![GSMA logo]

Digital transformation in Tanzania
The role of mobile technology and impact on development goals

Contents

Executive summary

Tanzania is undergoing a digital transformation, reflected by the growing number of people connected to communications and internet services. This is having a profound impact on the country's social, cultural and economic frameworks, through enhanced access to key services and improved productivity and efficiency across economic sectors.

Mobile technology is at the centre of Tanzania's digital transformation. Mobile services today connect more people in the country than any other communications technology, with around 42% of the population subscribing to a mobile service in 2018. Mobile internet penetration has nearly quadrupled since 2010 to 18.5%, with more than 8 million new mobile internet subscribers added over that period.

In 2016, Tanzania launched the Second Five Year Development Plan (FYDP II) to accelerate progress towards realising the Tanzania Development Vision (TDV) 2025 – a long-term ambition to transform Tanzania from a low-productivity, agricultural economy to a knowledge-based, semi-industrialised middle-income economy by 2025. Digital technologies play an increasingly important role in addressing key elements of the development goals. This is underlined by the National ICT Policy 2016, which provides a framework for the development and growth of the ICT industry, to enable it to serve as a catalyst for socioeconomic development in the country.

The mobile industry is contributing significantly to the realisation of Tanzania's development goals through various activities and initiatives by mobile operators and other ecosystem players. This report highlights four important contributions the mobile industry is making to the development goals:

- **Access to key services** – Mobile operators provide affordable access to life-enhancing services for people in underserved communities. Inclusive and innovative business models have emerged from the convergence of various mobile services, particularly connectivity, mobile financial services, digital identity, and M2M and IoT.

- **Productivity and efficiency** – Mobile is driving productivity and efficiency gains in businesses and public institutions, especially in the agricultural sector where the technology is helping to address the knowledge and information gap for farmers and enabling efficient interactions and transactions between key players in the value chain.

- **Contribution to economic growth and social development** – In 2016 the total value added generated by the mobile operators alone (taking into account direct, indirect and productivity effects) was around $2.5 billion, equivalent to 5.2% of GDP. The mobile industry also employs more than 1.5 million people directly and indirectly, equivalent to 2.6% of the population.

- **Good governance** – Mobile is a key channel for Tanzania's e-government strategy, with public institutions now using mobile money, SMS and USSD platforms to deliver services, collect payments and engage with the general public.

Leveraging mobile technology to realise the development goals in Tanzania requires collaboration by all stakeholders, including the government, development organisations, private sector players and the mobile industry. There is an opportunity for further collaboration among these stakeholders to extend mobile services to unconnected populations; empower women and reduce all forms of inequality; support the emerging tech start-up ecosystem; and deliver the government's Electronic Revenue Collection System and a centralised identification database. The extent and outcome of collaboration on improving access to and adoption of mobile-based digital services rely on the ability of government to create an enabling environment and the right incentives for partnerships.

Investments in mobile network infrastructure and services form the basis of the mobile industry's contribution to Tanzania's development goals. To date, mobile operators have invested around TZS6 trillion ($2.6 billion) in the country, primarily in network infrastructure and increasingly in new platforms that enable digital services, such as mobile money and M2M. However, the mobile industry now faces several industry and regulatory challenges that need to be addressed to ensure the long-term sustainability of the industry and its capacity to extend life-enhancing services to underserved communities. An enabling regulatory environment that offers consistency and predictability in policy making and implementation is essential to strengthen investor confidence in the industry. Key policy enablers to support the growth and sustainability of the mobile industry include an efficient spectrum management framework, an enabling infrastructure policy and an optimal market structure.

1

Mobile enabling digital transformation in Tanzania
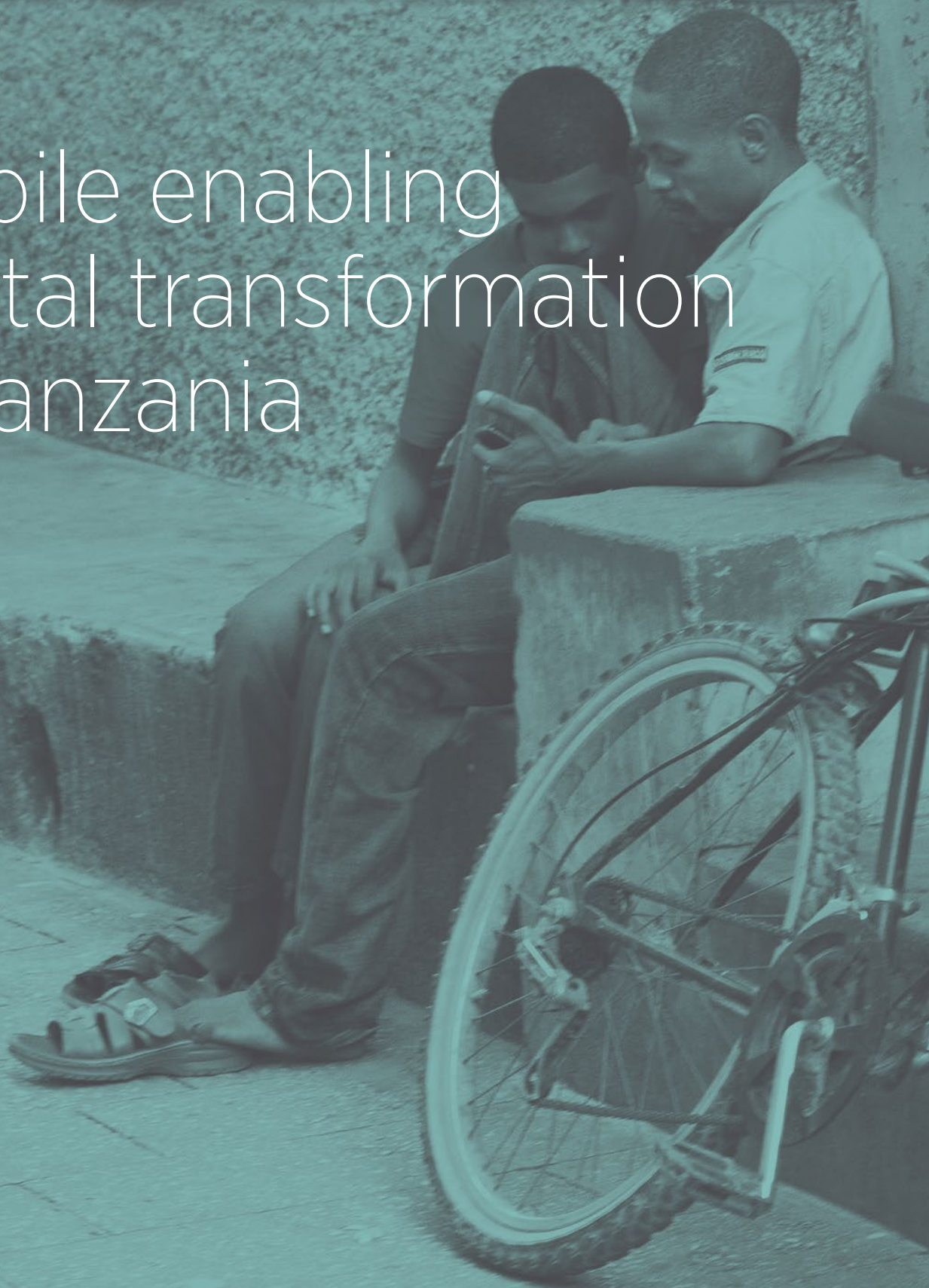
Digital technology can help address a range of socioeconomic challenges in any society. This is particularly true in developing countries where large swathes of the population lack access to essential services, mainly due to insufficient resources and weak infrastructure. In many countries, digital technologies and the internet in particular now serve as a platform for improving healthcare, education, commerce, information sharing, employment and innovation. In turn, this generates measurable economic, social and cultural value, from improving productivity and efficiency in key sectors of the economy, to enabling access to life-enhancing services for individuals and communities.

Tanzania's digital ecosystem has evolved considerably in the last decade. More people use digital services today than at any time in the past. Over this period, Tanzania has seen significant economic growth – with average annual GDP growth of 7%[1] – and improvements in living conditions for many citizens. This is largely attributable to improved access to key services, including education, agricultural market information, healthcare, financial services and employment, through digital technologies. In 2016, the government of Tanzania launched the National ICT Policy 2016,[2] an update to an earlier version adopted in 2003, in recognition of the contribution of the ICT sector to promoting socioeconomic development in the country.

Tanzania has seen considerable investment in fibre infrastructure in recent years. The government-backed National ICT Broadband Backbone (NICTBB) now extends over 7,500km in regions and districts across the country, and the Fibre Consortium (comprising Airtel, Tigo, Vodacom and Zantel) has constructed about 400km of metro fibre in Dar es Salaam, Dodoma, Morogoro, Mwanza and Arusha, as well as over 1,500km of backbone fibre linking the major cities of Dar es Salaam, Dodoma, Arusha and Moshi. However, mobile technology has emerged as the key driver of digital transformation in the country. The technology enables last-mile connectivity for people without access to fixed network infrastructure, while the convenience and affordability of mobile devices, relative to other communications devices, enables personal connectivity to digital services. Mobile networks cover a wide area, making it a more cost-effective option relative to fixed-line technologies for connecting underserved areas, while rising smartphone adoption is allowing more people to use advanced, feature-rich digital services.

Across the country, mobile is giving people access to key services while improving public and private sector service delivery. In 2012, the government launched the National eHealth Strategy (2013–2018), recognising the potential for mobile technology to help improve the health and social welfare of all citizens. In May 2016, the Vocation Education Training Authority of the Ministry of Education, Science & Technology partnered with Airtel and Dar Teknohama Business Incubator to develop and implement a mobile e-learning platform called VSOMO to expand the reach of VETA in providing digital content to potential clients who cannot physically attend classes. In October 2015, the Registration Insolvency and Trusteeship Agency (RITA), in partnership with Tigo and UNICEF, launched an initiative to help parents register their children's births by mobile phone as part of efforts to better plan health, education and other public services.

Meanwhile, Tanzania is one of the most advanced mobile money markets in Sub-Saharan Africa. The service has helped to:

- reduce transaction costs and improve safety for individuals and businesses

- enhance the efficiency of the economy by reducing the need for users to travel long distances to bank branches to make transactions in person

- create employment and additional income for tens of thousands of small and medium-sized enterprises (SMEs) acting as mobile money agents.

1   World Bank
2   Tanzania National ICT Policy, 2016

1 The benefits of mobile money extend far beyond financial inclusion

Individuals	Government	Economy
Increased employment and investment – directly and via supply chains	Higher tax base and receipts due to sector revenue and employment	Higher per-capita income due to rising productivity and employment rates
Wider access to financial services: credit, savings, insurance and payments	Lower risk of fraud and theft via direct transfer of social subsidies	Efficient monetary policy due to less money held outside of banks
Empowerment of women and rural communities	Greater access to government services for underserved areas	Investment in education and healthcare, enabling human capital development

1.1   Tanzania mobile market landscape

Mobile has become the most pervasive communications platform in Tanzania; in 2007, around 5 million people, representing a 10th of the population, subscribed to a mobile service. Today, the number of unique mobile subscribers has grown fivefold to 25.2 million.[3] Similarly, mobile internet for most people is the only platform available to get online. Mobile internet penetration has nearly quadrupled since 2010 to 18.5%, with more than 8 million new mobile internet subscribers added over the period. In total, there were around 11 million mobile internet subscribers in Tanzania in 2018.[4]

Tanzania's mobile market is served by eight mobile operators, making it one of the most competitive markets in Sub-Saharan Africa. Four operators – Airtel, Halotel, Tigo and Vodacom – together account for 96% of market share. ARPU of $2.5 is one of the lowest in the region. In 2017, the mobile operators generated combined revenues of TZS2.9 trillion ($1.25 billion), 15% of which was re-invested in network development as capex. To date, mobile operators have invested around TZS6 trillion ($2.6 billion) in the country.

