



Uganda:

**Driving inclusive
socio-economic progress
through mobile-enabled
digital transformation**



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To realise the potential that mobile offers Uganda, the GSMA, in partnership with the Swedish International Development Cooperation Agency (Sida), Department for International Development (DFID), United Nations Development Programme (UNDP), UN Capital Development Fund (UNCDF) and UN Global Pulse agreed to pursue a National Dialogue for Digital Transformation to accelerate progress. This aims to bring together key government ministries, departments and agencies, mobile industry leadership and development partners to demonstrate how mobile can be a positive force for societal change and build a collective vision to deliver on this opportunity.

In June 2018, the partners convened a Technical Working Group (TWG) to map mobile's current and potential impact on national development and progress on the UN Sustainable Development Goals (SDGs), to identify opportunities to drive more impact and draft an action plan to realise these opportunities. Special appreciation for the entire process goes to the following individuals and their respective organisations:

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Foreword



With the adoption of the 2030 Agenda in 2015, the world has embarked on the most ambitious, complex but transformative agenda. We are living in an exponential age, which calls for dynamism in everything that we do

to keep at pace with the wave of change. Knowledge, innovation, technology and science are critical enablers for the achievement of the Agenda. The world is experiencing significant changes because of the ensuing fourth industrial revolution. Specifically, nothing has transformed the developing world in the past two decades more than the advent of mobile technology. It is phenomenal looking at how mobile technology has evolved in developing countries, including Uganda, within a very short timeframe.

Today, as you will find in this report, the mobile revolution has changed, and is continuing to shape, the way we do things, either as individuals, or institutions. The spread of mobile phones, communication systems, and the internet has had a big impact on job creation, business development, and transformation in several sectors such as agriculture, health, education, infrastructure and tourism. In Uganda's agriculture sector, farmers use the power of mobile to transact and receive extension services. The growth of financial markets in the rural areas has also benefited immensely from this revolution.

You will find this report instrumental not only in highlighting several examples on the power of mobile technology on development, including those drawn from other countries, but also its contribution to the aspirations of the National Development Plan. It also provides an excellent baseline to guide interventions in the Third National Development Plan; the preparation of this will commence in 2019. The report provides a

platform for all actors to identify strategies to help the country harness mobile enabled technology to support the realization of the national development objectives and the 2030 Agenda as well as the associated 17 Sustainable Development Goals (SDGs).

I would like to take this opportunity to thank the Government of Uganda, the private sector, development partners and civil society institutions that nominated a formidable technical team to guide the preparation of this report. I also acknowledge the technical team at UNDP for working tirelessly with the GSMA to ensure this report is prepared in a consultative manner. UNDP appreciates the valued partnership with the GSMA, based on which this report has been prepared.

I call upon partners and private sector to work together to harness the opportunities highlighted in this report for the achievement of the SDGs. Also, I recognize and call upon Government to put appropriate incentives, strengthen coherence between the national and international policy environments and regulatory frameworks and build institutional capacity to harness the potential of science, technology and innovation, particularly mobile enabled technology for SDGs. I wish to reiterate UNDP's commitment to continue supporting the Government of Uganda, and more generally, the Ugandan people in their effort to realize the collective vision of becoming a prosperous nation by 2040 through innovative approaches including mobile enabled technology.

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Executive summary

As Uganda advances its efforts focused on the Sustainable Development Goals (SDGs) and the Uganda Vision 2040, harnessing the power of mobile technology will be critical to influencing progress across all development goals. Mobile is the first among all information and communication technologies to reach across geographies, income levels and cultures, enabling access to basic services where traditional means have often failed, including financial services, access to health information, education and clean energy. Mobile technology also enables the most widespread means of accessing the internet – the foundation for Uganda’s digital future.

Digital transformation is underway in Uganda, as shown by the growing number of people accessing digital content and services. This is having a profound impact on the country’s socio-economic development, with digital platforms beginning to provide access to life-enhancing services while improving productivity and efficiency across key sectors of the economy.

Mobile technology is at the heart of this digital transformation. The technology is the primary form of internet connectivity for the majority of people in the country. Around 20 million people¹ have a mobile subscription, representing 44% of the population. Nearly half of all mobile subscribers also access mobile internet services. By June 2018, there were nearly 10 million mobile internet connections in Uganda – a penetration rate of 23%, compared to less than 1% for fixed-line internet connections.² Furthermore, key mobile platforms such as mobile money and cellular IoT (Internet of Things) are enabling the creation, distribution and consumption of a range of digital services across the country.

In 2015, Uganda launched the second five-year National Development Plan (NDP II) 2015/16 – 2019/20. Its five priority areas – agriculture, human capital development, infrastructure, tourism, and minerals, oil and gas – prioritise action as part of a broader goal to transform the country from a low-income economy to a competitive and market-driven, lower middle-income economy by 2020, in line with the long-term vision of reaching upper middle-income status by 2040. The government of Uganda has

also pledged to achieve the SDGs and other international commitments. Although government and its development partners have committed resources to the NDP II priority areas and other development goals, economic progress has been sluggish, constrained by productivity challenges, slow private-sector growth and funding deficits for key sectors.

With more people using mobile services today in Uganda than ever before, the technology is having a direct impact on social and economic activities and, by extension, supporting progress with the national and global development goals.

In this report, we highlight five broad areas where the use of mobile technology is having a notable impact in Uganda:



Productivity and efficiency – mobile connectivity lowers the cost of accessing and disseminating vital information, allowing private businesses and public institutions to be more productive.



Service delivery – mobile platforms enable innovative solutions that leapfrog infrastructure and funding challenges across key sectors of the economy, notably health, education and utilities.



Good governance and social justice – mobile-enabled digitisation of government tax receipts and social security disbursements has increased transparency and accountability in those processes.



Climate change and the environment – mobile technology helps with disaster preparedness and response by raising public awareness and reaching out to vulnerable populations on disaster risks.



Digital entrepreneurship and emerging technologies – Around 4 in 5 tech start-ups use one or more mobile platforms in their solution, while mobile connectivity is enabling the development of blockchain and other emerging technologies in Uganda.

1. Total unique users who have subscribed to mobile services at the end of the period. Subscribers differ from connections such that a unique user can have multiple connections.
2. Quarterly Market Report, Q417, UCC



Accelerating socio-economic development through mobile

Technology is developing rapidly; as the global and national economy becomes ever more digital, it is vital to act now to ensure existing inequalities are not exacerbated. In Uganda, significant digital and financial gaps exist: around 4 in 5 people, including more than half the adult population, remain offline and risk missing out on the socio-economic benefits of digital transformation.³ In addition, more than a fifth of adults do not use financial services.⁴

To maximise the impact of mobile-enabled digital transformation in Uganda, the government, mobile industry and other stakeholders need to work together to enhance digital and financial inclusion, particularly among underserved populations. This will ensure inclusive socio-economic development in the country and accelerate efforts to achieve the national and global development goals. To this end, we have identified the following two broad areas of focus for efforts by government and other stakeholders:

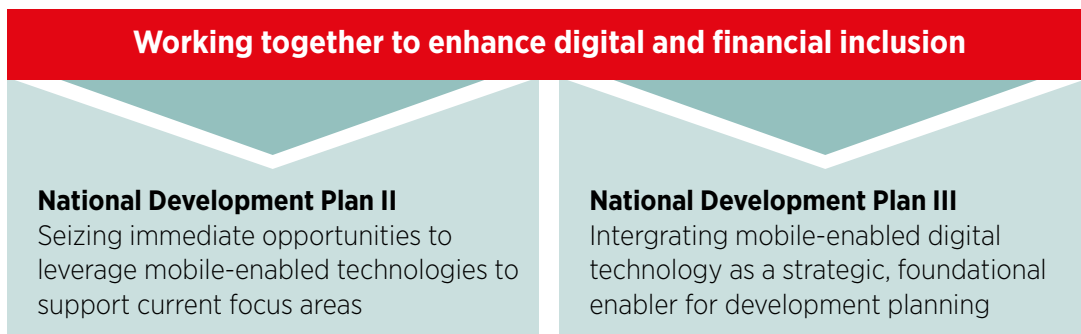
- **Leverage new opportunities for mobile-enabled progress on NDP II priority areas**

Although mobile technology is already having a positive impact on a number of sectors in Uganda, stakeholders can accelerate progress on the five NDP II priority areas by:

- scaling current – and deploying new – mobile-enabled solutions across the five NDP II priority areas
- leveraging emerging technologies, such as blockchain, for socio-economic development.

- **Incorporating mobile into NDP III planning**

Planning is underway for the Third National Development Plan (NDP III), due to commence in 2020/2021. In view of the continued contribution of mobile technology to Vision 2040 and the SDGs, all stakeholders in Uganda’s long-term development aspirations, including the National Planning Authority (NPA), mobile operators, other private sector players and development agencies, have a compelling opportunity to work together to incorporate the technology into the key objectives and focus areas of NDP III.



We are at a defining moment in Uganda’s history. Mobile is powering the most widespread and inclusive means of accessing the internet and digital technologies, which are vital to the growth of the

Ugandan economy in an increasingly digital world. Stakeholders need to act now to ensure that Uganda’s digital future is an inclusive one that leaves no one behind.

3. Quarterly Market Report, Q417, UCC
4. FinScope Survey, FSDU, 2018

1. Uganda today: opportunities and challenges in context

To understand how stakeholders can accelerate development through mobile-enabled digital solutions, it is important to understand the situation in the country today. Uganda is the eighth largest country in Sub-Saharan Africa by population and 12th largest economy. Population growth has remained consistently above 3% per annum, nearly three times the global average. Consequently, the country's population has doubled over the last three decades to 42 million, half of which are young people aged up to 18 years old.⁵ Uganda's economy grew at an average rate of 6.9% between 1990 and 2012.⁶ However, average growth fell below 5% between 2013 and 2017 as the country grappled with private sector credit constraints, poor harvests due to adverse weather, unrest in South Sudan, and underperformance in public sector project execution.⁷

The underperformance of the economy in recent years amid continued population growth has had an adverse effect on poverty levels. The Uganda National Household Survey 2016/17 shows that more than 8 million people (21% of the population) now live in poverty, compared to 6.6 million in 2012/2013.⁸ This reversed a trend in the country that had seen the proportion of the population living below the national poverty line decline from 56% in 1992 to 20% in 2013.⁹

Uganda faces considerable economic and social inequalities. It is ranked 17th among the countries with the highest level of income inequality in Africa¹⁰, with a GINI coefficient of 0.42.¹¹ A study on Uganda development and demographics found a significant

income disparity among the country's 121 districts. The Gross Domestic Product (GDP) per capita of Wakiso, one of the country's richest districts, at UGX11.7 million (\$3,250) is nearly 60× that of Kagadi, one of the poorest, at UGX205,843 (\$57).¹² In the UNDP Gender Inequality Index 2018, Uganda ranks low (126 out of 189 countries).¹³

Agriculture accounts for 72% of total employment¹⁴ and contributes around a quarter of GDP in Uganda, making it one of the most important sectors of the economy. Manufacturing, which is dominated by micro, small and medium enterprises (MSMEs), accounts for a fifth of GDP, while recent discoveries of oil and gas reserves are driving investments in the nascent energy sector. The ICT sector is one of the fastest growing sectors in the country, with an average annual growth rate of nearly 20%¹⁵ underpinned by the rapid uptake of mobile services. In 2015/2016, the ICT sector accounted for 8.7% of Uganda's GDP, compared to 6.6% in 2014/2015.¹⁶

Geographically, Uganda is landlocked and shares borders with Kenya, South Sudan, the Democratic Republic of the Congo, Rwanda and Tanzania. The country's wildlife and water resources, including Murchison Falls National Park and Lake Victoria, which it shares with Kenya and Tanzania, are a boon for its tourism sector. The Uganda Tourism Board estimates that the number of tourist arrivals in 2018 reached 1.7 million, a 29% increase over the previous year.¹⁷ Meanwhile, the ongoing conflict in neighbouring South Sudan has led to a steady increase in refugee arrivals, with the number of South Sudanese refugees in Uganda reaching around 1 million in June 2018.¹⁸

5. MoFPED, "State of Uganda Population Report", 2017

6. World Bank data

7. [World Bank](#)

8. [Uganda National Household Survey, UBOS, 2017](#)

9. [World Bank: Uganda Poverty Assessment 2016](#)

10. [UNECA](#)

11. Gini coefficient gauges economic inequality by measuring income distribution among a population. The coefficient ranges from 0 to 1, where 0 = perfect equality and 1 = perfect inequality.

12. Study by Frederick S. Pardee Center for International Futures, Josef Korbel School of International Studies and University of Denver, with support from the United States Agency for International Development (USAID)

13. Gender Inequality Index: a composite measure reflecting inequality in achievement between women and men in three dimensions: reproductive health, empowerment and the labour market.

