure
Transport
Routes
Operator
Tourism
Resources Registry (Open Data)
Suppliers
Talent
Mineral -oil and gas
Energy Sources
Generational Distributors

2.3 PILLAR THREE: CYBER SECURITY, DATA PROTECTION AND PRIVACY

Uganda has performed fairly and has been consistently rated in the top percentile of indices on the continent and in the region. However, the cyber threat landscape keeps on evolving. In addition, the increase in use of digital services across both public and private sector increases the cyber risk and exposure of the country. The potential for the total transformation of the economy and the attendant social impact is best demonstrated by the pervasive expansion and use of mobile money services in Uganda.

Also, to note, the DUV focuses on building a digitally enabled society that is agile and able to adapt to emerging technologies and trends. Cyber security continues to be a challenge in Uganda and the share of cyber related (computer) crimes to total economic crimes is on the rise. Therefore, it is important to have in place a robust and solid cyber security approach that establishes measures to ensure security of digitalization process and help to protect Uganda and its citizens in cyberspace.

It's based on this, that the current National Cyber security Strategy (2022) adopted the whole-of nation principle where reduction of overall national cyber risk is a shared responsibility. In addition, Uganda has a robust legal and regulatory framework for data protection and privacy with an operationalized Personal Data Protection Office. With the National Cyber security Strategy (2022) providing the required guidance, the next level of focus should be on harmonized implementation. Based on this, the following are the key enablers to achieve significant growth for the country as relates to cyber security, data protection and privacy.

MAPPING TO DUV INTERVENTIONS ON CYBER SECURITY, DATA PROTECTION AND PRIVACY

a) Building appropriate cyber security and data protection capabilities.
b) Enhanced security of digital online services.
c) Ensure protection of privacy of personal data.
d) Enhanced monitoring, enforcement and compliance to cyber security, data protection and privacy standards.

ROADMAP ENABLERS

Fostering a safe and trusted digital economy

Prioritize support for Small and Medium Enterprises.

Expand Cyber security Investments.

Threat preparedness and response

Promote National Cyber risk assessments.

Enhance national and sectoral incident response and information sharing.

Robust cyber security ecosystem

Enhance protection of National Critical Information Infrastructure.

Enhancement on enforcement and compliance with the Personal Data Protection and Privacy Act.

Cyber skilled Uganda

Raise public cyber security awareness.

Enhance knowledge through research and development.

Active and reliable partner of the international community

Increase bi and multi-lateral dialogue at the regional level.

Build capacity and confidence through international collaboration.

Promote calls for action for responsible state behavior in cyberspace.

The above enablers will contribute to the following outcomes by 2028:

75% of entities with access to adequate and relevant capacity for increased operational and responsive cyber security.

75% of public entities in compliance with the National Information Security Framework.

75% of all entities in compliance with data protection and privacy legal and regulatory framework.

85% Enhanced protection of National Critical Information Infrastructure.

2.4 PILLAR FOUR: DIGITAL SKILLING

The Fourth Industrial Revolution in which we now live requires citizens to have basic digital literacy in order to interact, navigate and make use of digital content and services. In addition, the work place is changing across Government and private sector through the fast adoption of ICT. This change is increasingly affecting all sectors and professionals. Job creators will also require digital literacy skills. The present way of work and life is fast getting digital. The implication of this change is that we must be forward looking and integrate digital skills within our education system as early as the entry level of primary school. This will require retooling for the teachers as well as education for the students. Government of Uganda, under the Uganda Communications Universal Services Access Fund (UCUSAF) set up ICT labs in over 1,000 secondary schools, tertiary institutions and universities across various regions of the country as well as trained over 3,800 teachers on basic computer literacy.

This intervention has mainly focused on secondary schools. The current focus from UCUSAF is to gain more leverage through implementing the ICT training for teachers within the teacher training colleges. The school labs have also been used to train over 300,000 citizens drawn from school neighboring communities on basic digital literacy skills. In order to enhance its sustainability, 500 citizens were trained through Uganda Institute of Information and Communication Technology to be able teach community members. In addition to this, Uganda Communications Commission further activated the establishment of ICT Clubs within supported schools in order to support peer to peer learning and innovation within student communities. Besides Government intervention, private sector schools have undertaken the most investment to equip their schools with ICT labs and also attract competent ICT trainers. However, the focus has mainly been to the students that are studying ICT related subjects at O' Level and A' Level.

The primary and tertiary uptake of ICT is still limited due to a mix of factors that involve funding, infrastructure, teaching skill and electricity challenges. The UCUSAF has limited funding that can take only additional 70 computer laboratories every year and also addresses ongoing maintenance costs and connectivity. Overall, digital skilling is still laced with challenges to achieve the desired critical mass of students that have been readied for the fourth industrial revolution. Based on this, the following are the key enablers to achieve significant growth for the country as relates to digital skilling:

MAPPING TO DUV INTERVENTIONS ON DIGITAL SKILLING	ROADMAP ENABLERS
a) Develop and implement a national digital skills formation framework.	Development of the digital skilling pilot program. The design of the pilot program will in addition address the following key aspects: a) Inclusion of people with disabilities; and b) Inclusion of the girl child

The above enablers will contribute to improved spectrum of digital skills through enhanced curricula and pedagogy including for persons with special needs.

2.5 PILLAR FIVE: INNOVATION AND ENTREPRENEURSHIP

To a large extent, the ICT products and services used across public and private are have been developed elsewhere. The local innovation and startup landscape is still nascent and therefore we have imitated local commercialized ICT products. The local startup ecosystem involves a few innovation hubs and Entrepreneur Support Organizations (ESOs) with most of them concentrated within Kampala Capital City and limited areas out of Kampala. There has been positive movement to consolidate the previous efforts in order to combine synergies through the establishment of the Association of Innovation and Entrepreneurship Support Organization in 2019. This has led to the rise of the Kampala Innovation Week (KIW) which has so far had four editions all promoting local innovations and sharing success stories in the country. To further further enhance the growth of the local innovation ecosystem, the Government of Uganda established the National ICT Initiatives Support Programme (NIISP).

The Programme primarily aims at facilitating growth and development of the local software applications and innovations by providing access to seed capital as well as working environment under the National ICT Innovation Hub. The NIISP has over the last five years supported over 24 startups of which four (4) have increased their market access beyond Uganda. The fund has realized notable local development and implementation of enterprise cost effective solutions such as the Electronic Government Procurement System and Education Management Information System leading to significant cost savings. This has demonstrated that locally developed solutions can meet business objectives. In addition, the Ministry of ICT in 2022 unveiled an initiative named 'Discover Africa's Innovation Powerhouse,' geared towards profiling successful Ugandan innovators and supporting them obtain access to new markets and funding at the global level. Furthermore, the Procurement and Disposal of Public Assets Authority (PPDA) issued out Guidelines in 2018 that created reservation schemes to promote local content (including local innovations) in public procurement.

Albeit there are still operational challenges related to obtaining support from Government MDAs to accept or use products and services developed by Ugandan startups. Based on this, the following are the key enablers to achieve significant growth for the country as relates to innovation and entrepreneurship:

MAPPING TO DUV INTERVENTIONS ON INNOVATION AND ENTREPRENEURSHIP

a) Development of an ecosystem that promotes development and commercialization of local ICT products and solutions including data and collaborative research.

ROADMAP ENABLERS

Enhance the National ICT Innovation hub at the Ministry of ICT and National Guidance to:

- Provide shared services as digital rails for use by startups.
- Champion access to Government e-services and APIs through UgHub by private sector.
- Drive mindset change to increase the acceptance of locally developed innovations.
- Ensure sustainability of digital national projects through enhancing the Hub structure.
- Enhance support for growth of the startup ecosystem by creating digital centers of excellence as well as in country and off shore promotion of Uganda's innovations building on the Uganda as Africa's Innovation Powerhouse campaign.
- Enhancing access to funding for startups.
- Promote use of sandbox environments with regulators to support innovators and systematic experimentation.

The above enablers will contribute to the following outcomes by 2030:

- Increase in Number to 282 ICT innovation products developed and commercialized.
- Increase in Digital Centers of Excellence in the productive centers of the country.
- Strengthened partnerships for knowledge sharing.

2.6 SYSTEMATIC EXPERIMENTATION

Government has generally had a slow response to the uptake of new and emerging technologies. This is mainly due to the gaps in knowledge and also lack of a formalized approach to experiment and allow use of emerging technologies within both service delivery and public administration. Globally, advancements in technologies have led to improved effectiveness and efficiency in service delivery. Businesses that adopt these have experienced positive returns on investment as well as positive impact on productivity and ease of doing business. Last year, Government through the Ministry of ICT and National Guidance made initial progress towards use of emerging technologies through the establishment of the National 4IR Strategy and the Framework for Ethical AI. In addition to shift from a 'regulate and forget' to a 'responsive, interactive approach,' the Ministry of ICT and National Guidance signed a Memorandum of Understanding with Sunbird Artificial Intelligence (AI) geared towards leveraging Artificial Intelligence Systems to increase the use of ICT services for Uganda's social and Economic development in accordance with NDPIII. Sunbird AI is a non-profit organization which focuses on developing open-source, practical, African centered systems that primarily works with partners to use data technology to improve planning, decision making and strengthening feedback between Citizens and policy makers.

This Digital Transformation Roadmap recognizes the value of emerging technologies and as such provides for the following commitments to support systematic experimentation of new and emerging technologies in Uganda:

a) To initiate and fund pilot projects for the adoption of innovative solutions.
b) To promote relevant innovation-related cooperation with the private sector and development partners.
c) Increase and coordinate the commissioning of digital government related research and development activities across the country and disseminate and put to use their results.
d) To increase regulator collaboration by increasing knowledge that will enhance responsivness that enables experimentation using new and emerging technologies.
e) Increase collaboration with relevant associations to create and grow Centers of Excellence on use of emerging technologies.

Through the Digital Transformation Program, the Ministry of ICT and National Guidance will initiate systematic experimentation in the following areas within the first two years of the approval of the Roadmap using a proof of concept approach:

SOURCE DOCUMENT	ROADMAP ENABLERS
National 4IR Strategy	**Agriculture:** Traceability using blockchain to enhance transparency, validation and authenticity on agricultural produce origin in an immutable and secure manner. This will improve competitiveness for most exported agricultural produce in Uganda. As a result, blockchain can be tested out to support ethical production over the agriculture life cycle.

SOURCE DOCUMENT

National 4IR Strategy

ROADMAP ENABLERS

Remote sensing and analytics to assess weather patterns and predict the impact of adverse weather conditions on future yield and farming season planting.

Smart credit risk assessments to provide financial institutions with agriculturally-relevant and data driven models to assess risk and develop credit scoring that fit the needs of small holder farmers. This will allow them to have access to capital.

Mobile delivered digital extension services to upskill farmers knowledge and capabilities to increase productivity embedded with AI capabilities and natural language processing.

Human Capital

Enhancing teacher and student capabilities through digital tutoring as a channel to delivery of quality education to populations who remain hard to reach including a blend of Augmented Reality (AR) and Virtual Reality (VR).

Aligning the education system to meet the needs of 4IR by equipping youth with knowledge, skills and capabilities to participate in transformation of the economy as well as increase employment opportunities both in country and offshore. Micro-credentialing and online courses can be used to acquire specific skills to meet the global demand in areas such as blockchain.

Enhancing medical supply chains using blockchain to enhance the integrity of medical supply chains and overcome current challenges of counterfeit medicines by facilitating proof of authenticity.

Improving emergency response and supply of relief items and medical supplies in hard to reach areas or disaster affected areas using unmanned aerial vehicles.

Water and Environment

Internet of Things (IoT) remote sensing to predict disasters and improve proactive response as well as early warning in communities prone to occurrences such as mud slides and flooding.

Managing water resources using a fusion of IoT sensors, cloud-based water management systems for a sustainable borehole management Programme in Uganda.

Land

Using blockchain to enhance security and transparency in land registration as well as reduce on forgeries and legal disputes related to land ownership in Uganda. Countries that have implemented this have realized the benefits in reduction in paperwork, reduction in fraudulent activities, enhanced speed in transactions, improved property verification and unlocking capital.

e-Participation

Using blockchain to incentivize community participation in planning, idea generation, and community driven supervision of service delivery. Blockchain-based planning platforms can include educational resources, token-based participation incentives, and a feedback loop between stakeholders. This would encourage community engagement and better integrate local communities in the planning, developing value chains, improving public confidence, and improving services for sustainable success.

Smart contracts can be automated to incentivize good behavior from all stakeholders and improved feedback loops for long-term sustainability and delivery of good plans.

SOURCE DOCUMENT

Ethical AI Framework for Uganda

ROADMAP ENABLERS

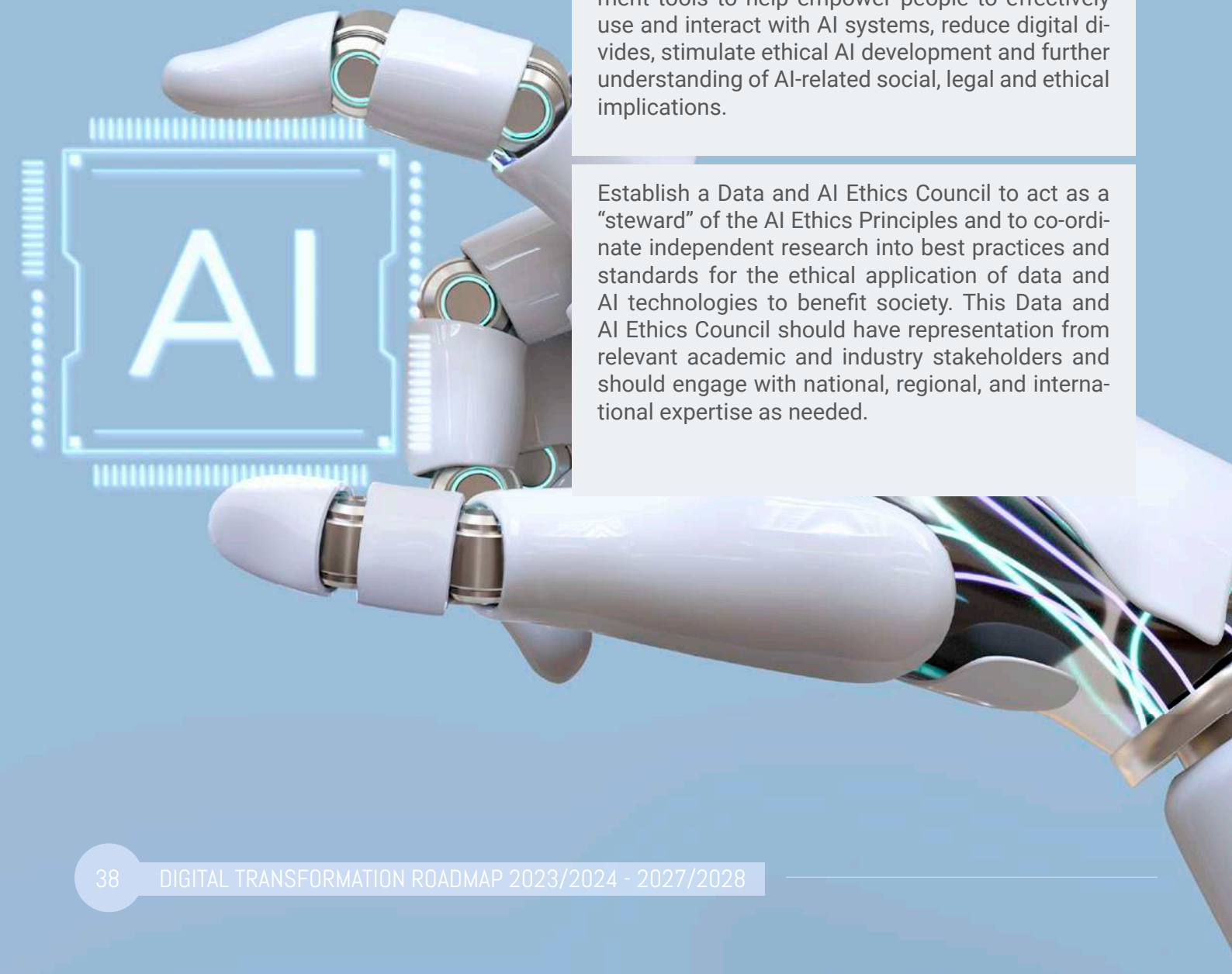
Develop a National AI Strategy that will provide guidance on the social value, societal unity, and social impact arising from the use of artificial intelligence and other data-driven technologies.

Invest in AI literacy and research to empower people to effectively use and interact with AI systems, reduce digital divides, stimulate ethical AI development and further understanding of AI-related social, legal and ethical implications.

Mobile delivered digital extension services to upskill farmers knowledge and capabilities to increase productivity embedded with AI capabilities and natural language processing.

Develop ethical framework guides and self-assessment tools to help empower people to effectively use and interact with AI systems, reduce digital divides, stimulate ethical AI development and further understanding of AI-related social, legal and ethical implications.

Establish a Data and AI Ethics Council to act as a “steward” of the AI Ethics Principles and to co-ordinate independent research into best practices and standards for the ethical application of data and AI technologies to benefit society. This Data and AI Ethics Council should have representation from relevant academic and industry stakeholders and should engage with national, regional, and international expertise as needed.



2.7 PRESERVING THE ENVIRONMENT

Use of IT enabled services helps to promote green environment due to reduction in paper-based transactions. In addition, advancements in technologies have led to use of cloud setups based on virtualized servers that reduces on the percentage of energy consumption as well as carbon dioxide (CO 2) emissions into atmosphere. The other advantage of such advancements is reduced cost of equipment on local servers.

The Digital Transformation Roadmap will further promote preservation of the environment and use of Green IT through the following:

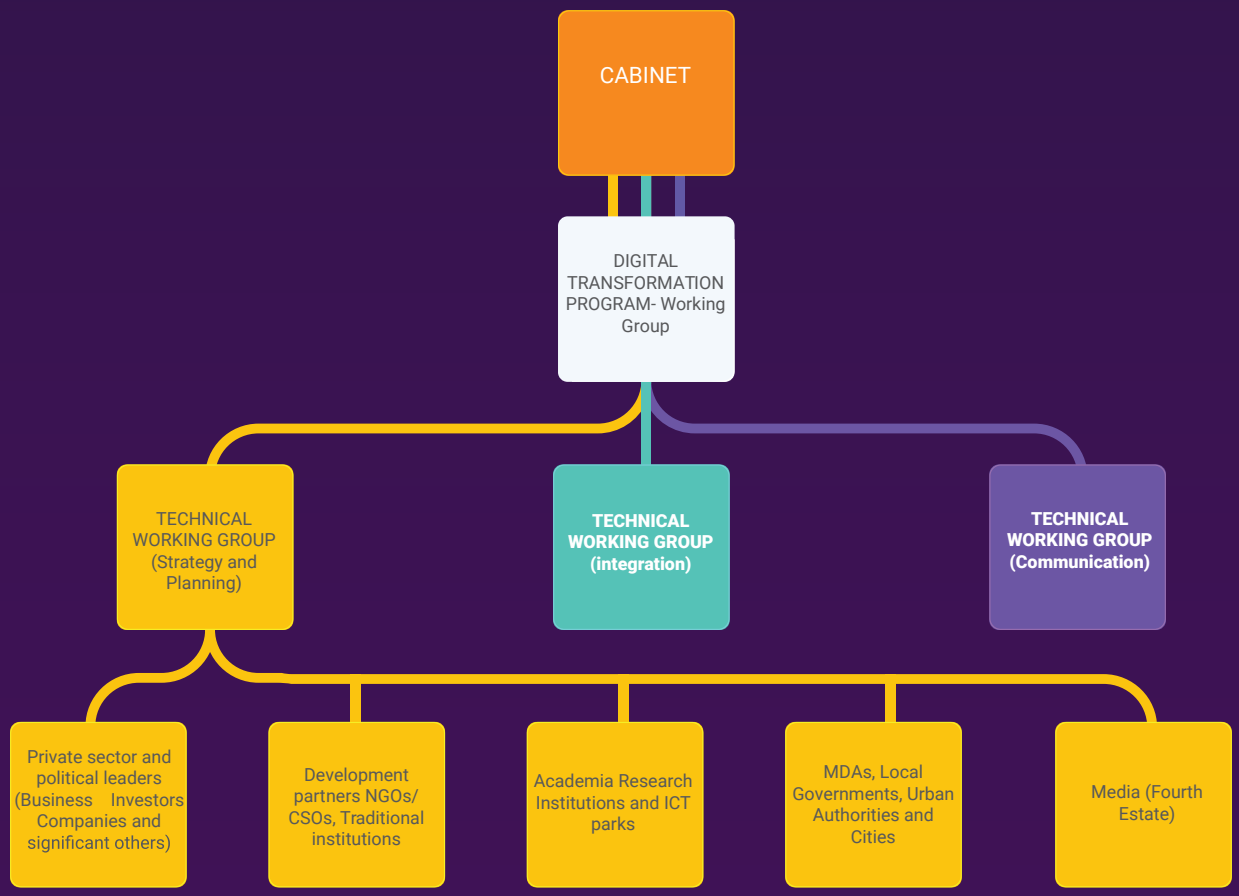
a) Reduction of energy consumption by promoting the use of cloud services and designing e-services to run by default in virtualized environments.
b) Promote the use of end computing devices especially modern versions that use less energy.
c) Disposal off e-waste in compliance with the National e-waste Policy.
d) Promotion of Environmental, Health and Safety best practices to protect human health and the environment as we increasingly utilize ICT products and services.
e) Continuous greening of the National Backbone Infrastructure (NBI) transmission sites using solar energy. Government will further encourage Internet Service Providers to implement green initiatives that reduce carbon emissions at transmission sites.