Source: TCRA

1   Market share by mobile operator, 2018

Smile	Smart	TTCL	Zantel	Halotel	Airtel	Tigo	Vodacom
<1%	<1%	1%	2%	9%	26%	29%	32%
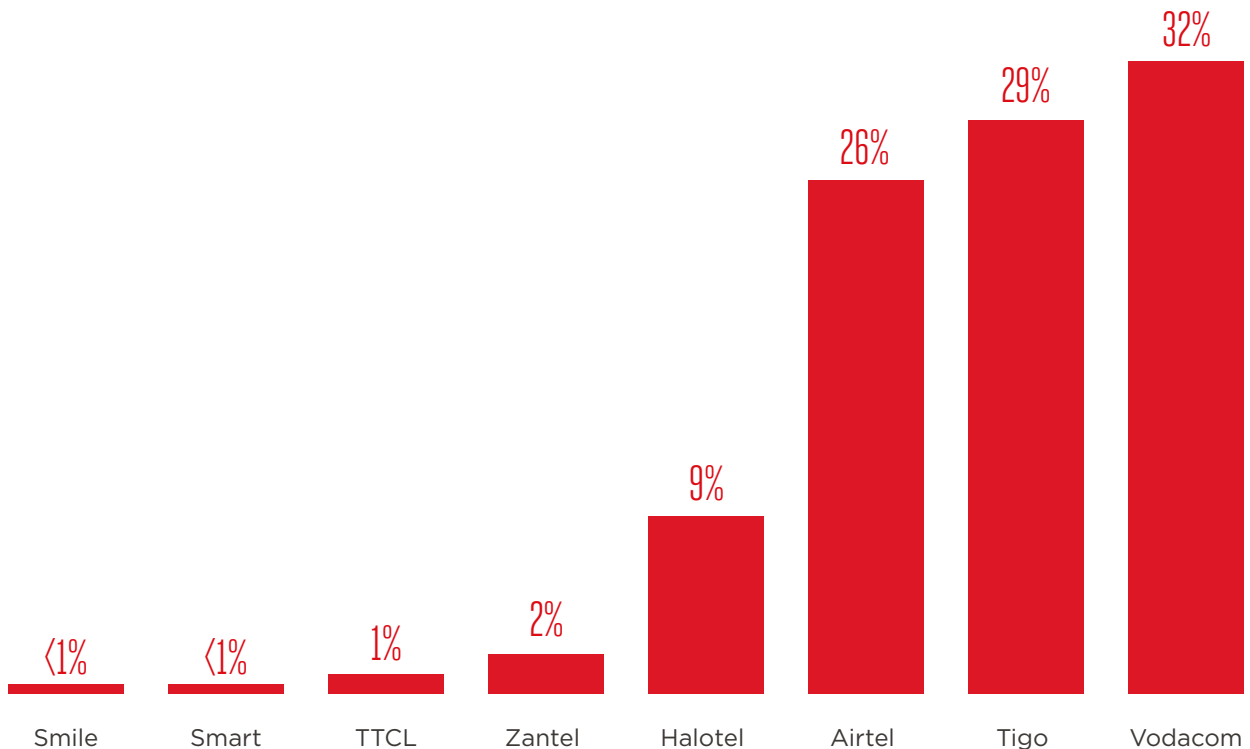
3   Unique subscribers reflect our estimate for the number of *individuals* who subscribe to at least one paid mobile service. This figure adjusts for multiple SIM ownership and subscriber inactivity (factor of 1.8) and is therefore lower than the more commonly cited mobile connections penetration (72% in Tanzania).
4   International Telecommunications Union (ITU)

Although the majority of mobile connections in the country are based on 2G (56%), the adoption of mobile broadband technologies is rising rapidly; 3G and 4G connections reached 40% and 4% of total connections respectively in 2018. Mobile operators' continued investment in network infrastructure is driving mobile broadband coverage expansion. Recent examples include the following:

• Having acquired 700 MHz spectrum in June 2018, Vodacom plans to utilise the spectrum to provide 4G data services to a greater number of communities across Tanzania.

• In FY16/17, Vodacom invested TZS150.5 billion ($66 million), representing 16% of revenue, predominantly in providing network capacity for both data and voice. The operator deployed an additional 342 2G and 612 3G sites during the period, while 4G was launched on 278 sites in Dar es Salaam with high-capacity fibre and microwave backhaul to all sites.

• In November 2017, Airtel announced plans to roll out 3G technology in the 900 MHz frequency band, with the aim of improving the quality and coverage of its mobile data services.

• In June 2017, Halotel announced plans to invest $1.7 billion in network infrastructure development.

• In 2016, Tigo deployed 535 new 3G sites and upgraded 408 existing base stations with 4G technology. Tigo's standard 4G covers 22 cities, and its 4G+ network has been deployed in five main cities: Dar es Salaam, Arusha, Morogoro, Moshi and Dodoma.

By the end of 2018, 3G and 4G networks covered around 61% and 28% of Tanzania's population respectively. This remains considerably lower than 2G coverage at around 90%, and means that more than half the population are unable to benefit from the social and economic benefits of mobile broadband connectivity. Tanzania also lags its regional peers in 3G and 4G network coverage (see Figure 2), underscoring the need for more robust enabling policies as well as greater collaboration between mobile operators, government agencies such as the Universal Communications Service Access Fund (UCSAF) and other stakeholders, including the World Bank and development organisations.

Source: GSMA Intelligence

2 · 3G and 4G coverage as percentage of population, 2018

	Tanzania	Uganda	Kenya	Rwanda	Sub-Saharan Africa
3G	61%	78%	88%	95%	69%
4G	28%	23%	61%	99%	43%

Tanzania at a glance

Total population
54.2 million
2018 population growth **3.1%**

Capital
Dodoma

Largest city
Dar es Salaam

Official languages
Swahili, English

Land area
945,087 sq km

Rural **68%**
Urban **32%**

Male **49%**
Female **51%**

0–14 year-olds **45%**
15–64 year-olds **52%**
65+ year-olds **3%**
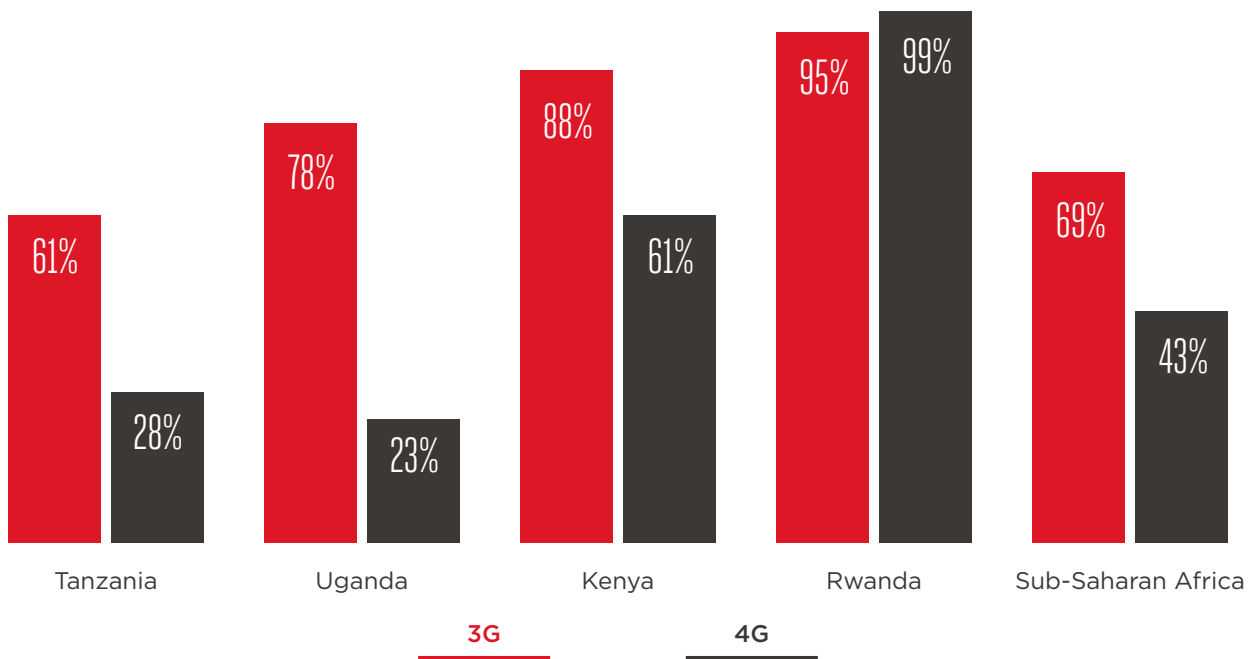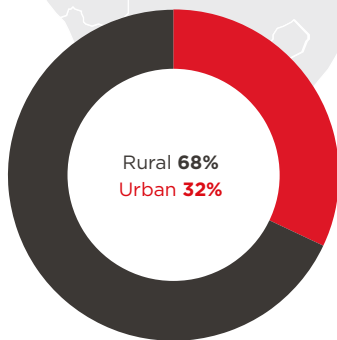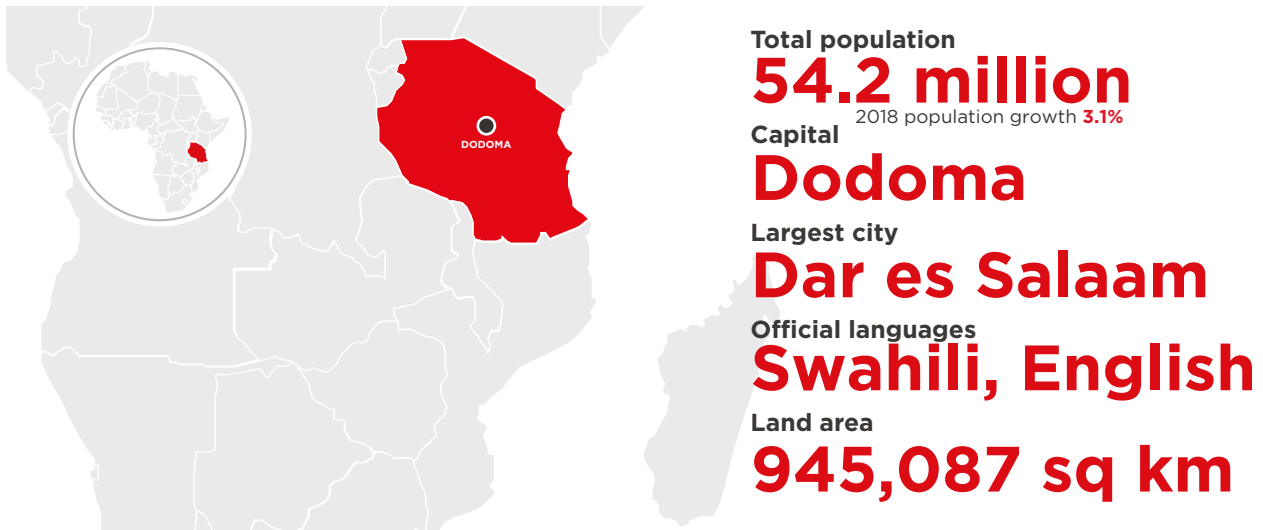
URBAN / RURAL
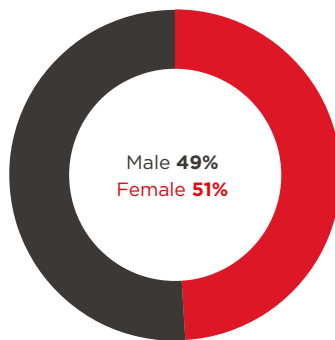
GENDER SPLIT
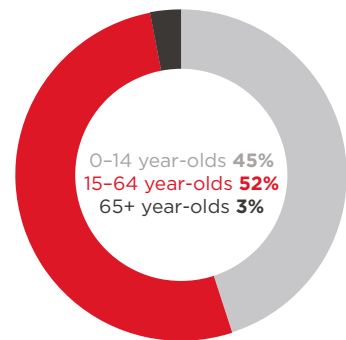
AGE DEMOGRAPHIC

KEY HUMAN DEVELOPMENT INDICATORS

Indicator	Tanzania	Sub-Saharan Africa
Unemployment	2.2%	7.3%
Poverty*	28.2%	41.0%
Literacy	80.3%	60.0%
Human Development Index	53.1%	52.3%

TANZANIA   **SUB-SAHARAN AFRICA**
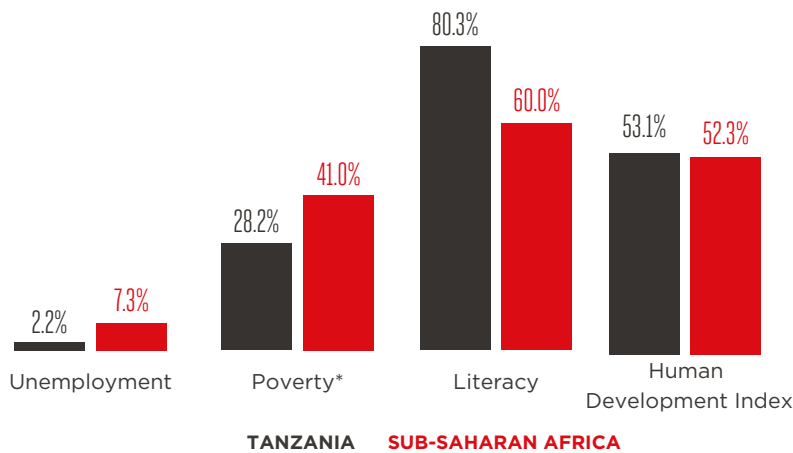
* 2011/12 Tanzania Household Budget Survey

GDP GROWTH

Tanzania: 5%, 7%, 7%, 7%, 7%, 7%
Sub-Saharan Africa: 4%, 5%, 5%, 3%, 1%, 3%

2012 2013 2014 2015 2016 2017

GDP PER CAPITA (CURRENT)
$936
SSA average $1,553
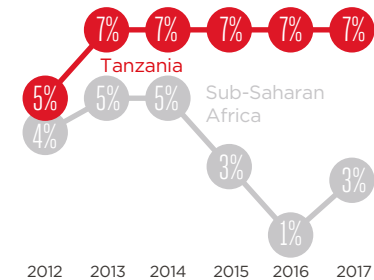
2

Mobile industry support for Tanzania's development goals

2.1 Development goals: the path to a modern economy

> We can no longer overlook the critical role the mobile industry plays in our economy. Such a direct and affordable channel before has never existed, and mobile phones are now held as critical enablers to eradicating poverty in all its forms and achieving the sustainable development agenda."
>
> **Samia Suluhu, Vice President of the United Republic of Tanzania, at the GSMA Mobile 360 Africa Conference in Dar es Salaam, July 2017.**

In June 2016, the government of Tanzania launched the second Five Year Development Plan (FYDP II), centred on the theme of "Nurturing Industrialization for Economic Transformation and Human Development". FYDP II incorporates the main focus of the first Five Year Development Plan (FYDP I, 2011/2012–2015/2016) and the National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA II, 2010/2011–2014/2015), namely growth and transformation, and poverty reduction.

FYDP II is based on three pillars – industrialisation, human development, and implementation effectiveness – and has nine aspirations. These are expected to produce a number of outcomes, including: raising the annual real GDP growth to 10% by 2021 (from 7% in 2015), reducing the basic needs[5] poverty rate to 16.7% by 2021 (from 28.2% recorded in 2011/12[6]), reducing maternal and under-fives mortality rates by nearly 50%, and improving access to clean and safe water in both rural and urban areas.