14. [Agriculture Sector Strategic Plan, 2015/16 - 2019/20](#), MoAAIF, 2016

15. [MoICT & NG](#)

16. [Statistical Abstract](#), NITA-U, 2016

17. [UBOS](#)

18. [UNHCR](#)

UGANDA: KEY FACTS



TOTAL POPULATION:
42,288,962



LAND AREA:
248,038 sq km

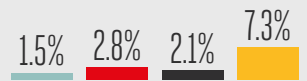
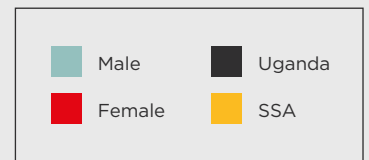
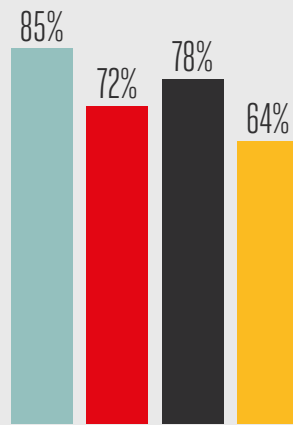
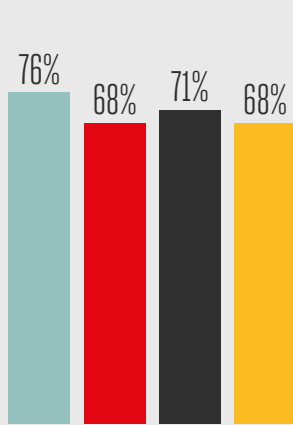
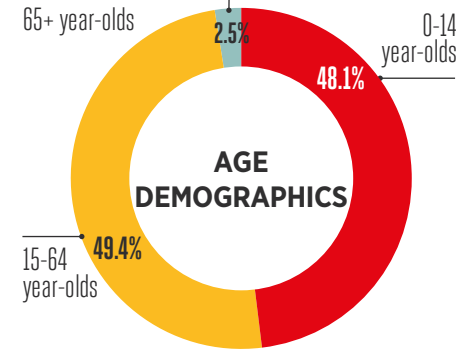
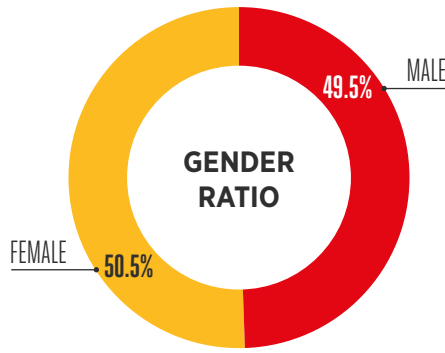
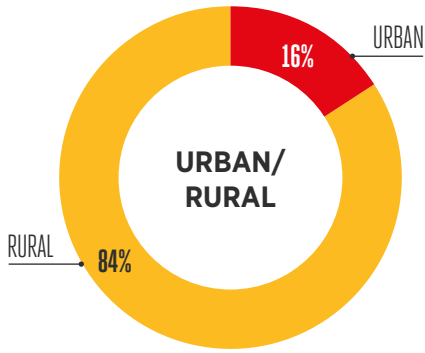
OFFICIAL LANGUAGE:



ENGLISH

CAPITAL:

KAMPALA



LABOUR FORCE PARTICIPATION RATE

LITERACY RATE

UNEMPLOYMENT RATE

GDP PER CAPITA (CURRENT):

\$604

(Lower middle income)

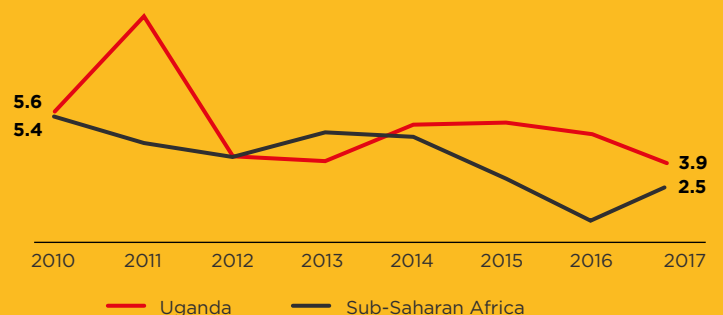


SUB-SAHARAN AFRICA (CURRENT):

\$1,554



GDP GROWTH (ANNUAL %)



Sources: UBOS, World Bank, UN, GSMA Intelligence

2. Government ambition for development in Uganda

Key to developing an action plan for digital transformation in Uganda is understanding the development plans already in place. In 2007, the government adopted the vision statement; ‘*A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years*’. To achieve this ambitious goal, strategic plans and milestones were established to serve as a roadmap for the social and economic development of the country. The government has also incorporated key elements of a number of regional and global development frameworks into its national development agenda.

In 2013, President Yoweri Museveni launched the Uganda Vision 2040, a 30-year development masterplan, envisioning transformation from a predominantly rural and low-income country to a competitive and market-driven upper middle-income country, by 2040. The vision outlines targets for a number of indicators, benchmarked against selected upper middle-income countries that have achieved a similar level of development status. Table 1 shows the baseline and targets for some indicators, and their respective fold change over the 30-year period.

Table 1

Baseline status and Vision targets

Development indicator	Baseline status (2010)	2016/2017 status	Target (2040)	2010 to 2040 Fold change
Per capita income	\$506	\$604	\$9,500	18.8
Population below poverty per 100 persons	24.5	21.4	5	-4.9
Income distribution (GINI coefficient)	0.43	0.42	0.32	-1.3
Population with access to electricity per 100 persons	11	20.4	80	7.3
Population with access to safe water per 100 persons	15	39	100	6.7
Infant mortality rate per 1,000 live births	63	43	4	-15.8
Maternal mortality rate per 100,000 live births	438	336	15	-29.2
Literacy rate per 100 persons	73	74	95	1.3
Gender Related Development Index (GDI)	0.51	0.87	0.9	1.7
Corruption Perception Index	2.5	2.6	7.1	2.8

Source: National Planning Authority, UBOS, UN, Transparency International



Vision 2040 proposes six five-year National Development Plans (NDPs) that will define Uganda's medium-term strategic direction, development priorities and implementation strategies. NDPI (2010/2011-2014/2015) mainly focused on strengthening the foundation of the economy and

establishing a foundation for future economic growth and social transformation.

NDP II (2015/2016-2019/2020) aims to propel Uganda to middle-income status by delivering on four broad objectives across five priority areas.

Figure 1

NDP II 2015/2016-2019/2020



Source: National Planning Authority





In 2015, under the presidency of Uganda, 193 UN member states adopted the SDGs. The 17-point plan, with its 169 associated targets, aims to end poverty,

combat climate change and fight injustice and inequality. The intention is to meet all the targets by 2030, with some requiring earlier attainment.

Figure 2

The UN Sustainable Development Goals (SDGs)



Source: UN

Uganda was among the first countries to localise the SDGs into its national planning frameworks. It has set up and operationalised structures for coordinating the implementation of the SDGs through partnerships and targeted resource mobilisation. In October 2018, the government developed a roadmap to create an enabling environment for delivering on the SDGs, and also act as a resource mobilisation tool during the NDP II implementation period.¹⁹

Uganda has also shown commitment to several regional development goals, which, along with the SDGs, feature in national development plans. These include the East Africa Community (EAC) Vision 2050 and the Africa Agenda 2063. Key focus areas of these two plans include infrastructure and industrial development, poverty eradication and human capital development, gender and women empowerment, and good governance.

19. Roadmap for Creating an Enabling Environment for Delivering on SDGs in Uganda, Government of Uganda, 2018





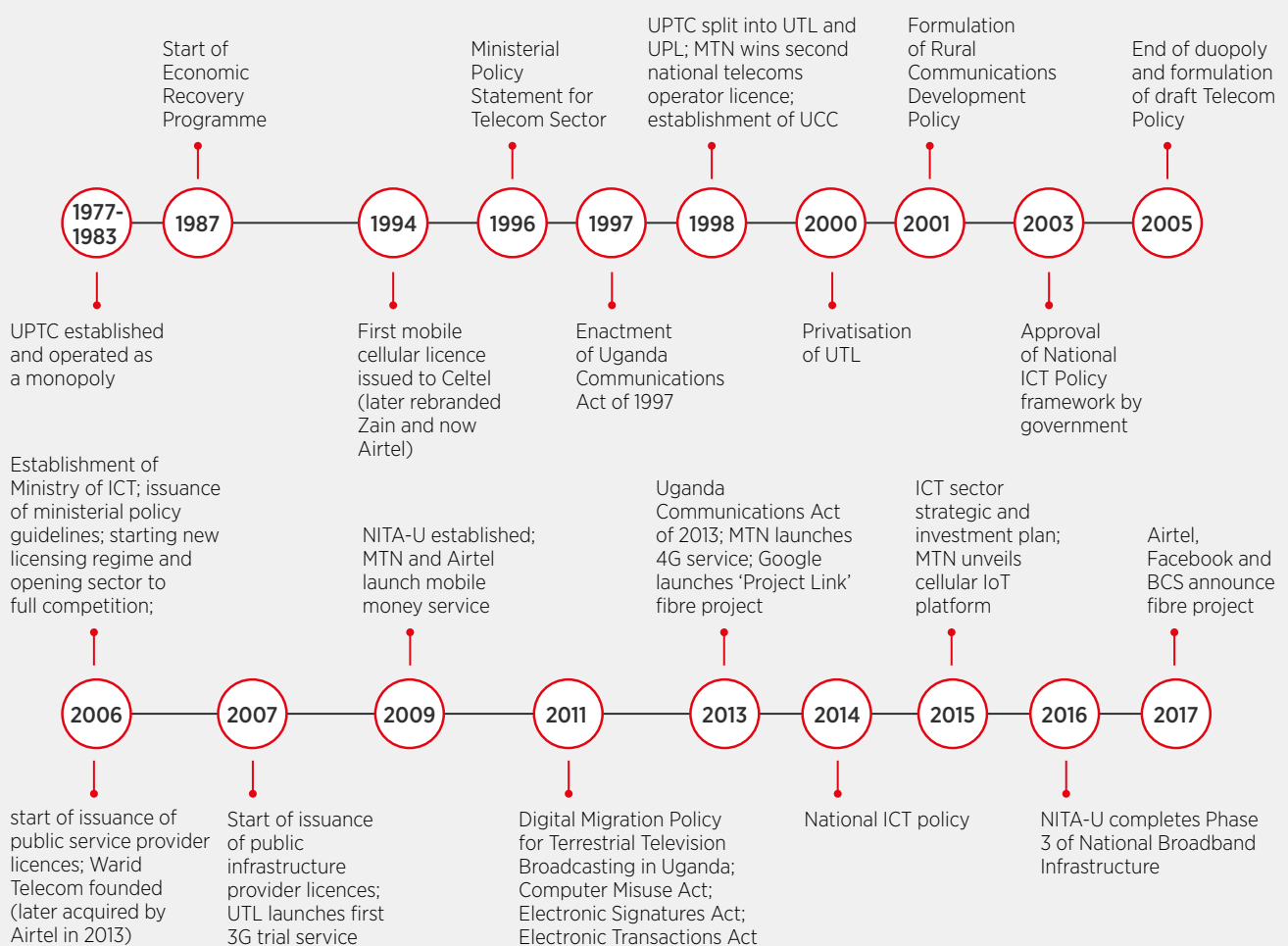
3. Uganda's digital landscape

Uganda's digital journey began in 1977 with the establishment of the Uganda Post and Telecommunications Corporation (UPTC). Progress greatly accelerated in the 1990s when the arrival of GSM-based technology and private investments in the telecoms sector led to the rollout of mobile networks.

The number of people with access to a digital service has increased significantly since the 2000s. 2G networks now cover more than 90% of the population and the scope of digital services has expanded beyond voice and text communication to a variety of services across multiple sectors.

Figure 3

Major milestones on Uganda's ongoing journey to digital transformation







3.1 ICT policy environment

The National ICT Policy (2014)²⁰ aims to transform Uganda into a knowledge society by 2025, with ICT at the centre of all aspects of life. It builds on key elements of the National ICT Policy Framework (2003) and several other policies, such as the E-government Framework Policy 2010 (draft)²¹ and the Telecom Policy 2011 (draft)²², aimed at increasing access to and

use of digital services. The National ICT Policy is a key enabler for the Digital Uganda campaign, which was launched in July 2017 to foster innovation and create a positive socio-economic impact by empowering people through ICT-based services. Table 2 outlines four key action areas of the National ICT Policy.

Table 2

National ICT policy action areas

Key action area		Priority actions
	Expansion of ICT infrastructure and its integration in the country	a) Extension of the national backbone infrastructure to cover the entire country as well as addressing last-mile challenges. b) Integration of the communication, broadcasting and Information infrastructure and systems. c) Promotion of reliable and affordable ICT infrastructure in rural, remote and other underserved areas. d) Implementation of the analogue-to-digital broadcasting migration roadmap.
	Deepening utilisation of ICT services by government, private sector, not-for-profit ICT organisations and the wider citizenry	a) Implementation of the national e-government strategy and masterplan. b) Awareness creation and mindset change. c) Increasing penetration of ICT equipment, services and applications.
	Enhancement of research and innovation in ICT products, applications and services	a) Development and implementation of an ICT research and innovation strategy. b) Promotion of industrial production and assembling of ICT products. c) Promotion of software and applications development. d) Setting up of ICT parks to support research and development as well as innovation.
	Improvement of ICT governance and environment in Uganda	a) Consolidation of reforms in the institutional, policy, legal and regulatory environment for the ICT sector. b) Setting of the requisite standards and regulations.

Source: Ministry of ICT & National Guidance

20. [National Information and Communications Technology Policy for Uganda](#) MoICT & NG, 2014

21. [National Electronic Government \(e-Government\) Framework](#), MoICT & NG, 2010

22. Draft Telecoms Policy, MoICT & NG, 2011

Sub-sector policy areas of the National ICT Policy include a number of strategies to accelerate the deployment of digital infrastructure and services in the country. These include the following:

- maintain a fully liberalised telecoms sector to attract investment
- provide incentives such as tax relief for network infrastructure, ICT development, application tools and software, and the reduction of excise tax as well as value-added tax (VAT) on ICT end-user equipment to improve access and affordability
- enforce fair and efficient management of scarce resources such as spectrum, numbering and rights of way
- promote the development of telecommunications products and services in local languages, taking into consideration the special needs of rural/poor communities, women and people with disabilities
- scale up the National Backbone Infrastructure (NBI) to cover the whole country
- encourage participation of the private sector in ICT infrastructure development
- develop rural investment incentives to facilitate expansion of the national postal infrastructure.