Collectively, this will enable the ICT Sector to demonstrate commitment to the UN Sustainable Development Goals on climate action as well as affordable and clean energy.

3.0 GOVERNANCE AND RESOURCE MOBILIZATION

3.1 IMPLEMENTATION ARRANGEMENTS

The Governance that will drive the implementation, monitoring and evaluation for this Roadmap will re-use the existing institutional framework established within the Digital Uganda Vision. The Governance is indicated in the illustration below :



Implementing Entity	Role Description
Cabinet	Consider and guide on the imperatives for a digital Uganda and approve policies, laws and regulations (as the later are sent to H.E the President for Assent).
Digital Transformation Program Working Group (DTPWG)	This Working Group comprises of heads of MDAs under the Digital Transformation Program. The DTPWG will take on the following roles: a) Coordinating the DUV Implementation; b) Organizing and guiding quarter meetings and activities of management structures; c) Preparation and dissemination of Action Plans (including costing and Monitoring Frameworks) and ensuring alignment with NDP III, Manifesto and Presidential Directives; d) Preparation and dissemination of quarterly, semi-annual and annual DUV implementation reports; e) Facilitating the annual DUV performance reviews; and f) Organizing DUV monitoring, inspection and other activities to enable collection of physical data to facilitate evidence-based reporting.
Technical Working Group – Strategy and Planning	The TWG on strategy and planning will be constituted by DT-PWG which is now in place. This WG shall: a) Ensure broad stakeholder consultation in discussing key issues and harmonize Government and stakeholder positions; b) Examine and review of DUV related policies and plans, reviewing past performance, emerging policy issues and future spending pressures; c) Formulate DUV Implementation plans in line with the Roadmap and their alignment to the national budget; and d) Monitoring the implementation of the sub-component DUV areas of the Roadmap.

Technical Working Group – Communication	The Communication TWG will be constituted by all public relations officers and spokespersons of MDAs and the private sector umbrella organizations. The roles will include the following: a) Reviewing and clear sub-component DUV areas of the Annual and semi-annual DUV performance reports before consideration by the DUV Secretariat; b) Developing position papers on policy and strategic issues in the thematic area for consideration by cabinet; c) Reviewing new project concept notes and make recommendations to DUV WG for clearance; d) Facilitating dialogue with partners (DPs, CSOs, etc.) around each program on emerging policy and technical issues aimed at increasing impact on DUV outcomes; and e) Ensuring timely sharing and dissemination of key information to PWGs and program institutions to facilitate implementation of DUV activities.
Implementing Partners	a) Private Sector; b) Development partners, NGOs and CSOs as well as Traditional Institutions; c) Academia: Schools, and Training Institutions and ICT Parks; d) Local Governments, Urban Authorities and Cities; and e) Media (Fourth Estate).

Ref: Digital Uganda Vision (variation)

In addition, the resource mobilization shall follow the financing measures identified within the Digital Uganda Vision which include:

a) Appropriations from the national budget to various implementing MDAs and LGs;
b) Development partners;
c) Provision of pre-financing through Uganda Development Bank;
d) Leveraging private equity funds; and
e) Domestic revenue mobilization.

3.2 CROSS SECTOR COLLABORATION

Collaboration with responsible Ministries, Departments and Agencies has been identified as necessary to influence the right interventions to address the following key challenges that affect Digital Transformation but are outside the ambit of the Ministry of ICT and National Guidance :

ACCESS TO ELECTRICITY

01

The National IT Survey (2022), the National Baseline Survey and Infrastructure Blueprint and several index measures identified gaps in the national electricity grid coverage as a driving factor to low adoption of ICT related services and devices. Government is undertaking various efforts through Ministry of Energy and Mineral Development to increase the national electricity grid coverage using a mix of hydro generated electricity, solar and other renewable energy generation projects. The collaboration will align the coverage increase plan with areas where Government can invest internet infrastructure extension or reuse investments in energy for increase in coverage of fiber. The increase in electricity grid coverage has a positive impact on ensuring available supporting infrastructure for extra nodes and empowering access for end users.

HARMONIZATION OF TAXES FOR ICT RELATED PRODUCTS AND SERVICES

02

The National Baseline Survey and Infrastructure Blueprint highlighted the stalement between tax and ICT policies. On one hand, Government strives for increased access to ICT goods and services and on other hand establishes taxes that hamper the earlier aspirations. In addition, the conflict in taxation versus access creates Uganda as a less favorable destination for ICT related investments in the region. In addition, local assemblers and manufacturers of ICT devices similarly face a tax burden which leads to a higher price in terms of device cost for end users. Ministry of ICT and National Guidance should pursue collaborations with the Ministry of Finance, Planning and Economic Development to harmonize the taxation approach for ICT goods and services that will spur access as well as create an attractive environment for ICT related investment. This will enable Uganda seize the opportunity of transformation into a regional ICT hub.

03

COLLABORATION WITH MINISTRY OF LOCAL GOVERNMENT AND LOCAL GOVERNMENT ADMINISTRATION TO CREATE A FAVORABLE OPERATING ENVIRONMENT FOR BROADBAND INFRASTRUCTURE INSTALLATIONS.

Telecom operators are exposed to further indirect costs from Local Governments for installation of Broadband Infrastructure.

04

COLLABORATION WITH PRIVATE SECTOR FOUNDATION UGANDA TO BOOST THE USE OF ICT GOODS AND SERVICES AMONGST SMALL AND MEDIUM ENTERPRISES THAT FORM THE FABRIC OF THE ECONOMY.

Increase in adoption of ICT within daily business practices amongst SMEs will further spur the growth of Uganda's digital economy. In addition, this improves competitiveness, productivity and resilience for SMEs especially given the impact of COVID-19 where digital was the only means of survival. The National IT Survey further identified this gap. An example is one in two businesses (55%) had internet access, and only one in every three businesses had a business website. Ministry of ICT and National Guidance should establish a collaboration to promote the use of ICT goods and services amongst SMEs. This will entail undertaking an assessment to establish the current challenges so as to identify and tailor interventions for improvement. The European Union Digital Intensity Index for SMEs could be used as a benchmark. This will further compliment running interventions such as the online market intelligence platform to facilitate export trade, B2B exchanges and connections between Uganda SMEs and counterparts in other countries as well as tap into opportunities presented through the African Continental Free Trade Area.

05

COLLABORATION WITH BANK OF UGANDA TO ENHANCE THE CURRENT APPROACH FOR DIGITAL PAYMENT INFRASTRUCTURE

This will influence the establishment of the necessary payment switch infrastructure to enhance instant real-time payment necessary for growth of the digital economy.

06

Collaboration with the Ministry of Trade, Industry and Cooperatives to review and enhance the Uganda Micro, Small and Medium Enterprise (MSME) Policy to create a conducive and business competitive environment that will allow access to markets especially in public sector related procurements.

Collaboration with Academia, private sector, industry associations and innovators to implement the projects in each pillar.

07

Coordination process for interested partners

3.3 MONITORING AND EVALUATION

The implementation roadmap of the Digital Transformation Roadmap will be monitored through the Monitoring and Evaluation Framework provided for under the Digital Uganda Vision. The framework is aligned to the reporting and accountability frameworks for Government and includes annual as well as mid-term evaluation to report on lessons learned and identification of areas for improvement. In addition, all entities that have lead roles shall be required to follow current reporting guidelines for quarterly reporting and will review work-plans and budgets for activities' implementation as presented in the implementation log frame.

3.4 RISK MITIGATION

This roadmap will follow the Risk Mitigation strategies that are laid out in the Digital Uganda Vision. The strategies address risks in these areas; operational, financial, organizational and technological.

Nature of Risk	Anticipated Risk	Mitigation Measures
Operational Risk	a) Insufficient resource investment in this sector. b) Various MDAs remain under-resourced with the current ICT investment in most of government being below 32%. c) Gaps in up-take of IT systems making automated work difficult and sustaining bureaucratic procedures and delayed implement-tion of key functions. d) Multiplicity of un-matching case reporting formats some lacking key flexibilities and agility to align to diverse stakeholder needs.	a) Wider staff engagements at dissemination and awareness events to show-case the critical role of digitalization and its capacity to integrate Uganda into the global sphere of influence under various sectors. b) Enhancing provision of systems, computers as well as human resource capacity to roll out key aspects of this vision via various networks to various regional offices on which they ought to operate. c) Establish widely agreed-to and agile reporting template to serve reporting needs of various stakeholders. d) Fully implement the human resource structure to ensure stability and predictability of human resource performance to drive the digitalization agenda.
Strategic Risk	There are various policies, laws and regulations law that need to be reviewed to create an enabling environment for the attainment of the DUV. With a legal and institutional framework, there will be challenges in implementing strategic interventions paramount to the attainment of this vision.	a) Develop and implement a robust M&E dashboard/system to support reporting, oversight and reform. b) Ensure finalization and passage of strategic policies and Acts of Parliament to clearly stipulate the roles of various actors in the digitalization agenda. c) Strengthen collaborative mechanism between all executing agencies.

Financial Risk	a)	Currently the Digital Transformation Program faces limited resource al location from the national budget to fully execute the laid out agenda under NDP III.	a)	Develop and implement a resources mobilization strategy so that it is able to facilitate some of its activities with limited reliance of government allocation alone.
	b)	There is limited clarity on how resources are shared across various MDAs.	b)	As a DUV process there will be clarity on financing arrangements to increase the integrity of the planning, budgeting and financing and accountability.
Technological Risk	a)	Slow uptake of ICT systems within MDAs and among non-state actors.	a)	Government shall ensure full functionality of the all ICT systems and support staff in its use. This will include recruitment of more IT staff on permanent terms, and pro curement of scanners, computers and other supporting IT equipment.
	b)	The level of infrastructure stock is limited and the use of current stock is passive.	b)	There will be efforts to link all sys-tems and their interface with other national IT systems.
	c)	MIS has not yet been fully operationalized and other systems in place are not used as required.	c)	Government will sustain plans to set up e-Government centers of excellence per region.
	d)	Logistical challenges in terms of tools such as computers /laptops and low internet connectivity.	d)	Ensure that there is annual subscription to online libraries for offices to access new documented reference cases as well as protection of domains.

Ref: Digital Uganda Vision (variation)

4.0 IMPLEMENTATION PLAN

4.1 FIVE YEAR ROADMAP FOR INITIATIVES

DUV Pillar 1 - Digital Infrastructure and Connectivity						
Roadmap Enablers	Lead Entity	Year 1	Year 2	Year 3	Year 4	Year 5
Rationalization of broadband policies and establish a single policy source	MoICT & NG					
Develop a right of way policy	MoICT & NG					
Finalize the adoption of the Radio Spectrum Management Policy	MoICT & NG					
Develop guiding principles for spectrum allocation	UCC					
Expand the National Backbone Infrastructure (NBI) to reach a minimum additional 73 districts and 20 major towns with last mile connectivity to service at least 3,000 GoU administration units (Schools, MDAs, Local Governments, Hospitals, etc) with appropriate international bandwidth capacity (minimum 20 Gps)	NITA-U					
Expand MYUG to create an additional minimum 800 Wi-Fi hotspots within inclusion for rural and underserved areas	NITA-U					
Enhance Government Cloud by enhancing the hosting capacity as a centralized shared service to match the growth in e-service rollout (to ensure adequate capacity to support the projected 80% services and increased data storage and compute requirements) as well as establishment of two new additional data centers to enhance resilience	NITA-U					
Develop facilities sharing regulations	UCC					
Enforce existing fair competition regulations	UCC					
Enhance capacity (compute and storage) for the Government Cloud	NITA-U					
Design alternative spectrum models to encourage innovation	UCC					
License Low-earth Orbit (LEO) technology	UCC					
Subsidize the expansion of the Radio Access Network	UCC					
Development of a National Public Key Infrastructure (PKI) strategy	NITA-U					

Regulatory interventions to incentivize network operators to peer at the Uganda Internet Exchange Point	UCC					
Regulatory interventions to promote and attract Content Distribution Networks (CDNs) and Cloud Providers	UCC					
Enhance and repurpose use of regional postal outlets as e-service delivery points	UPL					
Develop the Digital Addressing platform	UPL					
Develop National spatial data infrastructure	MoHLUD/ MoICT & NG					
Payments	BoU					
DUV Pillar 2 - Digital Services						
Roadmap Enablers	**Lead Entity**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Development of a Citizen E-Service Co-creation strategy	MoICT&NG					
Undertake a comprehensive assessment of e-services in support of establishing digital registries as single sources of truth and promotion of the collect once principle in the following areas: a) Health b) Education c) Public Finance and Administration d) Agriculture e) Lands, Housing and Urban Development f) Trade, Industry and Cooperatives g) Gender and Labour h) Energy and Minerals Development i) Human Capital j) Justice, Law and Order	MoICT&NG					
Implementation of the sector digital registries (following detailed assessment and roadmap)	MoICT&NG					
Establishment of a testing and certification scheme for software	UICT					
Capacity building for ICT cadre in Government	UICT					
Development of a digital mindset change program	MoICT&NG					
Develop a Digital Service Standard	MoICT&NG					
Enhance regulation, education and awareness to support consumer protection	UCC					
Big Data Strategy areas						
Conduct baseline study on the available data in the country	MoICT&NG					
Develop the National Data Infrastructure Reference Model	MoICT&NG					
Implement the National Open Data Portal	NITA-U					

Drive sensitization on the value and opportunities of data in digital transformation	MoICT&NG					
Enhance the Government Integration Platform for scale aligned to the increased usage	NITA-U					
National 4IR Enablers:						
Pilot traceability in Agriculture using blockchain	MAAIF/ MOICT & NG					
Pilot smart credit risk assessments for farmers	MAAIF					
Pilot digital extension services using AI and Natural Language Processing	MAAIF/ MOICT & NG					
Pilot use of AR and VR in education	MoES/ MOICT & NG					
Accredit and recognize micro-credentialing using SFIA	NITA-U					
Pilot use of blockchain in medical supplies management	NMS					
Pilot use of unmanned aerial vehicles for emergency and relief response	OPM/ MOICT & NG					
Pilot use of IoT for proactive response and early warning in disaster prone areas	OPM/ MOICT & NG					
Pilot use of blockchain to enhance security, trust and transparency in land registration	MoLHUD					
Establish the Data and AI Ethics Council	MoICT&NG					
Develop the National AI Strategy	MoICT&NG					
Promote green IT environments and reporting	MoICT&NG					
Develop the National Data Strategy	MoICT&NG					
DUV Pillar 3 - Cybersecurity, data protection and privacy						
Roadmap Enablers	Lead Entity	Year 1	Year 2	Year 3	Year 4	Year 5
Prioritize support for Small and Medium Enterprises	MoTIC					
Expand Cybersecurity Investments	NITA-U					
Promote National Cyber risk assessments	NITA-U					
Enhance national and sectoral incident response and information sharing	NITA-U					
Enhance protection of National Critical Information Infrastructure	NITA-U					
Enhancement on enforcement and compliance with the Personal Data Protection and Privacy Act	PDPO					
Raise public cybersecurity awareness	MoICT&NG					
Enhance knowledge through research and development	UICT					
Increase bi and multi-lateral dialogue at the regional level	MoICT&NG					
DUV Pillar 4 - Digital Skilling						
Roadmap Enablers	Lead Entity	Year 1	Year 2	Year 3	Year 4	Year 5

Establish the digital skills acceleration program governance structure, monitoring and evaluation mechanism based on multi-sectoral implementation	MoES, UICT and MoICT&NG					
Conduct digital skills pre-assessment with the aim of categorizing the various levels and types of skills required	MoES					
Conduct research to develop and monitor digital skilling for people with disabilities and special needs	MoES/ UICT					
Conduct capacity building and skilling of primary and secondary school teachers and administrators to adopt ICT enabled education	MoES/UICT					
Conduct capacity building and skilling of Public Servants and Top Government Officials to adopt ICT enabled services and tools	MoICT&NG/ Ministry of Public Service					
Development of a digital skills curriculum and training manuals for primary and secondary schools	MoES/UICT					
Consolidate funding for the digital skills acceleration program	MoES, MoICT&NG					
Conduct country-wide digital skills awareness	MoES					
Provision of ICT tools and devices to facilitate digital skills training	MoES, MoICT&NG					
Knowledge management and leadership- enforcement of trends, best practices (related to 4IR)	MoICT&NG					
Development of public partnerships to promote access to subsidized low-cost ICT devices including provision of renewable energy such as solar	MoICT&NG					
Development of a centralized E-Learning platform	MoES, MOICT & NG					
Integration of existing education management information systems	MoES, MOICT & NG					
DUV Pillar 5 - Innovation and Entrepreneurship						
Roadmap Enablers	Lead Entity	Year 1	Year 2	Year 3	Year 4	Year 5
Development of the Digital Innovation Program	MoICT&NG					
Develop the E-Commerce Strategic Plan	MoTIC					
Develop collaboration amongst regulators	MoICT&NG					
Activate use of the Skills Framework for the Information Age (SFIA)	NITA-U					
Digital fitness program for public servants- establishment of digital transformation champions	MoICT&NG					
Development of Cohorts to merge innovation consumers and developers (development of a database and platform)	MoICT&NG					
Develop regulatory sandbox environments	MoICT&NG					
Digital Rails for startups (financial platforms)	MoICT&NG					
Systematic Experimentation Projects	MoICT&NG					

ANNEX

ANNEX 1 PROPOSED BUDGET

Short Term – Year 0 to Year 1

#	Name of Project	Pillar	Amount (USD)
1	Consultancy for Rationalization of broadband policies and establish a single policy source	Digital Infrastructure & Connectivity	400,000
2	Development of a National Public Key Infrastructure (PKI) strategy	Digital Infrastructure & Connectivity	300,000
3	Regulatory interventions to promote and attract Content Distribution Networks (CDNs) and Cloud Providers	Digital Infrastructure & Connectivity	400,000
4	Pilot of the Enhancement and repurpose use of regional postal outlets as e-service delivery points in Central and four regional cities	Digital Infrastructure and Connectivity	1,000,000
5	National Payment Switch Enablement	Digital Infrastructure & Connectivity	1,000,000
6	Consultancy for development of a Citizen E-Service Co-creation Strategy	Digital Services	450,000
7	Undertake a comprehensive assessment of e-services in support of establishing digital registries as single sources of truth and promotion of the collect once principle	Digital Services	800,000
8	Development of a digital mindset change program	Digital Services	500,000
9	Review of the existing regulatory, education and awareness initiatives to support consumer protection and monitoring quality of service	Digital Services	200,000
10	Conduct baseline study on the available data sets in the country, develop the open data portal and publish the identified data sets	Digital Services	500,000
11	Conduct digital skills pre-assessment with the aim of categorizing the various levels and types of skills required including for persons with disability	Digital Skilling	800,000
12	Consultancy for development of the Digital Innovation Support Program through the Innovation Hub	Innovation and Entrepreneurship	250,000

Medium Term – Year 2 to Year 3

#	Name of Project	Pillar	Amount (USD)
1	Implementation of the sector digital registries (following detailed assessment and roadmap)	Digital Services	35,000,000
2	Consultancy to fast track the development of a Digital Service Standard	Digital Services	180,000
3	Co-creation through the Innovation Hub to pilot for proof of value for systematic experimentation	Digital Services	500,000
4	Development of a centralized E-Learning platform	Digital Skilling	300,000
5	Implementation of the Digital Innovation Support Program through the Innovation Hub	Innovation and Entrepreneurship	900,000
6	Support for the activation of the Skills Framework for the Information Age (SFIA)	Innovation and Entrepreneurship	100,000
7	Consultancy for the development of digital rails for startups	Innovation and Entrepreneurship	500,000
8	Consultancy for the enhancement of the ugHUB to facilitate integration of the single registries	Digital Services	19,000,000
9	Consultancy for the enhancement of the PKI UgPASS	Digital Infrastructure and Connectivity	5,000,000
10	Develop National spatial data infrastructure	Digital Infrastructure & Connectivity	900,000
11	Rollout of the Enhancement and repurpose use of regional postal outlets as e-service delivery points in across the remaining points in the country	Digital Infrastructure & Connectivity	4,000,000