The implementation of FYDP II is expected to enhance the pace of progress towards achieving the Tanzania Development Vision (TDV) 2025. This was formally launched in 2000 to transform Tanzania from a low-productivity, agricultural economy to a semi-industrialised, middle-Income economy, with a GDP per capita of $3,000 or more by 2025. It has five key targets;

- high-quality livelihood
- peace, stability and unity
- good governance
- a well-educated and learning society
- a competitive economy capable of producing sustainable growth and shared benefits.

5   The minimum resources needed for physical wellbeing (World Bank)
6   Household Budget Survey (HBS), 2011/12

Re-emphasising the government's recognition of the role of ICT in achieving FYDP II and TDV 2025, the Ministry of Works, Transportation and Communications launched the National Information and Communications Technology (ICT) Policy 2016, to provide an updated framework for guiding the development and growth of the ICT industry. The ICT policy has 22 objectives which can be grouped into four broad categories that outline the contribution of digital technologies to socioeconomic development in the country: access to key services, productivity and efficiency, socioeconomic impact and good governance.

Tanzania's development goals are in line with the United Nations Sustainable Development Goals (SDGs) – a 17-point plan to end poverty, combat climate change and fight injustice and inequality by 2030. Tanzania joined 192 other United Nations member states to adopt the SDGs in September 2015.

Source: UN

3 The UN Sustainable Development Goals

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS	SUSTAINABLE DEVELOPMENT GOALS

2.2 Realising the development goals: the role of mobile

Mobile technology is the primary digital communications and internet platform in Tanzania and will therefore play a central role in realising the country's development goals. Table 2 maps the pillars of the FYDP II, the TDV 2025 targets, the National ICT Policy and the UN SDGs to the contribution of the mobile industry to the development goals.

Four main ways through which the mobile industry currently contributes to Tanzania's development goals are: improving access and increasing the scale and sustainability of key services; enhancing productivity and efficiency; contribution to GDP and economic growth; and contribution to good governance initiatives.

Source: GSMA Intelligence

2 Mapping the contribution of mobile to the development goals

FYDP II Pillars
Infrastructure, Human development,
Implementation and effectiveness

TDV 2025 Targets / National ICT Policy	High-quality livelihood	Peace, stability and unity	Good governance	Well-educated and learning society	Competitive economy capable of sustainable growth and shared benefits	Mobile industry impact: current contribution and future impact
Access to key services	●		●	●	●	• 44 million mobile connections, including 25.2 million unique subscribers. This will rise to 61 million connections, including 36 million unique subscribers, by 2025 • 11 million mobile internet users, rising to 27 million by 2025 • 21 million mobile money subscriptions • ~90% 2G network coverage and ~61% mobile broadband network coverage. Mobile broadband coverage to reach ~75% by 2020 • Mobile is enabling digital identity: e.g. as of August 2017, the Tigo-backed mobile registration system had successfully registered and issued certificates for more than 1.6 million children • Other life-enhancing services mobile enables access to include health, education and public services
Productivity and efficiency		●	●	●	●	• Mobile money has helped expand financial inclusion in Tanzania. In 2017, 60% of the adult population had a mobile money account. The total value of mobile money transactions in 2017 reached around TZS50 trillion ($22 billion), almost half of annual GDP • Mobile money has helped reduce transaction costs, improve safety for individuals and businesses, and enhance the efficiency of the economy by reducing the need for users to travel long distances to bank branches to make transactions in person • Through the provision of timely information around farming techniques, weather and market prices, mobile agriculture has helped improve the productivity of smallholder farmers and enhanced food security • Mobile insurance has helped reduce administrative costs for local insurers by up to 95%. This highlights the contribution of mobile to enhancing efficiency gains across multiple sectors
Contribution to economic growth and social development	●	●		●	●	• In 2016, the total value added generated by the mobile operators alone – taking into account direct, indirect and productivity effects – in Tanzania was around $2.5 billion, equivalent to 5.2% of GDP • The economic contribution of mobile operators will rise to more than $4 billion in 2020, accounting for more than 6% of GDP • Mobile operators and the ecosystem provided direct employment to more than 3,000 people in Tanzania in 2016. Another 1.5 million people were employed indirectly by the mobile industry, equivalent to 2.6% of the population, including more than 150,000 mobile money agents
Good governance	●	●	●		●	• Mobile operators contribute to public funding through taxes and fees which are spent in other sectors of the economy • Mobile operators are implementing e-RCS to improve accountability and transparency in the collection of government taxes and VAT • Mobile operators contribute to security and law enforcement through compliance with know-your-customer (KYC) requirements • Public institutions increasingly use mobile platforms, such as mobile money, SMS and USSD, to deliver services, collect payments and also engage with the general public
SDGs	1, 2, 3, 5, 6, 7, 10	11, 16	10, 16, 17	4	8, 9 12	

Circle = highest impact of mobile

2.3 Access to key services

FYDP II and TDV 2025 have a strong focus on human development, with specific targets around health, poverty reduction and the general wellbeing of citizens.

However, delivering services with a high social impact, such as health and education, is often constrained by significant gaps in infrastructure, funding and skills, especially in rural communities. For example, Tanzania has around 5.2 clinical health workers per 10,000 people, one fifth of the optimal ratio recommended by the World Health Organization. The lack of access to key services for the most vulnerable people impacts negatively on the quality of livelihood and overall human development.

Tanzania has set a goal of improving its national Human Development Index (HDI) score from 0.52 in 2014 to 0.57 by 2021. FYDP II outlines a number of interventions to close the infrastructure and skills gaps in the country, such as investments in transport and power

infrastructure. However, financing these initiatives could prove challenging given the limited resources available and other competing needs. Additionally, it takes a considerable amount of time to build hard infrastructure such as power and transport facilities, even when the funds are available, meaning the impact of infrastructure investment may not be felt in the short to medium term. Mobile technology is, however, enabling access to key services for people across the country, despite the above-mentioned deficits, through inclusive and innovative business models emerging from the convergence of mobile services. Below, we highlight how four key services – connectivity, mobile financial services, digital identity, and M2M and IoT – are providing affordable access to life-enhancing services for people in underserved communities.

2.3.1 Connectivity

Personal access to fast, reliable and continuous connectivity is a foundational element for digitally enabled socioeconomic development. Mobile networks cover a wider area than any other technology in

the country, and the convenience and increasing affordability of mobile phones make them a more practical option for most users and for delivering services to underserved areas.

Source: GSMA Intelligence

4 Unique subscribers

Unique subscribers   Unique subscriber penetration
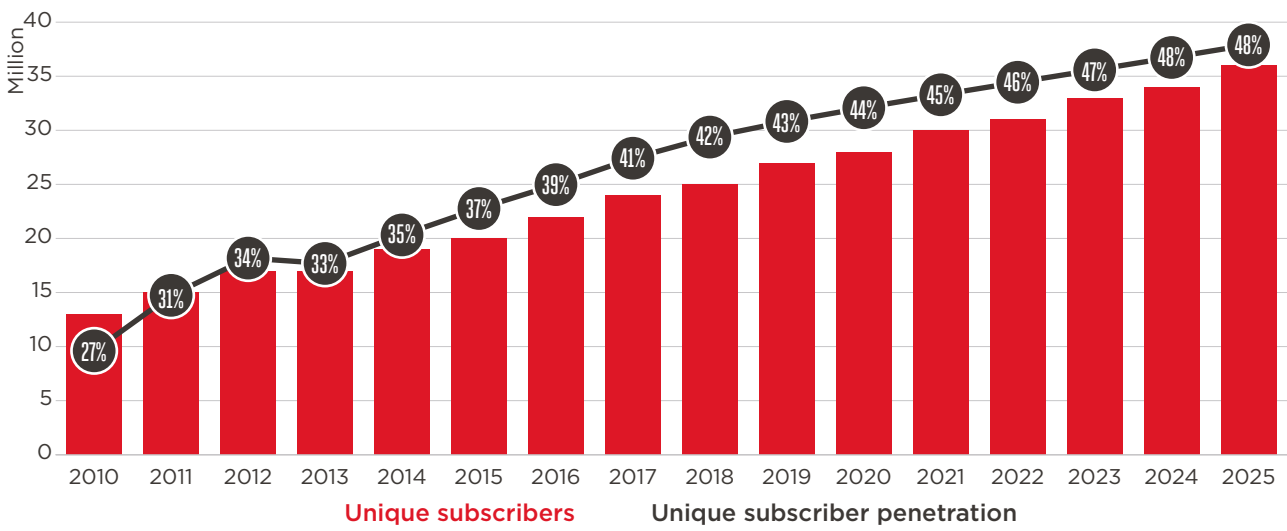
Improving healthcare

TDV 2025 High quality livelihood	**FYDP II** Human development	**UN SDG** 3

Vodafone Moyo

The number of women suffering complications during childbirth in Tanzania is high, with an estimated 3,000 new cases of obstetric fistula each year. Since 2010, the Vodafone Foundation, through the Moyo campaign, has worked with the Comprehensive Community Based Rehabilitation in Tanzania (CCBRT) hospital in Dar es Salaam to facilitate free travel and treatment for women with obstetric fistula. The "text-to-treatment" project assists doctors and more than 400 community ambassadors across Tanzania to raise awareness, identify and refer patients for treatment. Through this initiative, the hospital sends funds via M-Pesa to pay for the patient's bus fare. More than 2,200 women from across the country have been treated since the Foundation started supporting the programme.

The initiative is now being replicated to mobilise maternal health in Tanzania, starting in rural areas in Sengerema and Shinyanga. Using a network of more than 100 taxi drivers, the Foundation responds to emergency calls, taking pregnant women on what is often a three-hour journey to reach the nearest hospital. Once women arrive at the hospital, the emergency taxi drivers are paid using M-Pesa. The ambulance taxi service is complemented by a mobile app that has been developed for the community health workers, which enables them to maintain a register of pregnant women and keep track of those subject to a high risk of complications during childbirth.

Tigo's CCBRT partnership

Tigo partnered with CCBRT hospital to treat patients with cleft lip, setting up an SMS reminder platform for patients, and raising awareness about CCBRT's services. Tigo also supported treatment to restore mobility to patients with clubfoot. Approximately 2,200 children are born per year with clubfoot in Tanzania, almost 50% with both feet affected. Clubfoot is a deformity where the foot is curved inwards and downwards. If treated early enough, clubfoot is completely correctable and does not require surgery. With an annual grant provided by Tigo, the CCBRT team are able to offer Ponseti treatment to more than 400 children (new cases) and many more who attend follow-up casting sessions. In addition, the

SMS service, which reminds patients of their medical appointment, has helped CCBRT dramatically lower the medical costs from 49% to 10% among clubfoot patients. This highlights the impact of integrating technology into healthcare service delivery.

Wazazi Nipendeni

Healthy Pregnancy, Healthy Baby (HPHB) – also known as Wazazi Nipendeni[7] – is a value-added SMS service available across four mobile phone networks in Tanzania – Airtel, Tigo, Vodacom and Zantel. The service is owned by the Ministry of Health and managed by the mHealth Tanzania Public-Private Partnership Program. HPHB enables access to vital health and nutrition information via SMS. The service is free and has been available in Swahili since its launch in 2012. To date, more than 1.8 million users have cumulatively received more than 115 million messages through the service.

Evidence of its success includes information sharing and behaviour changing. The information is shared beyond the user base (73% of participants declared that they share the information they learn from the service with others), while experienced HPHB service users (those subscribed to the service for longer than six months) had comparatively better nutrition knowledge than new users. For example, the percentage of users who correctly recalled knowledge concerning appropriate breastfeeding practices was 73% across experienced users and 67% across new users.

Airtel Millennium Village Project

Airtel introduced the Millennium Village Project (MVP) to improve access to medical and educational services in rural areas via mobile technology through a TZS15 million investment. Under this initiative, Airtel has provided 220 mobile lines for community health workers and community education workers in clusters in Mbola in the Tabora region. Each worker can interact with households within their clusters at a subsidised rate and connect them with the nearest health facility/medical practitioner. Airtel also provides free internet connectivity for real-time data analysis as part of the project.

---

7   Healthy Pregnancy, Healthy Baby is the actual name of the service, but many refer to it as Wazazi Nipendeni, which was the name of the multimedia marketing campaign

Improving education

TDV 2025	FYDP II	UN SDGs
Well-educated and learning society	Human development	4 5 10

Vodafone Foundation

Vodafone Foundation supports the government's efforts to introduce the ICT curriculum and provide children across the country with access to technology. In partnership with Samsung, the Foundation has installed "smart classrooms" in schools located in some of the most disadvantaged neighbourhoods of Dar es Salaam, as well as other parts of the country, to improve the learning environment for students and teachers. More than 6,000 students and 150 teachers have been provided with devices, connectivity and online education.

Airtel FURSA

Airtel's FURSA aims to empower youths through grants, entrepreneurship skills, mentorship and access to certified vocational education via a mobile app. To date, the programme has provided in kind grants to more than 145 youths while another 4,000 have received entrepreneurship skills.

Airtel has also partnered with the Vocational Educational Training Authority (VETA) and DTBi to deliver the VSOMO youth empowerment programme.

VSOMO targets young entrepreneurs in Tanzania, helping them access vocational skills and employment. The programme allows beneficiaries to study through their phones and, on completion of the programme with the required pass mark, visit the nearest VETA center for practical training. More than 8,000 young people are registered on the VSOMO app.

Tigo e-Schools (Internet for Schools)

In 2016, Tigo partnered with the Ministry of Works, Transport & Communications to facilitate the rollout of internet access points in the country's public secondary schools to complement the government efforts to ensure learning institutions are connected to the internet. To date, Tigo has connected 57 public secondary schools across the country with fast internet connectivity, providing free internet access to more than 64,000 students. Tigo also launched an initiative to digitise education by installing a learning management system (LMS), along with training for the teachers, in the connected schools. The LMS platform provides digital educational content for students and teachers to enhance the learning experience for students and prepare them for a digital future.