3.2 Digital networks in Uganda

Access to fast, reliable and affordable digital content and services by individuals, businesses and public institutions is the fundamental feature of a knowledge-based economy. In Uganda, access to digital services relies on fixed-line and mobile networks.

3.2.1 Fixed-line networks in Uganda

In 2006, the MoICT received funding towards the implementation of the National Data Transmission Backbone Infrastructure and e-Government

Infrastructure (NBI/EGI) Project. In 2010, the National Information Technology Authority of Uganda (NITA-U) assumed oversight of the NBI/EGI and has completed the first three phases of the project, as shown in Table 3. Now in its fourth phase, the NBI/EGI provides connectivity to more than 321 MDAs, local government sites and government service centres (e.g. hospitals and universities) across the country as of January 2019.²³

Table 3

Uganda NBI coverage

Phase I	198km of fibre network connecting Kampala, Mukono, Jinja, Bombo and Entebbe.
Phase II	1,400km of fibre network connecting Busia, Tororo, Mbale, Malaba, Kumi, Soroti, Lira, Gulu, Elegu, Masindi, Kyenjojo, Fort Portal, Kasese, Bushenyi and Mbarara.
Phase III	756km comprising the following fibre routes: Kampala – Masaka – Mbarara – Katuna (border with Rwanda), Masaka – Mtukula (border with Tanzania), Masindi – Hoima – Kyenjojo.
Phase IV	Commenced in the 2018/2019 financial year. Its scope includes: <ul style="list-style-type: none"> • extending the ICT backbone to the West Nile districts of Pakwach, Nebbi, Arua, Yumbe, Koboko, Adjumani, Katakwi and Moroto • connecting three border points of Uganda at Oraba with South Sudan, and Vurra and Mpondwe with DR Congo to the ICT backbone for regional connectivity and to enhance the redundancy of the NBI.

Source: NITA-U, website accessed October 2018

23. <https://www.nita.go.ug/projects/national-backbone-infrastructure-project-nbiegi>



The Uganda Communications Commission (UCC) has also licensed a number of private companies to deploy fibre infrastructure across the country. For example, Liquid Telecom is investing UGX2 billion (\$525 million) to roll out fibre infrastructure in Kampala through its local subsidiary Infocom.

Despite these developments, access to and use of fixed-line services in Uganda remains low. The number of fixed-line connections in Uganda fell to 262,000 at the end of 2017, equivalent to a penetration rate of less than 1%.²⁴ This is mainly due to limited last-mile connectivity to homes and small businesses, and in many cases high access costs for end users. As a result, the majority of fixed-line users in the country are public institutions, large businesses or residential homes in urban areas.

That said, investments in fibre-optic infrastructure by local and international companies play a vital role in enhancing wireless connectivity across the country. Some key players and recent developments in this space include the following:

- MTN has invested in a fibre network, which now covers more than 5,000km, to enhance data transmission capacity to 3G and 4G sites around the country.
- Uganda Electricity Transmission Company Limited (UETCL) has installed data fibre in its transmission lines to complement existing underground fibre infrastructure.

- Google, through its African broadband infrastructure company CSquared, is deploying fibre infrastructure to provide wholesale capacity to third-party data providers.
- Facebook has collaborated with Bandwidth & Cloud Services (BCS) Group and Airtel to deploy around 800km of fibre infrastructure across North Western Uganda, with the potential to connect around 3 million people to the internet.

3.2.1 Mobile networks in Uganda

Mobile access networks complement the fixed-line infrastructure in Uganda by providing last-mile connectivity to end users, especially those without access to any other access technology. For the majority of the population, mobile is their first and only platform to access digital services. Furthermore, the convenience and portability of mobile devices and services, relative to other communications devices and technologies, enables personal, as opposed to communal, access to digital services.

The wide area coverage of mobile networks also makes the technology a more cost-effective option for connecting remote and sparsely populated communities. In Uganda, 2G networks now cover nearly the entire population, while mobile broadband networks (3G/4G) cover 4 in 5 people in the country.

Table 4

Uganda mobile network coverage as of March 2018

Coverage by region	Geographic coverage			Population coverage		
	2G	3G	4G	2G	3G	4G
Central	78%	48%	9%	99%	88%	53%
Eastern	84%	51%	4%	99%	82%	15%
Northern	78%	31%	1%	96%	65%	9%
Western	93%	55%	2%	98%	78%	8%
Total	83%	44%	4%	98%	78%	23%

Source: NITA-U

24. UCC

UGANDA MOBILE SECTOR AT A GLANCE, JULY 2018

MOBILE NETWORK OPERATORS



UNIQUE MOBILE SUBSCRIBERS



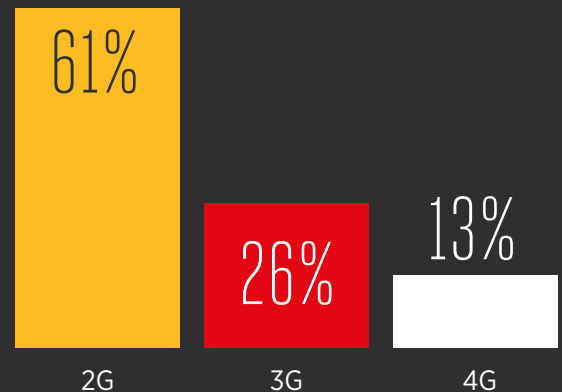
19.8 MILLION



46%

use mobile internet

% CONNECTIONS (EXC CELLULAR IOT²⁵)



SMARTPHONE ADOPTION

16%

compared to

30%

for Sub-Saharan Africa



ARPU²⁶ PER SUBSCRIBER



\$3.6



compared to \$7.2 for Sub-Saharan Africa

25. Internet of Things

26. Average Revenue Per User

3.3 Mobile technology as an enabler of digital services in Uganda

Mobile technology has emerged as the preferred platform to create, distribute and consume digital content in Uganda, where the uptake of fixed-line services is constrained by low infrastructure coverage and high access costs. Below, we highlight how three mobile services – **connectivity, mobile money** and **cellular IoT** – are driving digital transformation in Uganda.

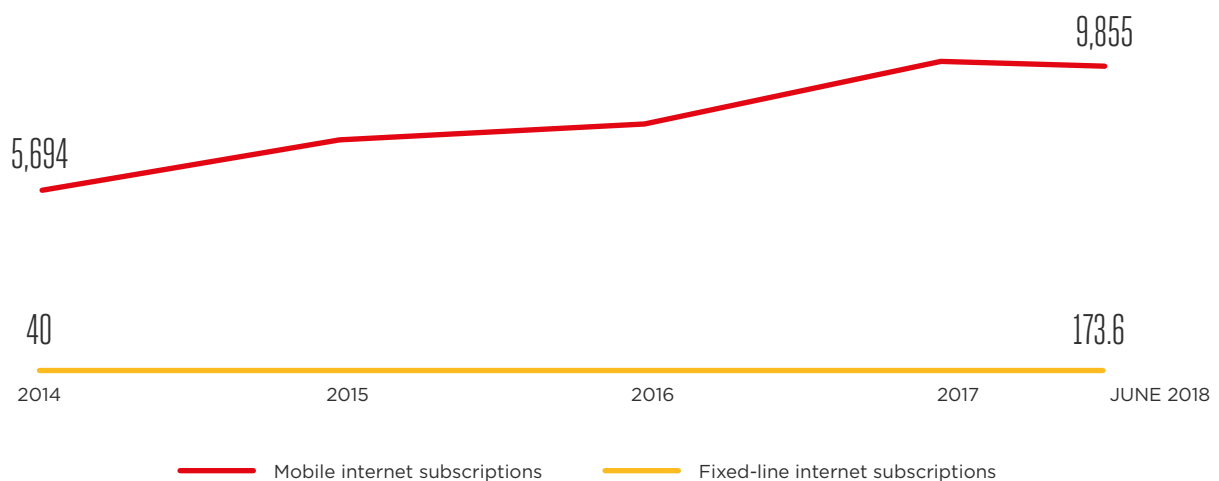
3.3.1 Connectivity

At a foundational level, mobile technology provides connectivity to basic communications services and

the internet. In Uganda, just over 19.8 million people²⁷ have a mobile subscription, representing 44% of the population. Nearly half of all mobile subscribers also access mobile internet services. By June 2018, there were nearly 10 million mobile internet connections in Uganda – a penetration rate of 23%. The number of smartphone connections in Uganda has quadrupled over the last four years to approximately 6 million, around a quarter of total mobile connections. This is allowing more people to use feature-rich digital services on their mobile devices, reducing the impact of much lower penetration of personal computers and other data-enabled devices.

Figure 4

Mobile versus fixed-line internet subscriptions (000s)



Source: Uganda Communications Commission

3.3.2 Mobile Money

The broad access to mobile phones and the low cost structure associated with deploying mobile money services countrywide have seen mobile money become the main driver of formal financial inclusion²⁸ in Uganda, which now stands at 78%.²⁹ In the year to June 2018, the total value of transactions over mobile money platforms reached UGX73.1 trillion (\$17.4 billion)³⁰, more than half of Uganda's GDP. There are now more than 22 million

registered mobile money accounts in the country, held by citizens across social and geographical divides, compared to around 5 million registered accounts in traditional banks. Mobile money platforms have evolved from providing peer-to-peer (P2P) remittances and airtime top-ups to enabling access to more complex financial products, including savings, credit, insurance and person-to-government (P2G) transactions.

27. Total unique users who have subscribed to mobile services at the end of the period. Subscribers differ from connections such that a unique user can have multiple connections.

28. Uptake of savings, credit, insurance and payment services by adults

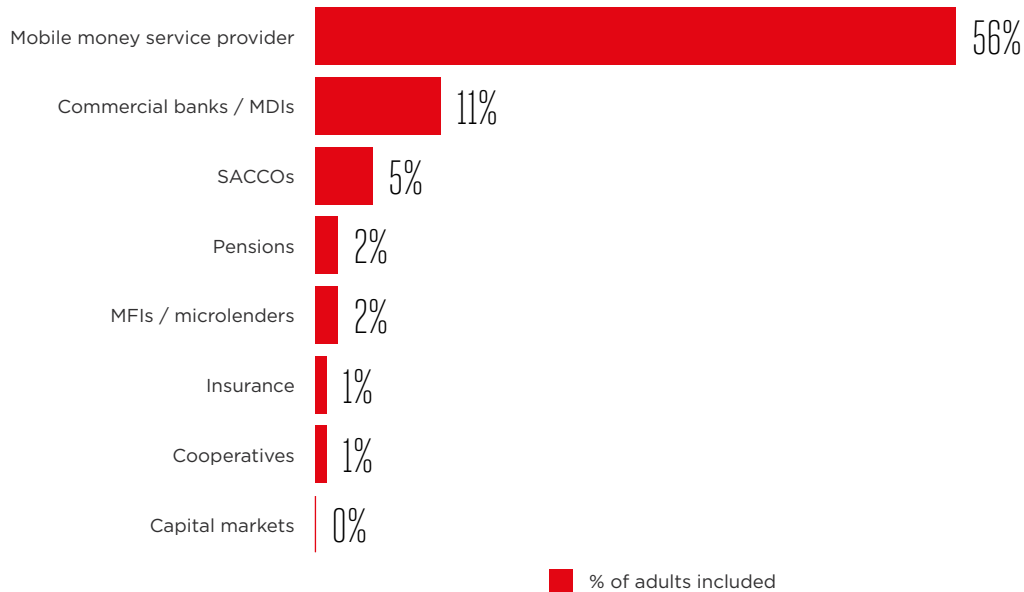
29. [FinScope Uganda: Topline findings report](#), FSD Uganda, 2018

30. Bank of Uganda (BoU)



Figure 5

Mobile money is the main driver of formal financial inclusion in Uganda



Source: FinScope Uganda survey 2018

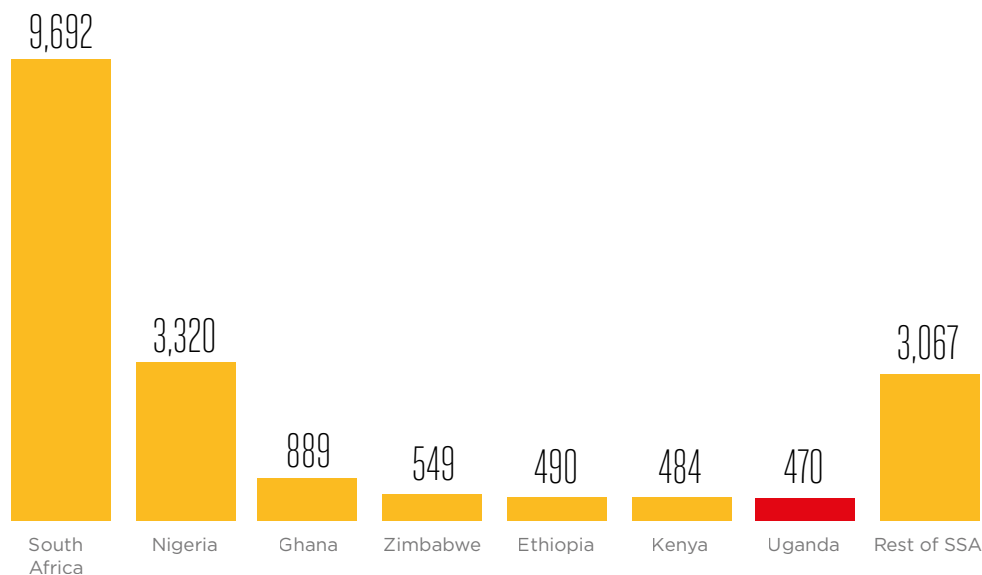
3.3.3 Cellular IoT

Cellular IoT (Internet of Things) refers to the connection of a variety of devices to a common network to enable autonomous communication with other devices. Notable use cases in Uganda include the utilities sector, where cellular IoT connections facilitate the operation of pay-as-you-go (PAYG) solutions for clean energy and water systems, and the transport

and logistics sector with vehicle tracking and fleet management solutions. As of December 2018, there were nearly half a million cellular IoT connections in Uganda, making it the seventh largest cellular IoT market in Sub-Saharan Africa.