Long Term – Year 3 to Year 5

#	Name of Project	Pillar	Amount (USD)
	Expand the National Backbone Infrastructure (NBI) to reach a minimum additional 73 districts and 20 major towns with last mile connectivity to service at least 3,000 GoU administration units (MDAs, Local Governments, Hospitals, Schools, etc) with appropriate international bandwidth capacity (minimum 20 Gps)	Digital Infrastructure & Connectivity Digital Infrastructure & Connectivity	49,600,000
	Expand MYUG to create an additional minimum 800 Wi-Fi hotspots within inclusion for rural and underserved areas		

	Enhance Government Cloud by enhancing the hosting capacity as a centralized shared service to match the growth in e-service rollout (to ensure adequate capacity to support the projected 80% services and increased data storage and compute requirements) as well as establishment of two new additional data centers to enhance resilience	Digital Infrastructure & Connectivity	15,000,000
	Establishment of a testing and certification scheme for software	Digital Services	400,000
	Capacity building for ICT cadre and Policy makers in Government	Digital Skilling	1,500,000
	Capacity Building on the value and opportunities of big data in digital transformation	Digital Services	500,000
	Clinics and drives to promote green IT environments and reporting	Digital Services	200,000
	Prioritize support for Small and Medium Enterprises	Cybersecurity, data protection and privacy	500,000
	Promote National Cyber risk assessments	Cybersecurity, data protection and privacy	400,000
	Enhance national and sectoral incident response and information sharing	Cybersecurity, data protection and privacy	800,000
	Enhance protection of National Critical Information Infrastructure	Cybersecurity, data protection and privacy	4,000,000
	Enhancement on enforcement and compliance with the Personal Data Protection and Privacy Act	Cybersecurity, data protection and privacy	1,000,000
	Raise public cybersecurity awareness	Cybersecurity, data protection and privacy	2,500,000
	Conduct capacity building and skilling of primary and secondary school teachers and administrators to adopt ICT enabled education	Digital Skilling	3,000,000
	Conduct country-wide digital skills awareness	Digital Skilling	1,500,000
	Provision of ICT tools and devices to facilitate digital skills training	Digital Skilling	15,000,000
	Development of public partnerships to promote access to subsidized low-cost ICT devices including provision of renewable energy such as solar	Digital Skilling	700,000
	Consultancy for the development of the E-Commerce Strategic Plan and supporting its implementation activities	Innovation and Entrepreneurship	600,000

LIST OF ENTITIES THAT CONTRIBUTED TO THE DEVELOPMENT OF THE ROADMAP

Project Implementation Team	
Name	**Entity**
Shirley Nakyejwe	Ministry of ICT & National Guidance
Paul Kabagambe	Ministry of ICT & National Guidance
Dennis Ssubi	Ministry of ICT & National Guidance
Doreen Bujjingo	Ministry of ICT & National Guidance
Brandy Azeirwe	Ministry of ICT & National Guidance
Rita Kanya	Ministry of ICT & National Guidance
Reagan Matsiko	Ministry of Education and Sports
Sharp Mugabe	Government Citizens Interaction Centre (State House Uganda)
Samuel Wamukota	Centenary Technology Services
Sarah Ategeka	Centenary Technology Services
Nawalh Namudiba	Centenary Technology Services

1	Adjumani S S
2	African Centre of Excellence in Bioinformatics and Data intensive Sciences
3	African Excellence Centre of ICT for Education
4	Agwok Primary School
5	Alliance for Trade in Information Technology and Services (ATIS)
6	Amuria Town Council
7	Angwecibange primary School
8	Apuuton Primary School
9	Asili Fortune
10	Atratraka Primary School - Maracha
11	Awach S.S
12	Blockchain Association of Uganda
13	BPO and Innovation Council Council
14	Bubandi S.S Seed - Bundibugyo
15	Bugema Adventist Secondary School
16	Bugembe Muslim primary school - Jinja
17	Buhanda Primary School - Kibaale
18	Buikwe District Local Government
19	Bukhonzo Primary School - Namisindwa
20	Bukulula Girls Ss - Kalungu
21	Bunagana Town Council
22	Bunanganda primary school
23	Bunyoro Secondary School - Kagadi
24	Bunyoro Secondary School- Kagadi
25	Bupoto Primary School - Namisindwa
26	Bura Primary School - Maracha
27	Busia Border Seed SS
28	Busia District Local Government
29	Busoga College Mwiri
30	Buwagga Senior Secondary School - Wakiso
31	Buwembe Secondary School - Busia
32	Byabakoora Primary School - Kyegegwa
33	Camp Moses Junior Primary School - Rakai
34	Chemwania S. S - Kween
35	College of Business and Management Sciences, Makerere University
36	Comboni College - Lira City
37	Cwero Primary School - Gulu
38	Destiny Christian High School - Luwero
39	Development Initiatives (DIVINIT)
40	Digital transformation Program working group
41	Directorate of Government Analytical Lab
42	Dokolo District Local Government
43	East African Civil Aviation Academy
44	Education Digital Agenda Committee
45	Education Policy Review Commission
46	Entebbe comprehensive secondary school
47	Entebbe Secondary School – Wakiso
48	Equal Opportunities Commission
49	Ericsson Uganda
50	Erussi SS Nebbi
51	Excel College Pakwach
52	Fairland high school – Mukono
53	Five Star High School - Ntungamo
54	Gayaza Road Triangle SS-Kiwenda
55	Good Times Infant School Kawaala

56	Government Citizen Interaction Centre
57	Gulu City High School
58	Gulu District Local Government
59	Hands of Love Primary and Secondary School - Mayuge
60	Higher Education Students Financing Board (HESFB)
61	Ibanda District Local Government
62	Ibanda S. S
63	ICT Teachers Association of Uganda
64	Iganga District Local Government
65	Iguli Girls Secondary school - Dokolo
66	IJB Junior School
67	Infectious Diseases Institute
68	Internet Society
69	ISACA Uganda
70	Jacarandas Junior School - Wakiso
71	Japan International Cooperation Agency (JICA)
72	Jinja District Local Government
73	Kabaale Sanje SS - Kyotera
74	Kabale Preparatory School - Kanungu
75	Kabingo seed secondary School - Isingiro
76	Kabulasoke Demonstration School - Gomba
77	Kagadi Peoples - Kagadi
78	Kahinju Ss Fort-Portal - Fortportal
79	Kaloi Primary School - Moroto
80	Kampala Capital City Authority
81	Kanyengyero Community SS – Nkanga
82	Katakwi District Local Government (DLG)
83	Katakwi Township P/S
84	Katakwi Township Primary School
85	Katalemwa Ss-Matugga
86	Kibaale District local government
87	Kichinjaji Primary School – Soroti City
88	Kihanga public secondary school - Ntungamo
89	Kiira Primary School - Jinja
90	Kiira Primary School – Jinja City
91	Kinyara SS - Masindi
92	Kitamba High School - Kalungu
93	Kochi Secondary School KOBOKO
94	Kyakabadiima Parents Secondary School -Kagadi
95	Kyankwanzi District Local Government
96	Kyenzige Junior Nursery And Primary School - Kagadi
97	Kyotera Central Secondary School - Kyotera
98	Logoba Ss - Moyo
99	Lords Meade Vocational College - Buikwe
100	Lubaale C/U Primary School – Gomba
101	Lubugumu Jamia High School - Wakiso
102	Luwangula Secondary School - Kamuli
103	Makerere AI Lab
104	Makerere University
105	Masinya Secondary School - Busia
106	Mastercard Foundation
107	Ministry of Agriculture, Animal Industry and Fisheries
108	Ministry of Education and Sports (MoES)
109	Ministry of Finance Planning and Economic Development (MoFPED)
110	Ministry of Gender, Labor and Social Development
111	Ministry of Justice and Constitutional Affairs
112	Ministry of Local Government
113	Ministry of Public Service
114	Mountains of the Moon University
115	Moyo District Local Government
116	MUKONO DLG
117	Mungula Secondary School -Adjumani
118	Musese Secondary School - Mbale
119	Nam High School
120	Namasyolo Primary School - Busia
121	National Curriculum Development Centre (NCDC)
122	National Housing Construction Company (NHCC)
123	National ICT Innovation Hub
124	National Information Technology Authority (NITA-U)
125	Ndeija PEAS High School - Ntungamo
126	Ndekye Ss - Ntungamo
127	Nebbi District Local Government
128	Nebbi Town S. S
129	Nemba Secondary School - Namisindwa
130	Nomad primary school - Mayuge
131	Ntungamo District local government
132	Office of the Prime Minister

133	Ojingo Primary School
134	Okwira Primary School - Tororo
135	Omach Primary School
136	Omara Ebek Memorial Primary School - Amolatar
137	Optimus 7 Ltd.
138	Overseas Development Institute (ODI)
139	Pakwach Senior Secondary
140	Panyadoli Self Help Secondary School - Kiryandongo
141	Peak primary school - Kampala
142	Peas High School Kazingo – Fort Portal
143	Pilkington college muguluka
144	Planit Consults
145	Public Sector Foundation Uganda
146	Refactory Limited
147	Rubongi Army Secondary School - Tororo
148	Rugarama Sec School - Ntungamo
149	Ruhinda SSS - Mitooma
150	Rwengiri Primary School - Kiruhura
151	Science, Technology and Innovations Secretariat
152	Sibuse Primary School – Namisindwa
153	Sironko Progressive S.S
154	SNV Netherlands Development Organisation
155	St Joseph's College Ombaci – Arua City
156	St. Andrews College Ssanda - Wakiso
157	St. Charles Lwanga Ss Bukeerere - Mukono
158	St. Daniel Comboni S. S - Moroto
159	St. John's SS Nandere
160	St. Joseph Buganda Secondary School - Mityana
161	St. Leonard's Ss Maddu - Gomba
162	St. Mary Assumpta Girls SS/ Pagirinya Refugee SS - Adjuma
163	St. Peter's Primary School Nsambya
164	St. Stephens SS, Mukono
165	St. Thomas More SS Minakulu, Omoro
166	St.James S.S Hoima - Hoima
167	St.Kizito S.S
168	Stanbic Uganda
169	SunBird AI
170	Swedish Embassy
171	Taibah International School
172	The Amazima School - Buikwe
173	The Innovation Village
174	The Judiciary
175	The Overseas Development Institute (ODI Global)
176	Uganda Bureau of Statistics
177	Uganda Civil Aviation Authority
178	Uganda Communication Commission (UCC)
179	Uganda Institute of Information and Communications Technology (UICT)
180	Uganda Law Society
181	Uganda Media Centre
182	Uganda National Council for Science and Technology
183	Uganda National Meteorological Authority
184	Uganda Police
185	Uganda Registration Services Bureau (URSB
186	UN Capital Development Fund (UNCDF)
187	UNDP Chief Digital Office
188	Yumbe District Local Government

With support from the United Nations Development Programme

THE REPUBLIC OF UGANDA
MINISTRY OF EDUCATION AND SPORTS

PILOT DIGITAL SKILLS ACCELERATION PROGRAM

2023/2024 - 2025/2026

PILOT DIGITAL SKILLS ACCELERATION PROGRAM

TABLE OF CONTENTS

Appreciation

Authors: Amos Mpungu, Patrick Muinda, Rowena Turinawe, Osbert Osamai, Steven Kirenga and Sylvia Nakanwagi.

Strategic Contributors: Senior Management Team (Ministry of ICT & National Guidance), Peter Kahiigi, Innocent Fred Ejolu, Berna Mugema, Nathan Tumuhamye, Hadijah Nabbale, Vivian Ddambya, James Beronda, and Dr. Grace Ssekakubo.

ABBREVIATIONS

3D	Three Dimensional
GoU	Government of Uganda
MOICT & NG	Ministry of ICT and National Guidance
MOES	Ministry of Education and Sports
TVET	technical vocational education
DUV	Digital Uganda Vision
EDC	Educators' Digital Competence Framework
SDG 4	Global Sustainable Development Goal 4
NDP	National Development Plan
NITA-U	National Information Technology Authority Uganda
UBOS	Uganda Bureau of Statistics
IDES	Inclusive Digital Economy Scorecard
UCC	Uganda Communications Commission
UICT	Uganda Institute of Information and Communications Technology
NCDC	National Curriculum Development Centre
Wi-Fi	Wireless Fidelity
JCSE	Joburg Center for Software Engineering
ICDL	International Computer Driving License
NPA	National Planning Authority

FOREWORD

By making investments in digital skills development, we are ensuring that our residents are prepared to prosper in a world that is changing quickly

It gives me great pleasure to launch our new digital skills acceleration program, which aims to give our workers the digital capabilities they need to succeed in a constantly changing digital environment.

This program is an essential step in achieving our objectives of creating a workforce and citizens that are prepared for the digital age and making sure that no one is left behind. It is crucial that as a country we possess the skills required to fully utilize these advancements as we continue to see the rapid progress of digital technology.

Our digital skills acceleration program has been carefully designed to give people the instructions, resources, and tools they require to succeed in the digital economy. Three fundamental strategic areas — Collaboration, Digital Literacy and Skilling, Access & Availability and Integration of services and data —form the foundation of our digital skills acceleration program.

The first strategic area focuses on establishing co-ordination across stakeholder groups. The second area emphasizes giving everyone, regardless of background or situation, access to digital training and tools.

The third area focuses on the provision of ICT tools such as computers, laptops, 3D printers, smart Boards, among others and access to ICT infrastructure such as internet and connectivity across the country. The fourth area focuses on the provision and use of tools such as self-service portals, e-training platforms, digital assessment tools and alike in an integrated manner.

By making investments in digital skills development, we are ensuring that our residents are prepared to prosper in a world that is changing quickly.

I invite everyone to benefit from our digital skills acceleration program as we work together to create a more affluent and technologically advanced future.

For God and my Country

Hon. John Chrysestom Muyingo
State Minister for Higher Education
@JCMuyingo

FOREWORD

The aim of this document is to provide a comprehensive overview of the key considerations and strategies that governments can adopt to effectively harness the power of big data

As we seek to provide our citizens with the skills they need to succeed in the digital age, the Ministry, private sector and development partners have collaborated to create this digital skills acceleration program, which I have the privilege of presenting to you.

We have seen a significant change in how we interact, learn, and work in recent years.

Our lives are now completely reliant on technology, making digital literacy crucial for success in practically every industry.

By giving both individuals and businesses useful information, resources, and tools, this program aims to close the digital skills gap.

Anyone can learn the digital skills they need to succeed, in my opinion, with the correct attitude, commitment, and assistance. For this reason, the Ministry is dedicated to encouraging digital literacy and giving everyone access to training courses and resources.

I urge you to utilize this program and the resources at your disposal. You may improve your employment opportunities, boost your output, and aid in the growth of our country by investing in your digital skills.

Together, we can create a workforce and populace that is stronger and more adaptable and is prepared to take advantage of the opportunities presented by the digital age.

Ms. Ketty Lamaro
Permanent Secretary - Ministry of Education and Sports
@KettyLamaro

EXECUTIVE SUMMARY

This Digital Skills Acceleration Program will help the Government of Uganda (GoU), specifically the Ministry of ICT and National Guidance (MOICT & NG) and the Ministry of Education and Sports (MOES) together with its strategic partners, both local and international implement practical activities over the next five years to accelerate the planning, provision, monitoring, and evaluation of Digital Skills across the country. This program considers the current ICT landscape, the current state of education in Uganda and considers primary schools, secondary schools, and technical vocational education (TVET) institutions. It has been prepared as a follow up to the conclusions of the data collection process during the development of this program including benchmarking exercises, the National IT Survey 2022, key interventions in the Digital Uganda Vision (DUV) 2040, Education Digital Agenda Strategy 2021 – 2025 and the Educators' Digital Competence Framework (EDC). This program will drive enhancements related to Digital Skilling in Uganda targeting primary and secondary level by focusing on the following enablers:

Governance & Private Public Partnerships to ensure that all stakeholders in the education sector and ICT sectors as well as development partners are involved in developing, creating awareness, implementing and funding digital skilling.

Digital Literacy and Skilling. Basic and intermediate digital skills should be provided within primary and secondary schools in a sustainable manner.

Access & Availability to support provision of ICT devices and enable access to educational content with extended affordable connectivity.

Integration of educational services and data to achieve integration of existing information systems within the education sector taking advantage of data re-use, open data, planning and budgeting.

By adopting this program, we will have created a strong foundation that drives digital skills development across Uganda, at early childhood development and schooling education levels. This will equip our next generation with the right skills to ably participate in the digital economy and unlock Uganda's potential in the Fourth Industrial Age.

This program was developed in coordination with the Ministry of Education and Sports, Refactory Uganda, Uganda Communications Commission (UCC), Education Policy Review Commission, National Curriculum Development Centre (NCDC) and the Digital Transformation Committee at the MOICT & NG.

1.0 INTRODUCTION

Rapid developments in new digital technologies are challenging the status quo and increasing the possibilities of the future. Examples of these are 5G communications, smartphones, mobile computing, quantum computing, cloud storage, big data, Artificial Intelligence (AI), blockchain, virtual/augmented reality and Internet of Things (IoT) among others. The continuous emergence of these technologies is transforming the organization of how people live and work and digital skills are a critical connecting factor for governments, businesses and citizens. Digital Skills can be defined as the skills needed to 'use digital devices, communication applications, and networks to access and manage information.' Digital skills involve the use of ICT tools ranging from computers and mobile phones to Artificial Intelligence and machine learning technologies to improve productivity, efficiency, and communication. They have proven to be key driver for employment, Business Process Outsourcing (BPO) and innovation.

These Skills have become a necessity and priority for majority of the countries aspiring to improve their socio-economic standing using ICTs. An example is the Republic of Kenya, also known as 'Silicon Savannah' for its progress in establishing good internet connectivity, a very successful mobile money service, and a wide range of public digital services. Kenya is now focusing on digital skilling and plans to train and build capacity for 20 million citizens, 350,000 teachers, and 300,000 civil servants under its National Digital Master Plan for 2022–2032 . The Republic of Rwanda has equally prioritized digital skilling at a national level by establishing seven centers of excellence for data sciences, Internet of Things (IoT), ICT, mathematical sciences, biomedical and e-health, an Information Access Center and Cyber security. The government also set up a Digital Ambassadors Program (DAP) to increase the number of digitally literate citizens and their use of e-Government and e-Business services, a Digital Literacy for Workforce (DLW) aimed at training government employees in digital literacy and the Rwanda Coding Academy (RCA)- a hybrid of both general education and TVET that deals with Software De-

velopment, Embedded Systems Programming, and Cyber-Security among others . Rwanda has also developed a national digital talent policy which focuses on enhancing digital skilling.

Other developed countries which have already reached the desired aspirations have advanced in digital skilling. For instance, in the Republic of Estonia, 90% of general schools offer classes in IT & technology- the Government developed a digital skills acceleration program (Tiger Leap) which provided all schools across the country with computers, internet access, financial support to Local Governments to purchase ICTs, development and provision of basic ICT courses and developed an integrated educational portal to allow for data sharing. Canada ranks very highly in the global digital competitiveness rating according to the digital riser report 2021 and developed an Innovation and Skills Plan to provide its citizens with critical skills focused on research, technology and commercialization, among others. As part of the initiative, the Strategic Innovation Fund has created and maintained more than 70,000 jobs and leveraged a total investment of over $45 billion.

The Government of Uganda (GoU) equally attaches great importance to the development of education by recognizing education and digital skills as an essential tool for transformation of society, national growth and prosperity of all Ugandans. Education is one of the government's cornerstones and foundational blocks for poverty alleviation and national developments as expressed by the Uganda' Vision 2040 and the Global Sustainable Development Goals (SDG 4). Uganda, like other countries has made various efforts to understand and map out the landscape in line with digital skills and education. For instance, various studies and efforts related to the same have been conducted such as: i) the development of the Education Digital Agenda Strategy 2021 – 2025 which provides a rationale and action plan for integrating ICT into teaching, learning, assessment, sports and administration five (5) years; ii) the EDC framework developed by UNICEF which aligns with the 2030 Agenda of the Sustainable Development Goals (SDGs) and prioritizes digital literacy; and iii) UNCDF's digital agenda of 'Leaving No One Behind in the Digital Era', which aims to empower one million Ugandans by 2024 to use digital services that leverage innovation and technology in key sectors, thus contributing to the UN Sustainable Development Goals.