Improving access to clean water

TDV 2025	FYDP II	UN SDGs
High quality livelihood	Human development	1 3 6 11 and 12
Competitive economy capable of sustainable growth and shared benefits	Implementation and effectiveness	

Around half of Tanzania's population – more than 25 million people – lack access to an improved source of safe water, according to Water.Org. A key human development goal of FYDP II is to provide 85% of the rural population and more than 90% of urban dwellers with sustainable access to clean and safe water by 2020/21. Mobile technology is contributing to this by enabling innovative business models and applications that improve access to safe water for the general public.

In 2013, Africa Water Enterprises, a UK-based charity, and eWATER, a technology provider, formed a partnership to develop eWATERtap – a mobile technology and solar-based solution for affordable and sustainable water systems in Africa. The GSM-monitored taps dispense water when users present their NFC eWATERtag, which stores their prepaid water credit. Water credit is purchased through an agent with a smartphone app. Where mobile money is readily available, users can pay remotely via mobile money, with their credit stored in the cloud. The solution helps to improve revenue collection and the continuous maintenance of water infrastructure, especially in rural areas, by reducing the risk of human errors and fraud as well as providing real-time information on the functionality of the water systems to service engineers.

eWATERtaps received a grant from the GSMA Mobile for Development Utilities Programme, supported by the UK government, to develop and pilot the technology in the Gambia and has scaled the solution to Tanzania and Senegal. In Tanzania, eWATERtaps have been successfully used to deliver water to more than 5,000 people in two villages since June 2017.

Connecting the refugee population

TDV 2025	FYDP II	UN SDGs
High quality livelihood, Well-educated and learning society	Human development	3 4 5 10

Nyarugusu is one of three large refugee camps in the Kigoma region in north-west Tanzania. The camp is home to more than 136,000 refugees from DRC and Burundi. Refugees live in 142 villages across 28 square kilometres. Some 53% are under the age of 18. Connectivity in Nyarugusu was significantly improved by Vodacom's installation of a mobile tower within the camp in 2016. Airtel and Halotel have also made improvements to mobile infrastructure serving the camp, including the construction of an Airtel 'cell on wheels'[8] and a Halotel tower 5 kilometres from the camp, covering both the host community and the camp. Access to mobile connectivity is helping the refugee population in Nyarugusu address the social challenges they face in four key ways:

Connecting with family

96% of users make calls to friends and family living in the camp and 81% call friends and family outside the camp. Refugees are using social media to find missing loved ones, connect with friends and family, relay news and information, and as a safety net during emergencies.

Economic opportunity and mobile money

20% of refugees are engaged in informal trade. Connectivity provides them with opportunities to identify new clients, contact suppliers and access financial services through mobile money. In addition, 52% of phone users access mobile money for remittances, informal payments, savings or humanitarian cash transfers. Airtel has supported the World Food Programme since December 2016 in facilitating cash distribution and cash-out services to refugees. Airtel shares a 3G tower inside Nyarugusu camp with other operators to enhance network quality and stability for the refugees and people around the area.

Education

In 2016, the Vodafone Foundation launched its 'connected classrooms' project in six schools in Nyarugusu, providing a Wi-Fi connection, projector and tablet devices for teachers and children. In addition, 28% of adult internet users in the refugee camp are using their phones to access informal education opportunities, including language learning and further education.

Connectedness and wellbeing

The importance of news and entertainment for refugees should not be underestimated. Connectivity can facilitate community activities within the camp and enable refugees to feel better connected to their home countries and to the world outside the camp.

---

8   This was set up in October 2016, but was adversely affected by a storm in early 2017 and is no longer in operation. Airtel is instead sharing the Vodacom tower to provide coverage to the camp's population.
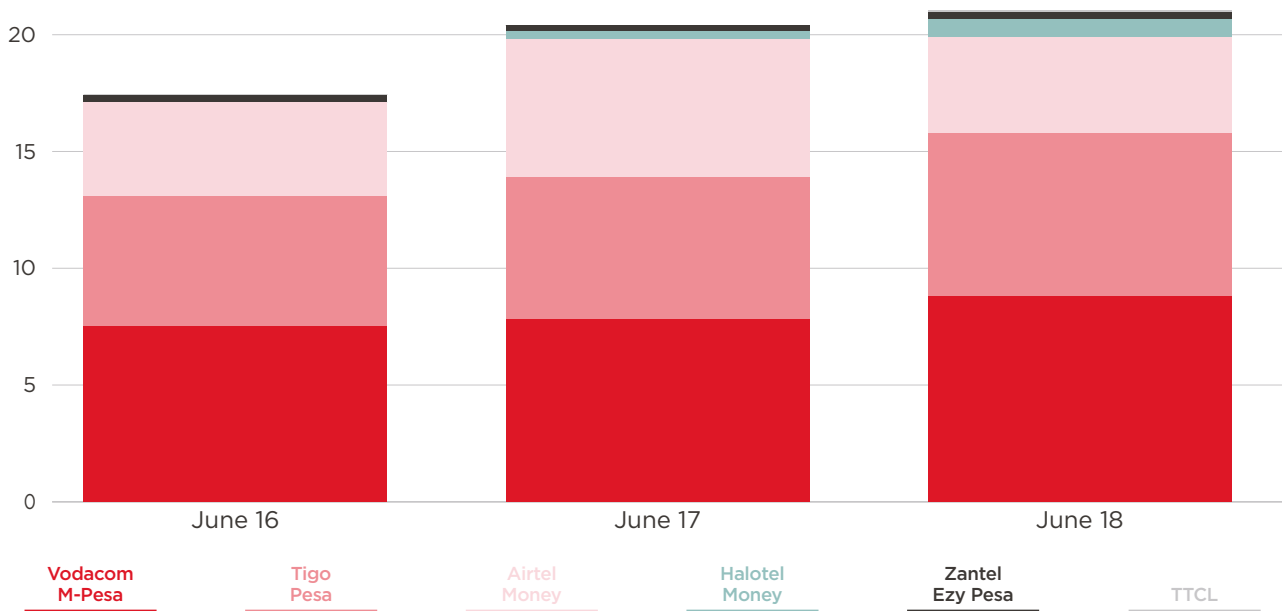
2.3.2 Mobile financial services

The provision of financial services via a mobile platform, particularly mobile money, is one of the most dynamic innovations in the mobile industry and has led to significant social and economic benefits for users. Mobile money is a key driver of financial inclusion in Tanzania; a majority of respondents (60%) in the 2017 FinScope survey reported taking up mobile money services, which reflects a 10ppt increase from 2013.[9] The service was first launched in Tanzania in 2008, and by June 2018 the country's top six mobile money providers – Airtel, Halotel, Tigo, TTCL, Vodacom and Zantel – had nearly 21 million mobile money subscriptions between them.[10]

Source: Tanzania Communications Regulatory Authority (TCRA)

5 Mobile money subscriptions (million)

| | Vodacom M-Pesa | Tigo Pesa | Airtel Money | Halotel Money | Zantel Ezy Pesa | TTCL |

In recent years, mobile money has evolved from traditional payments such as domestic remittances and airtime top-ups, to more complex financial products, creating opportunities to enable innovative services for governments, businesses and individuals. The 2017 FinScope report by the Financial Sector Deepening Trust (FSDT) indicates that of the 43% of adults in Tanzania who save, 35% do so through their mobile wallet. Furthermore, of the 44% of adult Tanzanians who borrow, 4% do so via mobile money and 3% from banks. The report also shows that between 2013 and 2017, the total number of adults using financial services grew by 15%, with those using mobile financial services rising by 38%.[11]

Growth of mobile financial services and the expansion of the mobile money ecosystem have been helped by the interoperability of mobile money platforms. Interoperability allows customers to make payments from the mobile money account of one provider to the mobile money account of another provider. From the early days, the Bank of Tanzania has had a progressive regulatory approach, seeking to create a conducive "test and learn" environment.[12] This approach, combined with the competitive landscape, has made Tanzania a clear leader in the industry and helped to drive innovation around products and services aimed at improving the financial lives of its citizens, as well as drive financial inclusion to rural parts of Tanzania.

9   Tanzania: A digital ecosystem takes shape, Financial Inclusion Insights, 2016
10   TCRA
11   FinScope Tanzania: Insights that drive Innovation, FSDT, 2017
12   Enabling Mobile Money policies in Tanzania, GSMA, 2014

Mobile-enabled credit

TDV 2025	FYDP II	UN SDGs
High quality livelihood Competitive economy capable of sustainable growth and shared benefits	Human development	1 2 5 8 10

Access to credit is crucial for financial inclusion and inclusive economic growth as it allows citizens to expand their options for managing and storing funds, gaining direct access to licensed deposit-taking institutions.

- Vodacom Tanzania and the Commercial Bank of Africa (CBA) launched M-Pawa, a mobile savings and loan product, in June 2014. As of May 2016, M-Pawa had recorded 4.8 million accounts, with TZS39 billion ($17.9 million) disbursed to entrepreneurs, most of whom were women or youths.

- In March 2016, Tigo launched Tigo Nivushe, a nano loans product that allows Tigo Pesa customers to build their own credit history and take out small loans without any collateral. The loans – with an average of TZS10,000 ($5) – are processed in real time and funds transferred within minutes. As customers build up their credit history, they are able to borrow higher amounts with lower administration fees. Loans are delivered directly to the mobile wallet so customers can immediately use the funds to pay bills, transfer to others, or cash out at the thousands of agents across the country.

- Airtel Tanzania, in partnership with credit scoring provider Jumo, launched Timiza Wakala Loans in 2015, a service that provides 20,000 Airtel Money agents with loans from TZS50,000 to TZS500,000 (approximately $23 to $229).[13] The Airtel Money Timiza service has so far provided unsecured loans to agents and customers of more than TZS350 billion ($155 million).

The empowerment of women

TDV 2025	FYDP II	UN SDGs
Well-educated and learning society	Human development	1 2 5 10

In 2010, Vodacom launched the M-Pesa Women Empowerment Initiative (MWEI), with the aim of supporting women entrepreneurs in remote parts of the country or deprived urban areas. So far, MWEI has provided loans worth more than $200,000 in 42 districts in Tanzania. Women who do not have access to loans from financial institutions are asked to form groups and receive an M-Pesa cash float (interest-free) of between TZS5,000 to TZS150,000 ($2.2 to $66). Whenever a member of a group repays, the money is given to another member of that group, making repayment a priority among members while at the same time ensuring that more and more women get access to the interest-free loans.

13   "Airtel offer Timiza loans to Airtel Money agents", Airtel

2.3.3   Digital identity

The ability to prove one's identity is critical to accessing a range of services such as healthcare, education and financial services, as well as securing employment and voting. This is especially true for those who normally face more barriers to accessing identity documents such as children, women, rural populations, refugees and the very poor. Robust digital identity systems can also produce huge savings for the general population, government and business; can increase transparency and accountability; and can drive innovation. Birth registration is a vital first step in establishing a strong Civil Registration and Vital Statistics (CRVS) system – an essential tool for effectively planning and monitoring public services, as well as development policies and programmes. Accurate demographic data also protects governments against fraud, leads to more efficient and cost-effective delivery of government services and social protection (especially in areas related to health and education), and can ensure fairer and more transparent electoral processes.

In addition to ratifying the United Nations Convention on the Rights of the Child, the government of Tanzania has made birth registration compulsory through the Births and Deaths Registration Act (2002) and the Law of the Child Act (2009). Through this legislation, the government recognises every Tanzanian child's right to a name and nationality and further establishes the responsibility of each parent or guardian to register the birth of their child. In recent years, the government of Tanzania has initiated a series of measures to improve birth registration rates and is moving towards a decentralised and comprehensive CRVS system. The aim is to establish a system that not only addresses the core issues of accessibility, affordability and rate of birth registration but also helps the country draw on the fruits of such a system to meet its governance and development agenda.[14]

Mobile is at the heart of the government's birth registration efforts, providing a transformative opportunity to offer new identity services that are more efficient and effective than paper-based and traditional identity systems.

Mobile birth registration

TDV 2025	FYDP II	UN SDG
Good governance	Implementation and effectiveness	10

Tanzania has one of the lowest rates of birth registration in the world and the third lowest rate in East and Southern Africa. Only 16% of children under the age of five are registered, far below the average for Sub-Saharan Africa (44%) or neighbouring countries such as Uganda (30%), Kenya (60%) and Rwanda (63%).[15] Furthermore, only half of the children who are officially registered in Tanzania receive a birth certificate. With registration services only available at one site per district, many parents must make (at least) two long journeys in order to register their child and collect a birth certificate. In areas that lack adequate infrastructure and public transport, travelling this distance can be prohibitively time-consuming, expensive and inconvenient, particularly for those who must disrupt their income-generating activities or sacrifice daily wages.

In 2011, the Registration Insolvency and Trusteeship Agency (RITA), with support from UNICEF and Tigo, developed the Under-Five Birth Registration Initiative (U5BRI) – a five-year birth registration strategy that aimed to make the process of registering new births more affordable, widely accessible and efficient. The project is funded by the government of Canada. Millicom (Tigo) Tanzania has developed a mobile birth registration platform, while also providing SMS and internet services and raising awareness of the programme through communications and marketing channels. One of the six goals of the U5BRI project was to use mobile phone technology to ensure the instant transfer of data to the central server at RITA. Data is uploaded via SMS, which facilitates real-time tracking through a dynamic backend dashboard.