Figure 6

Cellular IoT connections (000s), December 2018



Source: GSMA Intelligence

4. The impact of mobile-enabled digital services on the development goals in Uganda

Mobile technology has the potential to help address a wide range of social and economic challenges in Uganda. Government ministries, development agencies and NGOs, and private sector players increasingly use mobile platforms to deliver vital services across the country. In turn, this generates measurable economic, social and cultural value for individuals, communities and wider society.

In 2016, the mobile industry became the first to commit to the UN Sustainable Development Goals (SDGs). At the 73rd session of the UN General Assembly (UNGA) in September 2018, the GSMA launched the third *Mobile Industry Impact Report*, which assesses the progress the industry is making to contribute to the SDGs across the world, including in Sub-Saharan Africa. For further details, see details at www.gsma.com/betterfuture/2018sdgimpactreport.



4.1 Mapping mobile services to the development goals in Uganda

Table 5 summarises how mobile is currently supporting the priority areas of NDP II and associated SDGs in Uganda.

Table 5

Mobile supporting priority areas of NDP II

NDPII priority areas		Associated SDGs	The role of mobile platforms – connectivity, mobile money, M2M/IoT	
Agriculture		2 ZERO HUNGER 8 DECENT WORK AND ECONOMIC GROWTH 10 REDUCED INEQUALITIES 12 RESPONSIBLE CONSUMER AND PRODUCTION 13 CLIMATE ACTION 15 LIFE ON LAND	<ul style="list-style-type: none"> Deliver vital information on weather, cultivation techniques, market prices etc, to smallholder farmers to improve their productivity and income Enable the digitisation of the agricultural value chain to improve efficiency, facilitate secure and transparent payment of farmers, and reduce waste 	<ul style="list-style-type: none"> Disseminate early-warning messages to communities in vulnerable areas on time to prevent agricultural crises
Human capital development		1 NO POVERTY 3 GOOD HEALTH AND WELL BEING 4 QUALITY EDUCATION 6 CLEAN WATER AND SANITATION 7 AFFORDABLE AND CLEAN ENERGY 10 REDUCED INEQUALITIES 16 PEACE, JUSTICE AND STRONG INSTITUTIONS	<ul style="list-style-type: none"> Improve access to life-enhancing services, including health, education, safe water, clean energy and sanitation, particularly underpinned by residents' ability to access mobile services in their own name or use mobile-enabled identity-linked services such as mobile money and IoT Improve the productivity and income of entrepreneurs and provide access to a wide range of financial products, such as savings, insurance and credit 	<ul style="list-style-type: none"> Disseminate timely early-warning messages to communities in disaster-prone areas to prevent disasters
Infrastructure		6 CLEAN WATER AND SANITATION 7 AFFORDABLE AND CLEAN ENERGY 9 INDUSTRY INNOVATION AND INFRASTRUCTURE 11 SUSTAINABLE CITIES AND COMMUNITIES	<ul style="list-style-type: none"> Mobile operator investment in network infrastructure provides the foundation for a digital society. Over the last decade, mobile operators have invested more than \$1 billion in capital expenditure in Uganda Mobile money and cellular IoT platforms enable innovative 	<ul style="list-style-type: none"> solar energy solutions and sustainable provision of safe water Collect disaster-related information to develop an annual report to analyse trends for risk-informed decision-making, and to develop contingency plans
Minerals, oil and gas		8 DECENT WORK AND ECONOMIC GROWTH 12 RESPONSIBLE CONSUMER AND PRODUCTION	<ul style="list-style-type: none"> Improve safety by helping workers easily collect data, review and evaluate situations in real-time and take immediate corrective actions where needed 	
Tourism		8 DECENT WORK AND ECONOMIC GROWTH 15 LIFE ON LAND	<ul style="list-style-type: none"> Mobile apps provide detailed guides on places and attractions in Uganda, as well as travel and hospitality solutions from service providers Mobile connectivity in remote 	<ul style="list-style-type: none"> tourist locations provides reassurance for visitors Mobile big data can be used to estimate the number of tourists and value generated from tourism to inform national tourism policy

4.2 Snapshot of use cases: mobile contributing to development in Uganda

With more people using mobile services today in Uganda than at any time in the past, the technology is having a direct impact on social and economic activities in the country and, by extension, helping achieve national and global development goals. We highlight five broad areas where the use of mobile technology is having a significant impact.



PRODUCTIVITY AND EFFICIENCY

Mobile technology is driving economic growth in Uganda by improving productivity and efficiency across different sectors of the economy. At the core, mobile connectivity lowers the cost of accessing and disseminating vital information, allowing private businesses and public institutions to be more productive. Government ministries and small businesses use basic voice, SMS and internet-based services, such as WhatsApp, to communicate more efficiently and effectively, reducing unproductive travel time and transport costs.

Furthermore, mobile internet services provide access to valuable online information and services, which in turn improves operational efficiencies, while the use of mobile money has improved the efficiency of business transactions. Over a three-month period, regular users of mobile financial services in Uganda saved at least 12 productive hours that would otherwise have been spent travelling to a financial institution and dealing with traditional transaction and payment methods.³¹

Use cases

E-government services

In 2006, Uganda developed an e-government framework to guide harmonised implementation of e-government initiatives as one of the pillars to transform the country into a knowledge-based economy. A number of agencies have set up e-government platforms to support service delivery, efficient transactions and information provision. According to the United Nations E-Government survey, Uganda's Online Service Index improved from 50% in 2016 to 57% in 2018, which puts the country in the high Online Service Index bracket.³²

For the majority of citizens, mobile connectivity and mobile money offer the best opportunity to interact with e-government and other online services. For example, mobile money is now the primary platform for people to paying personal and business taxes, and water and electricity bills in Uganda. The NITA-U National IT Survey 2017/2018 found that mobile money payment of utility bills is the most used e-government service, accounting for 63% of total transactions.³³

Examples

Ministry of Finance, Planning and Economic Development (MoFPED)

In August 2018, MoFPED began implementing the National Electronic Payment Gateway system through which users will pay for all government services. The gateway uses mobile money to enable digital transactions and improve service delivery to users.

Uganda Revenue Authority (URA)

URA uses a mobile platform in its eTAX system. Since introduction, URA reports that mobile money has increased the efficiency of tax payments and increased collection rates.

Ministry of Local Government (MoLG)

MoLG, which oversees 121 district local governments and 42 municipal councils, uses mobile-enabled instant messaging platforms to communicate and mobile money services to disburse funds to the district administration officers. Officers within districts also use mobile communications services, such as voice calls and instant messaging, to improve efficiency and save costs by avoiding time-consuming journeys for activities that can be performed remotely.

31. [2017 State of the Industry Report on Mobile Money](#) GSMA, 2017

32. [Uganda Improves in Government Online Service Delivery](#) UNPAN, 2018

33. National IT Survey 2017/18, NITA-U, 2018



A key enabler of online services is the ability to prove one’s identity over digital platforms; service providers need assurance of the validity of customers’ identities. To this end, NITA-U is implementing Mobile Identity (Mobile ID) as a tool to enable users to prove their identity online via a mobile phone. The solution will also allow users to sign online documents digitally. The Mobile ID service aims drive uptake of e-government and e-commerce services, especially those that involve high-value payments or exchange of confidential documents. The Mobile ID service has the potential to:

- promote secure exchange of data over the internet by the public and private sectors
- improve efficiency in e-service delivery
- promote e-commerce in Uganda by increasing trust in online transactions
- achieve and maintain a paperless environment
- enhance uptake of online services with a seamless e-transaction experience.

Agriculture

Uganda relies heavily on agriculture for jobs and economic growth: agriculture accounts for 72% of employment and contributes around a quarter of GDP. Mobile technology is helping to address a number of inefficiencies in the sector, which often have a negative impact on productivity. These include poor access to relevant information, use of inefficient farming techniques, lack of access to finance for investment in better seeds and inputs, the time and travel required to receive cash payments for crops, and the overall lack of visibility for buyers and sellers.

Basic mobile services such as SMS, Unstructured Supplementary Service Data (USSD) and automated voice deliver market and weather information to farmers while mobile-based enterprise solutions rely on mobile money and cellular IoT to help agribusinesses digitise the procurement of crops from smallholder farmers and implement digital farmer records to support tractability and certification requirements. Beyond structured agriculture solutions, farmers and different players in the agriculture ecosystem use mobile-enabled services, such as WhatsApp and other social media platforms, to share information and provide support to one another.

Examples	Agri-Fin Mobile	Agri-Fin Mobile, developed by Mercy Corps and funded by the Swiss Agency for Development and Cooperation (SDC), works with partners to build sustainable models, where farm and crop management tools and financial services are “bundled” in affordable, unified platforms on mobile phone channels to promote mass uptake.
	MergData	MergData is a technology platform developed by Farmerline to connect smallholder farmers to information, markets and services to improve productivity.
	G-Soko	G-Soko was developed by the East Africa Grain Council as a market transaction platform to increase farmers’ income by providing access to sustainable markets for their products as well as enabling easy interaction between the farmer and the buyer.
	FarmForce	Software-as-a-Service solution that simplifies how agri-businesses manage their relationship with smallholder farmers, increases traceability and enables access to formal markets. The FarmForce solution efficiently manages outgrower schemes and contract farming programs.
	ESE Agri Solution	Digitisation of the touch points between smallholder farmers and farmer organisations

UTL offers bulk payment services to agribusinesses through its mobile money service, M-Sente. In 2015 M-Sente launched business-to-person (B2P) bulk payment digitisation pilots in coffee and sugar cane value chains, with the support of Financial Sector Deepening Uganda. For the coffee pilot, UTL collaborated with the Uganda Coffee Farmers Alliance, which currently reaches 53,000 households in rural Uganda.³⁴ For the sugar cane pilot, UTL works with Bumagaya Sugar, an independently owned agribusiness based in Buikwe, Eastern Region. The agribusiness employs 150 salaried agricultural workers and sells raw sugar cane to Uganda's third largest sugar company, Sugar Corporation of Uganda Limited.³⁵ The agribusiness previously transported physical cash to farming estates on payday, leading the agribusinesses to hire armoured guards at additional fixed cost to mitigate the risk of theft and other physical threats. Bulk payment services now present a more secure and less costly option for agribusinesses.

In 2015, mobile technology provider Yo Uganda partnered with coffee exporter Kyagalanyi Coffee, the United Nations Capital Development Fund and mobile operator MTN to digitise business-to-person payments to smallholder farmers in the coffee value chain. As of January 2017, around 3,000 unique smallholder farmers supplying coffee cherries to Kyagalanyi had accepted mobile money as a payment method. This has helped reduce risks to personal safety for staff as well as time spent travelling with physical cash.



34. <http://www.ucfa.or.ug/>

35. <http://www.mehtagroup.com/>



SERVICE DELIVERY

In Uganda, delivering life-enhancing services by conventional means is constrained by several challenges, including a lack of adequate infrastructure and, in many cases, the inability of end users to pay high upfront costs. These challenges are especially acute in rural areas, where more than 80% of the population live and where basic infrastructure such as roads and

electricity is most lacking. However, mobile platforms, including messaging, mobile money and cellular IoT, are enabling innovative solutions that leapfrog these challenges across key sectors of the economy, notably health, education and utilities. This is having a direct, positive impact on human capital development in Uganda, one of the priority areas of NDP II.

Use cases

Health

Uganda performs better than many of its peers in Sub-Saharan Africa across key health indicators, despite having a number of healthcare challenges, including a shortage of healthcare workers and a lack of healthcare facilities in many rural communities. Key successes over the last two decades include a 40% drop in maternal mortality rate and a fall in HIV infection rates from 30% of the population to 6.5%.³⁶

The progress reflects the efforts of the government of Uganda in setting ambitious goals and putting programmes in place to achieve them. Some programmes, in partnership with development partners such as the United Nations International Children's Emergency Fund (UNICEF), involve the use of mobile platforms to bridge the gap in access to healthcare services and information, enable faster and more effective coordination of healthcare and professionals, and digitise drug inventory and supply chains. Data from the GSMA mHealth Tracker currently records 53 mHealth services in Uganda.³⁷



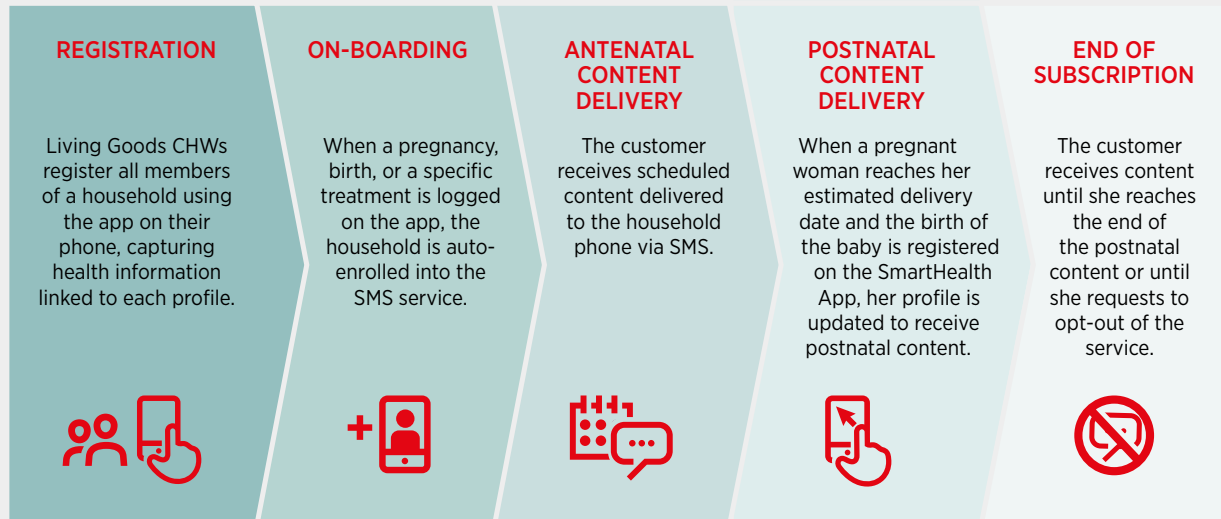
36. <https://bulamuhealthcare.org/healthcare-in-uganda/>