1.2 DEVELOPMENT CONTEXT

1.2.1 Methodology

The development of this program was executed in four main phases:

a) **Inception Phase:** Formation of project concept and multi-discipline project working group.
b) **Consultative Phase:** Stakeholder consultations, desk reviews and international benchmarking.
c) **Data Collection Phase:** Data collection, analysis and initial validation.
d) **Development and Closure Phase:** Development of Digital Skills Acceleration program and secondary validation conducted with stakeholders.

The program was created by analyzing survey results, pertinent papers, benchmarking against trends in Africa and around the world, the Ugandan context, and priorities. Reviews by experts and stakeholders, dialogue and co-creation, public involvement, and workshops were also conducted.

1.2.2 National Context

The Government of Uganda is clearly aligned on the importance and need for Uganda to participate actively in digital skilling as demonstrated in the following national planning context:

Education Digital Agenda Strategy 2021 - 2025

The Education Digital Agenda Strategy builds on other existing strategies and plans developed by other complementary sectors that include aspirations of ICT integration in education and sports. It takes cognizance of current education reforms that are underway in the education and sports system at all levels. The proposed interventions are designed to embed ICT more deeply across the system to enhance the overall quality of Uganda Education and Sports. The Education Digital Agenda Strategy 2021 - 2025 is aligned to the National Development Plan (NDP) II and NDP III which advocate for human capital development in the sector leveraging on the ICT use and penetration resulting into improved quality learning outcome.

Educators' Digital Competence Framework (EDC)

The SDGs clearly call for all members of the international community to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'. The EDC framework is consistent not only with the European framework for Digital Competence of Educators (DigCompEdu), but also along with other frameworks. EDC offers a holistic approach for developing educators' digital competence in the following areas: inclusion, diversity, pedagogy, digital literacy, and communication.

1.2.3 Current State

General Access and Digital Literacy

Recent surveys by the government and research organizations point to a general lack of access to ICT tools and basic digital literacy in the population. NITA-U's 2022 National Information Technology Survey revealed that 97% of individuals had not used any computing device in the previous three months, while only 1.3% owned personal computers/laptops. In addition, only 10% had used the internet for any purpose in the previous three months. Among individuals that had not used the internet, lack of knowledge or skills was the biggest barrier 37%, followed by lack of knowledge about what the internet was 28% and the high cost of internet access 26%.

According to the World Bank country report on Uganda , These findings are consistent with other surveys conducted by institutions such as Research ICT Africa's '2017–2018 After Access Survey' which showed that Uganda, at 14 percent, has one of lowest internet user rates in the region with lack of knowledge and skills and affordability of devices and internet as key drivers for low usage. Lack of skills is even more of a challenge at the local government level. The report further states that: Low levels of completion at primary and secondary school means that there is a large group of youth who do not complete basic schooling.

According to the Uganda Bureau of Statistics (UBOS) report on education, the percentage of population aged 13+ who complete primary school is about 60 percent, 9 percent complete O level, and only 4 percent complete A level. Further, the report shows that "13% of the population aged 10 years and above had never been to school in Uganda ." A UBOS manpower survey 2016/2017 reveals that about 5.8 percent of future formal jobs require IT skills but this is likely to be low given the increasing use of digital technologies for work. The manpower survey reveals that the demand for IT skills is most pronounced in the public administration 8.2% and finance and insurance sectors 6.2 percent%. However, other key skills such as technical skills, creativity, and communication skills increasingly rely on IT skills so the demand may be much higher.

Access and Digital Literacy in Schools

The education system is divided into pre-primary, primary (7 years), secondary (6 years), and tertiary (3+ years) levels. Gross enrollment at pre-primary is low at 29.2% , at primary is >100 % , at secondary is 40%. A World Bank study noted the limited digital skills development at the primary level and digital skills courses at the secondary level are optional. At the secondary school level, computer studies (recently re-branded as ICT) is one of the courses offered at lower secondary (O Level) and ICT as a subsidiary course at upper secondary (A Level). These courses offer basic and intermediate-level skills. However, none of these courses are compulsory for all students.

According to the Ministry of Education Digital Agenda concept paper , A review of the new syllabus for the ICT subject for Lower Secondary (O Level) shows a heavy tilt towards "computer applications." Comparing it to international competency frameworks such as the UNESCO Digital Skills Competency Frameworks it also shows that the new lower secondary syllabus is light on topics such as privacy and identity protection (vital in today's digital economy) as well as programming or computational thinking. On a positive note, the new Lower Secondary Curriculum calls for the integration of ICTs across the entire curriculum which could develop digital skills for all students.

Availability of ICT equipment and connectivity

At the secondary school level, the main provider of ICT equipment and connectivity has been UCC through the Uganda Communications Universal Service Access Fund (UCUSAF) in partnership with the Ministry of Education. Almost all government-owned schools and all national teacher training colleges were equipped with ICT labs between 2008 and 2014, a tremendous achievement that made possible the delivery of digital skills training. Another issue pointed out in the studies above, is the sustainability of internet connectivity as schools lacked funds to continue paying for connectivity after UCUSAF support ended. Stakeholders observe that the lack of an ICT in Education Policy may be hindering continuous and sustained investments in the ICT infrastructure and connectivity by the Ministry of Education and its partners.

1.2.4 Challenges and Opportunities

Weak Curriculum for Digital Skilling:

According to the World Bank DE- Uganda Country Diagnostic Digital Skills Report, 2020, there is a need to revisit and update the curricular at all levels to cater for digital up-skilling. According to the National IT Survey 2022, 14.7% of Government employees, including teachers and school administrators lack required skills to use IT. There is limited integration digitalization in the existing education curriculum. As a result, there is inadequate professional workforce in digital skilling. There are currently, 32 universities in Uganda all accounting for a student population of about 110,000, turning out over 30,000 graduates annually. According to the Devscape report, Africa is home to 700,000 developers, with 11,003 coming from Uganda and yet only 30% of the respondents are in full-time employment even though there is a huge demand for developers. This could be because of the lack of experience that employers are looking for .

Inadequate Policy Framework:

Uganda lacks a national digital skills framework that guides government policies, programs, curriculum, and standards for digital skills. (National level policies and strategies recognize the need to develop ICT skills in education and among ICT industry practitioners). As pointed out in the IDES Report, an alignment of the ICT in education policy with the skills required to support the Digital Uganda Vision is required to improve the national score. There is no single entity or group of entities focused on Strong Coordination on driving the development of digital skills policies and programs. Uganda lacks a national digital skills framework that guides government policies, programs, curriculum and standards for digital skills, inadequate connectivity and equipment at schools, and strong leadership on digital skills development. There needs to be a cross-ministerial steering committee led or co-led by MoES and MoICT and NG.

Low awareness and Capacity to Foster Digital Skills:

According to the 2021 Uganda Inclusive Digital Economy Score Card report, Uganda scored only 33% on digital skills which leaves many excluded from access to digital skills. There is also a general low level of public awareness about the need for digital skills, use of various technologies, the workings of the ICT sector. This lack of awareness partially contributes to the overall low appreciation and prioritization of digital skilling reforms at a national level. Furthermore, only 28% of the schools (both primary and secondary) surveyed during the development of this program offer incentives for digital training. This does not help in fostering the uptake of digital skilling.

Limited Access to ICT Equipment and Connectivity:

According to the findings of the National IT Survey 2022, access to internet services and ICTs among LGs is still very low, with only 4.6% of staff having a computer (desktop computer or laptop) assigned to them for work purposes and 5.6% of staff routinely using a computer at work (for work purposes). The proportion of staff with internet access was even lower, at only 2.5%. This caters for the schools outside the central or more modernized parts of the region. In addition the survey identified the following factors related to equipment and connectivity:

a) high costs of gadgets.
b) lack of skills to use the gadgets.
c) high costs of internet/data bundles.
d) unstable/ no electricity. connections
e) unstable/poor network.

1.2.5 International Outlook: Lessons Learned

An international outlook through a benchmark exercise was conducted in order to identify critical success factors that influence design of successful Digital skills Programs. The selection of the countries for the benchmark considered the following:

a) Internationally recognized leading countries in ICT development, provision of public services and Digital Skilling. These are South Korea and Estonia; and

b) Sub-Sahara countries which are comparable to Uganda but have made commendable strides in the provision of public digital services and digital skilling at a national level. These Egypt and South Africa.

The benchmark findings are as noted in the table below :

Republic of Estonia
Integrated single education registry: Estonia has established a centrally managed information system to support all the public schools in the country, making it easy for adoption and maintenance of the ICT. The www.ehis.ee contains personalized and non-personalized data on whole education system, for both private and government schools - with over 600 different data fields. Estonia also utilizes digital libraries since they have more potential in being personalized and adopted by children.
Digital Skills Categorization & Mapping: Estonia categorized the various digital skills across different verticals such as; basic digital skills for all, IT specialist skills, digital skills for IT professionals, digital skills for non IT professionals and IT management and smart customer skills. This mapping also covered the type of learning and the sources of the education. This categorization helped them to adequately develop a skills demand analysis and forecast system.
Collaborative Partnerships: Estonia has been able to put together a strong collaborative framework between government, universities, VET schools and private sector players. These partnerships have gone ahead to launch new curricula, up-skill and re-skill IT specialists, provide basic skills for public (persons below 40 years of age). Another strategy for the training institutions in Estonia is to partner with companies who can give out laptops to their staff and mandate digital skills training. Estonia collaborates with its Universities and research institutions to promote modern digital technology in learning and teaching.
Digital Curricular: Estonia has made training in basic digital skills (information and data literacy, communication & collaboration, digital content creation, cyber security and problem solving) mandatory for all students before they go to High School. To note, the schools have great autonomy and take full responsibility for the implementation of this curricula. Furthermore, Estonia has e-governance technologies and services master's program which focus on designing, developing, and improving governmental systems and implementing e-government components on every level of the state.
Monitoring and Evaluation Framework: Estonia measures the following aspects in regards to digital skills regularly: ICT skills demand analysis and forecast, national skills strategy, basic skills for all, stakeholder involvement (PPP, NGOs and ICT companies), ICT Specialists for Higher education and VET, qualification framework quality assurance and digital skills in general education.

Republic of South Korea

Integrated single education registry: The information service system for education in Korea is comprised of three main groups: EDUNET (for teaching and learning), EMIS and NEIS (for administration), and CHLS (for home learning). EDUNET was developed to operate and provide multimedia materials, instructional lesson plans and evaluation items according to school level. This system serves as a single registry for all information related to education management in the country.

Regulatory and Policy Frameworks: National standards for digital skills and e-Learning were developed in Korea; the enactment of the Korea Educational Meta data (KEM). Furthermore, in 2008 it was proposed to the Joint Technical Committee (JTC) 001/SC36 of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) to integrate South Korean national standards for e-Learning in international standards. To enable quality control of e-Learning, the E-Learning Quality Assurance System (EQAS) was established using such criteria as content, service and platform. Korea also developed an E-learning Industry Development Law" in 2004 which contributed to the innovation of training methods for teachers, employees, and government officials.

Monitoring and Evaluation Framework: Monitoring and evaluation of ICT policy in education in Korea consists of measuring ICT in education for schools, ICT literacy tests for students, as well as an external evaluation of major national ICT projects. A five-year master plan on Education was developed to measure five critical aspects: information service, teacher capacity building, content development, infrastructure, and organizational structures.

Collaborative Partnerships: Promotion of ICT in education has been driven by strong cooperation among three unique key players: Ministry of Education, Science, and Technology (MEST), Korea Education and Information Service (KERIS), and 16 Metropolitan Provincial Offices of Education (MPOEs) in Korea.

South Africa

Collaborative Partnerships: South Africa has embraced various strategies and partnerships to boost digital skills across the various states. A partnership was established among the DCDT, ILO, ITU, UNDP Joint Programme on Digital Skills for Decent Jobs for Youth in Durban. Nedbank launched the Nedbank DigiSkills online platform, in partnership with Microsoft and Afrika Tikkun, to help South Africans acquire the in-demand skills (aimed at up-skilling and create sustainable income opportunities for 1,000 South Africans by the end of 2021, with plans to grow this number to 5,000 in the longer term.)

National Digital and Future Skills strategy: whose objective is to establish an education and skills development ecosystem that provides all South Africans with the required skills to create and participate in the digital economy. This strategy focuses on digital skilling across the lower, higher and tertiary levels of education and includes provision of access to ICT tools and infrastructure.

Access to ICT tools and Information: Under the leadership of the Department Communications and Digital Technologies, the National Electronic Media Institute of South Africa (NEMISA) was established as a non-profit institute for education and digital skilling.

E-Learning Platforms: This institute provides access to equipment and online training material in a semi-centralized manner on the NEMISA digital skills platform. This platform also contains access to other digital platforms from Microsoft Azure, Coursera, AI Repository, Microsoft Cloud, Microsoft Community training among others. This makes it easy for one to find information in one place. Other private sector players have come together to avail courses online- SPARK Schools Home Learning Portal (network of private schools) for lower grades, Advantage Learn specifically for Maths courses, E-learning firm Adapted Mind, Extramarks, E-Classroom, Educ8 SA, eLearnSA, IT Academy, among others.
Egypt
Collaborative Partnerships: **Egypt has leveraged multiple private sector partnerships to drive** the agenda of developing digital capabilities of Egyptian citizens, whether students, graduates or educators. These partners include ICDL Arabia, Cisco, Certiport of Pearson VUE and Microsoft. Digital Initiatives or programs have been put in place at a national level which provide skills/knowledge in cyber security, Artificial Intelligence, Machine learning, basic digital skills (entry) and social media safety.
National E-learning Platform: The Ministry of Communications and IT in Egypt established a national e-learning platform to provide digital skills training to the public. The programs are available for free, and are provided through interactive educational material bundles. Trainees get to receive a certificate by ICDL Foundation once they pass the qualifying tests
Digital skills Acceleration Strategies: The Ministry of Communication and Information Technology (MCIT) in Egypt has an initiative called "Our Future is Digital" and aims to train 100,000 young Egyptians and develop their ICT skills in areas of high market demand, including website design, data analysis, and digital marketing. The ministry also launched in 2020 "Our Digital Opportunity" initiate to engage with SMEs in the digital transformation process and training.
Access to ICT tools and infrastructure: The Ministry is also working on developing six technology parks in various cities which will consist of hardware design labs, startup incubators and training institutions and integrated systems for AI training, data science, and cyber security. The ministry's Digital Egypt Project aims to supply all government entities with fiber-optic cable connections. This process has been completed in 5,300 government buildings across Egypt, and when completed will connect some 32,000 buildings including public schools.

Table 2: International Outlook

In conclusion key aspects from benchmarking indicate the following key factors as critical success factors for digital skilling:

a) Establishment of a digital skills program or strategy is critical to driving improvements in digital skilling at a national level. Policies are not necessarily activators for this type of digital transformation.
b) Provision of access to digital platforms and information are an accelerator for a digital skills acceleration program. This will involve the provision of e-learning platforms and integrated databases/systems.
c) Collaborative partnerships with development partners and private sector players are very instrumental in promoting the agenda of digital skilling at a national level.
d) Curriculum reforms or efforts to include ICT in education have been deliberate efforts by Governments to push the agenda of digital skills acceleration.

2.0 PROGRAM ASPIRATION

The Program aspiration is to ensure Uganda is digitally developed to ensure inclusivity and build opportunities for the current young and future generations.

Goal

This program seeks to address the need for practical mechanisms to foster digital skills development across Uganda, at early childhood development and schooling education levels recognizing that digital skills is one of the keys to unlocking Uganda's potential in this digital era

Scope

This digital skills acceleration program will positively impact the digital skills ecosystem and landscape in Uganda. Therefore, implementation must take place within the following context.

a) Primary and Secondary schools, TVET and Government Public Servants have access to ICT tools and infrastructure.
b) Skills development is focused on building digital solutions or innovations that have demand in key sectors/markets such as manufacturing, commerce, government sector, health, education, tourism and trade among others.
c) The leadership of the digital skills acceleration program is powerful, collaborative and effective. It should involve multiple stakeholders across the academia, government, private sector and development partners.

Outcomes

a) Ensure no one is left behind concerning digital inclusion in Uganda providing the adequate skills.
b) Bridge the gender digital divide, by increasing the number of persons in hard-to-reach areas, females and PWDs being equipped with ICT tools, studying, and working in the ICT field.
c) Achieve a critical mass of digital skills for education among teachers/trainers and students especially at primary and secondary level, TVET and Government Public Servants.
d) Ensure that Uganda has adequate training and sustainable resources to meet the need for digitally skilled workforce in all areas of this digital economy.

2.1 VALUE PROPOSITION

The Digital Skills Acceleration Program will demonstrate the value listed below to its stakeholders:

a) **Global competitiveness:** In order to compete in the global digital economy, Uganda will harness the economic and social value of empowering its students, pupils, trainers, teachers, public servants and society with digital skills. These skills will empower Ugandans with the skills required for innovation and digital transformation.

b) **Creation of Jobs:** As mentioned above, Uganda is still grappling with unemployment of the youth and for those that are choosing the path of entrepreneurship, market demand remains a struggle. With the Digital Skills Acceleration Program rolled out at a national level, GOU together with all strategic partners will be able to create a talented workforce and create adequate synergies for demand, job employment and entrepreneurship.

c) **Increased uptake of digital services:** Greater digital literacy boosts the adoption and use of digital services and goods among the greater population. Government, private sector and other development partners have made significant investments in establishing ICT infrastructure and services in the education sector in Uganda. However, there is still considerably low adoption. According to the National IT Survey, 2022, only one in five individuals was aware of any government services provided online and among individuals that had not used any e-government services, most reported preferring personal contact (23%), followed by lack of knowledge that such services existed (21%). Lack of digital skills remains glaring.

d) **Shared use of data:** The data and value created by the provision of digital skills especially among the primary and secondary schools will be shared or distributed across all relevant organizations involved in providing education/training, planning, performance monitoring, labor, commerce, among others. The outcomes of this program will be open data available for public consumption and especially pivotal for development partners seeking to make financial investments.

The key stakeholders that will be intimately involved in the implementation of this program will include the following:

a) Ministry of Education and Sports (MOES).
b) Ministry of ICT and National Guidance (MOICT & NG).
c) National Information Technology Authority (NITA-U).
d) Uganda Communications Commission (UCC).
e) Uganda Institute of Information and Communications Technology (UICT).
f) National Curriculum Development Centre (NCDC).
g) Development Partners.
h) Private sector training partners.

The value proposition is further supported by the following opportunities :

Leverage ongoing efforts by Government to increase access to education services:

Government continues to invest heavily in the education sector over the NDPI and NDPII period. 92% of all parishes now have a government aided primary school, while 71% of all sub-counties have a government aided secondary school. Skills development has also been facilitated by the refurbishment and establishment of technical and vocational institutions, especially at the district level. The DUV also commits funds towards increasing investment in digital skilling infrastructure, enhancing the digital skills curricula, and inclusion of persons with special needs and providing infrastructure for digital skilling across the government. MOES should also leverage the ongoing efforts to expand the National Backbone Infrastructure (NBI) which is currently across 1,408 sites and 526 MYUG free Wi-Fi hotspots across the country.

Increase Community Mobilization and Mindset Change:

Under the NDP III, the government of Uganda is putting efforts towards community engagement and mindset change. With the adequate amount of funding and effort, this should empower families, communities, and citizens to embrace national values and actively participate in sustainable development. Key expected results include better uptake and/or utilization of public services including education at the community and district level. This program should take advantage of the programs under the NDP III to promote the agenda of digital skilling.

Strengthen Public Private Partnerships:

MOICT & NG has partnered with the Uganda Communications Commission (UCC) through the Rural Communications Development Fund (RCDF) to support school's computer laboratory infrastructure as a platform to provide basic digital literacy skills to the communities around the schools. 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. In addition, MOICT & NG has partnered with the Uganda Institute of Information and Communications Technology (UICT) to provide digital skills training for their students and innovators attached to the National ICT Innovation Hub. MOICT has also entered partnerships with private sector players such as Refactory Uganda, Centenary Technology Services, ICDL Africa, MTN Foundation, Wits Joburg Center for Software Engineering (JCSE) and Huawei among others. MOICT & NG and MOES can leverage such partnerships for funding opportunities and support with other reforms.

Young Population:

A large youthful population consisting of 23 percent of the population (approx. 9.6 million people) in Uganda presents an opportunity and demand for skilled, technical, and hands-on manpower for the economy. 78% of young people aged 13-18 years are currently attending school . Hence there is an opportunity for MOES, MOICT & NG and other development parties to investment in the skilling of Ugandan talent and students in the primary and secondary schools. The younger population is naturally more inclined to adopt digital technologies and thus an opportunity.