14   Birth Registration in Tanzania: Tigo's support of the new mobile birth registration system, GSMA, 2016
15   World Bank 2012

Flow of information – mobile birth registration in Tanzania

Mobile Phone → SMS → Mobile Network → SMS → SMS Gateway → Internet → Application Server
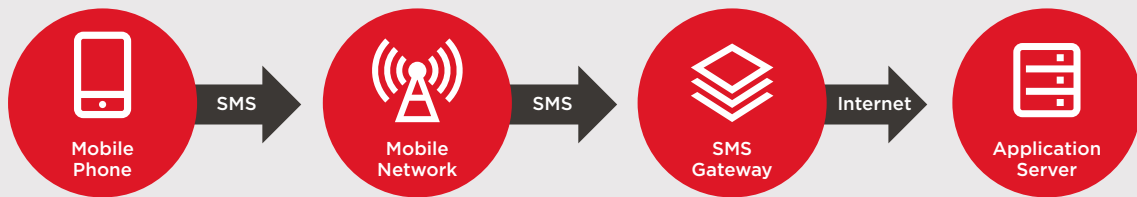
To modernise and improve the birth registration process, RITA and UNICEF worked closely with Tigo to develop a mobile application that allows registrars to collect birth registration data and upload it to a centralised system. In addition to providing their technical expertise to this project, Tigo helped facilitate the mobile registration process by providing the new registrars with free mobile handsets, data and SMS. RITA has also eliminated the TZS3,500 ($1.5) processing fee for birth certificates in the project locations, making it possible for parents to register their child and obtain a hand-written birth certificate free of charge. Importantly, the application brings registration services closer to the community by allowing health facilities and local government offices to act as mobile registration points. This means that those in the project regions have access to more than 2,500 registration points, compared to 42 before the implementation of the project.

The project was piloted in one district of Dar es Salaam (Temeke), before being scaled to nine additional regions: Mbeya, Songwe, Mwanza, Iringa, Njombe, Geita, Shinyanga, Lindi and Mtwara. In 2018, the project will be expanded to four more regions.

Tigo has highlighted that when the new mobile registration system was rolled out in Mbeya, the registration rate of children under five increased from 8% to 45% within six months. As of August 2017, the mobile registration system had successfully registered and issued certificates for more than 1.6 million children, while around 900,000 births were registered, representing a three-fold increase over the previous year. The project has helped raise the overall level of registration and certification in these regions to 79.1% from a baseline figure of 10.5% as per the 2012 Census.

2.3.4 M2M and IoT

M2M technology connects machines, devices and appliances wirelessly via a variety of communications channels to deliver services with limited direct human intervention. This transforms these devices into intelligent assets that offer a range of possibilities for improving how businesses operate. M2M is an integral part of the Internet of Things (IoT), which describes the coordination of multiple machines, devices and appliances connected to the internet through multiple networks.

Tanzania is among the top 10 M2M markets by connections in Sub-Saharan Africa, with 397,000 connections, equivalent to 1% of total mobile connections, at the end of 2018. Although Tanzania lags the leading regional M2M markets of South Africa (9.8 million connections) and Nigeria (3.3 million connections) by large margins, a number of M2M use cases are beginning to emerge in the country and are expected to drive growth in the coming years. For example, DTBi is implementing an M2M and IoT solution for fishing boats on Lake Victoria, to provide security and rescue in times of distress. In April 2016, Vodacom announced that it

had invested in M2M and IoT, partnering with technology provider Cumii International to provide vehicle tracking and fleet management services, monitoring of retail points, security systems and other telemetry services for individuals, public and private institutions, and the government.

M2M is a key element of innovative business models for clean energy, water and sanitation solutions. For example, the technology enables the mobile-enabled, solar pay-as-you-go (PAYG) model, which provides financed clean energy solutions for those without access to grid electricity. In October 2017, the World Bank and IFC jointly announced a two-year consumer education campaign in Tanzania to promote solar off-grid lighting and energy products to communities.

PAYG solar and other providers are utilising M2M technology, alongside other mobile services such as mobile money and connectivity, to develop innovative business models that deliver scalable and sustainable access to clean energy for users in underserved communities.

Access to clean energy

TDV 2025	FYDP II	UN SDGs
High quality livelihood	Infrastructure, human development	7 10

Off Grid Electric

Solar energy start-up Off Grid Electric launched a PAYG solar service in Arusha in 2012. Customers pay a $6 installation fee for a solar energy system that powers basic lights and devices such as radios, televisions and entertainment systems. Following installation, electricity can be accessed by buying $6–15 worth of credit through a mobile platform, M-Power. Customers pay monthly for the desired amount of credit via mobile money. Off Grid is available in about 60% of the country, with plans to expand to the remaining parts.

KopaGas

KopaGas designed a smart meter for gas cylinders and deployed a Pay-as-you-Cook service in Dar es Salaam in partnership with Oryx Energies. The service used M2M connectivity to monitor and control gas usage, and customers used mobile money to purchase gas for clean cooking, which removed affordability barriers for low-income households and enabled them to have easy access to clean cooking fuel. The pilot improved access to clean cooking fuel for 148 households and 2 small-scale food stands for a total reach of 870 people. Some 96% of KopaGas customers reported saving an average of $2.92 per week on cooking fuel. KopaGas received a grant from the GSMA Mobile for Development Utilities Programme, supported by the UK government, to deploy Pay-as-you-Cook services in Tanzania.

2.4 Productivity and efficiency

Tanzania's industrialisation pillar relies in large part on increasing productivity and improving efficiency in the production and distribution processes across key productive sectors of the economy. FYDP II identifies manufacturing, mining and metals, construction, agriculture, trade, natural resources management, tourism, science and technology, and the creative industry as key sub-sectors in the industrialisation agenda. Of these, mobile is having the highest impact on agriculture, the significance of which is underscored by the sub-sector's share of GDP and the total workforce: agriculture accounts for more than a quarter of Tanzania's GDP and employs nearly 67% of the working population.[16]

Despite the large proportion of workers in the agricultural sector, Tanzania's cereal yield of 1,678 kg per hectare is only 43% of the global average of 3,907 kg per hectare.[17] The mismatch between the productivity level of farmers and the size of the agriculture labour force is attributable to several factors, including low-income farmers' access to relevant information and widespread inefficiencies in food production, storage and distribution processes. It highlights the need for farmers to find efficient ways to increase food production in order to meet the government's performance targets for the sub-sector in 2020 and 2025 respectively (Table 3).

Source: National Five Year Development Plan 2016/17–2020/21

3 Agricultural sector performance targets

Agriculture (overall)	2015	2020	2025
Real growth rate	3.4%	7.6%	13.1%
Share of GDP (current prices)	29.7%	29.4%	32.0%
Share of total export earnings	20.4%	24.9%	36.7%
Share of total employment	66.9% (2014)	56.5%	41.2%
Productivity growth	3.3%	4.0%	4.0%

16   World Bank, data for 2014
17   Food and Agriculture Organisation (FAO), 2014

Under FYDP II, the government of Tanzania expects the increased use of modern technologies, including ICT, to increase productivity in the agriculture sub-sector. Mobile technology is well suited to help address this challenge by bridging the knowledge and information gap for farmers and enabling efficient interaction between key players across the value chain. This would increase efficiency and boost productivity levels in farming communities, and consequently increase economic output and the contribution of the agricultural sector to overall GDP.

Improving agricultural productivity

TDV 2025	FYDP II	UN SDGs
High quality livelihood, Competitive economy capable of sustainable growth and shared benefits	Human development, Implementation and Effectiveness	1 2 3 8 10 12

Tigo Kilimo

Tigo Kilimo is an agricultural value-added service provided by Tigo in Tanzania. The service offers information for farmers via mobile and can be accessed via four channels: USSD, push SMS subscription, IVR and a helpline. Tigo Kilimo provides agronomic tips on 10 major crops (maize, rice, Irish potato, cassava, onions, banana, citrus, sweet potato, tomato and cashew); market price information on these crops for key markets; and weather forecasts for 26 regions of the country. The service was launched in December 2012; by December 2014 Tigo Kilimo had almost 400,000 registered users. As of 2014, repeat users of the service were 30% more likely to be growing new crops, using new seeds or new agricultural practices. They were consequently 39% more likely to report increased income in a given year than those who did not use the service.[18]

Linda Mbegu

Airtel Tanzania has partnered with ACRE Africa, Seed Co Tanzania and UAP Insurance Tanzania Ltd to provide mobile crop insurance in Tanzania. The crop insurance enables farmers across the country to insure their seeds through an initiative called Linda Mbegu, a Swahili term for "protect your seeds". Upon purchase of a packet of seeds, the farmer can insure the seeds for 21 days by dialling the code *150*60# and entering the special number found inside the seed bag.

Mobile solutions for agriculture leverage connectivity and other mobile services, such as mobile money and M2M, to improve food production and distribution. Mobile money, for example, creates a significant opportunity for digitising payments and transfers in the agriculture sub-sector. This can serve as the entry point to financial inclusion for many farmers in remote communities, effectively addressing through agriculture the poor linkage of farmers with financial institutions that was identified as a challenge to women and youth in FYDP II.

Digitised payments also reduce costs, increase efficiency and transparency, and improve the safety of payments for agribusinesses and farmers. Agribusinesses, cooperatives, governments, international organisations and NGOs can take advantage of this opportunity to procure agricultural produce from farmers directly and more efficiently.[19]

18   Tigo Kilimo: Impact Evaluation, GSMA, 2015
19   Market size and opportunity in digitising payments in agricultural value chains, GSMA, 2016

Governments in developing countries use several measures, including subsidies, grants and income support payments, to stimulate the use of necessary inputs that enhance agricultural productivity. In Tanzania, the Ministry of Agriculture, Food Security and Cooperatives disbursed nearly 3 million vouchers for agriculture inputs worth $36.4 million to 1 million farmers on the mainland to prepare for the 2015/16 agricultural season. Mobile-enabled platforms can lower distribution costs, facilitate real-time and scalable transfers to smallholder farmers across multiple locations, mitigate cash-handling risks, such as theft and fraud, and enable transparent and traceable transactions.

Improving agricultural productivity

TDV 2025	FYDP II	UN SDG
High quality livelihood, Competitive economy capable of sustainable growth and shared benefits	Human development, Implementation and Effectiveness	1 2 3 8 10 12

The Connected Farmer Alliance (CFA) is Vodafone's enterprise platform for agricultural value chains that helps agribusinesses work more efficiently with smallholder farmers, in turn increasing their productivity and income. The platform is available on Vodafone-owned networks Safaricom (Kenya) and Vodacom (Mozambique and Tanzania) and leverages agricultural value-added service (Agri VAS) channels and Vodafone's M-Pesa mobile money to facilitate communication and payments between agribusinesses and their smallholder suppliers. It offers three key modules that provide transaction, communication and data collection/management capabilities, which can be configured into a solution set specific to the needs of a particular agribusiness. Since its launch in September 2012, eight agribusinesses across Kenya, Tanzania and Mozambique have tested the Connected Farmer mobile solution, including Olam and Tanga Fresh in Tanzania.

2.5 Contribution to economic growth and social development

Over the last decade, Tanzania has recorded an average GDP annual growth rate of 7%. While this is impressive by both regional and global standards, it is lower than the target rate of 8–10% required to eradicate absolute poverty in line with the development goals.

Furthermore, the goal of realising the projected per-capita GDP of $3,000 by 2025 requires a minimum annual economic growth rate of 8% up to 2020 and beyond, according to estimates outlined in FYDP II. Although the government's main interventions focus on further industrialisation and the expansion of trade to drive growth, it is worth noting the contribution of the mobile ecosystem, particularly mobile operators, to economic growth in Tanzania.

The mobile ecosystem consists of mobile operators, infrastructure service providers, retailers and distributors of mobile products and services, handset manufacturers, and mobile content, application and service providers. The direct economic contribution to GDP of these firms is estimated by measuring their value added to the economy, including employee compensation, business operating surplus and taxes. In 2016, the total value added generated by the mobile operators alone – taking into account direct, indirect and productivity effects – in Tanzania was around $2.5 billion, equivalent to 5.2% of GDP (see Figure 6).

Source: GSMA Intelligence

6 ## Total contribution to GDP in 2016

	Direct Impact	Indirect	Productivity	Total
$ billion	0.8 (1.7%)	0.2 (0.3%)	1.5 (3.2%)	2.5 (5.2%)

Direct Impact
Operator value added (wages, taxes and business surplus)

Indirect
Knock-on effect in sectors providing inputs in the supply chain of mobile goods and services

Productivity
Improved efficiency throughout the economy via the use of mobile technology (agriculture, education, finance, health)

The economic contribution of the mobile industry will increase in both absolute and relative terms, from $2.5 billion in 2016 to more than $4 billion in 2020, accounting for more than 6% of GDP. The majority of this increase will be driven by improved productivity, particularly from the increasing adoption of mobile broadband services. Wider network coverage and the rapid adoption of new 4G services could further accelerate growth and, subsequently, the mobile industry's contribution to economic growth.

Unemployment, which stands at 11.7%,[20] is a pressing concern in Tanzania. Technology is increasingly seen as part of the solution, through direct and indirect employment in the sector, more effective recruitment channels, and the additional growth and improvements to productivity it enables in adjacent industries. Mobile operators and the ecosystem provided direct employment to more than 3,000 people in Tanzania in 2016. Economic activity in the mobile ecosystem also generates jobs in other sectors; firms that provide

goods and services as production inputs for the mobile ecosystem will employ more individuals as a result of the demand generated by the mobile sector. Another 1.5 million people were employed indirectly by the mobile industry, equivalent to 2.6% of the population, including more than 150,000 mobile money agents, half of which earn at least $100 (TZS225,000) in profit every month.[21]

Furthermore, the wages, public funding contributions and profits paid by the industry are spent in other sectors, which provide additional jobs. Over the last two years, Tanzania's mobile operators have contributed approximately TZS1 trillion ($441 million) to government revenues through taxes, spectrum and regulatory fees.