37. [GSMA mHealth deployment tracker](#)

Examples		
	Community Health Management System (CHMS)	<p>With support from UNICEF, CHMS is the Ministry of Health (MoH) approved application that provides frontline health workers with patient registration and case management tools, under the National Health Records Program (NHRP). The Uganda MoH expects all new mHealth programmes to align with and support the NHRP and CHMS.</p>
	mTrac	<p>mTrac is an SMS service that tracks the stock of essential medicines at health facilities. Launched by the MoH with support from UNICEF and the Foundation for Innovative New Diagnostics (FIND), mTrac allows health facility workers to send stock-take reports by SMS. This reduces stockouts at facilities and improves transparency and accountability for the drugs.</p>
	WhatsApp Doc	<p>This is a private sector-led service developed by The Medical Concierge Group (TMCG). It gives mobile users 24-hour access to a doctor or pharmacist over WhatsApp. In addition to text messaging, users can provide information through images, video or audio.</p>
	FamilyConnect	<p>FamilyConnect sends messages via SMS to pregnant women and new mothers on actions they should take to ensure the good health of both themselves and their babies in the critical first 1,000 days of life. It also sends SMS messages to health workers on key follow-up actions they should offer to new mothers. By the end of 2018, more than 150,000 pregnant women and heads of households in nine districts are expected to be enrolled in FamilyConnect, with a strategy in place to reach national scale by 2020.</p>
	Uganda Mobile Vital Records System (MVRS)	<p>MVRS is a web/mobile-based system developed through a public-private partnership between UNICEF, Uganda Telecom and the Uganda Registration Services Bureau. It addresses the bottlenecks associated with a paper-based system, and plays a vital role in streamlining, simplifying and decentralising delivery of birth and death registration services in Uganda. It allows health workers and local government officials to report births with simple verification and printing of certificates at the sub-district level.</p>

Living Goods Uganda³⁸ deploys a network of door-to-door Community Health Workers (CHWs), 92% of whom are women, who are responsible for guiding families towards improved health and wellbeing. Living Goods uses mobile platforms to improve health service and information delivery by offering a digital channel for frontline workers in the form of mHealth apps embedded on the smartphones of CHWs and a free SMS information service targeting end users.

The Living Goods SMS service customer journey



Living Goods expects to have a network of 4,500 CHWs providing services to more than 600,000 households by the end of 2018. A five-year randomised control trial showed a 27% reduction in under-five mortalities and an increase of up to 72% in home visits for nursing mothers in the first seven days of the post-natal period. Drug prices also fell by 17% at clinics and drug stores near where Living Goods operates, while the prevalence of fake drugs fell by 50%, suggesting positive competitive pressure. CHWs performing disease outbreak surveillance, reporting, control and management could also lead to cost savings in health services, including a reduction in the number of patients who need to travel to understaffed health facilities for treatment.



38. [Living Goods Uganda: A community health service leveraging mobile technology](#), GSMA, 2018

Utilities

More than 4 in 5 people in Uganda lack access to electricity, and largely rely on expensive, polluting kerosene and firewood for power. Meanwhile, large population movements from rural areas to informal settlements around urban centres are creating a challenge for the provision of water and sanitation services. Some 61% of Ugandans lack access to safe water and 75% do not have access to improved sanitation facilities.³⁹

Mobile connectivity, mobile money and cellular IoT platforms offer an opportunity for government agencies and social enterprises to develop innovative solutions. One such solution is the PAYG solar model, which combines innovations around IoT, cloud computing and mobile money to provide flexible payment options for users and help create a credit history for customers with no formal financial background.

Examples	Electricity	More than 300,000 households across Uganda are benefitting from PAYG solar, though there is significant room for growth given that around 5 million households still lack access to electricity. Solar PAYG service providers in Uganda include M-KOPA, Fenix International, Village Energy and SolarNow.
	Water	In 2011, the National Water and Sewerage Corporation (NWSC) transitioned to an electronic payment system called 'e-water'. Mobile money is a key enabler of this system, accounting for more than 90% of total payments.
	Sanitation	<p>The Kampala Capital City Authority (KCCA) has implemented a mobile-enabled digital system to improve waste collection. The pit-emptying tracking system uses an Android-based platform to:</p> <ul style="list-style-type: none"> - determine the demand patterns for pit-emptying services - identify areas frequently served and those not - ensure that the pit waste is dumped at designated treatment plants - link the pit emptying private operators to clients through a call centre.

Humanitarian response

Uganda's refugee policy is often cited as one of the most progressive and generous in the world, with a favourable protection environment for refugees, including freedom of movement, the right to work and own business and property (including land to settle and cultivate), and access to public education and health services.⁴⁰ This has been shown to have positive impacts for refugee and host populations.⁴¹

However, the scale of refugee flows into Uganda is placing excessive pressure on state and humanitarian resources. Since the escalation of the civil war in South Sudan in July 2016 and the declaration of famine in February 2017, Uganda has become the largest recipient of fleeing migrants in Africa. The number of new arrivals from South Sudan reached a daily average of 245 arrivals in May 2018, while around 1,000 refugees from the Democratic Republic of the Congo continue to arrive in Uganda every week.⁴²

Mobile technology can be a lifeline for people impacted by crisis, with access to mobile devices and connectivity identified as humanitarian assistance in its own right. Meanwhile, the humanitarian sector is thinking creatively about how to maximise the impact of the minimal resources available. In northern Uganda, a number of humanitarian organisations have started to collaborate with the private sector, in particular mobile operators, to test the use of

39. <https://water.org/our-impact/uganda/>

40. UNHCR

41. Economic Impact of Refugee Settlements in Uganda, WFP, 2016

42. Uganda Humanitarian Situation Report, UNICEF, 2018



mobile money for the delivery of cash assistance to refugees. A key enabler is the government’s recognition of refugee identification documents as ‘acceptable’ forms of identity for compliance with mobile SIM registration and Know Your Customer (KYC) requirements imposed on mobile operators. Airtel and MTN are currently using mobile money payment platforms for humanitarian cash transfers and other Ugandan mobile operators are following suit. Mobile operators have invested heavily to extend and upgrade mobile connectivity in refugee settlements. In Bidi Bidi refugee settlement, one of the largest in the world with over 280,000 refugees, UNCDF, alongside the United Nations Refugee Agency, UNHCR, and other humanitarian organisations, provided operators with critical information to help inform their decisions to upgrade and expand coverage in the settlement, including the provision of GPS coordinates, population statistics and predicted trends.

Bulk payments via mobile money offer a cheaper, faster, more secure and transparent solution for humanitarian agencies looking to transfer cash aid to refugees and displaced persons. In Bidi Bidi refugee settlement, DanChurchAid made mobile money payments (eight instalments of \$38 per month) to 15,000 refugees via Airtel money in 2017/2018. During the project, Airtel invested in three new permanent network towers, and increased its sales team in the area to 25, subscribing over 86,000 new customers, with the support of UNCDF. Other non-governmental organisations (NGOs) including the Norwegian Refugee Council, International Rescue Committee, World Vision and the World Food Programme are also distributing digital cash-based transfers in partnership with mobile operators in the settlement.

Such projects are demonstrating how digital payments can maximise the impact of humanitarian organisations, ultimately improving the lives of refugees.⁴³

Education

Uganda has a high primary school enrolment rate by regional standards, at 91%.⁴⁴ However, much lower primary school completion (53%) and secondary school enrolment (34%) rates underscore the challenge of achieving the education development goal in the country. Although mobile-enabled learning platforms are yet to take off in Uganda, the technology is enabling other solutions to improve the delivery of education services in Uganda.

Examples

Ministry of Education (MoE)

MoE, in partnership with Mastercard and UNICEF, uses a mobile app, called Kupaa, to enable parents and caregivers to pay school fees and other school expenses. The app also allows schools to manage incoming payments and direct funds to relevant services.

The Uganda National Examinations Board (UNEB) partners with mobile networks to enable students to confirm their registration status and receive exam results via SMS.

UNICEF and the Ministry of Education operate EduTrac, an SMS-based data collection system, to track education issues such as teacher absenteeism, violence against children, water point and latrine functionality in schools, as well as school budget allocations. The data collected informs education policy and planning as well as programmes with development partners.

43. Humanitarian Payment Digitisation: Focus On Uganda's Bidi Bidi Refugee Settlement, GSMA, 2017

44. World Bank





GOOD GOVERNANCE AND SOCIAL JUSTICE

Good governance is one of the key principles of Vision 2040. Some of its main features as part of the development plan include citizen transformation and participation in governance, anti-corruption and respect for the rule of law, government effectiveness, and effective knowledge management. In line with this principle, the UNDP programme on Rule of Law and Constitutional Democracy (RCLD) focuses on overall institutional effectiveness, transparency and accountability in the management of public affairs. RCLD objectives in Uganda include enabling access to justice, including the fulfilment of human rights; and advancing affirmative action for women and marginalised groups.

Government departments and development agencies have implemented mobile-based services that are contributing to good governance and social justice in the country. For example, the digitisation of government tax receipts and social security disbursements has increased transparency and accountability in those processes, leading to greater public engagement in governance. In addition, mobile connectivity is enabling social justice services for vulnerable and marginalised people.

Examples

Ministry of Gender, Labour and Social Development (MGLSD)

The MGLSD uses mobile technology to:

- provide support to victims of child abuse and gender-based violence through the toll-free Sauti helpline
- provide a minimum level of income security to the elderly and vulnerable people through the Social Assistance Grants for Empowerment (SAGE) programme through mobile money.

United Nations Population Fund (UNFPA)

UNFPA supports the following;

- the SafePal App, which helps young people report sexual and gender-based violence in and around schools and other public places
- the GetIn App, which helps midwives and other Community Health Extension Workers to identify, record and follow-up on pregnant girls in rural areas.

Action for Transparency (A4T)

A4T is an anti-corruption initiative supported by the Swedish International Development Cooperation Agency (Sida) and Transparency International. It uses a smartphone app to allow citizens to check the amount of government money pledged to public institutions, such as schools and hospitals, as well as the amount actually spent.

United Nations International Children's Emergency Fund (UNICEF)

In 2011, UNICEF designed and deployed U-Report, a free SMS-based platform that enables citizens to report issues affecting themselves and their communities, and gain access to real-time feedback and information on new initiatives or campaigns.



CLIMATE CHANGE AND THE ENVIRONMENT

According to the World Bank, various types of disaster affect at least 200,000 Ugandans each year, notably drought and floods. The impact of these disasters on people and the economy often negates the gains in poverty reduction and socio-economic development in the affected areas. Meanwhile, with climate change, the World Bank predicts that around half the country's districts will become drought-prone by 2035. In view of this context, government agencies and humanitarian organisations in Uganda are increasingly using mobile platforms to enhance disaster preparedness and response efforts.

The use of mobile technology for disaster preparedness and response ranges from raising public awareness and reaching out to vulnerable populations on disaster risks, to developing community-specific parameters in designing and implementing response activities. Mobile can also be a platform for affected individuals and communities to share their experiences and communicate with authorities, both to provide information on early-warning signs and to coordinate response and humanitarian efforts.

Examples

National Emergency Coordination and Operations Centre (NECOC)

In 2014, the government launched NECOC, with the support of UNDP, to provide timely and early-warning information on disasters, climate modelling and forecasting, and help coordinate emergency response. NECOC is developing the Uganda Mass Early Warning System (UMEWS), to broadcast message alerts in English and several local languages over mobile. Meanwhile, UNICEF has created an interface on its U-Report mobile platform to enable it to transfer all disaster-related messages directly to NECOC.

Climate Change Adaptation and ICT (CHAI)

CHAI is a partnership between FHI 360, Uganda Chartered HealthNet, the Ministry of Water and Environment, Makerere University and the International Development Research Centre (IDRC). It has developed a climate information system for the collection, analysis and dissemination of adaptation information. The system uses mobile platforms to gather weekly crop and livestock market information from 46 local market outlets, and daily weather data from 22 sub-county weather stations, and disseminates information to households through community support organisations. Farmers receive seasonal weather forecasts, guidance on low-cost rainwater harvesting techniques, and information on drought and flood coping mechanisms.⁴⁵

Uganda Communications Commission (UCC)

UCC, in collaboration with the Office of the Prime Minister, the Ministry of Water and Environment, and the District Local Government of Butaleja, implemented a pilot project on setting up flood early-warning systems in the Butaleja district. In September 2014, one of the systems installed in the Manafwa district was activated to warn the community about possible flooding, allowing many people to move to higher ground for safety.

45. <https://www.fhi360.org/projects/climate-change-adaptation-and-ict-chai>



DIGITAL ENTREPRENEURSHIP AND EMERGING TECHNOLOGIES

Uganda has a vibrant tech start-up ecosystem, which plays an increasingly important role in the creation and distribution of locally relevant mobile content and services across the country. The tech startup ecosystem, supported by 16 active tech hubs⁴⁶, benefits from growing financial and technical support from mobile operators and private investors. In 2017, five startups from Uganda raised a combined \$16 million in funding, including solar startup SolarNow, which secured a \$6 million debt facility to help it reach more customers and expand access to PAYG solar power.