2.2 ENABLERS

a) **Political Will:** The success of this program will reply heavily on the political will and leadership within the cross ministerial teams. Top management within government and other sectors are key voices in the implementation of digital skills in the country because they have an appreciation of the value and are able to influence the design and development of policies.

b) **Enabling Environment (Regulatory, Policy & Strategy):** An enabling environment in terms of law, policies, regulations, guidelines, processes, and measures will be required to ensure compliance and full implementation of the Digital Skills Acceleration Program. This enabling environment includes the development of strategies which have been successful in various countries including the development of content, automation of learning platforms, revision of curricula and other digital skills programs, the review of existing ICT policies and the development of a comprehensive ICT skills policy as well as other legislation required.

c) **Governance:** Effective implementation of the program requires governance to facilitate responsibilities and ensure accountability in making the right decisions at all levels of compliance and implementation. Strong governance mechanisms will need to be enforced to endure that such a program is effectively implemented.

d) **Access to ICT Tools and Infrastructure:** One of the driving factors of this program is to ensure the availability and access to ICT tools, infrastructure and services. MOES and MOICT & NG together with other key bodies like NPA as well as other development partners, must prioritize increasing the access to ICT tools and infrastructure.

2.3 STRATEGIC AREAS

STRATEGIC AREA #1: GOVERNANCE & PRIVATE PUBLIC PARTNERSHIPS

This strategic area will focus on establishing co-ordination across stakeholder groups: A specific governance structure should be considered to ensure that all stakeholders in the education sector and the ministry of ICT including development partners are involved and that the training is delivered in a synchronized manner.

This component will also focus on establishing strategic partnerships with private sector players- especially training institutions, development partners, other government bodies in foreign countries among others to foster the implementation of this program. This support will involve policy development, funding, and awareness.

Initiatives

a) Constitution of a multi-sectoral working group
b) Establishment of a working framework for implementation
c) Establishment of M&E framework and metrics
d) Consolidated funding for digital skilling acceleration program
e) Digital skills awareness

STRATEGIC AREA #2: DIGITAL LITERACY AND SKILLING

Basic and intermediate digital skills should be provided to the primary and secondary schools, where the MOES, private sector training institutions and technology hubs are key actors. The Ministry of ICT & National Guidance and MOES must make use of its existing strategic partnerships to deliver these training programs in a sustainable manner. Foundational skills will include basic ICT skills as well as trainings on emerging technologies such as cloud computing, robotics, Artificial Intelligence and alike.

Initiatives

a) Conduct an ICT Digital skills pre-assessment with the aim of categorizing the various levels and types of skills required.
b) Development of curriculum and training manuals for digital skilling.
c) Inclusion of digital skills in curriculum to primary and secondary levels, and TVET levels.
d) Conduct data literacy and skills courses in the public primary and secondary schoolsTVET institutions and Government bodies.
e) Undertake train-the-trainer data literacy and online for teachers.

STRATEGIC AREA #3: ACCESS & AVAILABILITY

This area will focus on the provision of ICT tools such as computers, laptops,3D printers, smart Boards, among others and access to ICT infrastructure such as internet and connectivity across the country. This area will be a special focus for MOICT & NG as well as development partners. Under this section we shall focus on monitoring and evaluation of the access of ICTs and digital skills to the hard-to-reach areas, female and PWDs among others. There will also be joint advocacy on the value of digital skills as an economic and social resource to ensure access for all.

Initiatives

a) Government's efforts to expand the National Backbone Infrastructure, MYUG and other national infrastructure.
b) Conduct Research and monitoring on provision of ICTs and digital skills for Females, Hard-to-reach areas and PWDs.
c) Provision of ICT tools and devices to support digital skilling.
d) Mass advocacy on the value of digital skills as an economic and social resource.

STRATEGIC AREA #4: INTEGRATION OF EDUCATIONAL SERVICES AND DATA

This acceleration program will focus on the provision and use of tools such as self-service portals, e-training platforms, digital assessment tools and alike in an integrated manner. It will also focus on the integration of existing information systems within the education sector to take advantage of data re-use, open data, planning and budgeting, exporting of labor among others.

Initiatives

a) Development of a centralized E-Learning platform and digital platforms.
b) Integration of existing educational management information systems.
c) Use of Big data and Open Data in the education sector.

3.0 GOVERNANCE AND ECO SYSTEM

This ecosystem comprises stakeholders, systems, facilitation, and an enabling environment that collectively empower students, trainers, general people and public sector, among others to adopt digital skilling.

3.1 GOVERNANCE COMMITTEE

The governance structure will take a multi-sectoral approach to digital skilling. Therefore, each sector will have its governance structure and ecosystem to provide dedicated sector-specific leadership/coordination and be responsible and accountable for all decision-making and implementation. This structure will involve private sector players and development partners who will be part of the management and monitoring model. These entities will work together to enforce standards, policies, principles, practices, and processes for the effective application and implementation A governance reporting mechanism shall be institutionalized to aid the effective implementation of the Program at every level.

3.1.1 Function of the Governance Committee

a) Provide strategic direction and coordinate implementation of the digital skills acceleration platform;
b) Facilitate the establishment of the sector's integrated e-learning and data sharing platform to facilitate digital skilling;
c) Promote and ensure adequate investments in digital infrastructure ICT tools and connectivity that empowers the sector/industry's digital skilling economy;
d) Determine and coordinate the development of relevant policies, guidelines, frameworks, standards and plans related to digital skilling in the education sector; and
e) Any other functions as determined by the cross ministerial committee for digital skilling or relevant related organizations/development partners as part of the governance structure.

4.0 IMPLEMENTATION STRATEGY FOR THE PILOT DIGITAL SKILLS ACCELERATION PROGRAM

STRATEGIC AREA #1: GOVERNANCE & PRIVATE PUBLIC PARTNERSHIPS

No.	Action	Responsibility	Key Performance Indicator	Year 1	Year 2	Year 3
1.	Establish the Program Governance Structure and committees.	MOES, MOICT & NG	Level of achievement of strategy goals and strategic objectives.			
2.	Establishment of a working framework for implementation (multi-sectoral).	MOES, MOICT & NG, Development Partners, Training institutions	Number of annual performance reports.			
3.	Establishment of a monitoring and evaluation mechanism on data literacy and skills development in the country.	MOICT, UBOS, Private sector	Number of annual monitoring and evaluation reports.			
4	Consolidated funding for digital skilling acceleration program.	Digital Transformation Committee, NPA, MOICT & NG, MOES, Development partners	Number of support activities for access to ICT tools and infrastructure and digital skills (implementation, awareness).			

5	Conduct massive, country-wide digital skills awareness	MOICT & NG, training organizations	Annual performance reports			

STRATEGIC AREA #2: DIGITAL LITERACY AND SKILLING

No.	Action	Responsibility	Key Performance Indicator	Year 1	Year 2	Year 3
1.	Conduct an ICT Digital skills pre-assessment with the aim of categorizing the various levels and types of skills required.	MOICT & NG, MOES, NCDC	Validated skills pre-assessment report.			
2.	Joint development of a digital skills curriculum and training manuals for public primary and secondary schools.	MOICT & NG, MOES, NCDC	Percentage of digital learning materials and content management and sharing mechanisms all levels.			
3.	Inclusion of digital skills in curriculum to primary and secondary levels, and TVET institutions.	MOICT & NG, MOES, NCDC	Introduction of new digital courses in curriculum to include emerging technologies and other relevant digital skills.			
4.	Conduct data literacy and skills courses in the public primary and secondary schools, TVET and government entities.	MOICT& NG, MOES, MOPS	Capacity building and skilling of learners, teachers and administrators to adapt to ICT enabled education.			

5.	Undertake train-the-trainer data literacy and online for teachers.	MOICT, training organizations, development partners, MOPs	Capacity building and skilling of learners, teachers and administrators to adapt to ICT enabled education			

STRATEGIC AREA #3: ACCESS AND AVAILABILITY

No.	Action	Responsibility	Key Performance Indicator	Year 1	Year 2	Year 3
1.	Support Government's efforts to expand the National Backbone Infrastructure, MYUG and other national infrastructure.	MOICT & NG, UCC, NITA, Private organizations	Expansion of national ICT infrastructure (optic fibre and last mile connections) to schools.			
2.	Conduct research and monitoring on provision of ICTs and digital skills for Females, Hard-to-reach areas and PWDs.	MOICT & NG, MOES, UCC, NITA-U, private sector, development partners	Digital inclusion on access to ICT (internet and infrastructure)- Increase availability of ICT infrastructure and devices.			
3.	Provision of ICT tools and devices to facilitate digital skills training (lab equipment, laptops, smart boards etc.).	MOICT & NG, MOES, UCC, NITA-U, private sector, development partners	Digital inclusion on access to ICT (devices and tools)- Increase availability of ICT infrastructure and devices.			
4.	Mass advocacy on the value of digital skills as an economic and social resource.	MOICT & NG, MOES, Development partners	Annual performance reports.			

STRATEGIC AREA #4: INTEGRATION OF SYSTEMS AND DATA

No.	Action	Responsibility	Key Performance Indicator	Year 1	Year 2	Year 3
1.	Development of a centralized E-Learning platform and digital platforms.	MOES, MOICT & NG, Private Sector, Development partners	Utilization of ICTs in learning, teaching, research, education management and assessment of education outcomes.			
2.	Integration of existing educational management information systems.	MOES, MOICT & NG	Harmonized information within the sector which is sharable.			
3.	Use of Big data and Open Data in the education sector.	MOES, MOICT & NG	Number of education institutions utilizing big data.			

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3	African Excellence Centre of ICT for Education
4	Agwok Primary School
5	Alliance for Trade in Information Technology and Services (ATIS)
6	Amuria Town Council
7	Angwecibange primary School
8	Apuuton Primary School
9	Asili Fortune
10	Atratraka Primary School - Maracha
11	Awach S.S
12	Blockchain Association of Uganda
13	BPO and Innovation Council Council
14	Bubandi S.S Seed - Bundibugyo
15	Bugema Adventist Secondary School
16	Bugembe Muslim primary school - Jinja
17	Buhanda Primary School - Kibaale
18	Buikwe District Local Government
19	Bukhonzo Primary School - Namisindwa
20	Bukulula Girls Ss - Kalungu
21	Bunagana Town Council
22	Bunanganda primary school
23	Bunyoro Secondary School - Kagadi
24	Bunyoro Secondary School- Kagadi
25	Bupoto Primary School - Namisindwa
26	Bura Primary School - Maracha
27	Busia Border Seed SS
28	Busia District Local Government
29	Busoga College Mwiri
30	Buwagga Senior Secondary School - Wakiso
31	Buwembe Secondary School - Busia
32	Byabakoora Primary School - Kyegegwa
33	Camp Moses Junior Primary School - Rakai
34	Chemwania S. S - Kween
35	College of Business and Management Sciences, Makerere University
36	Comboni College - Lira City
37	Cwero Primary School - Gulu
38	Destiny Christian High School - Luwero
39	Development Initiatives (DIVINIT)
40	Digital transformation Program working group
41	Directorate of Government Analytical Lab
42	Dokolo District Local Government
43	East African Civil Aviation Academy
44	Education Digital Agenda Committee
45	Education Policy Review Commission
46	Entebbe comprehensive secondary school
47	Entebbe Secondary School – Wakiso
48	Equal Opportunities Commission
49	Ericsson Uganda
50	Erussi SS Nebbi
51	Excel College Pakwach
52	Fairland high school – Mukono
53	Five Star High School - Ntungamo
54	Gayaza Road Triangle SS-Kiwenda
55	Good Times Infant School Kawaala

56	Government Citizen Interaction Centre
57	Gulu City High School
58	Gulu District Local Government
59	Hands of Love Primary and Secondary School - Mayuge
60	Higher Education Students Financing Board (HESFB)
61	Ibanda District Local Government
62	Ibanda S. S
63	ICT Teachers Association of Uganda
64	Iganga District Local Government
65	Iguli Girls Secondary school - Dokolo
66	IJB Junior School
67	Infectious Diseases Institute
68	Internet Society
69	ISACA Uganda
70	Jacarandas Junior School - Wakiso
71	Japan International Cooperation Agency (JICA)
72	Jinja District Local Government
73	Kabaale Sanje SS - Kyotera
74	Kabale Preparatory School - Kanungu
75	Kabingo seed secondary School - Isingiro
76	Kabulasoke Demonstration School - Gomba
77	Kagadi Peoples - Kagadi
78	Kahinju Ss Fort-Portal - Fortportal
79	Kaloi Primary School - Moroto
80	Kampala Capital City Authority
81	Kanyengyero Community SS – Nkanga
82	Katakwi District Local Government (DLG)
83	Katakwi Township P/S
84	Katakwi Township Primary School
85	Katalemwa Ss-Matugga
86	Kibaale District local government
87	Kichinjaji Primary School – Soroti City
88	Kihanga public secondary school - Ntungamo
89	Kiira Primary School - Jinja
90	Kiira Primary School – Jinja City
91	Kinyara SS - Masindi
92	Kitamba High School - Kalungu
93	Kochi Secondary School KOBOKO
94	Kyakabadiima Parents Secondary School -Kagadi
95	Kyankwanzi District Local Government
96	Kyenzige Junior Nursery And Primary School - Kagadi
97	Kyotera Central Secondary School - Kyotera
98	Logoba Ss - Moyo
99	Lords Meade Vocational College - Buikwe
100	Lubaale C/U Primary School – Gomba
101	Lubugumu Jamia High School - Wakiso
102	Luwangula Secondary School - Kamuli
103	Makerere AI Lab
104	Makerere University
105	Masinya Secondary School - Busia
106	Mastercard Foundation
107	Ministry of Agriculture, Animal Industry and Fisheries
108	Ministry of Education and Sports (MoES)
109	Ministry of Finance Planning and Economic Development (MoFPED)
110	Ministry of Gender, Labor and Social Development
111	Ministry of Justice and Constitutional Affairs
112	Ministry of Local Government
113	Ministry of Public Service
114	Mountains of the Moon University
115	Moyo District Local Government
116	MUKONO DLG
117	Mungula Secondary School -Adjumani
118	Musese Secondary School - Mbale
119	Nam High School
120	Namasyolo Primary School - Busia
121	National Curriculum Development Centre (NCDC)
122	National Housing Construction Company (NHCC)
123	National ICT Innovation Hub
124	National Information Technology Authority (NITA-U)
125	Ndeija PEAS High School - Ntungamo
126	Ndekye Ss - Ntungamo
127	Nebbi District Local Government
128	Nebbi Town S. S
129	Nemba Secondary School - Namisindwa
130	Nomad primary school - Mayuge
131	Ntungamo District local government
132	Office of the Prime Minister

133	Ojingo Primary School
134	Okwira Primary School - Tororo
135	Omach Primary School
136	Omara Ebek Memorial Primary School - Amolatar
137	Optimus 7 Ltd.
138	Overseas Development Institute (ODI)
139	Pakwach Senior Secondary
140	Panyadoli Self Help Secondary School - Kiryandongo
141	Peak primary school - Kampala
142	Peas High School Kazingo – Fort Portal
143	Pilkington college muguluka
144	Planit Consults
145	Public Sector Foundation Uganda
146	Refactory Limited
147	Rubongi Army Secondary School - Tororo
148	Rugarama Sec School - Ntungamo
149	Ruhinda SSS - Mitooma
150	Rwengiri Primary School - Kiruhura
151	Science, Technology and Innovations Secretariat
152	Sibuse Primary School – Namisindwa
153	Sironko Progressive S.S
154	SNV Netherlands Development Organisation
155	St Joseph's College Ombaci – Arua City
156	St. Andrews College Ssanda - Wakiso
157	St. Charles Lwanga Ss Bukeerere - Mukono
158	St. Daniel Comboni S. S - Moroto
159	St. John's SS Nandere
160	St. Joseph Buganda Secondary School - Mityana
161	St. Leonard's Ss Maddu - Gomba
162	St. Mary Assumpta Girls SS/ Pagirinya Refugee SS - Adjuma
163	St. Peter's Primary School Nsambya
164	St. Stephens SS, Mukono
165	St. Thomas More SS Minakulu, Omoro
166	St.James S.S Hoima - Hoima
167	St.Kizito S.S
168	Stanbic Uganda
169	SunBird AI
170	Swedish Embassy
171	Taibah International School
172	The Amazima School - Buikwe
173	The Innovation Village
174	The Judiciary
175	The Overseas Development Institute (ODI Global)
176	Uganda Bureau of Statistics
177	Uganda Civil Aviation Authority
178	Uganda Communication Commission (UCC)
179	Uganda Institute of Information and Communications Technology (UICT)
180	Uganda Law Society
181	Uganda Media Centre
182	Uganda National Council for Science and Technology
183	Uganda National Meteorological Authority
184	Uganda Police
185	Uganda Registration Services Bureau (URSB
186	UN Capital Development Fund (UNCDF)
187	UNDP Chief Digital Office
188	Yumbe District Local Government

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MINISTRY OF ICT & NATIONAL GUIDANCE

A Knowledge and Productive Society driven by ICT & National Ideology

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MINISTRY OF ICT & NATIONAL GUIDANCE

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BIG DATA UTILIZATION STRATEGY

2023/2024 - 2027/2028

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Appreciation

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ABBREVIATIONS

B2B	Business to Business
B2C	Business to Citizens
G2B	Government to Business
G2C	Government to Citizens
G2G	Government to Government
MSMEs	Micro Small and Medium Enterprises
UCC	Uganda Communications Commission
OECD	Organisation for Economic Co-operation and Development
UNCTAD	United Nations Conference on Trade and Development
NDP3	National Development Plan 3
ICT	Information and Communication Technologies
URA	Uganda Revenue Authority
NSSF	National Social Security Fund
NWSC	National Water and Sewerage Cooperation
NIRA	National Identification and Registration Authority
AI	Artificial Intelligence
UBOS	Uganda Bureau of Statistics
MDAs	Ministries Departments Agencies
LGs	Local Governments
MOICT & NG	Ministry of ICT and National Guidance
NITA	National Information Technology Authority - Uganda
MOES	Ministry of Education and Sports
NCDC	National Curriculum Development Centre
MOPS	Ministry of Public Service
MOJCA	Ministry of Justice and Constitutional Affairs
NDPO	National Data Protection Office
MOFA	Ministry of Foreign Affairs
MEACA	Ministry of East African Community Affairs

FOREWORD

We can use data to make wise judgments, make the most of our resources, and further our development objectives. With the help of the Big Data Utilization Strategy for Uganda, we can use data to gain insights that will guide our agenda for national development.

It is with great pleasure that I offer to you the Big Data Utilization Strategy for Uganda. This document outlines our government's commitment to using data to enhance the quality of life for its people, spur innovation, and boost economic growth. Data is the new currency in the modern digital world, and its significance cannot be understated.

We can use data to make wise judgments, make the most of our resources, and further our development objectives. With the help of the Big Data Utilization Strategy for Uganda, we can use data to gain insights that will guide our agenda for national development.

Various stakeholders, including government organizations, businesses, academic institutions, members of civil society, and development partners, participated in a consultative process to establish this strategy. Together, we have worked to make sure that the plan is in line with our national aims while also considering the difficulties and setting we face.

The strategy offers a road map for implementing important measures that will promote the use of data across several sectors and programmes, including business, agriculture, education, and health.

It lays out specific goals and targets as well as a structure for monitoring and evaluating progress and making necessary changes as we go.

I urge all citizens, residents and stakeholders to support the implementation of this policy, and I would want to thank everyone who helped develop it, specifically the United Nations Development Programme (UNDP) for the financial and technical support.

By working together, we can leverage the power of data to transform our country and create a better future for all.

For God and My country

Hon. Dr. Chris Baryomunsi, MP
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PREFACE

This Big Data Utilization Strategy serves as a guiding framework for Uganda to leverage the power of data to achieve our economic, social, and environmental goals.

We are living in an era of unprecedented technological advancement, where the world is generating vast amounts of data every day. This data holds tremendous potential to drive economic growth, promote social development, and enhance the quality of life for people all over the world.

Countries around the globe recognize this potential and have embarked on initiatives to harness the power of data to drive innovation and improve their societies. In this context, the importance of developing a Big Data Utilization Strategy cannot be overstated.

This Big Data Utilization Strategy serves as a guiding framework for Uganda to leverage the power of data to achieve our economic, social, and environmental goals.

The aim of this document is to provide a comprehensive overview of the key considerations and strategies that governments can adopt to effectively harness the power of big data.

I believe that this Big Data Utilization Strategy document will serve as a valuable resource for the government, businesses, and individuals who seek to navigate the rapidly evolving landscape of big data. It is my hope and prayer that this strategy will stimulate discussion, inspire innovation, and drive positive change in our societies.

I extend our gratitude to all those who contributed to this document, especially the UNDP and Centenary Technology Services. I invite all stakeholders to join us in the ongoing efforts to leverage the power of big data for the betterment of our communities and the world.