Beyond jobs and economic growth, mobile operators also contribute to social development through a range of projects under their corporate social responsibility schemes.

Selected Corporate Social Responsibility Initiatives

TDV 2025	FYDP II	UN SDG
High quality livelihood, Competitive economy capable of sustainable growth and shared benefits	Human development, Implementation and Effectiveness	1 2 3 4 6 7 10 13 14 15 16 17

In 2016 **Tigo** drilled 21 boreholes in eight regions, providing more than 130,000 people with clean and safe water. The operator plans to drill another 30 boreholes in 2018 to improve water, sanitation and hygiene in vulnerable communities across the country.

In 2017, **Zantel** participated in the beach clean-up exercise at Kunduchi Fish Market in Dar es Salaam, in support of an initiative to deliver a cleaner and safer environment for aquatic life as well as for the local community. The operator also donated 350 iron sheets and 350 bags of cement to flood victims on Pemba Island in Zanzibar.

Vodacom Foundation has launched the hakuna wasichoweza partnership, aimed at curbing absenteeism among girls in schools through the provision of sexual health education and feminine hygiene products. More than 10,000 girls across the country have benefitted from the initiative since its launch in 2014. The partnership with the Tanzania Marketing and Communications Company (TMARC) was initiated in the southern Tanzanian region of Mtwara, and has since moved to the neighbouring region of Lindi, with the aim of delivering innovative communications that invoke behavioural change across communities and improve lives.

20   UNDP Tanzania Profile
21   Agent Network Accelerator Survey: Tanzania Country Report, Helix Institute of Digital Finance, 2014

2.6 Good governance and transparency

Good governance is a key target for TDV 2025 and an underlying factor of the "Implementation effectiveness" pillar of FYDP II. Digital technologies offer significant opportunities for governments at all levels to improve their performance in terms of transparency, accountability and citizen engagement. The government has taken steps to use ICT in government operations in order to increase government accountability and transparency, and reduce corruption. It does so through the e-Government Agency (eGA), which aims to promote the use of ICT for public service delivery.

ICT enables transparency and accountability in public service delivery, improves the productivity and efficiency of government agencies, and facilitates the monitoring and evaluation of the impact of government services. Mobile is a key channel for Tanzania's e-Government strategy. Public institutions can use mobile money, SMS and USSD platforms to deliver services, provide information, collect payments and engage with the general public. For example, the Tanzania Revenue Authority (TRA) now collects payments for VAT and motor vehicle licence payments via mobile money, while the Tanzania Electrical Energy Supply Company (TANESCO) and the Dar Es Salaam Water and Sewerage Corporation also collect bill payments via the same platform.

Transparency and accountability in the payment of taxes

TDV 2025	**FYDP II**	**UN SDGs**
Good governance, Competitive economy capable of sustainable growth and shared benefits	Infrastructure, Implementation and Effectiveness	1 8 9 11 16 17

Electronic Revenue Collection System (e-RCS)

The mobile industry in Tanzania supports the government's efforts to improve resource mobilisation and revenue collection, with services such as mobile money serving as key enablers. In 2016, mobile operators, along with the TCRA and TRA, implemented an initiative to notify their customers, mainly through SMS, of the amount of VAT paid to the treasury when they pay for a mobile service, such as purchasing airtime for a prepaid account. Furthermore, the government launched the e-RCS initiative in June 2017, which enables real-time tax remittance, particularly VAT and excise duty. Mobile operators have adopted this mechanism by reconfiguring and upgrading their backend systems to interface with the government platform. e-RCS, operated by the TRA and the Zanzibar Revenue Board (ZRB), provides greater transparency for taxpayers on the exact amount of revenue collected from online transactions by automatically calculating and collecting the right amount of taxes from companies, and sending it directly to relevant accounts of both TRA and ZRB without human intervention.

Public utility payments

TDV 2025	FYDP II	UN SDGs
Good governance, Competitive economy capable of sustainable growth and shared benefits	Infrastructure	6 9 11 12

Over the past decade, mobile money has helped to make public utility payments more efficient and cost-effective. In Tanzania, the Dar Es Salaam Water and Sewerage Corporation enabled water payments via mobile money in 2009. By 2013, mobile money payments had increased utility revenues by $45,000 per month.[22] Mobile payments for water services have improved revenue collection, reduced losses and disrupted the monthly billing and payment paradigm, allowing households to pay when and how they want.

More than 70% of electricity bills in the country are now paid through mobile money services. This has relieved customers from standing in long queues and travelling long distances to pay their electricity bills.

Mobile operators, by working with the telecoms regulator, also support the government's security, anti-money laundering and identity efforts through compliance with know-your-customer (KYC) requirements. Since 2009, the KYC process applicable to mobile operators in Tanzania has transitioned from a paper-based approach to a largely digital process known as eKYC. Under this system, SIM registration applications are submitted electronically, reviewed and verified manually and, in the event of a successful application, activated electronically in near real time. eKYC records contain an electronic form with photographs of the ID document and of the person. This approach will become more robust once NIDA establishes a comprehensive national identification database, against which mobile operators can validate customer identification documents in real time and with an enhanced level of accuracy.

---

22 State of the Industry report on Mobile Money, GSMA, 2017

3

Opportunities for public-private collaboration

Further opportunities are emerging for mobile to help realise Tanzania's development goals. However, these require a collaborative approach by all stakeholders – the government, development organisations, private sector players, civil society organisations and the mobile industry. Collaboration is necessary to ensure a harmonised approach to the use of digital technologies, and to overcome access and usage barriers to mobile adoption. Below, we highlight some key areas where public-private collaboration is required to increase the impact of mobile on Tanzania's development goals.

3.1 Coverage expansion

In Tanzania, mobile internet penetration has nearly quadrupled since 2010 to 18.5%, with more than 8 million new mobile internet subscribers added over that period.

Despite this remarkable growth, two fifths of the country's population still remain offline and excluded from the socioeconomic benefits of the internet. A disproportionate share of unconnected individuals come from underserved population groups, including women and those on low incomes, who still face significant barriers to mobile internet adoption.

Today, around a fifth of the population, representing 11 million people, are not covered by a mobile broadband network (see Figure 7).

Source: GSMA Intelligence

7 Connected and unconnected populations

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Not covered not connected	90%	87%	84%	80%	75%	67%	59%	44%	21%
Covered by 3G networks but not connected	5%	6%	9%	11%	16%	22%	28%	41%	61%
Connected to the mobile internet	5%	7%	8%	8%	9%	11%	13%	15%	19%
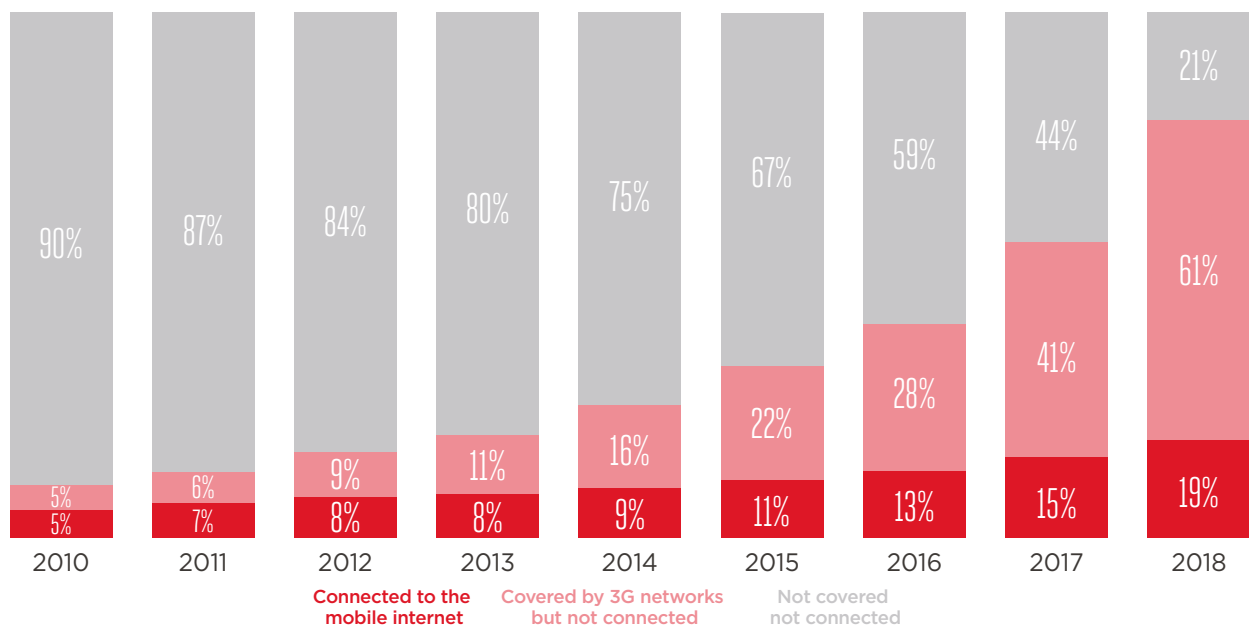
Mobile operators' direct investment in infrastructure deployment has proven effective in expanding coverage to current levels. With most urban areas now covered by a mobile broadband network, infrastructure-related exclusion is highest in rural areas where the deployment of conventional network infrastructure is more challenging. Extending network coverage to underserved areas requires collaboration between mobile ecosystem players and other stakeholders, particularly the government and telecoms regulator, with a view to implement more efficient infrastructure deployment solutions that improve the economics of rural rollout.

The active infrastructure-sharing initiative launched in Tanzania in 2016 demonstrates the impact of collaboration between stakeholders. The pilot was facilitated by the GSMA and involved three main stakeholder groups – mobile operators, equipment vendors and the government (see Figure 8)

8 Tanzania infrastructure sharing stakeholders

Pilot site	Technical	• Tower companies • Network equipment vendors • National fibre network	HUAWEI · NOKIA NETWORKS · ERICSSON
	Commercial	• Sales and distribution channel partners • Digital ecosystem partners • Device vendors	airtel · tigo · vodacom
	Legal and regulatory	• Regulator • Tax authorities • Financial institutions	

The aim of the initiative was to test the sustainable provision of mobile broadband services to around 72,000 new users in rural areas via six 3G pilot sites, and consequently enhance digital inclusion in the underserved areas. Early findings from the project show strong enthusiasm among the beneficiaries: adoption of mobile services has now reached 95% of the addressable market,[23] equivalent to 41,300 unique subscribers. 3G services are in high demand among younger customers, with 16% of unique mobile subscribers using data services on a daily basis. Involving appropriate central government and local institutions from the beginning is a key success factor in terms of time-efficient processing of administrative approvals. For example, the project benefitted from the Universal Communications Service Access Fund (UCSAF) technical expertise as well as prompt approval and coordination with the other government ministries, departments and agencies in charge of land, environment, infrastructure and so on for swift site acquisition and infrastructure deployment.

Meanwhile, the proportion of the population covered but not connected to a mobile broadband network is increasingly rapidly, highlighting the need to address the main consumer enablers to mobile adoption – namely, affordability, consumer readiness and locally relevant content. Tanzania already has one of the lowest mobile tariffs in the region, though relatively low income levels mean mobile services still account for a significant proportion of income for many, especially the bottom 40% of the population by income.

Tanzania outperforms many other African countries in developing locally relevant mobile content and applications, including content in local languages, but there is scope to do more. For example, the government can collaborate with innovators to digitise relevant data and information for end users, while development organisations and private investors can invest in digitals skills and new mobile-based approaches to extend services to underserved populations. There is also a clear need to improve digital skills. In collaboration with the GSMA, mobile operators are reviewing various approaches used in initiatives across Africa and Asia to raise digital literacy among users in order for them to maximise the benefits of accessing the internet.

23   Adult population

World Bank-supported Digital Tanzania

The World Bank-sponsored Digital Tanzania Program aims to assist the country to harness its digital potential. It aims to ensure that all citizens have access to high-quality, low-cost connectivity, that public services are easily accessible online, and that the digital economy is driving growth, innovation and job creation. Projects will be delivered in two phases:

- Phase I (2018–2022) will focus on strengthening Tanzania's core Digital Foundations – closing the connectivity gap, increasing market competitiveness and investment, and strengthening digitally enabled service delivery infrastructure and capacity within government.

- Phase II (2021–2026) will focus on Tanzania's digital acceleration – leveraging improved connectivity and enhanced capacity for public digital service delivery to accelerate growth of the digital economy, encourage private and public innovation utilising digital technology, and support expansion of digital pubic services offerings across key sectors.

