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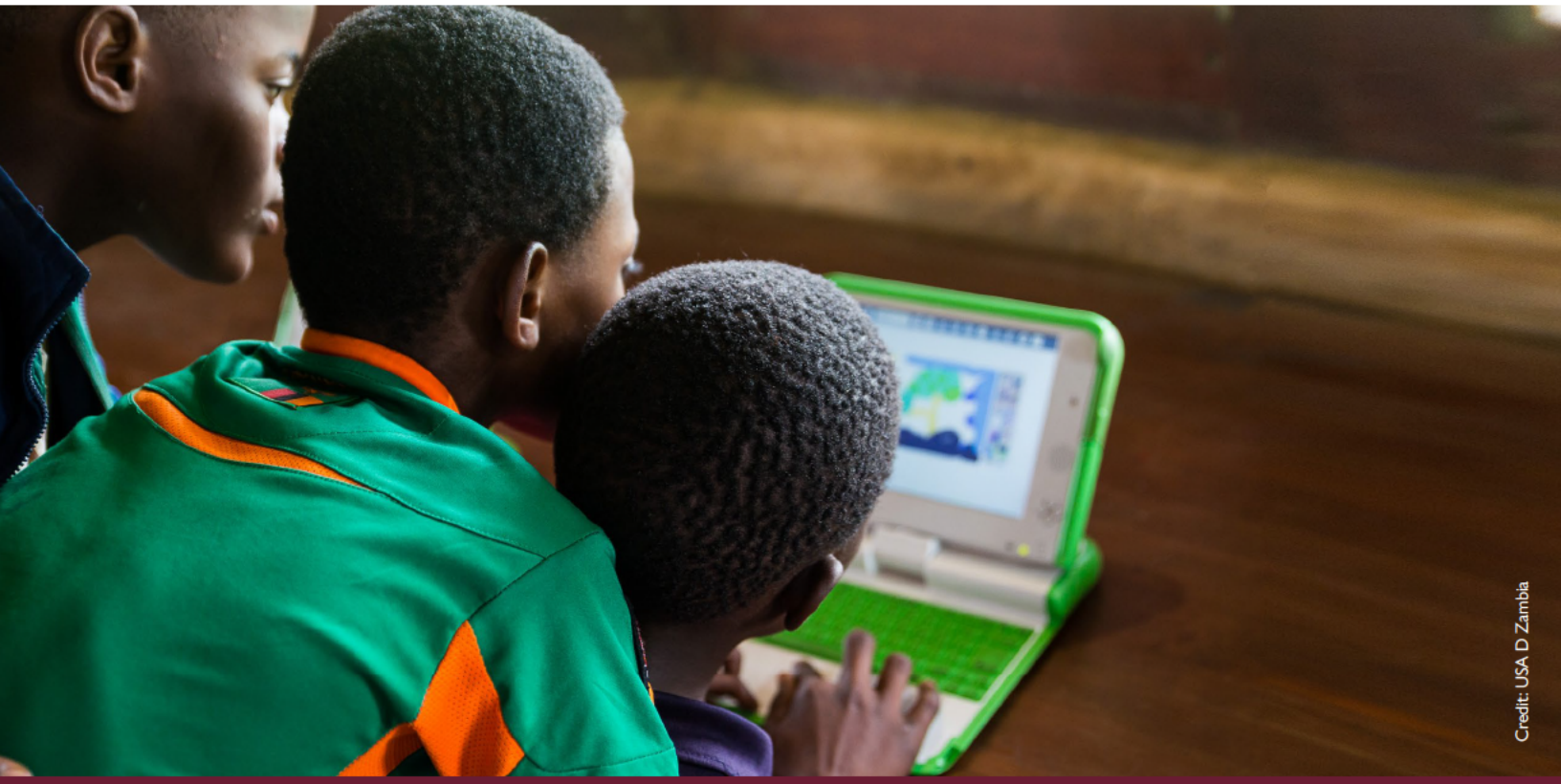
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DIGITAL ECOSYSTEM COUNTRY ASSESSMENT (DECA)

Zambia

JULY 2022

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ACRONYMS

7NDP	Seventh National Development Plan
8NDP	Eighth National Development Plan
AGOA	African Growth and Opportunity Act
API	Application Programming Interface
ATM	Automated Teller Machine
B2B	Business to Business
B2C	Business to Consumer
BoZ	Bank of Zambia
BRK	Biometric Registration Kit
CDCS	USAID Country Development Cooperation Strategy
CII	Critical Information Infrastructure
CI/CD	Continuous Improvement/Continuous Delivery
COMESA	Common Market for Eastern and Southern Africa
CSO	Civil Society Organizations
DECA	Digital Ecosystem Country Assessment
DFS	Digital Financial Services
DNRPC	Department of National Registration, Passports and Citizenship
DO	Development Objective
FSP	Financial Service Provider
G2B	Government to Business
GDP	Gross Domestic Product
GSB	Government Service Bus
GWAN	Government Wide Area Network
ICT	Information and Communications Technology
INRIS	Integrated National Registration Information System
ISP	Internet Service Provider
KII	Key Informant Interview
LDCs	Least-Developed Countries
MCTI	Ministry of Commerce, Trade and Industry
MFI	Microfinance Institution
MNO	Mobile Network Operator
MoF	Ministry of Finance
MSME	Micro-, Small-, and, Medium-sized Enterprises
MoSMEDev	Ministry of Small- and Medium-sized Enterprise Development