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EXECUTIVE SUMMARY

One of the key aspirations of the Digital Vision Uganda 2040 is “Digital and Data Driven Economy”. The Vision proposes for government to strengthen mechanisms of authorization, processing, analyzing, sharing and managing electronic data, information, knowledge, and practices between organizations and stakeholders in the country. This is aimed to strengthen its ability to effectively combine scientific and operational data and use this to support a data-driven scientific innovation that inform policy and other actions.

The Big Data ecosystem in Uganda, both in the government and private sector, is in its early stages of development. The government has shown interest in harnessing the potential of Big Data, but it is still limited by challenges relating to inadequate technical expertise, infrastructure and investment. On the other hand, the private sector has been more proactive in adopting Big Data technologies, mainly in sectors such as banking, finance and telecommunications.

This Big Data Utilization Strategy is designed to enable us to make data-driven decisions that will drive economic growth by focusing on the following:

Data Foundations and Governance
To ensure that the government of Uganda puts in place the enabling environment for big data, that fosters increasing investments in big data and infrastructure deployments that speed up the utilization of data for innovative and developmental objectives.

Data Literacy and skills
To ensure that citizens, government and private organizations acquire the relevant knowledge and skills to effectively use data as a resource for development.

Data Security, Privacy and Responsibility
To address information security and cyber security risks involved in data management in Uganda.

Data Access, Integration and Availability
To provide an enabling environment for the seamless use of data collected by the government, businesses, and individuals for developmental and innovative purposes without compromising data security and privacy.

Data Services and Innovation
To provide resources, capacity, and an enabling environment for the developmental and innovative use of data as a national resource for new value creation, social and economic growth and prosperity.

Data Sovereignty and Equality
to address data ownership, classification, control and access as related to residency and data localization according to the national laws and regulations of Uganda.

By adopting this Big Data Utilization Strategy, we will be able to make data-driven decisions that will drive the growth of a digital society.

1.0 INTRODUCTION

Big Data has a purpose and is crucial to the growth of the economy. Big data currently in use includes, among other things, data from mobile phones, satellite or aerial images, radio, social media, smart meters for electricity, radio, credit cards, public transportation use, and health records. Big Data can be described using the following characteristics famously known as the 5Vs; The total amount of data generated and stored referred to as "volume", the type and nature of the data, referred to as "variety", the speed at which the data is generated and processed known as "velocity", the inconsistency of the dataset known as "variability" and the data quality as called "veracity".

The National Development Plan (NDP) III identifies ICT as a fulcrum of development with a huge potential to make Government and business enterprises more effective, efficient and competitive globally. Some of the key critical areas for intervention include increasing ICT penetration, reducing the cost of ICT services, creating 30,000 or more ICT sector jobs, increasing the number of local ICT innovation products and services and providing 80 percent of Government services online. Big Data has the potential to support the achievement of the targets above and is an area of special focus in the NDP under, objective 339 section viii which speaks to "supporting development and uptake of emerging technologies such as Fourth Industrial Revolution Technologies."

One of the key aspirations of the Digital Vision Uganda 2040 is "Digital and Data Driven Economy". The Vision proposes for government to strengthen mechanisms of authorization, processing, analyzing, sharing and managing electronic data, information, knowledge, and practices between organizations and stakeholders in the country.

Data as a critical factor of production complements labour and physical capital. Unlike capital or labour, data is non-depletable; the use of data by many does not diminish its quantity or value but rather increases its value. The genesis of value creation lies in the extraordinary amounts of detailed machine-readable information available about practically everything. This digital data arises from the digital footprints of various personal, social and

business activities taking place on digital platforms that increasingly form the digital substrata of economic and social activity in virtually every sector.

The data economy refers to the processes of producing, analysing, transmitting, disseminating, and consuming digital data in the modern digital era. Data's non-depletable quality and widespread use might raise its value. Data acquisition (to supply fresh sources of data), data storage and warehousing, data modeling and analysis/mining, data visualization, data transfer, and data protection are all included in the data value chain. This value chain produces "digital intelligence," which supports attempts at innovation and well-informed decision-making.

According to the United Nations Conference on Trade and Development (UNCTAD) 2019 study on the digital economy, value is created whenever data is turned into digital intelligence and monetized through commercial application. Because of this, productivity in the digital economy is primarily decided by how effectively digital intelligence is applied to various use cases. The "digital capital" of today is this digital intelligence. In the hyper-connected culture of today, many methods of data monetization are used to create the economic worth of this digital capital.

It is evident that in the digital age, data is the main source of income. Machine learning, artificial intelligence, big data analytics, and automation are all experiencing significant advancements thanks to the data economy, which is the core engine of the digital economy. The global data economy is estimated to be worth $3 trillion by the World Economic Forum. This demonstrates how the global data economy is expanding rapidly and exponentially.

It is generally acknowledged that the introduction of new digital technologies and the rapid global expansion in data are having a significant impact on the business, public, and research sectors. The Big Data revolution is expected to pick up speed in the future decades, and the impact of digital technology will fundamentally alter the state of the world economy throughout that time.

Digital technology has changed the socio-economy and society during the past several years, having an impact on all spheres of activity and the daily lives of all Ugandans. This transition is centred on data, and more will follow. Innovation based on data will greatly benefit citizens.

The manner that data are collected and used in a society where people produce ever-increasing volumes of data must prioritize the interests of the individual, in accordance with our values, fundamental rights, and laws. Only if citizens are convinced that any sharing of personal data would be subject to strict adherence to Uganda's data protection rules and regulations will they trust, and support innovations driven by data.

The amount of non-personal industrial data and public data in Uganda is rising, and technical advancements in data processing and storage have created a potential source of growth and innovation that should be exploited. Citizens should have the ability to use insights from non-personal data to make smarter judgments. And everyone should have access to that data, whether they are a start-up, public or private entity. This will ensure that everyone reaps the rewards of the digital dividend and help society make the most of innovation and competitiveness.

In order to realize this goal, Uganda will build on its solid legal foundation in the areas of data protection, fundamental rights, safety, and cyber security. In the end, the goal will be to reap the rewards of improved data utilization, such as higher productivity, open governance, and practical public e-services. This strategy presents the National Guidance for the Development and Use of Big Data, together with the strategic priorities of the Ministry of ICT. In order to help planners and decision-makers in the research and public sectors make decisions regarding commitments and projects that take advantage of opportunities and address the difficulties posed by big data, this approach aims to give information.

As a result, its objectives and focus are consistent with other national plans and agendas for public and private sector investment in ICT and big data. This strategy supports the objectives and plans outlined in the National Development Plan, The Digital Vision for Uganda 2040, the Sustainable Development Goals, the President's Manifesto, and other pertinent goals.

We picture a Big Data ecosystem that fosters innovation, speeds up socio-economic progress, and puts Uganda in a better position to compete in the Fourth Industrial Revolution.

1.1 DEVELOPMENT CONTEXT

The Strategy was developed by analysing the Ugandan context by undertaking surveys, reviewing pertinent papers and by benchmarking against trends in Africa and around the world.

1.1.1 Current State

The Big Data ecosystem in Uganda, both in the government and private sector, is in its early stages of development. There are some initiatives aimed at improving data collection, management and analysis such as the Ministry of Finance, particularly through its Budget website, produces disaggregated data; not only financial data, but also district-level work plans and performance reports. The Uganda Bureau of Statistics (UBOS) curates data collected by itself and a range of administrative systems. It publishes a range of nationally aggregated statistics on a relatively timely basis. The Ministry of ICT and National Guidance established the Parish Development Model Information System which supports data collection at the Parish level, analysis, tabulation, storage and dissemination to aide in data driven decision community support planning.

Other common areas where Big Data is being used in various sectors to drive innovation and improve operations are noted below:

01	02	03	04	05
Banks are using Big Data to detect and prevent fraud, improve customer experience, and enhance risk management. They use data analytics to analyze customer transactions, detect unusual activity and prevent fraud.	Telecommunications companies are using Big Data to gain insights into customer behaviour, preferences, and network usage. They use this information to optimize their networks, improve customer experience and develop new products and services.	The agriculture sector is using Big Data to optimize crop production, reduce waste and increase profits in a few initiates. Farmers are using data analytics to make informed decisions about crop selection, planting and harvesting based on weather patterns, soil conditions, and market demand.	The Ministry of Health is using Big Data to track the spread of diseases and monitor the effectiveness of health interventions. They use data analytics to collect, analyze and share real-time data from health facilities to inform decision-making and improve health outcomes.	Retail companies are using Big Data to optimize their supply chain, reduce waste and increase profits. They use data analytics to analyze customer behaviour, predict demand and improve the efficiency of their operations.

However, despite these developments, the Big Data ecosystem in Uganda still faces challenges that need to be addressed. One of the major challenges is the lack of skilled personnel with expertise in Big Data and data analytics. There is also a need to enhance investment in infrastructure, such as high-speed internet and data storage facilities, to support the growth of the ecosystem. Similarly, there is a need for more investment in research and development.

Legal and Regulatory environment

Uganda has put in place laws, standards and regulations relating to the security, collection, sharing, archival and use of data. These include The Archival Act, The National Data bank regulations and the Data Protection and Privacy Act among others.

Data Standards

The Government of Uganda with support from the World Bank put in place the Enterprise Architecture and Interoperability framework . This framework enables all government agencies design their data architecture to enable efficient and secure sharing of data.

Data Infrastructure – Collection, Storage and Processing.

The state of Big Data technology infrastructure in Uganda is still in its early stages of development. There are some initiatives aimed at improving the infrastructure, but significant investments are still needed to fully support the growth of the Big Data ecosystem.

One of the main challenges is the lack of high-speed internet connectivity in most parts of the country, which is critical for the processing and analysis of large amounts of data. The infrastructure is also limited by the availability of data storage facilities, which can be a barrier to the growth of the ecosystem.

However, there are some efforts underway to improve the infrastructure. The government is investing in the expansion of the National Backbone Infrastructure, which will improve internet connectivity and support the growth of the Big Data ecosystem. The private sector is also investing in data centres and cloud computing solutions to support the growth of the ecosystem. There are various fragmented efforts to setup data centres both in the public and private sectors to foster collection, storage and real-time processing of data. Private companies and telecommunications companies have built data centres whereas the National Data Centre serves the public sector interests for storage and processing of data.

Applied Big Data and Research

Makerere University operates the AI Lab which carries our research and implements big data and AI projects in collaboration with Government and the private sector. Other universities like Busitema University and Mbarara University have opened similar labs. The UN Global Pulse initiative opened its first African lab in Kampala and is conducting research on several big data use cases.

Capacity building and training

Makerere University and others have introduced data science courses at undergraduate and graduate levels to build the big data skills capacity in the country. In addition, Data Science Africa a continental non-profit organization has also opened a local chapter in Uganda to help identify and solve problems using local resources and talent.

Data Governance

Whereas, standards exist for data management, the mandate in terms of data ownership still lies with individual government bodies under various Acts of Parliament. This traditional based mindset approach, 'territorial walls amongst organizations' and low awareness levels of data sharing benefits has hindered the free exchange of data across entities and with the private sector as some data are withheld by the respective owners.

Data Sharing

The government is taking some steps to improve data exchange through the development of a National Data Management System by the Uganda Bureau of Statistics. This system is aimed at improving data collection, management, and analysis to support better decision-making. In addition, Government has established a national data exchange platform (UGHUB) as a shared service, which facilitates the sharing of data between government agencies and the private sector. This platform improves the accessibility and usability of data for decision-making, planning and e-service delivery.

Challenges

The strategy recognizes the following as challenges limiting Uganda from fully participating in and taking advantage of the data economy:

Access:

Much of the data that is accessible is only available in pdf format moreover some agencies sell their data at exorbitant rates. UBOS and other line ministries and agencies generally appear to be committed to the private sharing of data with any institution that formally seeks official approval from the chief executive. Reasons given for not making data accessible include that the integrity of the data is at stake if users can edit and republish it, and that those that need the data already get it through formal relationships and established channels. It would be fair to conclude that, in general, Ugandan institutions are committed to the use of their data in both aggregated and disaggregated format, but that their definition of the legitimate user group is a limited one.

Technology and big data:

One of the biggest challenges facing a national Data Revolution in Uganda are electricity supply, internet access and computer equipment.

Culture:

Culture refers to the inherent propensity of organizations in the public and private sectors to withhold information and prevent its usage and reuse. Data is thought to be a power that should not be lightly given up. The BDUS implementation will focus heavily on changing people's perspectives and raising awareness of the value of open data and data utility for enhanced value creation for original data owners and potential users.

Trust:

Consumers in the digital economy and the general public generally lack faith in matters of data protection, privacy, security, and breach. The adoption of BDUS will put in place procedures that would provide consumer protection, data privacy and security, as well as reduce the promotion of monopoly and anti-competitive behaviour, to ensure that confidence is built.

Data Imbalances:

By virtue of their mandates and services, the government agencies in charge of data gathering, large businesses in the private sector, multinationals, and development partners control the data space. This makes it challenging for smaller businesses to successfully compete with data, allowing these data-haves to keep or perhaps increase their market domination. BDUS aims to create a data market in which MSMEs and smaller businesses will also have access to data held by the data haves.

Leveling-up with the Global Data Economy:

On the one hand, the world is supporting data privacy, while on the other, cross-border data flows. The two competing requirements must be balanced. To achieve and balance these international criteria, Uganda would need to develop its digital infrastructure and competence. BDS aims to develop the necessary digital infrastructure, including cloud computing, edge computing and connectivity to make Uganda the African nation with the best data protection and support for legally compliant cross-border data flow.

Integrated data:

Harmonization of data is necessary to enable efficient service delivery, initiatives for social and humanitarian development, and the improvement of national security, among other advantages. Currently, several sectors have duplicated data sources which increases complexity in data sharing and harmonization. One of the key areas of attention for BDUS implementation will be to encourage database harmonization so that users can benefit from the data economy and the wider digital economy.

Data Literacy, Capabilities, Intelligence and Insights:

There is lack of a critical mass of skilled big data related practitioners in Uganda. Data literacy and competencies are essential to use the tools and technology that make data collecting effective and enable data to be transformed into intelligence and insights. BDS will make sure that data literacy and capabilities are available to advance capabilities in cutting-edge fields like blockchain, deep learning, advanced analytics, artificial intelligence and machine learning.

Digital Identity:

One of the fundamental infrastructures for the digital economy is digital identity. There are challenges related to the legally compliant access to citizens national identity data. The huge potential of the data economy cannot be fully tapped if a significant section of the population is excluded.

1.1.2 International Big Data

No.	Country	Focus Area	Lessons Learned
1	Estonia	a) Open Data. b) Data Usage. c) Data Sharing and Research. d) Decentralized Data. e) Legislation. f) Enabling environment for innovation.	a) Data ownership and usage is for the benefit of the Citizens. b) Decentralized control of data powered by integration. c) Development and constant r view of legislation related to data management. d) Create enabling environment for use of open data and innovation.
2	South Africa	a) Human Capital and Research Capacity Development. b) Cyber infrastructure for Big Data. c) Collaboration. d) Data governance. e) Overarching coordination and advocacy.	a) Boost big data research and collaboration. b) Strengthen data governance structures. c) Build required enabling cyber infrastructure for big data and other technologies.
3	Republic of Korea	a) Private sector centered data eco system and innovation. b) Data utilization. c) Data services for daily use. d) Comprehensive data policy. e) Data Infrastructure.	a) Setting up Data Markets to facilitate big data utilization. b) Strengthening Government Policies for data access, security and others. c) Ensuring Industry application of big data for the benefit of citizens.

4	Nigeria	a) Data Literacy and Skills. b) Data Security. c) Data Sovereignty. d) Open Data. e) Data Infrastructure / Technology. f) Data Harmonization. g) Data usability.	a) Harmonized and integrated National databases for better strategy implementation. b) Digital Identity as an enabler for big data utilization.
5	UK	a) Data foundations. b) Data skills. c) Data availability. d) Responsible data.	a) Ensuring a trusted data regime. b) Using government data to drive efficiency and improved public services. c) Ensuring security and resilience of data infrastructure. d) Championing the international flow of data.
6	US	a) Foundational activities (gove-nance, planning, and infrastructure). b) Enterprise activities (standards, budget-ing, and coordintion). c) Optimized activities (self-service analyt-ics). d) Data-Driven activities (proactive evidence - based decisions and automated data improvements).	a) Promote information sharing through inter-agency councils, such as the CDO Council, to identify and share what practices work best for different use cases. b) Including statutory requirements in the action plan is helpful for comprehensive awareness and oversight and minimizes potentially duplicative data related activities. c) Encourage involvement of the CDOs in strategic planning and budget development activities for their agencies.
7	Euro-pean Union	a) Availability of data. b) Imbalances in market power. c) Data interoperability and quality. d) Data governance. e) Data infrastructures and technologies. f) Skills and data literacy. g) Empowering individuals to exercise their rights. h) Cyber security.	a) Putting in place A cross sectoral governance framework for data access and use. b) Enablers: Investments in data and strengthening Europe's capabilities and infrastructures for hosting, processing and using data, interoperability. c) Competences: Empowering individuals, investing in skills and in SMEs. d) Setting up common European data spaces in strategic sectors and domains of public interest.

1.1.3 Data Definition

The definition of data used by BDUS is taken from the literature on information science. Data are referred to as being organized in a hierarchy with information and knowledge. This strategy defines data to include the following:

a) Unfiltered symbols or signals that are generated from all things (living or non-living) that belong to Uganda.
b) Information collected either through a physical or digital method from the activities of the Ugandan Government, private businesses, development partners, multinationals and/or individuals within or outside of Ugandan territory.
c) Information converted to digital formats and transformed into information through computing activities.
d) Information used to support people's experiences, skills, thinking models, and decision-making processes which can lead to products and services among others.
e) Information that contributes to a body of knowledge in research and innovation that can be used and reused by humans for governance and business performance, improvement of social and economic activities and sustainable development.

This strategy broadly classifies data, either at rest, in motion or in use, as follows:

a) Personal or non-personal data.
b) Private and public data.
c) Data for commercial purposes, governmental and development purposes in different sectors and industries.
d) Non-structured and structured data.
e) Instant and historic data.
f) Volunteered, observed and inferred data.

1.1.4 Applicability

Building and utilizing data as a national resource for value development and international competitiveness will be the focus of the BDUS. Although the public and private sectors produce, gather, store, and use data for various objectives, the data applications are comparable and consistent. Data sharing between the public and private sectors must have a cross-sectoral focus.

The following five categories define the fundamental framework of data sharing and collaborations amongst the key stakeholders:

Government-to-Government Model:

The purpose of G2G data sharing is to facilitate data sharing between MDAs and LGs, where relevant and appropriate, with proper protections to enable effective and optimal use of data for service delivery and informed decision-making. MDAs must assess and proactively address the procedural, regulatory, legal, and cultural barriers to sharing data within government entities and with external partners.

Government-to-Business Model:

The purpose of G2B data sharing is to ensure collaboration in which public institutions make their data available to private businesses and vice versa for the design and use of innovative services for the benefit of the public and their interest. An agreeable business model may be designed for the purpose. Parties must adhere to legal, and regulatory provisions in ensuring a secure collaboration and use of shared data.

Business-to-Business:

The B2B data sharing ensures that businesses share or trade more of their data with other businesses. This is to provide value-added services and create new values based on agreed business models. Parties must adhere to legal, and regulatory provisions in ensuring a secure collaboration.

Government-to-Citizens:

G2C data sharing ensures that Government institutions can open public data for individuals/citizens who need the data for social and economic purposes. Parties must follow and adhere to the relevant legal and regulatory provisions for such engagement.

Business-to-Citizens:

B2C data sharing ensures that businesses and private bodies can open private data for individuals/citizens who need the data for social and economic purposes. Parties must follow and adhere to the relevant legal and regulatory provisions for such engagement.

2.0 THE BIG DATA STRATEGY ASPIRATIONS

The Big Data Strategy (BDS) aspirations are founded and built on the following:

Goal:

Making data as accessible, shareable, and usable as possible for all types of stakeholders who require information for economic and societal gains.

Strategic statement

Data is the key to impactful planning and decision making.

Alignment statement:

Big Data is a key component that drives impactful planning and decision making to improve productivity of people, organizations, businesses and Government. This is based on innovation. Given the significance of data as a new economic resource for value creation, the BDUS is positioned to drive Uganda's transformation where every Ugandan, the Government, and the Private sector could harness the power of a data-driven society for personal and sustainable national development securely and safely.