Phases I and II will involve significant collaboration with other stakeholders, including mobile operators and the private sector, on initiatives around education and digital skills development. These will help to equip citizens and businesses with the digital skills needed to improve their livelihoods and to thrive in the digital economy of the future.
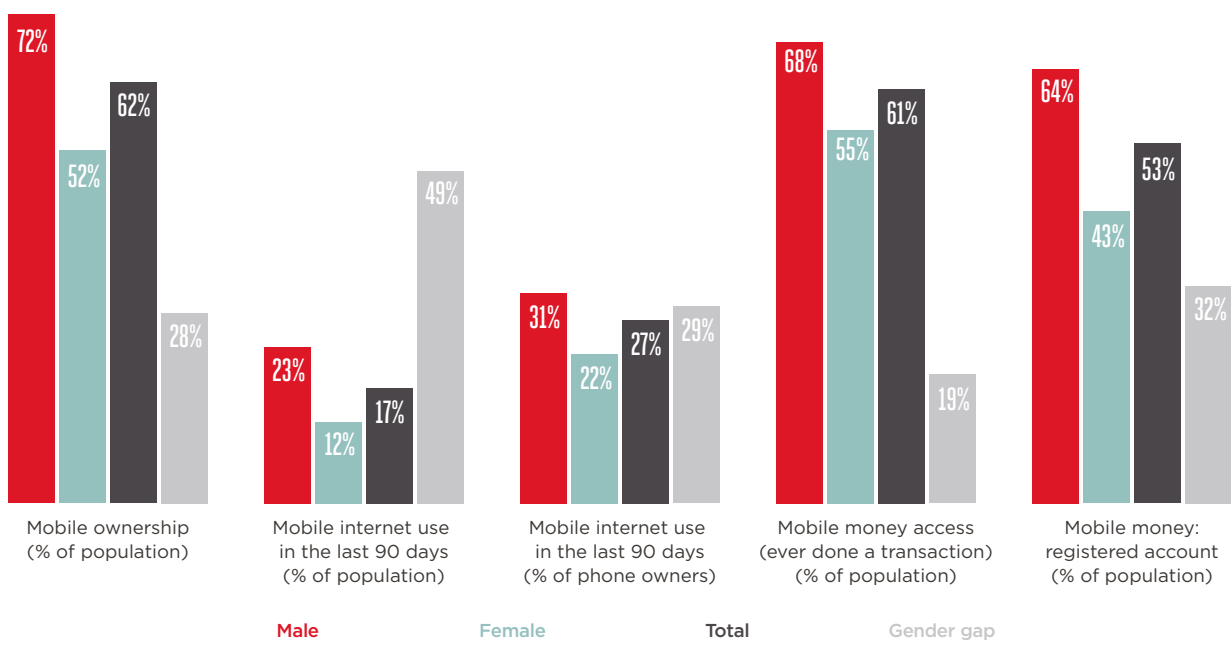
3.2 Accelerating gender equality

The government of Tanzania has expressed a commitment to closing the social and economic gaps in women empowerment to allow an inclusive contribution of women to national economic growth. Tanzania is ranked 71st out of 149 countries in the World Economic Forum's Global Gender Gap index for 2018[24] – higher (i.e. better) than most Sub-Saharan African countries, but considerably lower than some of its closest neighbours in the region, including Rwanda (6th), Burundi (31st) and Uganda (43th).

Gender inequality is costing Sub-Saharan Africa on average $95 billion per year, peaking at $105 billion in 2014 (6% of the region's GDP), jeopardising the continent's efforts around inclusive human development and economic growth. The main constraints to attaining gender equality in the region revolve around socio-cultural practices, norms and societal attitudes that limit the opportunities for women to contribute to economic activities.[25]

While mobile technology has been spreading quickly, it has not done so equally, with lower uptake of mobile among women. Even when women do own a mobile device, they are less likely to use it for more sophisticated services such as mobile internet and mobile money. GSMA research highlights that women face many barriers to owning and using mobile phones including cost, network quality, safety and harassment issues, and digital skills.[26] This is underscored by the findings from the Financial Inclusion Insights (FII) Wave 4 survey, conducted in September 2016 (see Figure 9).

Source: InterMedia

9 Tanzania: FII Wave Survey 2016

	Mobile ownership (% of population)	Mobile internet use in the last 90 days (% of population)	Mobile internet use in the last 90 days (% of phone owners)	Mobile money access (ever done a transaction) (% of population)	Mobile money: registered account (% of population)
Male	72%	23%	31%	68%	64%
Female	52%	12%	22%	55%	43%
Total	62%	17%	27%	61%	53%
Gender gap	28%	49%	29%	19%	32%

24   The Global Gender Gap Report, WEF, 2018
25   Accelerating Gender Equality and Women's Empowerment in Africa, UNDP, 2016
26   Bridging the gender gap: Mobile access and usage in low- and middle-income countries, GSMA, 2015

Mobile operators across Africa are driving the effort to accelerate digital and financial inclusion for women through the GSMA Connected Women Commitment Initiative, which supports mobile operators in low- and middle-income countries in reducing the gender gap in mobile internet and mobile money by 2020. There are now 47 commitments from 33 operators globally, including 18 operators in Africa. GSMA Connected Women is proud to have four operator Commitment Partners in Tanzania – Smart Tanzania, Tigo Tanzania, Vodacom Tanzania and Zantel.

Multi-stakeholder cooperation in developing tools and policies, and effective sharing of best practices is central to addressing the digital gender gap. By partnering with mobile operators to deliver relevant products and services targeted at women, such as social security transfers and healthcare services, government and development organisations can help deepen financial inclusion and improve digital skills among women. Government can also collaborate with other stakeholders to address the barriers to mobile internet access that women often experience more acutely than men, and which therefore impede gender equality online. These barriers include affordable access, issues around safety, digital literacy and confidence, and the availability of relevant content, applications and services. Efforts to help women access mobile directly catalyse broader gender equality across social, economic and political dimensions — benefiting not only women themselves, but also their communities, businesses and the broader economy.

Empowering women through mobile services

Tigo Connected Women/Dreams Project

Tigo has partnered with Jhpiego, an international non-profit health organisation affiliated with Johns Hopkins University, to empower women and girls through financial and digital inclusion. Through the initiatives, Tigo has increased the proportion of women in its mobile money customer base by 2% since signing the Connected Women Commitment Initiative. Around 10,300 women in the Shinyanga, Kahama, Kyela, Msalala and Ushetu districts have been reached through this initiative.

Vodacom Business Women Connect

Vodacom's Business Women Connect (BWC) uses the M-Pesa and M-Pawa mobile money services to help women microbusiness owners increase revenue and access loans via their mobile phones. BWC was launched in 2016 through a partnership with TechnoServe, Vodacom, ExxonMobil Foundation, the World Bank and the Centre for Global Development. Since its launch, the programme has trained nearly 3,000 women in the use of M-Pawa, while nearly 2,000 participants have also received business skills training.

3.3 Supporting digital entrepreneurship

Tanzania 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. Tech innovation in the country is supported by nine active tech hubs[27] (see Table 4) and growing financial and technical support from private investors, including mobile industry players.

Source: GSMA Intelligence

4 Active tech hubs in Tanzania, 2017

Name	Description
Anza 360	AEC's accelerator programme for social entrepreneurs in Tanzania. Anza offers a comprehensive suite of services to help social businesses scale up, have greater impact, and impact the lives of low-income Tanzanians.
Buni Hub (by TANZICT)	A technology hub that fosters innovation and technology entrepreneurship through capacity building, mentoring programmes and community empowerment. Founded in 2011, Buni Innovation Hub's focus is to discover, nurture and mentor youths with innovative technological solutions to problems facing Tanzania.
CAMARTEC (Centre for Agricultural Mechanisation and Rural Technology)	Focuses on developing and disseminating technologies suitable for agricultural and rural development.
Dar Teknohama Business Incubator (DTBi)	An independent autonomous entity of COSTECH with its own Board that promotes the growth of emerging technology-based companies contributing to job creation and the enhanced economic health of the nation.
Kili Hub	Kili Hub aims to create and grow a community of social impact organisations that can collaborate to make a positive impact in the Kilimanjaro region.
Small Industries Development Organisation (SIDO) – Dar es Salaam Regional Office	The government's SIDO has regional offices across the country where designers can rent space and work near other innovators. The major objective of SIDO Business and Technology Incubator Programme is to improve the chance of growth and rate of survival for small and medium-sized enterprises.
TANZICT/TANSIS	TANZICT was a bilateral project between Tanzania and Finland that worked in the areas of information society, ICT sector & policies, mobile, ICT4D and entrepreneurship. The TANZICT project ended in June 2017 and is being reformed under the name TANSIS.
Twende-AISE	Accelerating Innovation and Social Entrepreneurship (AISE) is an innovation centre for students and instructors that combines local experience and technical knowledge to create affordable innovations for low-income villagers.

Partnerships between mobile operators and tech hubs/innovators have the potential to accelerate the development of new content and services. Tech start-ups can leverage the scale, resources and other assets (such as APIs and distribution networks) that mobile operators have to enhance the functionality and reach of their solutions. This could help mitigate route-to-market challenges for start-ups by providing the platform, customer relationships and resources to drive their mobile innovation to scale. Furthermore, mobile operators can benefit from local innovation and the agility of start-ups in creating new services amid rapid digital disruption in several industries, such as education, transportation and utilities.[28]

27   Research by GSMA Ecosystem Accelerator programme
28   Building Synergies: How Mobile Operators and Start-ups Can Partner for Impact in Emerging Markets, GSMA, 2017

The GSMA, through the Ecosystem Accelerator Innovation Fund, facilitates collaboration between start-ups and mobile operators. The selected start-ups receive up to £250,000 in funding and up to 15 months of support (mentorship, facilitation of relationships with mobile operators, and access to networks) from the Ecosystem Accelerator programme. In December 2018, Tanzania-based microhealth insurance start-up Jamii was selected as one of the grantees for the third round of the fund.

The Ecosystem Accelerator programme is supported by the UK Department for International Development (DFID), the Australian Government, the GSMA and its members.

To support tech innovation and digital entrepreneurship, government needs to allow and create incentives for collaboration among stakeholders, as well as partner with innovators to digitise relevant government data and information for end users. For example, the Tanzania e-Government Agency and the National Bureau of Statistics can work with local innovators and mobile operators to develop a mobile-centric platform for the country's Open Data Portal. Meteorological and agricultural institutions can also collaborate with innovators and mobile operators to develop and send useful tips and information to farmers over mobile platforms, thereby improving overall productivity. Investors and donors also need to increase and diversify funding across the continent, beyond South Africa, Nigeria and Kenya, for broader development of the start-up ecosystem.

Tech start-up Jamii addresses insurance challenge through partnerships

In Tanzania, the penetration of health insurance is as low as 4.5%. The majority of Tanzania's low-income and informal workers do not have access to insurance and struggle to pay for health services. Tech innovator Lilian Makoi launched Jamii Africa, a micro-insurance health start-up that provides health insurance targeted at Tanzania's low-income population over mobile. The move was largely inspired by the absence of traditional insurance companies in the low-income informal sector, which accounts for around 76% of Tanzanians. Through a strategic partnership with Jubilee Insurance and Vodacom, Jamii built a mobile policy management platform that performs all the administration activities of an insurer, and allows users to access cheap insurance via USSD, starting from $1 per month. The mobile platform performs all the administration activities of the insurer, helping cut insurance

administration cost by 95%. The Bill and Melinda Gates Foundation provided technical support and design plus user experience testing during the first pilot, while the second pilot was developed at the Barclays Africa three-month accelerator programme.

Jamii has had a significant impact in its first three years of operation – it now works with more than 400 hospitals and has 10,000 customers. In January 2017, Jamii closed a $750,000 seed funding for expansion across Tanzania and several countries across Sub-Saharan Africa, including Kenya, Uganda, Ghana, Nigeria and South Africa. This demonstrates the potential for collaboration between the different stakeholders to help address critical social challenges in Tanzania and beyond.

3.4 Digital identity

Mobile already plays an important role in speeding up progress with birth registration in Tanzania. However, the widespread adoption of formal identity documents in Tanzania is still in its infancy: ID penetration among the adult population is just 49%,[29] leaving around 13 million adults at risk of not being able to prove their identity.

The identity landscape remains complex due to the number of ID documents available and the lack of a centralised national ID database. ID documents are issued and managed by different parts of government and are issued via different processes, some of which are more accessible to the broader population than others. This has resulted in a somewhat fragmented ID landscape as some forms of ID are harder to access than others, particularly if they come with a higher financial cost, multiple journeys to the issuing agency or if the application requires a large number of supporting identity documents.

From late 2015, the government of Tanzania, through the National Identification Authority (NIDA), embarked on a concerted effort to ensure that every Tanzanian obtains a National Identification Number (and, where possible, a corresponding National ID Card). This initiative will help in accessing life-enhancing services that require proof of identity, such as opening a bank account or registering a SIM card to access mobile services. This should result in improvements in the management of various IDs by relevant authorities.

As the Tanzanian government explores various options for the future of Tanzania's ID system, challenges regarding the logistical and investment requirements for implementing certain technologies and the associated risks of digital exclusion and access issues are critical matters for consideration. To this end, mobile operators have offered to support the government in NIDA's efforts to extend national identification penetration by providing mass communication (SMS push campaigns), facilities (space in shops) to set up temporary registration points during the 2018 ID registration campaign, and connectivity between NIDA outposts and their back offices.