MoTS	Ministry of Technology and Science
NFIS	National Financial Inclusion Strategy
NFS	National Financial Switch
NFSDP	National Financial Sector Development Policy
NGO	Non-Governmental Organization
NPSVS	National Payment System Vision and Strategy
NRC	National Registration Card
NTBC	National Technology Business Center
PACRA	Patents and Companies Registration Agency
PEPZ	Private Enterprise Program Zambia
PKI	Public Key Infrastructure
POC	Point of Contact
POS	Point of Sale
PRMC	Policy Research Monitoring Center
PSP	Payment Service Provider
REPSS	Regional Payment and Settlement System - COMESA
RTGS	Real Time Gross Settlement
SADC	Southern African Development Community
SEC	Securities and Exchange Commission
SIRESS	SADC Integrated Regional Electronic Settlement System
SME	Small- and Medium-sized Enterprises
STEM	Science, Technology, Engineering, and Mathematics
SZI	Smart Zambia Institute
TA	Technical Assistance
TCO	Total Cost of Ownership
UNCTAD	United Nations Conference on Trade and Development
USSD	Unstructured Supplementary Service Data
USAF	Universal Service and Access Fund
WTO	World Trade Organization
ZACCI	Zambia Chamber of Commerce and Industry
ZAMPOST	Zambia Postal Services Corporation
ZECHL	Zambia Electronic Clearing House Limited
ZICTA	Zambia Information and Communications Technology Authority

Executive Summary

Zambia's journey toward digital transformation has made important, foundational progress in recent years. Mobile connectivity coverage has expanded to reach more than 90 percent of the population. The cost of accessing the Internet is declining, becoming more affordable for many. Demand for digital services, especially digital financial services, has grown exponentially. Domestic e-commerce companies received a boost from COVID-19 restrictions as people turned to their phones to shop. The core infrastructure needed to drive the government's digital transformation is in place, and more and more services for businesses and citizens are coming online. The tech startup ecosystem also has some important players in place to provide the infrastructure and support needed to drive digital innovation locally.

Still, Zambia faces many challenges to achieving comprehensive social and economic digital transformation that benefits all Zambians. Geographic and gender digital divides are deep and risk growing further. Reaching those without connectivity will require a focused commitment from both the public and private sectors, as will improving access to high-speed, high-quality broadband. Many key social facilities such as schools and healthcare providers need to be connected. Digital literacy and skills are weak across the population. Several laws at the heart of Zambia's Internet governance were developed and rushed to adoption ahead of the 2021 elections without adequate stakeholder engagement, and numerous provisions create new powers for the government to control expression and assembly in online spaces. At the same time, those provisions intended to secure digital infrastructure and create needed data and cybersecurity have not yet been implemented.

Zambia's newly assembled government, appointed in September 2021, has demonstrated its commitment to Zambia's digital transformation with the creation of the Ministry of Technology and Science, charging that newly formed body with driving Zambia's digital transformation. Digital transformation features as an important element in the 8th National Development Plan. A new ICT Policy and Digital Transformation National Strategy are slated for adoption in 2022. With the government's commitment and engagement with the stakeholder community, these documents will help chart a path for Zambia's digital transformation over the upcoming years.

The U.S. Agency for International Development (USAID) launched its Digital Strategy in April 2020 with the goal of supporting our partner countries through their digital transformations. The strategy charts an agency-wide vision for development and humanitarian assistance in the world's rapidly evolving digital landscape. It aims to improve USAID development and humanitarian assistance outcomes through the responsible use of digital technology and to strengthen the openness, inclusiveness, and security of partner country digital ecosystems.

A critical product of the Digital Strategy is the Digital Ecosystem Country Assessment (DECA). The DECA informs the development, design, and implementation of USAID's strategies, projects, and activities. It is a decision-making tool designed to help USAID Missions identify opportunities, maximize benefits, and manage the risks associated with digital technology. Its purpose is to support partner nations on the journey to self-reliance through a better understanding of their digital ecosystem and how it can be leveraged or strengthened through future programming.

KEY FINDINGS

Zambia's nearly 90 percent coverage of 2G Internet access constitutes a solid foundation for focusing short-to-medium-term efforts on increasing adoption. The price of mobile Internet access is dropping, although the number of Internet users is still below average for the Sub-Saharan region, even with the lower pricing incentive. Prices for fixed wireless Internet services are still prohibitive for most households, and those services are used primarily by the corporate sector.

Government policies and market limitations constrain potential for more rapid mobile broadband (4G) investment and expansion. One of the most significant impediments to expanding the coverage and capacity of Zambia's connectivity infrastructure is excessive sector taxation, which emerged as an overarching challenge during stakeholder interviews. Another tax-related barrier to network expansion is the taxation of fiber optic cables and other telecommunication equipment, after the Zambia Revenue Authority changed the harmonized system codes for fiber from 900.11.00 to 8544.70.00, imposing 25 percent customs tax and thereby increasing the cost of network deployment.

Despite broad network coverage, smart device ownership numbers are still low, below the regional average, due to their cost relative to average monthly income, while data affordability for the region is average. Improving digital device affordability is a critical factor in expanding Zambians' internet adoption.

Low digital literacy and skills among youth and adults are holding back more rapid development of Zambia's digital ecosystem. Addressing this effectively will take a coordinated effort across the public and private sector and civil society. Educational policymakers do not have the resources or capacity to update and implement curricula in line with current market needs. Teachers lack the knowledge and skills to teach ICT curricula or to use digital technologies in their programs. Many schools lack appropriate infrastructure and devices. Where programs have been effective, the private sector and civil society have been actively involved.

Digital divides are deep, overlapping, and multifactorial. The data show that the urban-rural digital divide is much wider than the gender divide, and it is important to keep in mind that there may be significant intersectionality between these two "divide" demographics. Of those rural residents who do have the availability, access, ability, and appetite to use digital technologies, the majority may well be men.

Appetite for online content and services is growing at increasing rates while information literacy needs improvement. More and more Zambians are coming online, particularly through social media platforms. At the same time, there is evidence that harassment and criminal activity also are increasing. During the pandemic, more people began to fall victim to digital financial fraud schemes, for example. Information literacy is low as it relates to unwanted online attention, harassment, bullying, and similar behaviors.