2.1 RATIONALE FOR THE BIG DATA STRATEGY

With the introduction of the Data Protection and Privacy Act (2019), Uganda has made major strides in the areas of data protection and privacy in keeping with the global trend of protecting the sanctity of personal data. With this advancement, a brand-new economic sector has emerged, necessitating the establishment of a special agency—the National Data Protection Office. Only if there is a national strategy or plan to make the best use of the potential the data economy brings can increased efficacy in data usage and protection, as well as deeper achievement recorded by Uganda, be achieved. The rationale is driven by the following:

Analytics: The need to analyze humongous data that would be generated during digitisation and digitalization of various economic sectors will require huge analytics capabilities. The more data is digitized the more analytics will be required to make informed decisions and the more value will be created. Advanced analytics requires the use of digital technologies such as machine learning (ML), deep learning (DL), and artificial intelligence (AI) among others. Therefore, effective data analytics will drive BDUS aspirations and outcomes. Analytics will drive the digital economy and ultimately, the digital economy will drive the main economy.

Innovation: Uganda, as a developing nation that aspires to develop every aspect of its society must be driven by innovation. Most of the world's innovations in the digital age are driven by data. The Organization for Economic Co-operation and Development confirms that data-driven innovation forms a key pillar in 21st-century sources of growth. Big data sets are becoming a core asset in the economy, fostering new industries, processes and products and creating significant competitive advantages. The quest for innovations that will provide solutions to most of the country's challenges and change the narrative of being a consuming nation to a producing nation while putting the country at a highly competitive edge is needed now more than ever before.

E-Services: E-services come with convenience, reduce the cost of operations, and expand the coverage of public service delivery among other benefits. Because of these benefits, seamless access to electronic services will drive inclusive growth and sustainable development. At the core of electronic service delivery are quality data and digital intelligence. The quest for electronic end-to-end services will grow the digital economy.
This strategy therefore:

a) Creates an environment that is conducive to data being a key driver for Uganda's innovations, productivity and performance, digital services, job creation, global competitiveness, social development, and economic prosperity.

b) Provides guidance on how data can positively impact, and shape Uganda's future as economic activities move into the digital environment, expand the local data market, and greatly support the development and implementation of the nation's socioeconomic policy.

c) Enables realization of opportunities to accelerate the adoption and use of digital technologies, particularly emerging technologies for data collection, validation, storage, analysis, transmission, protection, and reporting to improve research and innovations, digital services, the digital economy, job creation, enhanced quality of life, social and economic growth and prosperity, global competitiveness, and sustainable future demands. Uganda has some opportunities to leverage in order to accelerate its participation in the data economy optimally. These opportunities will be key incentives to drive the implementation of BDUS.

Opportunities

Uganda has some opportunities to leverage in order to accelerate its participation in the data economy optimally. These opportunities will be key incentives to drive the implementation of BDS.

a) **Population:** As of Friday, February 10, 2023, the Uganda Bureau of Statistics (UBOS) estimates that there were around 45,080,056 people living in Uganda. Over 75% of the people in this figure are youth. In the digital age, this is a major force behind social and economic activity. More data-related initiatives by the government, commercial sector, civil society, and development partners are being driven by and will continue to be driven by the need to offer services to the public.

b) **Increase in mobile and broadband penetration:** The increase in the number of mobile phones and smartphone users (over 33 million users as at March 2022) is driving broadband penetration (which is at 23.5 million in March 2022). This drives the creation of a massive amount of digital data every second.

c) **Increase in digital platforms and services:** New platforms are coming up within the country to provide different services in the digital space. new platforms are emerging to offer various services in the digital sphere. This offers opportunities to profit from the utility of data on the one hand, and from data security on the other.

d) **Digital Transformation Wave:** The growing digitization of data is fostering the digitalization of various industries and sectors. Value will increase as more data are digitized. The wave of national and international digital revolution is what is driving this

2.2 VALUE PROPOSITION

BDUS will demonstrate the value listed below to its stakeholders:

a) Access to data and its use for the public good will be available to ever body.
b) The value created by the utilization of the data will be distributed.
c) A favourable climate will be there to make data a significant source of employment.
d) In order to compete in the global economy, Uganda will harness the economic and social value of both local and foreign data. The BDUS will promote the growth of data-driven and data mining businesses in the nation.
e) Improved data management cycle governance will guarantee that data are produced and used in a standardized manner and with built-in quality.
f) Data driven delivery of policy and public service.
g) The strategy will foster deeper cooperation and collaboration between the public sector, academia, the private sector, civil society and development partners to utilize big data for the advancement of common aspirations.
h) By implementing this strategy the public, students, pupils and public officers shall benefit by acquiring knowledge in data management tools, technologies, innovation and legal environment.
i) The speed, efficiency and scope of scientific research will improve through the use of big data.

3.0 STRATEGIC AREAS

The Big Data Strategy focuses on the following strategic areas:

STRATEGIC AREA #1: DATA FOUNDATIONS AND GOVERNANCE

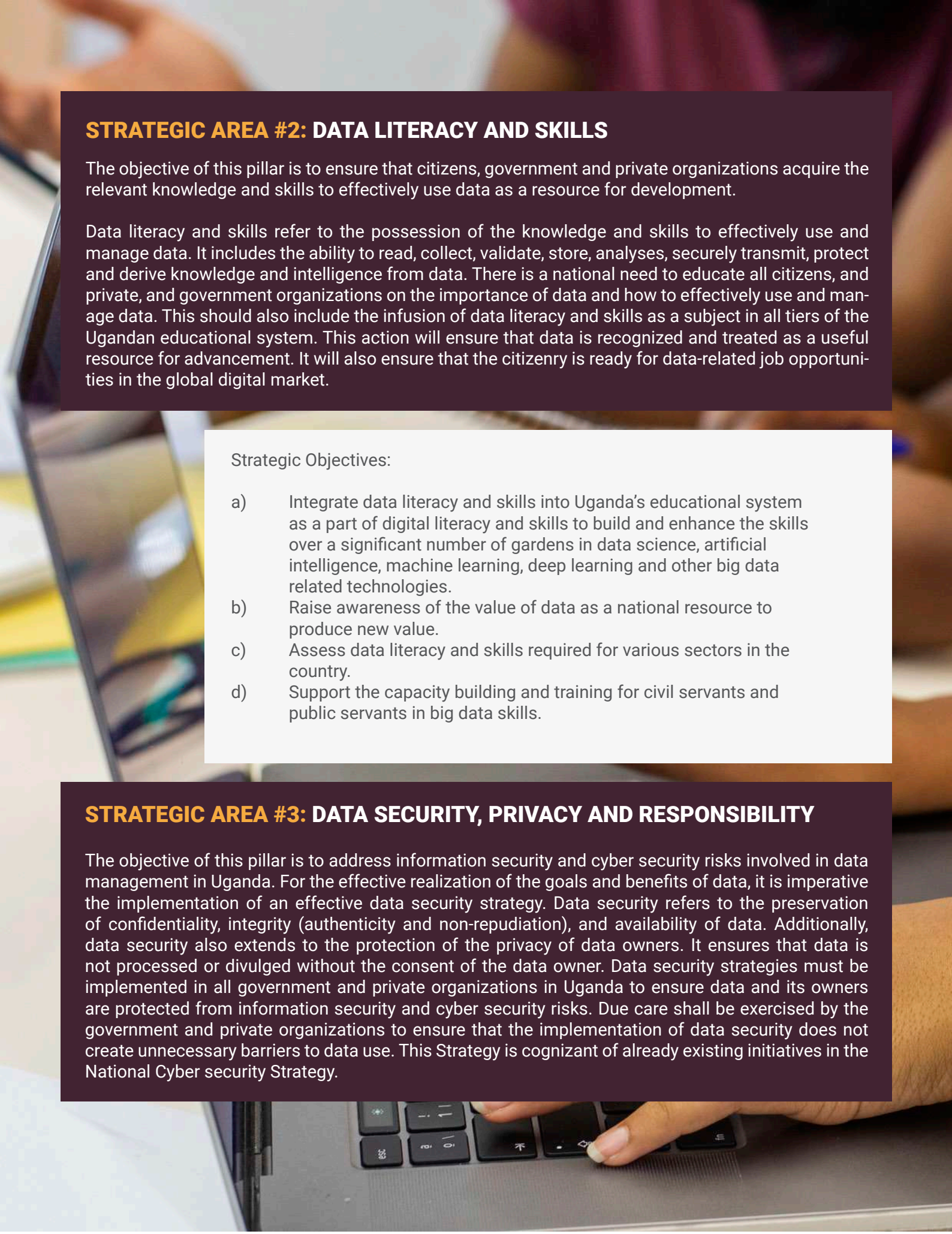
The purpose of this strategic area is to ensure that the Government of Uganda puts in place the enabling environment for Big Data, that fosters increasing investments in big data and infrastructure deployments that speed up the utilization of data for innovative and developmental objectives. The enabling environment includes an effective legal and regulatory framework, data infrastructure which includes infrastructure and technologies for data processing, storage and data sharing. Data foundations also include enterprise planning for data, standardization for data management, budgeting, planning and financing for big data.

Efficient and effective data management requires investment in electricity and modern digital technologies. This involves investments in technologies such as data centres, security operating centres, data transmission links (satellite, fibre optics cable, 5G, microwave, Internet), databases, the Internet of Things (IoT), big data analytic platforms, web applications, Artificial Intelligence (AI), machine learning (ML), and deep learning and among others. While many of these technologies are available in the country, there is a need to ensure the local production of some of these technologies to reduce the cost of deployment and increase national security.

Additionally, there is a need to ensure that all back-end related government digital infrastructure is integrated as an Integrated Shared Platform; this action will help reduce the wastage of government funds and increase the efficiency and effectiveness of government service delivery. Furthermore, a minimum standard for data infrastructure shall be made available to government and private organizations for reference.

Strategic Objectives:

a) Ensure better adherence to current legal and regulatory frameworks for data protection regulations.
b) Create an environment that will encourage more investment and advancements in data infrastructure.
c) Develop models to guide organizations on the minimum standards required for data infrastructure.
d) Put in place Data standardization mechanisms and provide assurance services for the big data ecosystem as well as data quality and eliminating barriers to data use.
e) To harmonize all national data in disparate locations for the purpose of effective management, improved public service delivery, and the creation of new business models and services.



STRATEGIC AREA #2: DATA LITERACY AND SKILLS

The objective of this pillar is to ensure that citizens, government and private organizations acquire the relevant knowledge and skills to effectively use data as a resource for development.

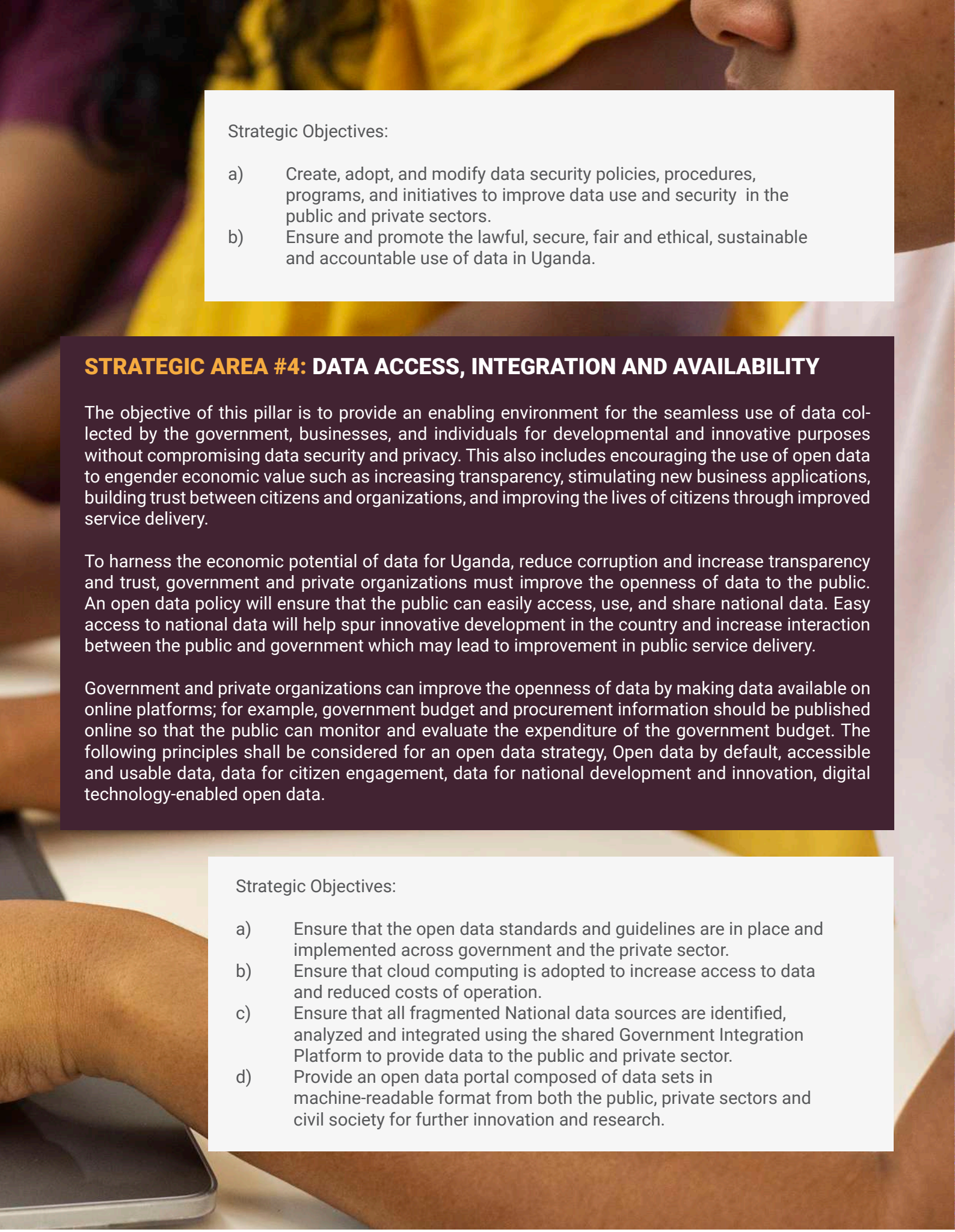
Data literacy and skills refer to the possession of the knowledge and skills to effectively use and manage data. It includes the ability to read, collect, validate, store, analyses, securely transmit, protect and derive knowledge and intelligence from data. There is a national need to educate all citizens, and private, and government organizations on the importance of data and how to effectively use and manage data. This should also include the infusion of data literacy and skills as a subject in all tiers of the Ugandan educational system. This action will ensure that data is recognized and treated as a useful resource for advancement. It will also ensure that the citizenry is ready for data-related job opportunities in the global digital market.

Strategic Objectives:

a) Integrate data literacy and skills into Uganda's educational system as a part of digital literacy and skills to build and enhance the skills over a significant number of gardens in data science, artificial intelligence, machine learning, deep learning and other big data related technologies.
b) Raise awareness of the value of data as a national resource to produce new value.
c) Assess data literacy and skills required for various sectors in the country.
d) Support the capacity building and training for civil servants and public servants in big data skills.

STRATEGIC AREA #3: DATA SECURITY, PRIVACY AND RESPONSIBILITY

The objective of this pillar is to address information security and cyber security risks involved in data management in Uganda. For the effective realization of the goals and benefits of data, it is imperative the implementation of an effective data security strategy. Data security refers to the preservation of confidentiality, integrity (authenticity and non-repudiation), and availability of data. Additionally, data security also extends to the protection of the privacy of data owners. It ensures that data is not processed or divulged without the consent of the data owner. Data security strategies must be implemented in all government and private organizations in Uganda to ensure data and its owners are protected from information security and cyber security risks. Due care shall be exercised by the government and private organizations to ensure that the implementation of data security does not create unnecessary barriers to data use. This Strategy is cognizant of already existing initiatives in the National Cyber security Strategy.



Strategic Objectives:

a) Create, adopt, and modify data security policies, procedures, programs, and initiatives to improve data use and security in the public and private sectors.
b) Ensure and promote the lawful, secure, fair and ethical, sustainable and accountable use of data in Uganda.

STRATEGIC AREA #4: DATA ACCESS, INTEGRATION AND AVAILABILITY

The objective of this pillar is to provide an enabling environment for the seamless use of data collected by the government, businesses, and individuals for developmental and innovative purposes without compromising data security and privacy. This also includes encouraging the use of open data to engender economic value such as increasing transparency, stimulating new business applications, building trust between citizens and organizations, and improving the lives of citizens through improved service delivery.

To harness the economic potential of data for Uganda, reduce corruption and increase transparency and trust, government and private organizations must improve the openness of data to the public. An open data policy will ensure that the public can easily access, use, and share national data. Easy access to national data will help spur innovative development in the country and increase interaction between the public and government which may lead to improvement in public service delivery.

Government and private organizations can improve the openness of data by making data available on online platforms; for example, government budget and procurement information should be published online so that the public can monitor and evaluate the expenditure of the government budget. The following principles shall be considered for an open data strategy, Open data by default, accessible and usable data, data for citizen engagement, data for national development and innovation, digital technology-enabled open data.

Strategic Objectives:

a) Ensure that the open data standards and guidelines are in place and implemented across government and the private sector.
b) Ensure that cloud computing is adopted to increase access to data and reduced costs of operation.
c) Ensure that all fragmented National data sources are identified, analyzed and integrated using the shared Government Integration Platform to provide data to the public and private sector.
d) Provide an open data portal composed of data sets in machine-readable format from both the public, private sectors and civil society for further innovation and research.

STRATEGIC AREA #5: DATA SERVICES AND INNOVATION

The objective of this pillar is to provide resources, capacity, and an enabling environment for the developmental and innovative use of data as a national resource for new value creation, social and economic growth and prosperity.

Data usability will ensure the establishment of data as a usable and useful national resource for value creation to support social and economic development. For Uganda to enjoy the economic benefits of data, strategies shall be implemented to unlock the value of data and ensure the best use of data for economic gains by different sectors of the economy. The unlocking of data through the implementation of the BDUS will lead to the proliferation of data-driven and data analytic-based organizations. It will also enable access to both local and foreign data (data belonging to other countries) by the government and the business sector to harness for economic gains. The long-term result would be having a system that promotes the creation of more organizations with the capability to create digital platforms to collect, mine and generate useful intelligence from both local and foreign data for economic benefits and global competitiveness.

There shall be mass advocacy within the country on the value and importance of data and different use cases for data in areas such as research and development, national planning, population management, health, national security, national indices, banking and finance, science and technology, global competitiveness and many more.

Strategic Objectives:

a) Promote data-driven innovation, research and digital services.
b) Build the trust of citizens and other user groups within the data economy ecosystem.
c) Create plans and initiatives for the quick use of data in social, economic, and research and development endeavours.
d) Establish data innovation spaces through the National ICT Innovation Hub to leverage technology and application developments as incubators for new businesses and for the development of skills, competence and best practices.
e) Identify big data use cases in critical sectors for pilot implementation to explore the potential of big data.