Local tech hub, The Innovation Village, estimates that around 4 in 5 tech start-ups use one or more mobile platforms in their solutions. This underscores the central role the technology plays in enabling local tech innovation in Uganda. Beyond using mobile platforms, tech hubs and innovators are benefiting from increasing collaboration with mobile operators to accelerate the development of new content and

services and mitigate route-to-market challenges for start-ups. The scale (e.g customer base and distribution networks), financial resources and technical assets of mobile operators, such as application programming interfaces (APIs) and billing systems, can enhance the functionality and reach of new digital solutions from tech startups.⁴⁷

Mobile technology is pivotal to the concept of the sharing economy. In Uganda, a number of sharing platforms have emerged that enable individuals to share goods and services, such as cars or houses. In particular, this is having a significant impact on the transportation sector, where ride-sharing apps such as Uber and Taxify enable commuters to contact safe and reliable riders, while also creating income-generating opportunities for the riders by linking them with passengers in real-time.

- Tech startup Ensibuuko has developed a solution that uses mobile money to help SACCOs in Uganda mobilise and manage savings and offer credit efficiently. Its customised software, MOBIS, enables SACCOs to gain better insights from their data, manage transactions and make data-driven decisions.
- Tech startup LipaMobile's Somesa service is an integrated cashless platform that allows parents, schools and food vendors to pay for school fees, supplies and services. It also offers a savings platform where parents can save money and set timelines for fee payments.

Ensibuuko and LipaMobile are GSMA Ecosystem Accelerator Fund grantees.

Mobile connectivity is also enabling the development of blockchain and other emerging technologies in Uganda. Although the technology is still in its infancy globally, key stakeholders in Uganda are keen to explore potential use cases and create a talent pool of developers to drive adoption. For example, the government is looking to leverage blockchain

technology to improve efficiency in public service delivery and provide easier access to critical public services, such as payment systems and record management. Meanwhile, the Uganda Bankers Association (UBA) has announced that banks will adopt the technology with the aim to help reduce operational risks and costs.

46. Research by GSMA Ecosystem Accelerator programme

47. [Building Synergies: How Mobile Operators and Start-ups Can Partner for Impact in Emerging Markets](#), GSMA, 2017

Examples

Ministry of ICT and National Guidance (MoICT & NG)

MoICT & NG has established the National ICT Initiatives Support Program (NIISP) to provide an enabling ecosystem for Uganda's ICT Innovators to be productive and competitive.⁴⁸ In April 2018, the ministry selected 12 winning innovators for the NIISP innovation fund, eight of which directly use mobile technology for their solutions.

Wala

Wala, a blockchain-powered platform that aims to offer barrier-free banking solutions to the unbanked in emerging markets, launched its money transfer app in Uganda in April 2018. The app provides users with access to remittance services, credit and savings solutions. Wala has partnered with Block Commodities, FinComEco and the Dala Foundation to lend 100 million Dala tokens, worth \$10 million, to 50,000 small-scale farmers in Uganda (Dala is a digital token that allows fast and borderless micro-payments with no fees).

Ministry of Gender, Labour and Social Development

MGLSD supports tech innovation and digital entrepreneurship through its programmes including the Youth Livelihood Programme (YLP) and the Uganda Women's Entrepreneurship Programme (UWEP). YLP targets poor and unemployed young people across the country and provides capital to establish income-generating activities. Many of the projects in the ICT sector rely on mobile platforms, such as mobile money. As of May 2018, UGX675.2 million (\$177,000) had been disbursed to ICT-related projects.

Key issues

The use of mobile-enabled solutions across a variety of sectors is having a significant impact on socio-economic development in Uganda. However, the research undertaken for this report identified a number of lessons:

- Many of the solutions have been developed and implemented by third-party organisations and intervention partners, resulting in a high level of fragmentation, and a lack of coordination and control of services by the relevant ministry.
- Uncertainty around the continuity and sustainability of a service once the intervention period or donor funding is over can limit the long-term impact of the solution.
- There are insufficient protections for the intellectual property (IP) rights of young and, often vulnerable, innovators and entrepreneurs who build solutions on mobile platforms.

- Major obstacles to the implementation of mobile-enabled solutions include access barriers (poor network coverage in some communities and affordability concerns for vulnerable people) and usage barriers (poor digital skills in rural areas and lack of content in local languages).

Maximising the impact of mobile technology on socio-economic development in Uganda requires greater harmonisation of solutions by different stakeholders and increased efforts to enhance digital and financial inclusion. The next chapter of this report addresses these issues in more detail.

48. Report on the Progress of the National ICT Initiatives Support Programme (NIISP), MoICT & NG, 2018



5. Accelerating mobile-enabled progress on the development goals

Digital transformation in society is a continuous process of improving access to connectivity, creating and integrating digital services across different sectors of the economy, and educating citizens on how to use available content. In Uganda, a multi-stakeholder approach is required to maximise the impact of mobile on national development.

Uganda has made a solid start on its digital transformation journey. However, significant digital and financial gaps exist; around 4 in 5 people, including more than half the adult population, remain offline and risk missing out on the socio-economic benefits of this digital evolution. Meanwhile, more than a fifth of adults do not yet use formal financial services. Technology is developing rapidly; as the global and national economy becomes ever more digital, it is vital to act now to ensure existing inequalities are not exacerbated.

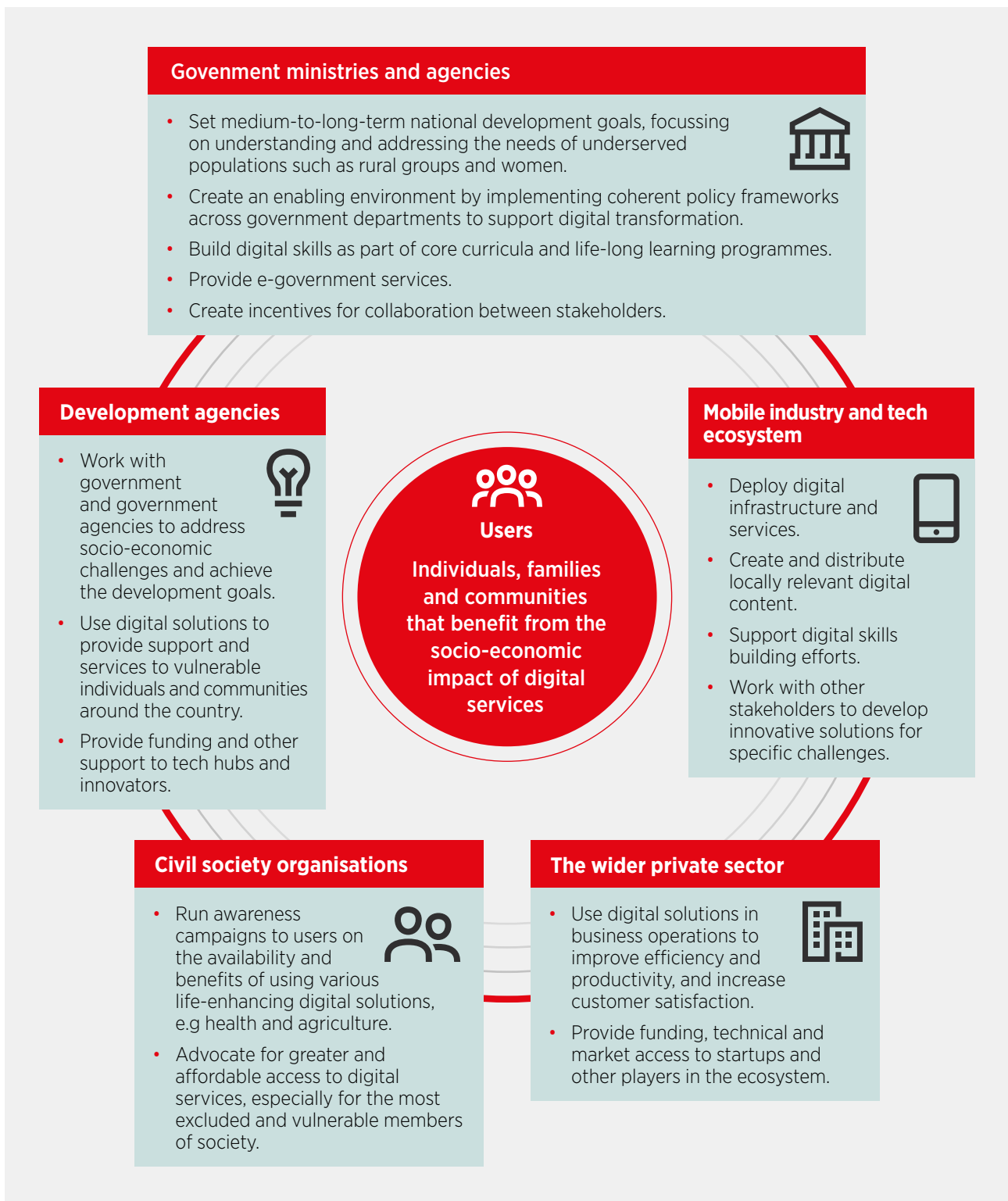


5.1 The role of stakeholders

Stakeholders in the digital ecosystem all play a role in driving digital transformation in Uganda. Figure 7 groups these stakeholders into categories according to their roles within the digital ecosystem.

Figure 7

Stakeholders in the digital ecosystem driving digital transformation

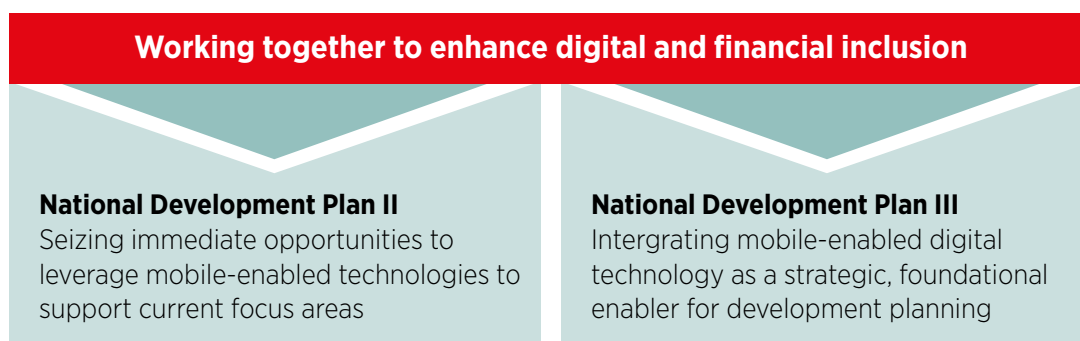




Building on these roles and activities, stakeholders need to collaborate on key action plans to accelerate mobile-enabled progress on national development and the realisation of the SDGs and Vision 2040. Collaborative action is required to maximise the impact of mobile technology on Uganda’s socio-economic development in enhancing digital and financial inclusion among underserved populations. This is a

cross-cutting goal, with action directed towards the following two areas:

- leveraging new opportunities for mobile-enabled progress on the NDP II priority areas
- incorporating mobile into NDP III planning.



The rest of this chapter explores specific actions stakeholders can take to enable a positive impact from mobile-enabled digital technologies.

5.2 Digital and financial inclusion in Uganda

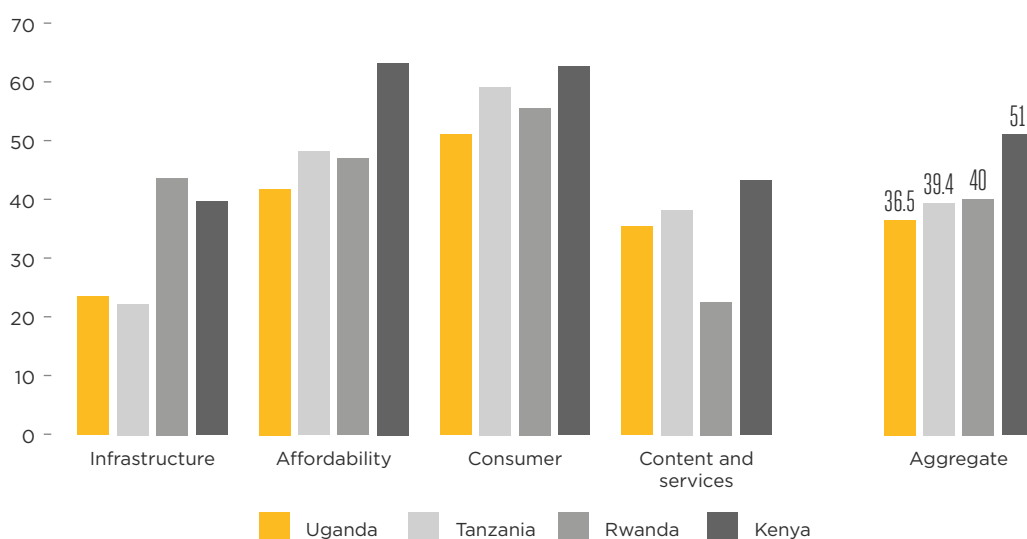
5.2.1 Digital inclusion

The GSMA Mobile Connectivity Index⁴⁹ measures digital inclusion in 163 countries across the world, including 37 countries in Sub-Saharan Africa, against four key enablers – infrastructure, affordability, consumer readiness, and content and services. This

helps demonstrate the impact of the enablers on digital inclusion, and supports the efforts of the mobile industry and other stakeholders to deliver on the ambition of universal mobile internet connectivity.