In 2021, Zambia enacted the Electronic Government Act, Electronic Communications and Transactions Act, Data Protection Act and Cyber Security and Cyber Crime Act. On one hand, these laws provide a strong online governance framework for addressing security concerns. On the other, the laws have **expanded government powers to police the online information space, raising concerns among stakeholders.** During interviews, media, civil society organizations, and activists all expressed concern about the ability of the government to engage in online monitoring, surveillance, and censorship. Stakeholders were cautiously optimistic that the newly elected government would not abuse these powers but also are pushing to amend the legislation to better protect digital rights. These concerns highlight the need for stronger **stakeholder inclusion in the development and implementation of the digital transformation agenda.**

The creation of the Ministry of Technology and Science has improved the governance of the digital transformation agenda, but mandate overlaps remain, suggesting that further efforts to improve governance are required to prevent duplication and a lack of synergy. A limited functional analysis of existing players revealed mandate overlaps of the main actors such as INFRATEL, ZESCO FibreCom, Zambia ICT Authority, Smart Zambia Institute, and the Ministry of Technology and Science. For instance, the Zambia ICT Authority has a broad mandate (which includes cybersecurity, root certification authority, skills development, and eCommerce, among others) that exceeds the functions of an ICT regulator, creating potential conflicts of interest. On the other hand, there are a few institutional gaps, the bridging of which is critical for the digital transformation agenda, namely (a) the lack of a Data Protection Authority, which, according to the Ministry of Technology and Science, should be established by June 2022 , (b) placing the national cybersecurity function in a Department under ZICTA instead of creating a separate Cybersecurity Agency, as prescribed by the Cybersecurity and Cyber Crimes Act, (c) mixed Smart Zambia Institute subordination and reporting lines between the President's Office and the Ministry of Technology and Science, and (d) subordinating the ICT regulator to the MoTS.

Zambia has made notable efforts to increase the interoperability between government systems; however, digitalization initiatives are focused on non-tax revenue services and are lagging at the local level. The flagship digital government initiative called the Government Service Bus (GSB), was launched in 2019 and aims to make government information systems and databases interoperable, bringing online 200 digital services and creating a digital one-stop-shop for service delivery, all by the end of 2021. As part of the GSB project, the Zambia Government Services Portal (ZamPortal) was developed to serve as the starting point and one-stop shop for government services for people, businesses, and civil society organizations. Non-tax-revenue-related services took priority, and as of the last inventory performed by the Ministry of Technology and Science, there is a total number of 910 services. Officials identified local government level services as most lagging.

The lack of foundational and digital ID systems represent some of the biggest barriers for Zambia's digital transformation. Zambia is in the initial stages of implementing an Integrated National Registration Information System, which is the national and civil registration information management system intended to provide biometric (fingerprints) enabled national registration cards and issuance of birth and death certificates by the Ministry of Home Affairs and Internal Security through the Department of National Registration, Passports and Citizenship. Enrollment started in March 2022 and was limited to civil servants with fewer than 5,000 people enrolled at the end of the month. The new system, once fully operational, will replace the current identification scheme, which uses plastic National Registration Cards that cover more than 80 percent of the population older than 16 years. It relies on paper records and insecure credentials. This has led many ministries, departments, and agencies to develop their own identification schemes, resulting in duplication of records, efforts, and funds, and an inability to uniquely identify individuals.

Over the past ten years, the Zambian government has implemented legal and institutional frameworks that provide a solid basis for a digital economy, although some key aspects, such as e-commerce and digital trade, are still not regulated and procedural inefficiencies persist. The laws cover both the financial and ICT sectors, while some core aspects such as e-commerce and digital trade are still not covered. The laws are supplemented by strategies covering financial sector development and financial inclusion. The Bank of Zambia (central bank) proactively regulates the sector, and the government has enhanced the institutional framework by forming the new ministries of Technology and Science, and Small and Medium Enterprise Development.

Mobile money transactions have surged over the last five years, driving adoption of digital financial services and promoting financial inclusion. The annual value of mobile money transactions increased by an average annual rate of 127 percent from 2017 to 2021 while financial inclusion grew from 59.3 percent in 2015

to 69.4 percent in 2020. The digital financial services are anchored by the real time gross settlement system and the national financial switch. Stakeholders noted that high digital channel maintenance fees and transactions hamper the adoption of digital financial services across MSMEs supply chains. The digital channel maintenance fees include USSD code annual fees with ZICTA and monthly USSD hosting fees with the Mobile Network Operators.

E-commerce is relatively underdeveloped in Zambia, with around 20 percent of Zambian Internet users–approximately 5 percent of Zambia's population–shopping online. Since the COVID-19 outbreak, the use of smartphones for e-commerce has grown rapidly, especially with regard to domestic payments in retail, wholesale, utility, and obligatory payments to the government. In interviews, stakeholders across the board highlighted underdeveloped logistics and systems, a lack of trust, and low levels of digital financial literacy as key barriers.

Tech entrepreneurship is emerging, led by FinTech, but could benefit from incentives to address startup and compliance costs, access to finance, and business and technical skill to scale products. FinTech activity is evidenced by at least three startups accessing investments of at least US $1 million each from international venture capital firms. The startups are supported by a critical mass of innovation hubs and accelerators, albeit largely in Lusaka. The hubs, which connect with provinces through programs and competitions, provide incubation, mentorship, training, co-working space, and acceleration services. Government tech startup support is channeled through the National Technology Business Center (NTBC), established in the Ministry of Technology and Science to facilitate technology transfer, commercialization, and innovation. The venture capital market, on the other hand, is nascent with government efforts to develop the sector only just having started through the establishment of a venture fund.

The national ICT sector is nascent, and while demand for specialists is growing, availability and awareness of opportunities in ICT education and professions are relatively low. Zambia's young population (with a median age of 16.8 years), the emerging tech entrepreneurship culture, and the government's digital transformation agenda point to a growing demand for an ICT labor force. The supply side of the digital talent pool is in its foundation stages with ICT learning programs comprising only 4.1 percent of the total learning programs offered at the higher education level. Despite the limited program offerings, Zambia is not leveraging non-traditional online education courses such as General Assembly or School 42 to grow the talent pool.