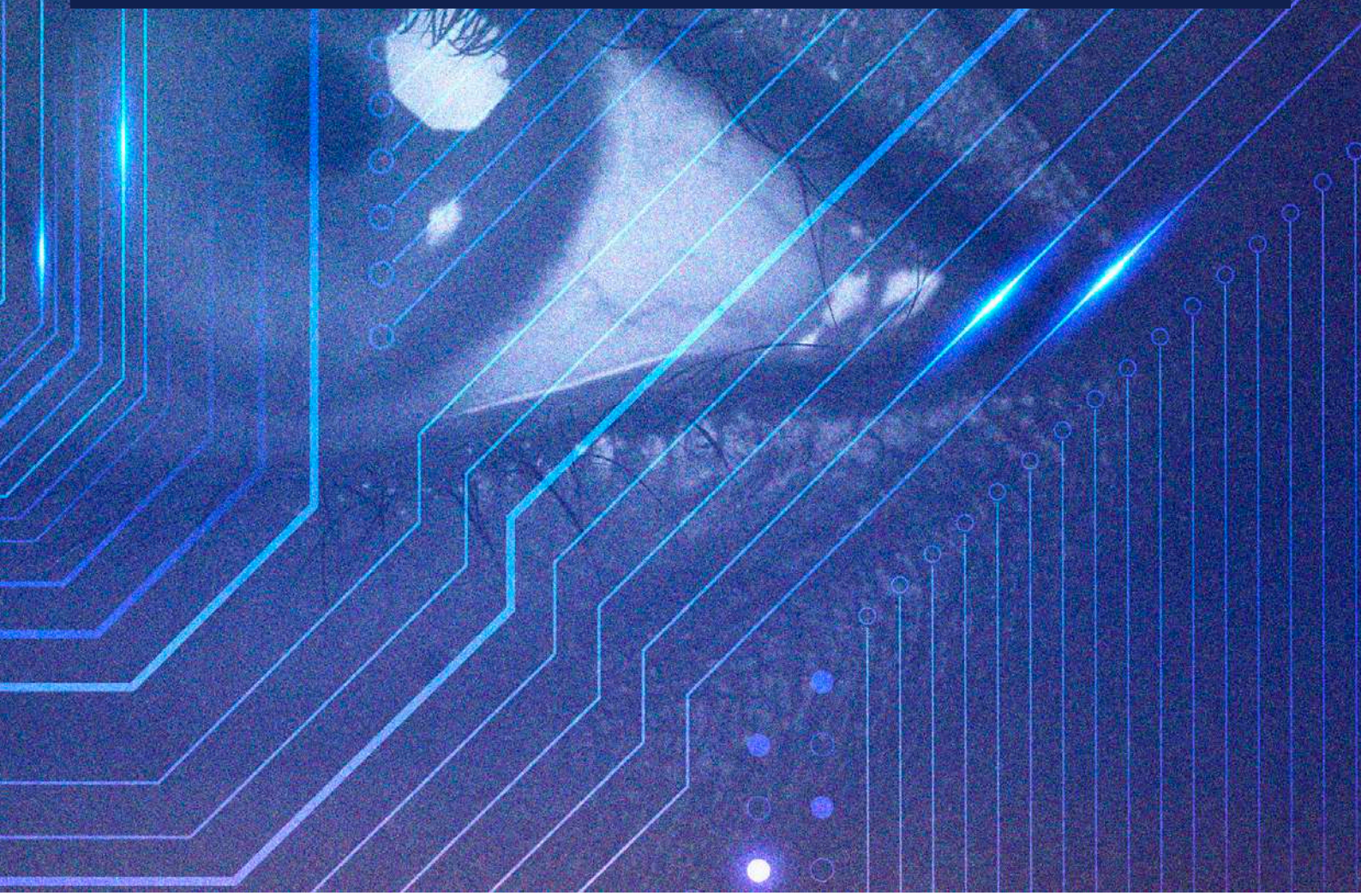
STRATEGIC AREA #6: DATA SOVEREIGNTY AND EQUALITY

The objective of this pillar is to address data ownership, classification, control and access as related to residency and data localization according to the national laws and regulations of Uganda. This implies that data collected in Uganda and from Ugandans within or outside the country is subject to all relevant laws, rules and regulations governing the use of data in Uganda.

Data Sovereignty ensures that any data generated is subjected to the laws and governance of the geographic location in which the data is collected and processed. Data Sovereignty is a key aspect of international data privacy that enables a country or any entity to regulate entities that can access sensitive data. Data Sovereignty is an important requirement that supports and strengthens data residency and compliance with national laws and regulations.

Strategic Objectives:

a) Ensure the existence of guidelines regarding compliance with the legal and regulatory framework for data use in Uganda.
b) Facilitate cross-border data flows.



4.0 BDUS ENABLERS AND DRIVERS

This section defines the strategic enablers and drivers.

4.1 BDUS ENABLERS

The outcomes of BDUS will depend on the following enablers:

Leadership: It is recognized that leadership is key to driving the implementation of BDUS in the public and private sectors. The top management in government and private organizations needs to recognize that data is a new valuable resource to drive the digital economy. Leadership must be ready to enable the right capabilities, an enabling environment, and effective governance for BDUS to achieve its aspirations. Therefore, BDUS recommends full leadership support and commitment at all levels for its implementation.

Enabling Environment: An enabling environment in terms of law, policies, regulations, guidelines, processes and measures will be required to ensure compliance and full implementation of BDUS.

Governance: Effective implementation of BDUS requires governance to facilitate responsibilities and ensure accountability in making the right decisions at all levels of compliance and implementation. A section is dedicated to the Governance approach that needed to be adopted for full implementation of the BDUS.

4.2 BDUS GOVERNANCE AND ECOSYSTEM

The BDUS governance is to provide adequate leadership and coordination to ensure responsibility and accountability for the successful implementation of the strategy. The BDUS Data ecosystem on the other hand comprises stakeholders, systems, facilitation, and an enabling environment that collectively empower people, businesses, public sector, among others to use data in pursuit of social and economic opportunities safely and securely in line with applicable standards, guidelines, regulations and laws.

4.2.1 BDUS GOVERNANCE STRUCTURE

The governance structure will take a programme-based approach to ensure ease of management and ownership. Therefore, each sector will have its governance structure and ecosystem to provide dedicated programme-specific leadership and coordination and be responsible and accountable for all decision-making and implementation. Under each programme governance structure and ecosystem, all actors are expected to develop their organization-specific data strategy following the national data governance model defined in the BDS. The governance structure should be made up of a data steering committee (DSC) or data governance committee (DGC), data stewards, data custodians, and data users. These entities will work together to enforce standards, policies, principles, practices, and processes for the effective management and use of data.

The membership of each programme data governance structure will comprise representatives from the public and private sectors. The composition of the representative shall be as follows:

Public Sector:

The public sector shall have representatives from the following organizations/entities:

a) The Ministry of ICT;
b) Any public institution with the responsibility for data governance;
c) Uganda Bureau of Standards;
d) The programme/industry regulator(s);
e) The programme/industry development agency;
f) The programme/Industry research institutes;
g) Judiciary; and
h) Tertiary institutions (Member must be the sector/industry specialist).

NOTE: The programme/industry Ministry or any responsible or equivalent public institution for the sector shall determine representatives from each organization/entity while ensuring that all the above organizations are represented. In the failure of the programme/industry Ministry to determine the representation, the Ministry of ICT and National Guidance shall determine the representation.

Private Sector:

The private sector shall have representatives from the following organizations/entities:

a) The programme/industry accredited associations/consortia/interest groups;
b) Non-Governmental Organizations/Civil Society Organizations promoting the peculiar sector/industry;
c) Innovation support Network or start-up ecosystem; and
d) Private Tertiary Institutions (Member must be the sector/industry specialist).

The Function of Governance Structure for BDUS

The functions of each governance structure is to:

a) Coordinate implementation of the programme/industry's operational activities;
b) Facilitate the establishment of the programme's integrated data platform;
c) Develop business models and implementation plans for the sector data access and use as captured in the BDUS;
d) Promote and ensure adequate investments in digital infrastructure that powers the sector/industry's data economy;
e) Provide MOICT with the sector's activities report and datasets for the operation of the National open data platform;
f) Determine and coordinate the development of relevant data policies, guidelines, frame works, standards, plans etc. in the sector of the economy; and
g) Any other functions as determined by the Ministry of ICT and National Guidance as part of the data governance structure.

4.2.2 BDUS Ecosystem

To encourage dialogue and feedback among the community of data beneficiaries and data-driven value-creating entities, the BDUS proposes a multi-stakeholder ecosystem group comprising the following:

a) Data owners or subjects;
b) Data users (users of data-driven services) including ordinary citizens;
c) Data controllers and processors;
d) Data-driven service providers and start-ups;
e) Data policy makers, planners and practitioners;
f) International organizations, development partners, and foreign collectors and users of Ugandan data;
g) Industry players and academia working on how data can drive the Ugandan economy; and
h) Members of the BDUS data governance structure.

The Responsibilities of the Sector BDUS Ecosystem

BDUS ecosystem will:
a) provide feedback on the implementation of the programme BDUS;
b) contribute to the development and implementation of relevant data policies, guidelines, frameworks, standards, plans etc. of the sector; and
c) Any other functions as determined by the programme's public and private BDUS governance leadership.

4.2.3 The Ministry of ICT and National Guidance

The Ministry of Information and Communications Technology and National Guidance will provide overall coordination of the BDUS implementation and as well as carry out the following functions:

a) Facilitate an appropriate enabling environment through relevant policies, strategies, regulations, standards, guidelines, frameworks, models, and plans related to data utility and protection;
b) Institutionalize a data governance reporting mechanism to aid the effective implementation of the BDUS at the organizational and sector levels;
c) Facilitate appropriate foreign direct and private sector-led investments in national data infrastructure;
d) Coordinate the overall data governance of various sector-specific governance structures;
e) Facilitate the development of strategy and business model for each sector;
f) Facilitate the development of an online platform for the operation and coordination of the BDUS ecosystem; and
g) Provide a mechanism for monitoring and evaluation of the BDUS implementation strategy.

4.2.4 Progress Monitoring and Risk

Monitoring and Evaluation

The implementation will be monitored through the Monitoring and Evaluation Framework provided for under the Digital Uganda Vision. The framework is aligned to the reporting and accountability frameworks for Government and includes annual as well as mid-term evaluation to report on lessons learned and identification of areas for improvement. In addition, all entities that have lead role shall be required to follow current reporting guidelines for quarterly reporting and will review work-plans and budgets for activities' implementation as presented in the implementation log frame.

Risk Mitigation

This will follow the Risk Mitigation strategies that are laid out in the Digital Uganda Vision. The strategies address risks in these area; operational, financial, organizational and technological.

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15	https://digitalpublicgoods.net/standard/

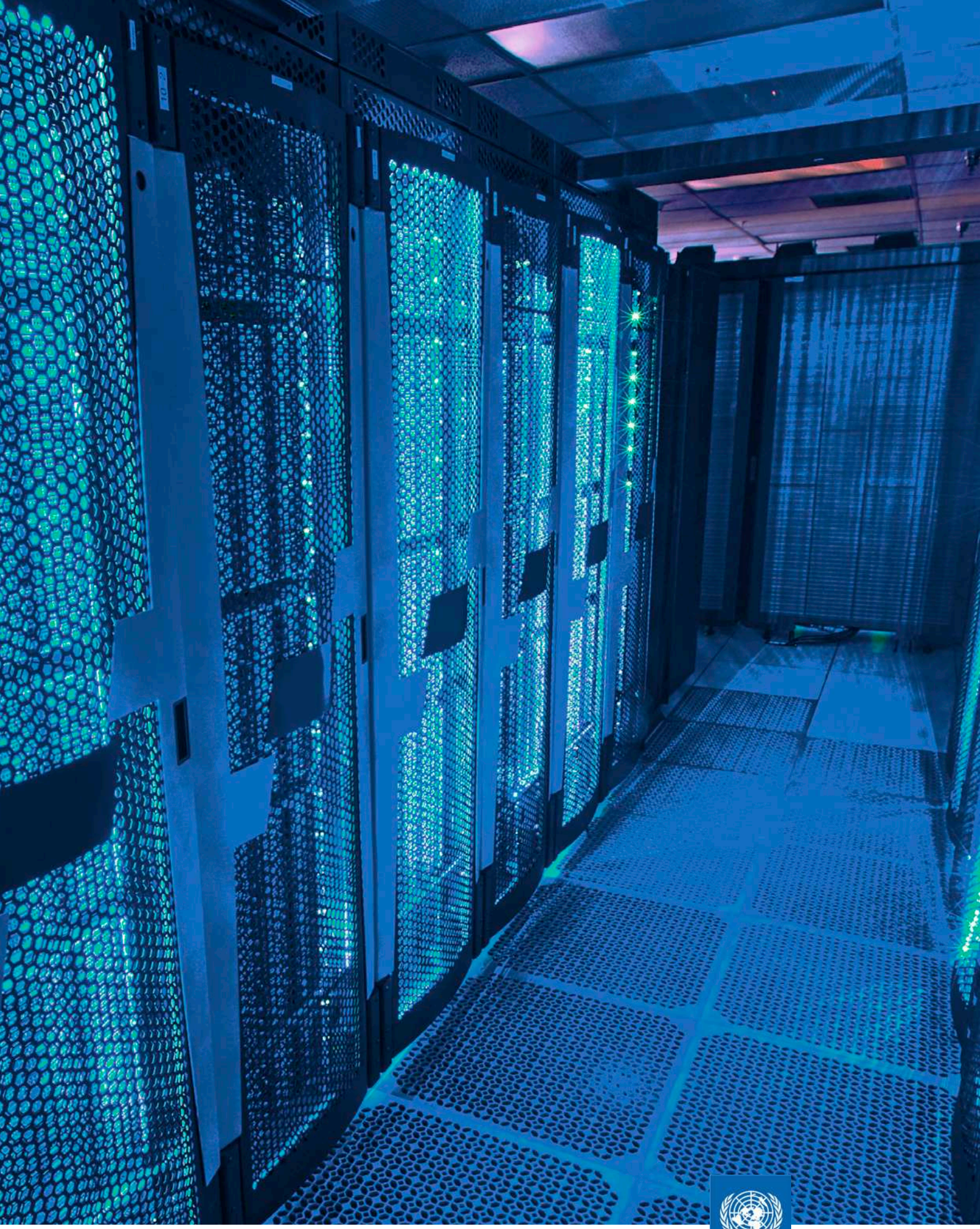
LIST OF ENTITIES THAT CONTRIBUTED TO THE DEVELOPMENT OF THE ROADMAP

Project Implementation Team	
Name	**Entity**
Shirley Nakyejwe	Ministry of ICT & National Guidance
Paul Kabagambe	Ministry of ICT & National Guidance
Dennis Ssubi	Ministry of ICT & National Guidance
Doreen Bujjingo	Ministry of ICT & National Guidance
Brandy Azeirwe	Ministry of ICT & National Guidance
Rita Kanya	Ministry of ICT & National Guidance
Reagan Matsiko	Ministry of Education and Sports
Sharp Mugabe	Government Citizens Interaction Centre (State House Uganda)
Samuel Wamukota	Centenary Technology Services
Sarah Ategeka	Centenary Technology Services
Nawalh Namudiba	Centenary Technology Services

1	Adjumani S S
2	African Centre of Excellence in Bioinformatics and Data intensive Sciences
3	African Excellence Centre of ICT for Education
4	Agwok Primary School
5	Alliance for Trade in Information Technology and Services (ATIS)
6	Amuria Town Council
7	Angwecibange primary School
8	Apuuton Primary School
9	Asili Fortune
10	Atratraka Primary School - Maracha
11	Awach S.S
12	Blockchain Association of Uganda
13	BPO and Innovation Council Council
14	Bubandi S.S Seed - Bundibugyo
15	Bugema Adventist Secondary School
16	Bugembe Muslim primary school - Jinja
17	Buhanda Primary School - Kibaale
18	Buikwe District Local Government
19	Bukhonzo Primary School - Namisindwa
20	Bukulula Girls Ss - Kalungu
21	Bunagana Town Council
22	Bunanganda primary school
23	Bunyoro Secondary School - Kagadi
24	Bunyoro Secondary School- Kagadi
25	Bupoto Primary School - Namisindwa
26	Bura Primary School - Maracha
27	Busia Border Seed SS
28	Busia District Local Government
29	Busoga College Mwiri
30	Buwagga Senior Secondary School - Wakiso
31	Buwembe Secondary School - Busia
32	Byabakoora Primary School - Kyegegwa
33	Camp Moses Junior Primary School - Rakai
34	Chemwania S. S - Kween
35	College of Business and Management Sciences, Makerere University
36	Comboni College - Lira City
37	Cwero Primary School - Gulu
38	Destiny Christian High School - Luwero
39	Development Initiatives (DIVINIT)
40	Digital transformation Program working group
41	Directorate of Government Analytical Lab
42	Dokolo District Local Government
43	East African Civil Aviation Academy
44	Education Digital Agenda Committee
45	Education Policy Review Commission
46	Entebbe comprehensive secondary school
47	Entebbe Secondary School – Wakiso
48	Equal Opportunities Commission
49	Ericsson Uganda
50	Erussi SS Nebbi
51	Excel College Pakwach
52	Fairland high school – Mukono
53	Five Star High School - Ntungamo
54	Gayaza Road Triangle SS-Kiwenda
55	Good Times Infant School Kawaala

56	Government Citizen Interaction Centre
57	Gulu City High School
58	Gulu District Local Government
59	Hands of Love Primary and Secondary School - Mayuge
60	Higher Education Students Financing Board (HESFB)
61	Ibanda District Local Government
62	Ibanda S. S
63	ICT Teachers Association of Uganda
64	Iganga District Local Government
65	Iguli Girls Secondary school - Dokolo
66	IJB Junior School
67	Infectious Diseases Institute
68	Internet Society
69	ISACA Uganda
70	Jacarandas Junior School - Wakiso
71	Japan International Cooperation Agency (JICA)
72	Jinja District Local Government
73	Kabaale Sanje SS - Kyotera
74	Kabale Preparatory School - Kanungu
75	Kabingo seed secondary School - Isingiro
76	Kabulasoke Demonstration School - Gomba
77	Kagadi Peoples - Kagadi
78	Kahinju Ss Fort-Portal - Fortportal
79	Kaloi Primary School - Moroto
80	Kampala Capital City Authority
81	Kanyengyero Community SS – Nkanga
82	Katakwi District Local Government (DLG)
83	Katakwi Township P/S
84	Katakwi Township Primary School
85	Katalemwa Ss-Matugga
86	Kibaale District local government
87	Kichinjaji Primary School – Soroti City
88	Kihanga public secondary school - Ntungamo
89	Kiira Primary School - Jinja
90	Kiira Primary School – Jinja City
91	Kinyara SS - Masindi
92	Kitamba High School - Kalungu
93	Kochi Secondary School KOBOKO
94	Kyakabadiima Parents Secondary School -Kagadi
95	Kyankwanzi District Local Government
96	Kyenzige Junior Nursery And Primary School - Kagadi
97	Kyotera Central Secondary School - Kyotera
98	Logoba Ss - Moyo
99	Lords Meade Vocational College - Buikwe
100	Lubaale C/U Primary School – Gomba
101	Lubugumu Jamia High School - Wakiso
102	Luwangula Secondary School - Kamuli
103	Makerere AI Lab
104	Makerere University
105	Masinya Secondary School - Busia
106	Mastercard Foundation
107	Ministry of Agriculture, Animal Industry and Fisheries
108	Ministry of Education and Sports (MoES)
109	Ministry of Finance Planning and Economic Development (MoFPED)
110	Ministry of Gender, Labor and Social Development
111	Ministry of Justice and Constitutional Affairs
112	Ministry of Local Government
113	Ministry of Public Service
114	Mountains of the Moon University
115	Moyo District Local Government
116	MUKONO DLG
117	Mungula Secondary School -Adjumani
118	Musese Secondary School - Mbale
119	Nam High School
120	Namasyolo Primary School - Busia
121	National Curriculum Development Centre (NCDC)
122	National Housing Construction Company (NHCC)
123	National ICT Innovation Hub
124	National Information Technology Authority (NITA-U)
125	Ndeija PEAS High School - Ntungamo
126	Ndekye Ss - Ntungamo
127	Nebbi District Local Government
128	Nebbi Town S. S
129	Nemba Secondary School - Namisindwa
130	Nomad primary school - Mayuge
131	Ntungamo District local government
132	Office of the Prime Minister

133	Ojingo Primary School
134	Okwira Primary School - Tororo
135	Omach Primary School
136	Omara Ebek Memorial Primary School - Amolatar
137	Optimus 7 Ltd.
138	Overseas Development Institute (ODI)
139	Pakwach Senior Secondary
140	Panyadoli Self Help Secondary School - Kiryandongo
141	Peak primary school - Kampala
142	Peas High School Kazingo – Fort Portal
143	Pilkington college muguluka
144	Planit Consults
145	Public Sector Foundation Uganda
146	Refactory Limited
147	Rubongi Army Secondary School - Tororo
148	Rugarama Sec School - Ntungamo
149	Ruhinda SSS - Mitooma
150	Rwengiri Primary School - Kiruhura
151	Science, Technology and Innovations Secretariat
152	Sibuse Primary School – Namisindwa
153	Sironko Progressive S.S
154	SNV Netherlands Development Organisation
155	St Joseph's College Ombaci – Arua City
156	St. Andrews College Ssanda - Wakiso
157	St. Charles Lwanga Ss Bukeerere - Mukono
158	St. Daniel Comboni S. S - Moroto
159	St. John's SS Nandere
160	St. Joseph Buganda Secondary School - Mityana
161	St. Leonard's Ss Maddu - Gomba
162	St. Mary Assumpta Girls SS/ Pagirinya Refugee SS - Adjuma
163	St. Peter's Primary School Nsambya
164	St. Stephens SS, Mukono
165	St. Thomas More SS Minakulu, Omoro
166	St.James S.S Hoima - Hoima
167	St.Kizito S.S
168	Stanbic Uganda
169	SunBird AI
170	Swedish Embassy
171	Taibah International School
172	The Amazima School - Buikwe
173	The Innovation Village
174	The Judiciary
175	The Overseas Development Institute (ODI Global)
176	Uganda Bureau of Statistics
177	Uganda Civil Aviation Authority
178	Uganda Communication Commission (UCC)
179	Uganda Institute of Information and Communications Technology (UICT)
180	Uganda Law Society
181	Uganda Media Centre
182	Uganda National Council for Science and Technology
183	Uganda National Meteorological Authority
184	Uganda Police
185	Uganda Registration Services Bureau (URSB
186	UN Capital Development Fund (UNCDF)
187	UNDP Chief Digital Office
188	Yumbe District Local Government



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