29   World Bank

4

Enabling mobile's contribution to the development goals
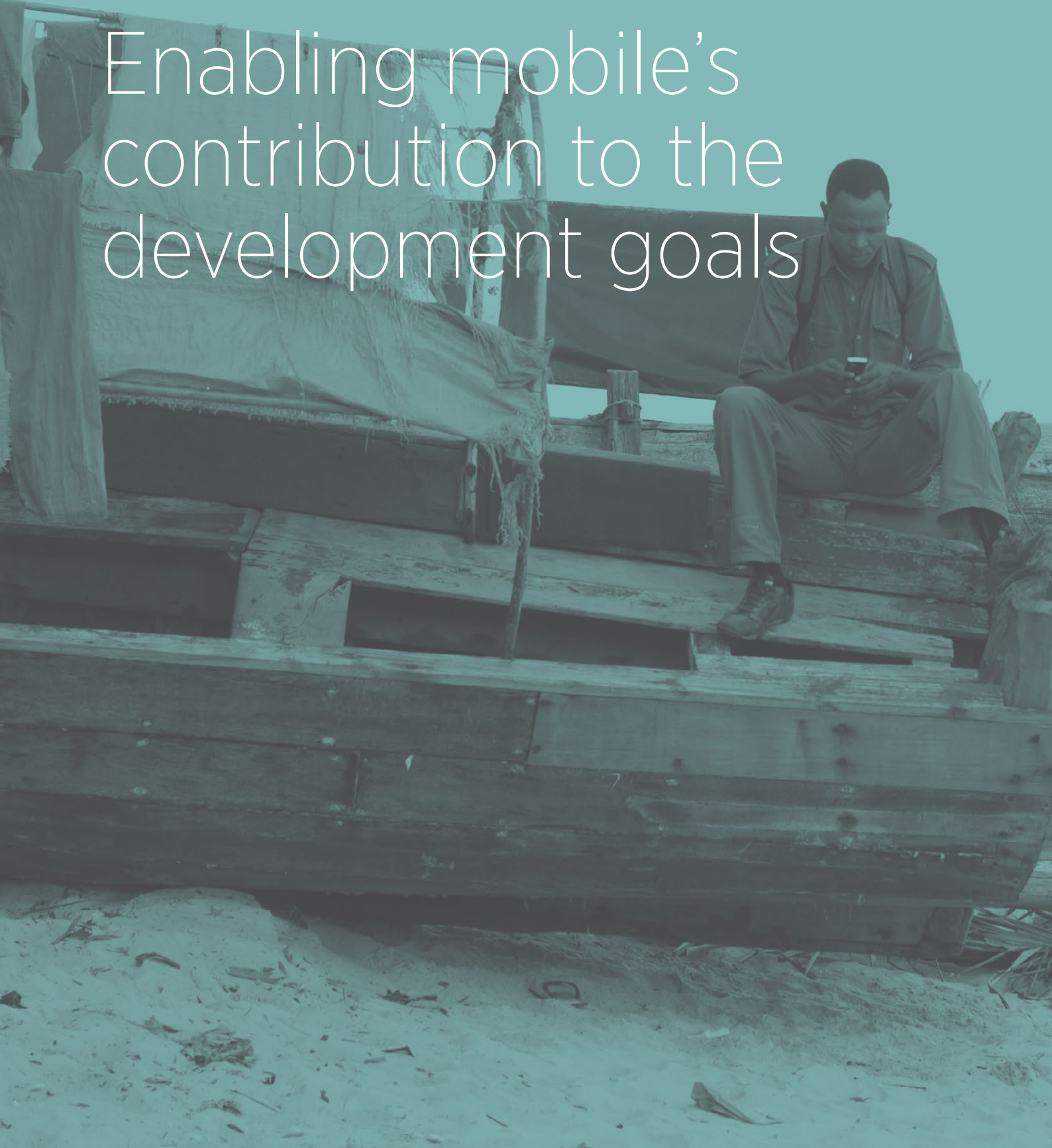
In view of the significant contribution of mobile technology and the activities of mobile operators to Tanzania's development goals, the government, relevant regulators and other stakeholders need to create an enabling environment to sustain growth of the mobile industry and continued investment in network infrastructure and services. To this end, there is a need and opportunity for the government to address specific regulatory and industry challenges that currently weigh on growth and investments (see Table 5).

Source: GSMA Intelligence

5 Policy enablers for sustainable mobile industry growth

Policy enabler	Recommendation
Spectrum policy	Given the importance of spectrum to mobile broadband, it is essential for governments and regulators to make the right spectrum decisions individually and collectively. These include ensuring operators have access to sufficient spectrum in a timely and affordable manner; providing support for new network investments; and avoiding costly restrictions on spectrum use. In Tanzania, the government needs to ensure that spectrum is allocated efficiently for the provision of mobile broadband services. The government also needs to license spectrum in a timely manner and on terms that encourage investment in line with the National ICT Policy 2016 objectives (see *Spectrum deep-dive* for more detail).
Infrastructure policy	The successful UCSAF tender mechanism for 2G deployment in rural areas and the government's policy over the last decade to allow passive infrastructure sharing, the liberalisation of the international gateway, and rural roaming have helped the expansion of network coverage in the country. It is essential for these policies to continue, and for the government to consider the following in the implementation of the National ICT Policy 2016: • allow more active forms of infrastructure sharing, especially in rural areas • allow fair access to public infrastructure, such as government buildings, roads and power lines, to bring down the cost of network deployment • allow further investment in the Fibre Consortium through a collaborative partnership model between mobile operators, NICTBB and TTCL.

Customer registration

In August 2016, the TCRA set up a joint regulatory/operator Steering Committee with the objective of enhancing the SIM registration process in Tanzania. Steps to achieving this include:

- transitioning from a paper-based to an electronic registration process

- enabling mobile operators to query customer identification credentials against the National Identification Database (NIDA) to make verification processes more effective in terms of compliance and efficiency for the customer

- proposing a joint communications campaign by the TCRA and licensees.

However, only a minority of the Tanzanian population currently hold a national ID. NIDA has reportedly issued nearly 3 million IDs so far, out of a total adult population of around 30 million.

Mobile operators provide access to life-enhancing mobile services, but also need to comply with SIM registration and KYC obligations to support national security priorities. Government action and support is crucial to addressing this challenge. Specifically, government needs to ensure that NIDA:

- is fully operational across the country and issuing IDs in a timely manner to eligible recipients

- integrates with the National Electoral Commission Database and other databases to facilitate de-duplication of records

- can be reliably accessed by mobile operators for information and verification (this has been trialled by some mobile operators).

Operating environment

Policy consistency and predictability are essential to sustaining investor confidence in the ICT sector and the mobile industry in particular. To achieve this, the government needs to establish a conducive legal framework for new policies, and should ensure that all technical and implementation requirements have been given due consideration. Regulators also need to adopt a standard process in the enforcement of regulations to enable consistency in terms of assessing mobile operators' compliance, given the recent examples of significant variations in timelines and formats in the execution of compliance orders. This would be in line with the National ICT Policy 2016 aim to "create an enabling environment to attract investment of private sector financial and technical capabilities for the development of ICT sector and industry".

Market structure

Tanzania has one of the most fragmented mobile markets in Sub-Saharan Africa, with eight active service providers. While market fragmentation has largely resulted from the government allowing new entrants into the market in a bid to drive down prices and accelerate network coverage through competition, this has turned out to be inexpedient as artificially low prices have negatively affected operators' margins and their ability to invest in network expansion. For these operators, narrow EBITDA margins may not provide enough cash flow to invest at scale in coverage and data, nor sufficient returns to cover the cost of capital. In extreme cases, some operators have been forced to close their operations. For example, BOL Mobile closed its operations in 2013.

Consolidation can help operators move to more sustainable business models and support more efficient investment. In turn, this will stabilise and have a positive impact on fiscal revenue as well as returns on investment for local investors in the mobile operators. A GSMA study[30] analysing the impact of the 2012 merger between two mobile operators in Austria – Hutchison 3G Austria and Orange – found that the merger had a significant and positive impact for Austrian consumers. While the study's findings are specific to Austria, the results show that a 4-to-3 mobile merger intensified competition in quality-related aspects and that a three-player market delivered more widely available and faster mobile broadband services than those experienced in four-player markets.

Taxation

High general and sector-specific taxes can constrain digital inclusion by making devices and/or services unaffordable for many people that need them, as well as serving as a disincentive for infrastructure deployment, especially in less viable areas. Although the Finance Act 2017 retained existing tax levels, this followed a number of budget cycles with significant increases of taxation on communications and mobile financial services. In 2016, the total tax contribution was estimated at $355 million, accounting for 5.7% of the total tax revenues of Tanzania.

There is a need to explore tax reforms that can result in greater affordability of mobile technology for consumers. Improved connectivity levels in turn will increase digital and financial inclusion, with wider positive effects for the productivity and economy of Tanzania.

---

30   Assessing the impact of mobile consolidation on innovation and quality, GSMA, 2017

Spectrum deep-dive: effective spectrum licensing for rural coverage expansion

There is significant potential for the government and operators to work closely to accelerate infrastructure rollout in unconnected areas. One such opportunity is in the efficient use of spectrum resources. For example, spectrum below 1 GHz is a key enabler for universal broadband access, bringing socioeconomic benefits to people in cities and remote areas. In order to cover rural and remote areas, lower frequencies with better propagation characteristics are vital.

By completing the digital switchover ahead of many other markets in Sub-Saharan Africa, Tanzania has shown that it has the drive to implement an enabling spectrum policy. The next step is for available spectrum in this band to be awarded to the entities that can generate the most value to society. Realising this requires a spectrum roadmap – a plan for government and stakeholders setting out the steps and timing for making available unused spectrum and for better utilising existing spectrum allocations. It is key to any effective spectrum management framework, and offers predictability, which in turn, encourages long-term network investments. A spectrum roadmap should cover:

- an audit setting out current use of spectrum and identifying any spectrum that could be re-allocated to higher value use

- the schedule for future spectrum releases

- how spectrum will be assigned, including a framework for determining spectrum prices and other terms and conditions

- the timing and process for spectrum renewal decisions

- a plan for the introduction of technology-neutral licensing and trading if not already in place.

While it is not possible or desirable to detail every approach in advance of allocating a spectrum band, investment risks can still be reduced by setting out what factors or criteria will be used to choose between the different alternatives. To get the best result, it is important the roadmap development involves the mobile operators and other stakeholders. While market-driven mechanisms, such as auctions, may be good for the overall transparency and market value discovery, they are not the only option available to governments to manage spectrum allocation and should only be used in appropriate circumstances. Revenue generation for the state should not be the key policy objective, as evidence shows that when prices are too high, consumers suffer. High spectrum prices result in high monthly or prepaid costs for consumers. High spectrum prices also result in lower quality networks and services.

The GSMA report, Effective Spectrum Pricing in 2017[31] links high spectrum prices to more expensive, lower quality mobile broadband services. Key recommendations for countries that want to maximise mobile's societal benefits include the following:

- Set modest reserve prices and annual fees based on local conditions and rely on the market to set prices.

- License spectrum as soon as it is needed as this helps avoid artificial spectrum scarcity.

- Avoid measures that increase risks for operators (e.g. that put the value of their financial viability in jeopardy).

- Publish long-term spectrum award plans that prioritise public welfare benefits over state revenues.

---

31   Effective Spectrum Pricing: Supporting better quality and more affordable mobile services, GSMA, 2017

The regulatory framework of a country should facilitate all types of sharing arrangements, from sharing of various components of mobile networks, including both passive and active sharing, to deeper spectrum integration. The sharing of mobile band spectrum optimises spectrum utilisation of frequency assets. It also has the potential to enhance the quality of mobile services provided and lower the cost of network operations. Therefore, spectrum sharing contributes to an improved user experience, better social welfare and economic growth. It does this to a much higher degree than when only relying on national roaming agreements. Any limitations in operators' engagement in sharing arrangements should be based on the principles of scrutiny under competition law or sector-specific telecommunications competition law.

The GSMA works hard to help improve connectivity in rural areas. To solve the connectivity gap, governments, regulators and mobile operators must collaborate on long-term solutions. The basic building blocks which can help make this happen are:

- cost-effective access to low frequency spectrum

- support for spectrum re-farming

- support for all forms of voluntary infrastructure sharing

- elimination of sector-specific taxation on operators, vendors and consumers

- non-discriminatory access to public infrastructure

- support for streamlined planning and administrative processes

- realistic quality-of-service targets agreed jointly with the industry

- support for appropriate competition policy, especially concerning market structure

- support for multi-sided business models such as zero rating and sponsored data.

Government leadership is a critical factor in establishing a conducive environment and developing the momentum for greater stakeholder collaboration. In addition to implementing key policy enablers to support the growth of the mobile industry, the government and its agencies need to become more involved in charting a holistic plan to leverage mobile technology to realise the development goals, and engage relevant stakeholders in every step of this process.

Mobile operators and other key stakeholders in the digital ecosystem all have roles to play. Mobile operators should find ways to develop economically viable rollout models to expand network coverage; use cost-optimising technologies and geo-analysis to optimise deployment; leverage APIs, hackathons, own app stores and partners to develop language-specific, relevant content; and embrace interoperability of platforms, such as mobile money and IoT, to drive scale and sustainability. For their part, donors, development partners, private sector players and civil society organisations need to work with policymakers to develop and implement regulatory best practices and partner with governments to improve ICT infrastructure in public institutions.

Acronyms

API	Application programming interface		**NFC**	Near-field communication
BOT	Bank of Tanzania		**NGO**	Non-governmental organisation
CCBRT	Comprehensive Community Based Rehabilitation in Tanzania		**NICTBB**	National ICT Broadband Backbone
			NIDA	National Identification Authority
CRVS	Civil registration and vital statistics		**RITA**	Registration Insolvency and Trusteeship Agency
DTBi	Dar Teknohama Business Incubator		**SACCO**	Savings and Credit Cooperative Organisation
eGA	e-Government Agency		**SDG**	Sustainable Development Goal
e-RCS	Electronic Revenue Collection System		**TANESCO**	Tanzania Electrical Energy Supply Company
FAO	Food and Agriculture Organization		**TCRA**	Tanzania Communications Regulatory Authority
FSDT	Financial Sector Deepening Trust		**TDV**	Tanzania Development Vision
FYDP	Five Year Development Plan		**TRA**	Tanzania Revenue Authority
HDI	Human Development Index		**TTCL**	Tanzania Telecommunications Company Limited
IFC	International Finance Corporation		**UCSAF**	Universal Communications Service Access Fund
IoT	Internet of Things		**UNDP**	United Nations Development Programme
ITU	International Telecommunication Union		**UNICEF**	United Nations International Children's Emergency Fund
IVR	Interactive voice response		**USSD**	Unstructured Supplementary Service Data
KYC	Know-your-customer		**VETA**	Vocational Education Training Authority
M2M	Machine-to-machine		**WHO**	World Health Organization
NBS	National Bureau of Statistics		**ZRB**	Zanzibar Revenue Board

gsma.com