ROADMAP FOR THE REPORT

Section 1 provides background on the DECA framework and goals. It includes a summary of USAID/Zambia's priorities, connecting them with digital solutions.

Section 2 presents the key findings about Zambia's digital ecosystem. This section is organized into three subsections by DECA pillar: digital infrastructure, access, and use; digital society and governance; and digital economy.

Section 1:

About this Assessment

USAID's Digital Strategy aims to improve USAID development and humanitarian assistance outcomes through the responsible use of digital technology and to strengthen the openness, inclusiveness, and security of country digital ecosystems. The Digital Strategy and the DECA are part of USAID's holistic approach to helping achieve the Sustainable Development Goals (SDGs).

As part of the Digital Strategy implementation, the DECA examines three broad areas in order to build understanding around the opportunities and challenges in a country's digital ecosystem:

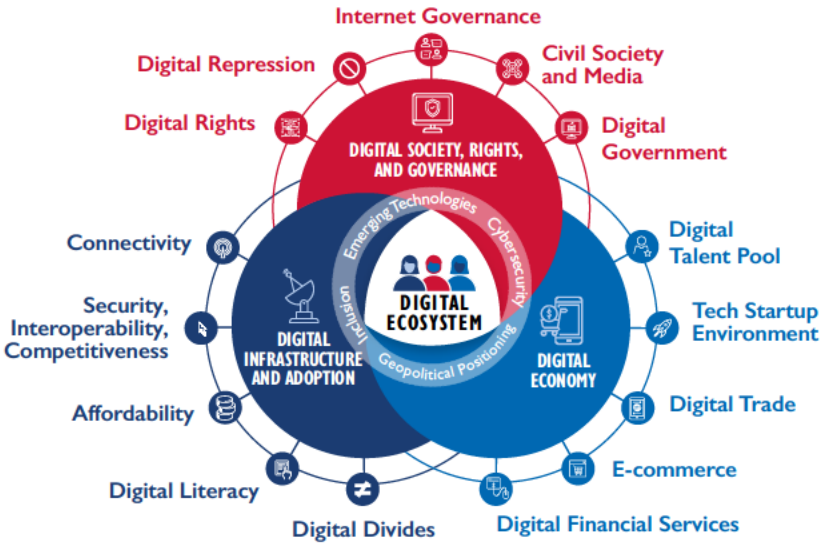
1. Digital infrastructure and adoption.
2. Digital society, rights, and governance.
3. Digital economy.

The Zambia DECA was developed between February and June 2022, reflecting desk research, consultations with USAID/Zambia, and two weeks of in-country key informant interviews and four weeks of virtual interviews. The in-country research included more than 73 interviews with stakeholders from civil society, academia, the private and public sectors, international development organizations, and USAID/Zambia technical offices.

What is a digital ecosystem?

A digital ecosystem is composed of stakeholders, systems, and an enabling environment that together empower people and communities to use digital technology to access services, engage with one another, and pursue economic opportunities.

The desk review and key informant interview research process largely informed the findings and recommendations included in this assessment. For this reason, issues that did not feature prominently in this process may not be represented in the report. Rather than act as an authoritative source on the country's digital ecosystem, the DECA is intended to be a rapid assessment of opportunities and challenges tailored to USAID's programmatic priorities, and thus may not cover all of USAID/Zambia program offices and projects in-depth.



Section 2:

DECA Findings

2.1. PILLAR 1: DIGITAL INFRASTRUCTURE AND ADOPTION

Digital Infrastructure, Access, and Adoption refers to the resources that make digital systems possible and to the manner in which individuals and organizations access and use these resources. Infrastructure is assessed by understanding geographic network coverage, network performance, Internet bandwidth, and spectrum allocation. Infrastructure directly affects how the Internet is used, who does and does not have access to the digital ecosystem, and why. This includes ownership and use of mobile phones and broadband, Internet affordability, and digital literacy.

KEY TAKEAWAYS

DIGITAL INFRASTRUCTURE AND ADOPTION	
• Zambia's nearly 90 percent coverage of 2G Internet access provides a solid foundation for focusing short to medium term efforts on increasing adoption. • Government policies and market limitations constrain potential for more investment and expansion of rapid mobile broadband (4G). • Despite broad network coverage, smart device ownership, given the high cost of devices, is still below the regional average. • Low digital literacy and skills among youth and adults are holding back more rapid development of Zambia's digital ecosystem. • Appetite for online content and services is growing while information literacy needs improvement. • Digital divides are deep, overlapping, and multifactorial.	**RELEVANT RECOMMENDATIONS** 1. Unlock the potential of broadband infrastructure and help drive adoption. 2. Invest in educating youth and upskilling adults for the digital economy and society. 3. Help bridge gender and geographic digital divides across USAID programs. 4. (Cross cutting) Strengthen capacity to develop and maintain secure, resilient cybersecurity infrastructure in Zambia.

Overall, Zambia is well connected. Internationally, it has fiber-optic backbone connectivity with six out of eight of its neighbors in addition to Africa subsea cables (see Figure 2). Nationally, more than 20,000 kilometers of fiber have been installed, connecting all provinces and districts. Approximately 90 percent of Zambia's population has mobile coverage of at least 2G available, and 80 percent of the population has 3G or 4G coverage available. A 3G mobile network allows one to access the Internet, though download speeds may be insufficient for rich content such as video, which is better viewed through a 4G broadband experience.