Figure 8

GSMA Mobile Connectivity Index



Source: GSMA Intelligence

49. www.mobileconnectivityindex.com

Uganda lags its regional peers in several key indicators and the aggregate score. Although infrastructure coverage has improved over the last three years, consumer-related barriers of affordability, locally relevant content, and lack of digital skills continue to limit mobile internet adoption. In July 2018, a report by the UN Broadband Commission for Sustainable Development found that in least developed countries, including Uganda, the rate of broadband adoption is slowing even in areas with infrastructure coverage.⁵⁰

Infrastructure – *the availability of high-performance mobile internet network coverage*

Mobile operators' direct investment in infrastructure deployment has proven effective in expanding coverage to current levels. Cumulatively, mobile operators have invested more than \$1 billion in their networks over the last 10 years. In January 2018, Airtel Uganda announced plans to launch 3G across all its sites in the country. The UCC has also played a significant role in extending connectivity through the Rural Connectivity Development Fund (RCDF), which supports the deployment of infrastructure in underserved areas, and the implementation of enabling policies around infrastructure sharing. With most urban areas now covered by a mobile broadband network, infrastructure-related exclusion is highest in rural areas, particularly the northern region of the country, where lower income levels and sparsely populated communities make the deployment of conventional network infrastructure more challenging.

Affordability – *the availability of mobile services and devices at price points that reflect the level of income across a national population*

Affordability represents a significant barrier to the uptake of mobile services in Uganda, particularly for consumers at the bottom of the income pyramid. The total cost of mobile ownership (TCMO), determined by the cost of service usage (voice, data, SMS), activation and handset, in Uganda is one of the highest in Sub-Saharan Africa. Entry-level mobile broadband service (500 MB per month) costs around 19% of the average Ugandan's monthly income,⁵¹ well above the 5% threshold recommended by the UN Broadband Commission. This is without accounting for charging costs, which may be high and/or involve travel to access power in off-grid communities.

The average selling price of smartphones has

declined by around 50% in Uganda since 2012 to less than \$100, with the influx of low-cost handset from Chinese manufacturers, such as Tecno and Gionee. In November 2017, MTN Uganda partnered with Fero Mobile to launch an entry-level smartphone for a retail price of UGX119,000 (\$31), adding to the growing number of sub-\$50 smartphones available. Despite these developments, many Ugandans are still not able to afford a smartphone.

Beyond handset cost, telecoms sector-specific taxes affect the affordability of mobile services, with a disproportionate impact on low-income and price-sensitive consumers. This is reflected in the negative impact of the mobile money tax and social media tax in Uganda. For example, in July 2018, the Bank of Uganda disclosed that mobile money transactions declined by UGX672 billion in the first two weeks of implementing the mobile money tax, while MTN reported a 50% drop in mobile money transactions in the first month after the implementation of the tax. Meanwhile, the social media tax could cost the Ugandan economy \$750 million in 2018 alone, factoring in both the economic impact of broadband penetration and the price elasticity of mobile internet use.⁵²

Consumer readiness – *Citizens with the awareness and skills needed to value and use the internet and a cultural environment that promotes gender equality*

A lack of digital literacy and skills, especially among the elderly and rural dwellers, is one of the biggest barriers to mobile internet adoption in Uganda. Additionally, ICT infrastructure in schools is limited, despite the introduction of ICT into the education curriculum. Around 43% of respondents in the latest Uganda Bureau of Statistics household survey cited lack of confidence, knowledge or skills as a major reason for not using the internet.

There are notable efforts by different stakeholders to overcome the digital skills gap in Uganda. The UCC, through the RCDF, has installed computers for public access in schools, libraries and post offices, and the Maendeleo Foundation through its Mobile Solar Computer classroom project is empowering children in rural schools with relevant computer skills. In April 2018 NITA-U signed a partnership with SOLVE Incubation and Kafeero Foundation to establish an Information Access Centre, which will be used to provide digital skills training and create a digital platform for e-learning.

50. [Broadband for national development in four LDCs](#), UN, 2018

51. International Telecommunications Union (ITU)

52. ICT Sector Taxes in Uganda, Research ICT Solutions, 2018



Content – *The availability of online content and services that are accessible and relevant to the local population*

Uganda has a rich variety of cultures and languages. While there has been a significant increase in the number of apps created in Swahili, the country’s second official language, the majority of the 41 indigenous languages are currently not being catered for by existing mobile content and services. Individuals who only speak these languages are unable to benefit from going online. Beyond language, content relevance is essential to stimulate usage. Some 18% of respondents in the UBOS household survey identified a lack of relevant content as a reason for not using the internet.

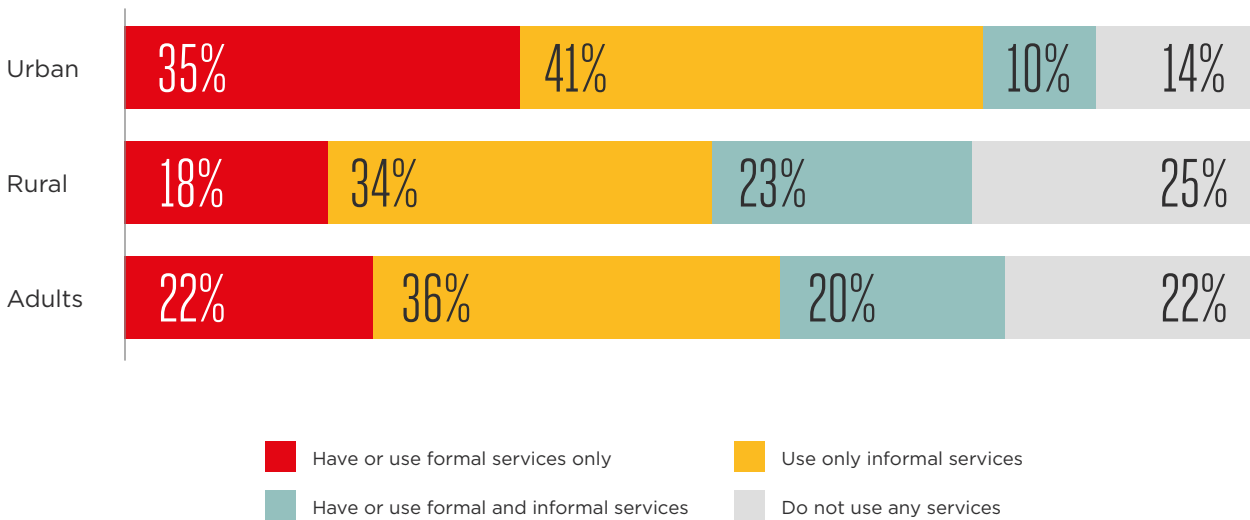
While global content providers such as Facebook and Google have launched localised services, the emergence of local tech innovators presents a significant opportunity for local content creation, given their personal knowledge and experience of the cultures and needs of individuals and communities in the country.

5.2.2 Financial inclusion

The challenge of financial exclusion is more acute in rural areas, which have a lower penetration of traditional financial institutions, and where the cost of accessing traditional financial services can be prohibitive for many users.

Figure 9

Uganda: Financial access strand



Source: FinScope survey, 2018

Financial inclusion can drive socioeconomic development and play a role in reducing extreme poverty. For example, access to credit helps encourage investments into assets that enable business owners to start or expand small enterprises, while savings and insurance help households and vulnerable people

manage cash flows and cope with external shocks. Ubiquitous and affordable mobile money solutions are crucial to deepening formal financial inclusion in Uganda.

Call to action: Key stakeholders should work together to enhance digital and financial inclusion

Infrastructure

- Government should consider providing incentives to stimulate rural rollout, such as tax breaks on imported equipment for rural network deployment.
- The UCC can consider accelerating the assignment of spectrum in the 700 MHz band. This spectrum is well suited to improve coverage in densely and sparsely populated areas, as well as improve the quality of service (e.g download speeds) provided.
- The UCC's RCDF can consider subsidising operators' opex for running network sites in rural areas.
- The UCC and mobile operators should work together to implement national roaming. This will ensure seamless connectivity, provide choice for consumers, and help avoid the expensive duplication of network infrastructure.

Learnings from Tanzania

Action: In 2016, Airtel, Tigo and Vodacom agreed to implement mobile broadband enabled rural pilot sites and test a tripartite national roaming agreement in Tanzania. The operators trialed a shared 3G network solution on six rural sites across the country.

Impact: 3G connectivity was provided to more than 73,000 people for the first time, in sparsely populated rural areas. The services enabled school teachers and businessmen to access information unavailable in their vicinity. Some 17% of mobile users use 3G data services daily on their phone (on par with national average).

- Mobile operators should continue to explore innovative solutions that can improve the economics of rural deployment. These include aerial technologies, such as satellites and balloons, and community networks.
- Development agencies should consider exploring innovative funding solutions to support infrastructure rollout. For example, in the late 2000s, Sida guaranteed corporate bonds that enabled MTN to roll out services to 24 rural municipalities, resulting in increased access to mobile services, improved returns by farmers leveraging mobile technology for greater market access, and new income streams for women and small business owners serving as local agents.

Affordability

- Government should consider reviewing sector-specific taxes on mobile-enabled services, including the social media tax and mobile money transaction tax, in light of the negative impact on consumers across the country, particularly the most vulnerable. Some 44% of respondents in a survey following the implementation of the mobile money tax were transacting less money, while another 47% had completely stopped using mobile money.⁵³ Reforming sector-specific taxes and fees can deliver significant economic and social benefits from increased digital inclusion.

Learnings from Kenya

Action: In 2009, the Kenyan government removed the 16% VAT rate on mobile handsets.

Impact: Over the following three years, the VAT reduction contributed to a 200% increase in handset sales and an increase in unique mobile subscriber penetration from 29% to 39%. Over the same period, the contribution of mobile to the Kenyan economy grew by nearly 250%, while mobile-related employment increased by 67%.

53. Understanding Consequences of Mobile Money Taxes in Uganda, UNCDF, 2018

- Mobile operators should explore financing options for customers who cannot afford the upfront cost of a handset. This can include direct financing, such as instalment plans over a given period, partnerships with a microcredit institution, or bundling with a complementary asset/service. For example, in 2015 MTN and Fenix International offered free internet-enabled handsets for customers who purchased their solar solutions.
- Development agencies and private sector players should subsidise the cost of handsets and mobile services for low-income beneficiaries and/customers. For example, a development agency looking to expand access to educational or health services can achieve better outcomes by subsidising the cost of handsets for beneficiaries.

Consumer readiness

All stakeholders should collaborate and streamline efforts to improve digital literacy in Uganda in order to:

- reduce fragmentation and duplication of efforts by the different stakeholders
- ensure that all vulnerable groups are targeted and that no one is left behind
- ensure efficient use of resources and, consequently, drive better outcomes
- exploit synergies between different stakeholders and their initiatives.

Learnings from Rwanda

Action: Many Rwandans lack the basic, functional digital skills needed to use the internet. Improving these skills will be key to realising the promise of Digital Rwanda. As part of its strategy to secure future growth in mobile internet subscribers, Tigo Rwanda decided to test the GSMA's Mobile Internet Skills Training Toolkit (MISTT), a training methodology to increase adoption and use of the mobile internet. Tigo began training customers across 11 of Rwanda's 30 districts (from June to September 2017).

Impact: 77% of the 80,000+ MISTT-trained customers increased their data usage, while trained agents grew the number of new data subscribers by 15%. It also increased smartphone purchases.

The MISTT training is giving customers the confidence to use the internet, shows how it can be relevant to their lives, and makes them feel more connected. The training also has a ripple effect, as customers are training other people on what they have learned.

Content

- Government ministries and agencies, which hold significant amounts of public information and records, should consider accelerating efforts to digitise these over mobile channels and in local languages to drive demand for digital content.
- Government can create the right policy environment to incentivise ecosystem partnerships for content creation.
- Government and development agencies can direct funds to systemic and sustainable investment, as opposed to short-term and fragmented one-off training programmes or competitions.
- Development agencies should explore using mobile channels to deliver information and services to beneficiaries.
- Private sector players should evolve their understanding of tech innovation from a corporate social responsibility (CSR) to a corporate social investment (CSI) perspective. This will stimulate investment and collaboration with tech innovators to develop vital digital solutions.
- In addition to opening up APIs, mobile operators should consider end-to-end partnerships, including co-branding opportunities with tech innovators.
- All stakeholders should work to understand the needs of different consumer segments of women so they can design and deliver relevant products and services to help close the digital gender gap

Financial inclusion

- Mobile operators and financial institutions should expand the mobile money agent network and improve liquidity in rural areas to encourage greater use of the service. According to a UBOS 2016 Household Survey, only 30% of residents in the Karamoja sub-region are knowledgeable about mobile money, compared to 95% in Kampala.
- Government should reconsider taxes on mobile money transactions to make the service more affordable to vulnerable users, especially the elderly and those on low incomes. This will stimulate use and growth of the digital financial ecosystem.
- Key stakeholders in mobile financial services, including FSDU and BoU, have recognised that interoperability in financial services is critical to the adoption of digital financial services in the country.⁵⁴ Mobile operators and other relevant stakeholders should therefore implement industry-led solutions for mobile money interoperability in Uganda. This will help grow the user base through network effects and make it easier for users to send and receive cash.



54. [Market research on interoperability in mobile financial services in Uganda](#), FSDU, 2017

5.3 Call to action: leverage new opportunities for mobile-enabled progress on NDP II

Mobile technology is already having a positive impact on a number of sectors in Uganda, some of them among the NDP II priority areas. Here, we assess the opportunity for the government and other stakeholders to create more impact. This will be achieved by accelerating mobile-enabled progress on the five NDP II priority areas through stakeholder commitment and actions to:

- scale current – and deploy new – mobile-enabled solutions
- leverage emerging technologies for socioeconomic development.