Even where Internet coverage is available, Zambians may not be accessing it. Affordability and quality limit access to the Internet and to devices. While the price of mobile Internet access is dropping, the number of Internet users is below average for the Sub-Saharan region, largely due to affordability issues and a lack of compelling services. Prices for fixed Internet services are still prohibitive for most households and are mostly used by the corporate sector. The cost of Internet access, including voice and data packages as well as devices (smartphones and computers), is a significant factor limiting digital adoption. The affordability–or lack thereof–of Internet

subscriptions, phones, computers, and tablets is often a barrier to uptake. Poor quality Internet connections and older-model computers and devices can discourage adoption, even where availability and affordability have been addressed. The launch of the 4th MNO, Beeline Telecoms, expected in 2022 should help increase sector competition and minimize costs. On the other hand, even though there has been no evidence to date of price increases due to inflationary pressure, such an economic event may potentially threaten efforts to increase the affordability of Internet connectivity.

Significant gaps remain in digital literacy and skills development across the general population, while the capacity to teach digital skills, whether in educational institutions or beyond, is insufficient. Government capacity in digital skills also leaves much room for improvement to allow proper development, maintenance, and use of digital systems, as does the small business' capacity to make use of such systems.

Zambia has displayed steady growth in the number of its social media users in the last few years. At the same time, the nation saw a 36.4 percent capacity usage increase and a 38.1 percent throughput increase in volume of data compared with the same measures in 2020, indicating a growing appetite for digital data and services usage. According to the most recent data (from 2018), only 6.9 percent of Zambians reported using the Internet at least once a day, and just 13.2 percent say they own a smartphone.[1] However, there are significant challenges for full digital inclusion of the rural population, as well as that of women and girls, though data on key factors is either unavailable, limited, or outdated.

Similar dynamics materialize across the region. Between 2021 and 2022, for example, the number of social media users increased by 7 percent in Kenya (totaling 21 percent of the population), 7.3 percent in Ghana (27.4 percent of the population), 13 percent in Tanzania (9.8 percent of the population in total), at 19.2 percent in Zimbabwe (102 percent of the population in total).[2] This accelerated data creation and use signals a growing appetite for digital interactions and potential for data-driven development in Sub-Saharan Africa, including Zambia.

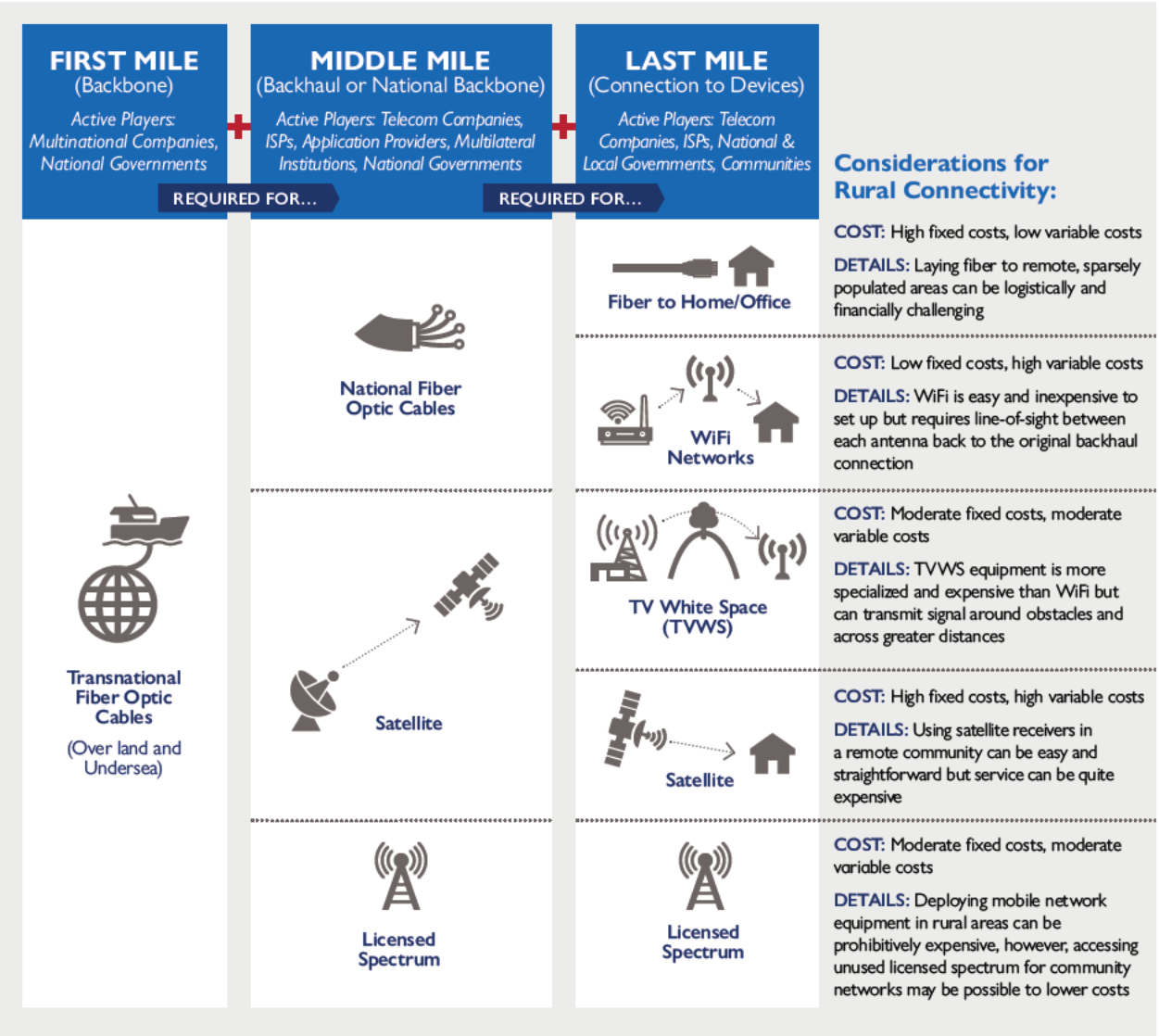
GOOD FIRST- AND MIDDLE-MILE INTERCONNECTIVITY, LAST-MILE LAGGING BEHIND

A robust digital infrastructure, including connectivity (broadband), devices (smartphones, computers, sensors), and computing resources (data centers and cloud infrastructures) is foundational to a digital society and economy. Connectivity infrastructure contains three core elements: first-mile connectivity, where the Internet enters the country; middle-mile connectivity, linking the first-mile and the core ISP network, and last-mile connectivity, where the Internet reaches end users and their devices (mobile phones, laptops, tablets, computers) through local access networks, either wirelessly or via a wired connection.

1 "National Survey on Access and Usage of Information and Communication Technologies by Households and Individuals," Zambia Information and Communications Technology Authority, 2018.

2 Based on Datareportal stats. https://datareportal.com, accessed June 2022.

FIGURE 1: Core elements of the connectivity infrastructure



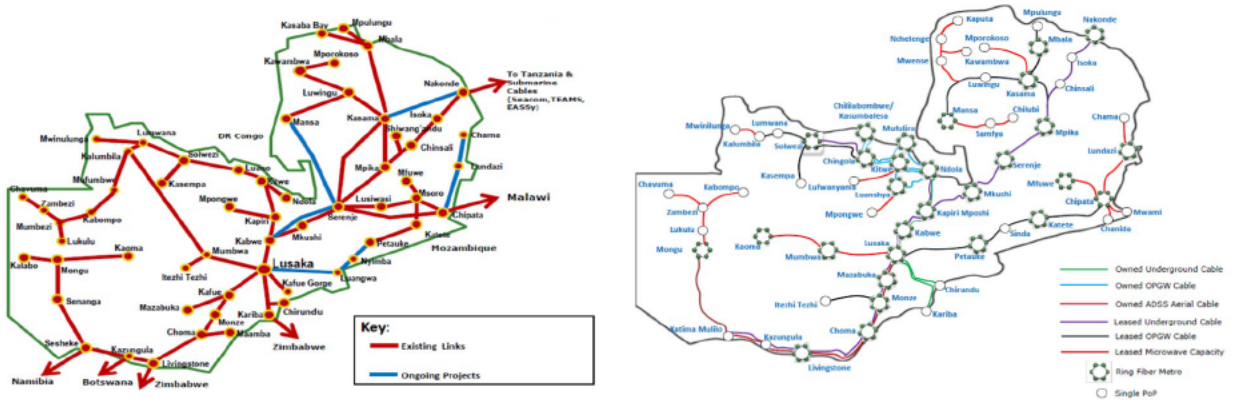
Source: USAID DECA Methodology

Zambia has strong **first -and middle-mile** fiber-optic connectivity, both domestically and internationally, and–given that Zambia is the shortest link between its neighbors and the African undersea cables–can potentially serve as a kind of connectivity hub for the region. This already translates into further investment by some wholesale operators such as MTN in the fiber optic backbone, ensuring that Zambia can sustain an increase in bandwidth and data throughput as the consumption of digital data and services increases. By the end of 2021, there were a total of eight wholesale operators in the market, including government-owned Fibercom, a ZESCO subsidiary, and Zamtel, and privately owned Liquid Intelligent Technologies, Airtel, and MTN.[3] Fibercom has the most extensive fiber-optic network coverage in the country, extending to a length exceeding 12,000 kilometers with international gateways to six countries. Liquid Intelligent Technologies boasts the second-largest fiber network with a total length exceeding 8,000 kilometers. Airtel and MTN co-own an extensive fiber backbone covering all major Zambian towns. ZAMTEL's network, covering most areas along the line of rail, also has access to several international submarine cables. A fiber link to neighboring Mozambique, which would provide the shortest route

3 Other operators include Smartnet with a total of 1,583.09 km of fiber and Paratus Telecom with 157.09 km of fiber, both privately owned.

to undersea cables, is still missing, though the Zambian segment is ready for connectivity. In general, the more dense a fiber optic network is in the country, the more it can be used to connect last-mile clients.

FIGURE 2: ZESCO Fibrecom (left) and Liquid Telecom (right) fiber network, 2021



Source: ZICTA, ICT sector market report, 2022

In Zambia, as in most countries worldwide, building out **last-mile** connectivity infrastructure that reaches the entire population, national and local government entities (including schools, universities and healthcare facilities), businesses and other organizations is challenging. Putting in place and maintaining the high-quality, broadband infrastructure that provides the necessary bandwidth capacity for running an advanced digital economy and society is expensive. The business case for the private sector to invest in last-mile connectivity is not always there. Some of the challenges facing last-mile infrastructure expansion in Zambia are its vast territory, low user base (especially for 3G and above) and high sector taxation.

BOX 1: Some key infrastructure terms: Broadband, Bandwidth, Active, and Passive Infrastructure

Broadband. The term broadband commonly refers to high-speed Internet access that is always "live." Broadband can be both fixed and mobile. Fiber-optic networks, for example, are fixed. Mobile broadband is delivered over a wireless mobile phone network (2G, 3G, 4G, 5G) and typically requires SIM cards to operate on mobile phones, tablets, or other devices. Recommendation I.113 of the ITU Standardization Sector defines broadband as a transmission capacity that is faster than primary rate ISDN, at 1.5 or 2.0 Mbit/s. Broadband corresponds to transmission speeds equal to or greater than 256 kbit/s.[4] For comparison, a 2G network can deliver basic services via SMS or USSD, because data transfer speeds capping at 0.1 Mbit/s are not sufficient for basic Internet needs; 3G network speed, averaging 3 Mbit/s, is typically adequate for accessing the Internet, though depending upon content and services accessed, download speeds may be slow, which can impact user experience and usage. For a true broadband experience, including data-heavy applications, HD streaming and video calls, a 4G network, typically providing average speeds of 14 Mbit/s, is needed.

Network bandwidth or simply *bandwidth* is a measurement indicating the maximum capacity of a wired or wireless communications link to transmit data over a network connection in a given amount of time. Bandwidth is typically represented in the number of bits, kilobits, megabits, or gigabits that can be transmitted in one second.