5.3.1 The opportunity for scaled impact from current and new mobile-enabled solutions

NDP II priority area	Mobile impact	Key action and potential for Uganda
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Agriculture	High	<p>Digitise agricultural value chain</p> <p>Uganda is a pioneer among other countries in Sub-Saharan Africa in digitising agricultural value chains. Donor funding and other support from development organisations have helped initial deployment of business-to-person (B2P) digital payment solutions using mobile money platforms. However, there is a need to scale the digitisation of the agricultural value chain in Uganda. This will:</p> <ul style="list-style-type: none"> • contribute to economic growth and increase farmers' income by improving operational efficiencies and increasing the productivity level in the agriculture sector • deepen financial inclusion among farmers and drive growth in the digital financial ecosystem by enabling more complex products, such as savings and loans, for farmers • reduce the risk of fraud and theft for farmers and agribusinesses, and give the government greater visibility of transactions in the value chain.
		<p>Learnings from Sri Lanka</p> <p>Action: Sri Lanka has a rural population of 82%, similar to Uganda, with high chemical use among farmers and a lack of timely farming information and appropriate finance. Dialog's Govi Mithuru offered localised voice messages sharing government approved content focusing on rice and kitchen garden crops.</p> <p>Impact: Around 440,000+ farmers were using the service by the end of 2017, with a 90% engagement level. Some 53% were women, and 90% made changes to their farming practices. Users decreased their use of chemicals, changed harvest practices, and changed planting techniques.</p>
		<p>Learnings from Kenya</p> <p>Action: As of the end of 2016, an estimated 94% of transactions in formal agricultural procurement was still cash-based. Connected Farmer launched as an enterprise platform to help agribusinesses work more efficiently with smallholder farmers, using mobile-enabled payments, communications and data collection/management functionality.</p> <p>Impact: As of 2017, Connected Farmer served over 80,000 smallholder farmers and 12 agribusiness clients. Studies have revealed gains in productivity and revenue for both agribusinesses and farmers using the platform.</p>



NDP II priority area **Mobile impact** **Key action and potential for Uganda**

Agriculture	High	<p>Utilise mobile for agriculture insurance</p> <p>In July 2016, the government launched the Uganda Agriculture Insurance Scheme (UAIS) to make insurance affordable to farmers and increase their access to credit by protecting agriculture loans from financial institutions against the effects of specified agriculture risks. The Ministry of Agriculture Animal Industry and Fisheries (MAAIF) disclosed that the number of farmers in the pilot reached 54,606 in August 2018, and announced plans to extend the scheme to all farmers in the country in the 2018/2019 financial year.</p> <p>With more than 10 million farmers in Uganda, MAAIF and its partners can leverage mobile technology in the nationwide rollout of the UAIS. This will:</p> <ul style="list-style-type: none"> • accelerate the rollout of the insurance scheme • reach farmers in remote communities and without access to a traditional financial institution • improve the operational efficiency of organisations collecting premiums and disbursing claims.
	Human Capital Development	High

**NDP II
priority
area**

**Mobile
impact**

Key action and potential for Uganda

Human Capital Development

High

Utilise mobile for distance-learning solutions

Distance-learning solutions can:

- provide more convenient learning for people in remote communities
- improve education attainment levels through affordable digital educational content and tutoring for less able students
- deliver online examinations and accreditation systems to reduce costs for disadvantaged students and expand the inclusion bracket.

Learnings from Indonesia

Action: Ruangguru is an online marketplace for personalised education in Indonesia, where teachers and tutors generate content, and students access content or request personalised advice for free. Students and parents can look up thousands of questions based on the latest curriculum. Ruangguru has forged partnerships with 32 (out of 34) provincial governments and more than 325 city and regency governments, many of which are using Ruangguru to help students prepare for high-school entrance exams.

Impact: By partnering with Telkom Indonesia, Ruangguru has attracted 6.3 million registered students and reached 418,515 monthly active users, who also gain access to 2 GB of free data when browsing Ruangguru's bundled content

Expand the role of mobile in refugee and humanitarian response

Expanding mobile-enabled services to refugees beyond connectivity and mobile money, to include life-enhancing services such as education, utilities and family/friend reconnection can significantly improve the wellbeing of refugees in Uganda and potentially prepare them to contribute positively to the socio-economic development of their host communities.

Learnings from Tanzania

Action: There are more than 130,000 refugees from DRC and Burundi in Nyarugusu refugee camp. Prior to 2016, the refugee population could only access 2G services from towers in nearby towns. In 2016, Vodacom installed a mobile tower within the camp, introducing 3G connectivity. Vodacom also launched its 'connected classrooms' project in six schools, providing a Wi-Fi connection, projector and tablet devices for teachers and children.

Impact: Reduced smartphone costs, enhanced internet connectivity and digital literacy training, and the development of accessible, user-friendly applications have improved education, information and employment opportunities for refugees. Some 28% of surveyed adult internet users in Nyarugusu are using their phones to access informal education opportunities, including language learning and further education. More than half of phone users reported using mobile money, many for conducting business. Around 65% of internet users go online for news and information, while 35% access entertainment, resulting in improved well-being of the refugees.

NDP II priority area **Mobile impact** **Key action and potential for Uganda**

Human Capital Development	High	<p>Implement assistive solutions for people with disabilities</p> <p>In Uganda, 1 in 5 people over the age of five has a form of disability.⁵⁵ The prevalence of disability increases with age, from 12% among 5-9 years olds to 67% among those aged 60 years and above. Those living with disabilities in Uganda are considered vulnerable and largely disadvantaged in workplaces and in other public places. The government has developed a National Disability Policy to promote effective service delivery to those with disabilities. This includes the Expanding Social Protection programme (ESP) which provides direct income support for the poorest and most vulnerable people, including those with disabilities. While mobile money is already being used to disburse funds to beneficiaries under this programme, stakeholders should consider emerging mobile-enabled technologies that can help integrate disabled people into society, especially through access to education and public services.</p>
Infrastructure	High	<p>Extend mobile broadband coverage to unconnected populations</p> <p>Around a fifth of the population are not yet covered by a mobile broadband network in Uganda. Stakeholders should work together to extend infrastructure to individuals and communities in areas without a mobile internet service in order to:</p> <ul style="list-style-type: none"> • ensure that no one is left behind in the emerging digital economy • maximise the impact of mobile on socio-economic development • provide data and insights to support the development of other infrastructure, such as roads, schools and hospitals. <p>Accelerate deployment of mobile-enabled utilities solutions</p> <p>Universal access to electricity is vital to realising Uganda's development goals. Considering the resources and time required to build grid electricity in excluded areas, mobile-enabled solutions such as solar PAYG offer a viable solution to the electricity deficit. Of the households lacking electricity, less than 10% have adopted solar PAYG solutions. There is an opportunity for stakeholders to address barriers to adoption and accelerate the deployment of these solutions across underserved areas.</p> <div style="background-color: #f5f5f5; padding: 10px; margin-top: 10px;"> <p>Learnings from Madagascar</p> <p>Action: Loowatt, in partnership with Airtel Madagascar, used mobile technology to support the servicing and maintenance of 100 waterless household toilets. Customers used mobile money to pay for collection services and SMS to schedule collections and maintenance. Loowatt personnel used the mobile app and web platform to manage operations and track waste from households to the treatment facility.</p> <p>Impact: The mobile tools supported the provision of sanitation services for 600 households. Use of mobile money peaked at 26% of Loowatt customers. The mobile app improved data visibility and transparency to enable real-time tracking of waste collection, transport and safe disposal.</p> </div>

55. "Uganda Demographic and Health Survey", UBOS, 2011

NDP II priority area	Mobile impact	Key action and potential for Uganda
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Infrastructure	High	<p>Learnings from Nepal</p> <p>Action: Gham Power partnered with Ncell to develop three micro-grids with a combined capacity of 37.6 kW to improve energy access for two rural villages and provide energy to two cell towers.</p> <p>Mobile money was used for bill payment, and smart meters were deployed to monitor individual consumption.</p> <p>Impact: 900 people benefitted from clean energy, driving up demand for telecoms and other life-enhancing products and services. This includes a 44% increase in smartphone ownership, a 32% increase in mobile internet usage, and a 32% increase in fridge ownership. Furthermore, local hotels saw a positive impact on business after adding an appliance.</p>
	Medium	<p>Leverage mobile for smart tourism</p> <p>Digital technologies play an increasingly important role in the tourism industry, from promoting key attractions to supporting tourists before and during their stay. For many tourists, being able to plan where to visit, what to do, and how to get to a destination, as well as engaging with service providers over digital platforms, is a vital part of the tourism experience. This is in line with the concept of smart tourism, which generally describes the use of ICT technologies both to enhance visitor experience and generate data and insights on tourist behaviour and facilities at destinations.</p> <p>The Ministry of Tourism, Wildlife and Antiques (MTWA) and its agencies and partners can leverage mobile technology to develop a smart tourism initiative in Uganda. This could include mobile connectivity at key tourist destinations around the country; a centralised digital tourism mobile app to promote tourist attractions and connect visitors with local service providers; and a system to analyse patterns and inform government policy. A smart tourism solution can help:</p> <ul style="list-style-type: none"> • improve Uganda’s competitiveness in relation to other destinations • improve the efficiency of resource utilisation for developing tourism infrastructure and services. <p>MTWA can also use mobile big data and real-time analysis to estimate the number of tourists, value generated and impact on wildlife to inform tourism and wildlife protection policies.</p>
Minerals, Oil & Gas	Low	<p>Leverage mobile for real-time analysis and monitoring of production</p> <p>Automation and connectivity generally increase an organisation’s efficiency and effectiveness, irrespective of the industry vertical. In Uganda, mobile technology can provide the required connectivity to enable the real-time analysis and monitoring of production at oil installations and mines.</p>



5.3.2 Emerging technologies

Around the world, the increase in mobile connectivity is enabling the application of big data and blockchain, two key emerging technologies, across a variety of sectors and use cases. In Uganda, there is a need for stakeholders to put in place the necessary enablers to maximise the impact of these technologies on socio-economic activities and the development goals, as highlighted below.

Technology	Potential use cases in Uganda	Enablers
<p>Big data – Mobile networks generate huge amounts of data on customer location, demographics and spend. Anonymised and aggregated data can be analysed to create valuable insights to accelerate efforts by governments, development agencies and NGOs to address various socio-economic, environmental and governance challenges as well as achieve the SDGs.</p> <p>In Uganda, Pulse Lab Kampala-UN Global Pulse is trialling the use of mobile big data to analyse population movement trends to support disease modelling and the development of early-warning applications for disaster outbreaks in collaboration with the government and mobile operators.</p>	<p>Insights on population location, mobility and demographic make-up can support efforts to:</p> <ul style="list-style-type: none"> • prevent or control the spread of diseases • prepare and respond to natural disasters • plan urban settlements and infrastructure investments, e.g schools, hospitals and transport • improve tourist destinations and services. 	<p>An important objective for policymakers seeking to encourage the efficient use of data in the economy should be to promote best practice through transparent, clear, fair and consistent data protection policies. To this end, government should empower relevant agencies to take on the needed changes to respond to the data revolution and promote sustainable guidelines for efficient data sharing between mobile operators and other stakeholders in the ecosystem, including across government agencies.</p> <p>There is a need to update the Uganda Data Privacy bill to bring it in line with international best practices and expedite the passage into law, in order to maximise the potential of using mobile big data to address ESG challenges.</p> <p>Parties from the supply side (operators) and demand side (governments and development agencies) should invest in the necessary skills and infrastructure to support mobile big data solutions.</p> <p>Stakeholders should seek to implement sustainable business models to support the long-term use of mobile big data solutions, as opposed to one-off pilots.</p>
<p>Blockchain – This is a secure platform, based on distributed ledger architecture, that lets people and organisations share information with each other with a high degree of trust and transparency. By automatically distributing the blocks of information across the whole network, the blockchain ensures that every user sees the most up-to-date information, the database has no single point of failure, and no single institution can control how the information is recorded, audited or managed.</p>	<p>Blockchain could be used by the government and its partners in the following areas:</p> <ul style="list-style-type: none"> • health – to address security, incompatibility and portability issues of health records, resulting in greater standardisation • identity – to enhance KYC processes to speed up business registration and drive G2P, G2B and B2C transactions growth • agriculture – to secure land transactions and verify ownership • oil and gas – to enhance fidelity of production and distribution information. 	<p>In May 2018, MoICT and NG announced plans to appoint a taskforce to explore how the Ugandan government can use blockchain technology. The recommendations of the taskforce will be crucial to the establishment of enabling policies and regulations for the application of the technology across relevant use cases.</p> <p>Investment in skills and infrastructure is needed to support a viable blockchain ecosystem. In Uganda, blockchain company Crypto Savannah has committed to training a talent pool of more than 5,000 developers over the next five years.</p>

5.4 Call to action: Incorporate mobile into NDP III planning

Planning is underway for NDP III, due to commence in 2020/2021. In view of the continued contribution of mobile technology to Vision 2040 and the SDGs, all stakeholders in Uganda's long-term development goals, including the National Planning Authority (NPA), mobile operators, UNDP and other development agencies, and private sector players, have a compelling opportunity to work together to incorporate the technology into the key objectives and focus areas of NDP III. This will complement short-term efforts supporting NDP II by embedding mobile-enabled progress into plans for the medium term. This will require:

- continuous engagement between stakeholders to identify the main areas of opportunity
- capacity building by stakeholders to equip key personnel with the necessary skills to incorporate mobile in the key focus areas of the development goals.



Conclusion

Mobile technology will continue to have a positive impact on social and economic transformation in Uganda. While mobile already contributes in many ways to address social and economic activities in the country, there is a need to accelerate this progress to realise the national development goals. This requires a collaborative effort by stakeholders to enhance digital and financial inclusion among underserved population in Uganda, scale mobile-enabled solutions in the five NDP II priority areas, and ensure that mobile technology is incorporated into NDP III.

We are at a key point in Uganda's history. Mobile is powering the most widespread and inclusive means of accessing the internet and digital technologies, which are vital to the growth of the Ugandan economy in an increasingly digital world. Stakeholders need to act collaboratively now to ensure that Uganda's digital future is an inclusive one that leaves no one behind.



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