By analogy, bandwidth can be compared with the volume of water that can flow through a pipe. The wider the pipe's diameter, the more water that can flow through it at one time. Bandwidth works on the same principle: the higher the capacity of the network, the more data that can flow through it per second. *(Source: techtarget.com)*

4 "Birth of Broadband," International Telecommunications Union, 2003, https://www.itu.int/osg/spu/publications/sales/birthofbroadband/exec_summary.html

Active telecommunications infrastructure refers to the electronic infrastructure and facility of a telecom tower, which us used to transmit information and typically includes Base Transceiver Station (BTS) / Node B, spectrum, antenna, feeder cable, Radio Access Network (RAN), microwave radio equipment, Base Station Controller (BSC)/ Radio Network Controller (RNC), etc.

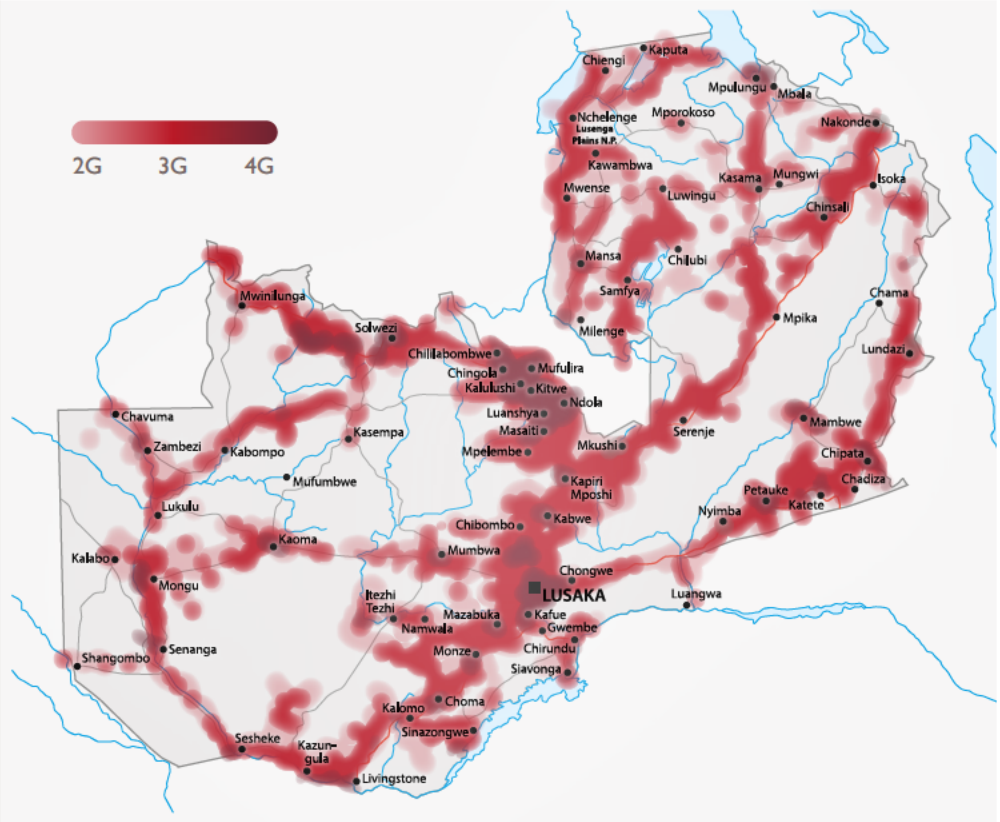
Passive telecommunications infrastructure refers to the infrastructure that supports the active layer of a telecommunications network, including but not limited to sites, buildings, shelters, towers, masts, poles, ducts, trenches, electric power supply, and air conditioning.

With around 90 percent mobile coverage in Zambia, the largest proportion of communication towers in 2021 continued to be 2G, accounting for 39.7 percent of users, followed by 3G sites at 31.9 percent, and 4G/LTE sites at 28.4 percent. Both 3G and 4G coverage are estimated to account for approximately 80 percent of the population, as they are typically deployed in high-density areas.

In other words, more than 90 percent of Zambia's population lives in an area with a GSM signal (2G or higher) and is able to place phone calls and send/receive SMS messages if they have a phone and an active subscription, while about 80 percent of Zambians could leverage 3G and 4G coverage and become mobile internet users at their place of residence if they had an active data subscription, a smartphone, and the ability to use it.

At the same time, 4G coverage is still very low compared with 2G, as can be seen from Figure 3 below.[5]

FIGURE 3: Mobile coverage map



Source: GSMA, https://www.mobilecoveragemaps.com/

5 Figure 3 does not include 3G coverage in Zambia, because DECA team interviews with MNOs revealed that companies are not significantly deploying 3G equipment, preferring to invest in 4G wherever possible.

The total number of active mobile network subscriptions in Zambia increased from 19.1 million in 2020 to 20.2 million in 2021, representing a growth rate of 6 percent and an improvement in the mobile penetration rate from 107 to 110 subscriptions per 100 inhabitants.[6] While this represents important growth for Zambia, it is slower than the general trend in the region, where active mobile subscriptions grew 9.5 percent from 2020 to 2021.[7] Zambia's increase is mostly attributed to larger investments in telecommunication coverage infrastructure, heightened competition among service providers, increased adoption of SIM cards for machine-to-machine communication such as POS terminals, and effects associated with the COVID-19 pandemic.

At the same time, unique mobile network subscriptions reached 7.5 million, representing a unique mobile penetration rate of 40.6 percent and an average of 2.7 subscriptions per unique subscriber. MTN and Airtel continue to claim the largest market share of subscriptions with 42.3 percent and 39.7 percent respectively, while Zamtel accounts for 17.9 percent of subscriptions.

According to ZICTA, the total number of active Internet subscriptions increased from 10.3 million subscriptions reported at the end of 2020 to 10.4 million recorded at the end of 2021, representing a growth of 1.3 percent and an Internet penetration rate of 56.7 per 100 inhabitants (see Figure 4). Given the current population growth rate of 2.9 percent[8] Internet adoption largely has remained constant.

Contrary to ZICTA's report, ITU estimates[9] that in 2020 only 19.8 percent of individuals in Zambia accessed the internet, signaling major gaps in device ownership and availability. One potential cause for such a discrepancy may be the fact that many of those who have an active Internet subscription, including both voice and data, are using only voice services.

Almost 99 percent of Internet users use mobile Internet subscriptions, with Airtel Zambia claiming the largest market share of mobile Internet users (48.5 percent), followed by MTN Zambia (40.9 percent), and Zamtel (10.6 percent).

Compared with mobile Internet subscriptions, the number of subscriptions to fixed Internet services is considerably lower, at around 80,600 subscriptions, roughly in line with World Bank numbers[10]. This discrepancy is mostly due to significantly lower coverage, typically limited to central areas of larger cities, as well as prohibitive costs of fixed Internet services for most household users. Thus, the vast majority of fixed Internet subscribers are large companies, for which the increased reliability, higher bandwidth, and uncapped data plans are worth the premium price.

In total, according to ZICTA, there are 52 licensed operators in the retail fixed and mobile broadband market[11].

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6 A mobile penetration rate exceeding 100% indicates that people have multiple subscriptions. Also, an increasing number of subscriptions are being used for machine to machine communications, such as POS terminals, IoT devices and others.

7 "Number of active mobile broadband subscriptions in Sub Saharan Africa from 2010 to 2021," Statista, accessed June 2022, https://www.statista.com/statistics/1313870/mobile broadband subscriptions in sub saharan africa/

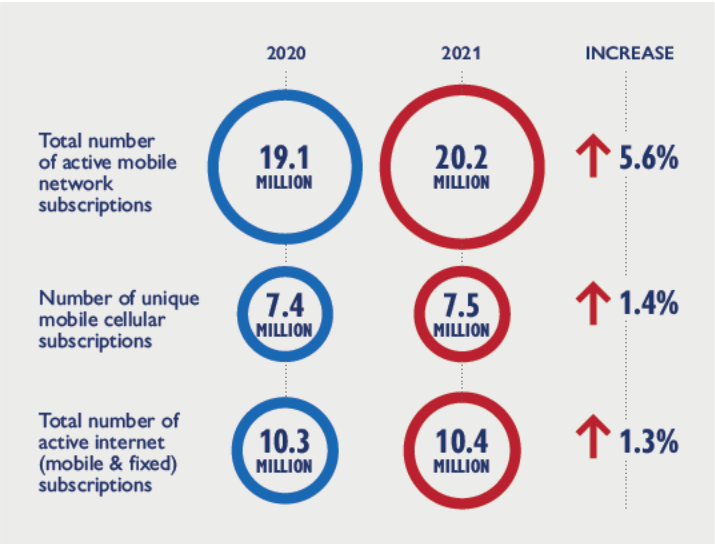
8 Population growth (annual %) Zambia, World Bank, accessed June 2022.

9 Percentage of Individuals using the Internet, accessed June 2022, International Telecommunication Union.

10 "Fixed broadband subscriptions Zambia," accessed June 2022, World Bank,

11 The up to date list of ICT license holders can be consulted on ZICTA's license registers website.

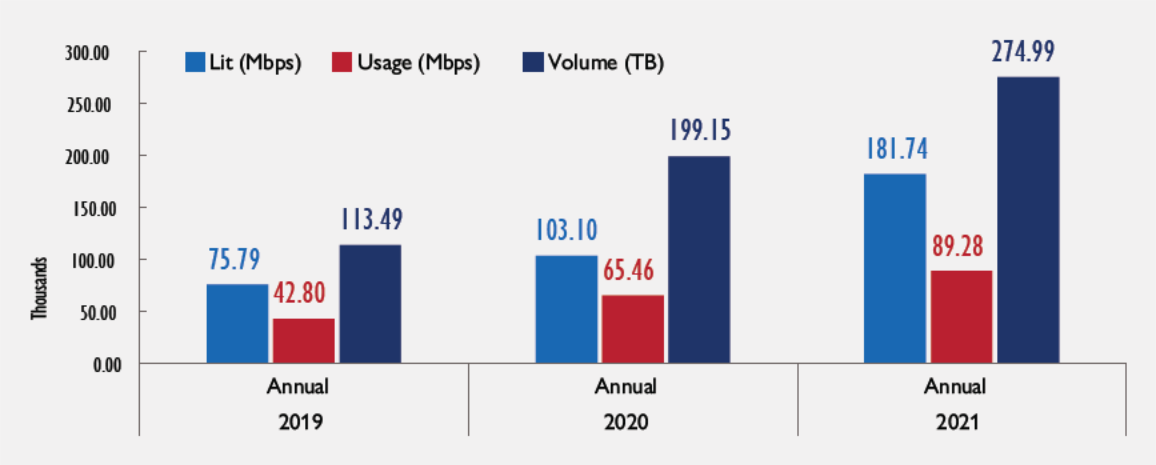
FIGURE 4: Mobile and Internet subscriptions indicators in Zambia



Source: ZICTA, ICT sector market report, 2022

The last three years, as can be seen in Figure 5, have seen a massive 2.4-fold increase in the volume of data consumed in Zambia, signaling an increased appetite for digital data and services. In order to respond to this increase in data consumption, MNOs have increased their total available bandwidth (also called equipped capacity or "Lit"), by 76.3 percent, while the actual average usage of equipped capacity increased by 36.4 percent. Generally, data traffic in Sub-Saharan Africa has been on an upward trajectory since 2018, as mobile broadband-capable devices become more accessible. It is expected that the average data traffic per smartphone will grow from 3GB in 2021 to 11GB per month by 2027.[12]

FIGURE 5: MNO bandwidth capacity, utilization, and data volumes: 2019 to 2021



Source: ZICTA, ICT Sector Market Report, 2022

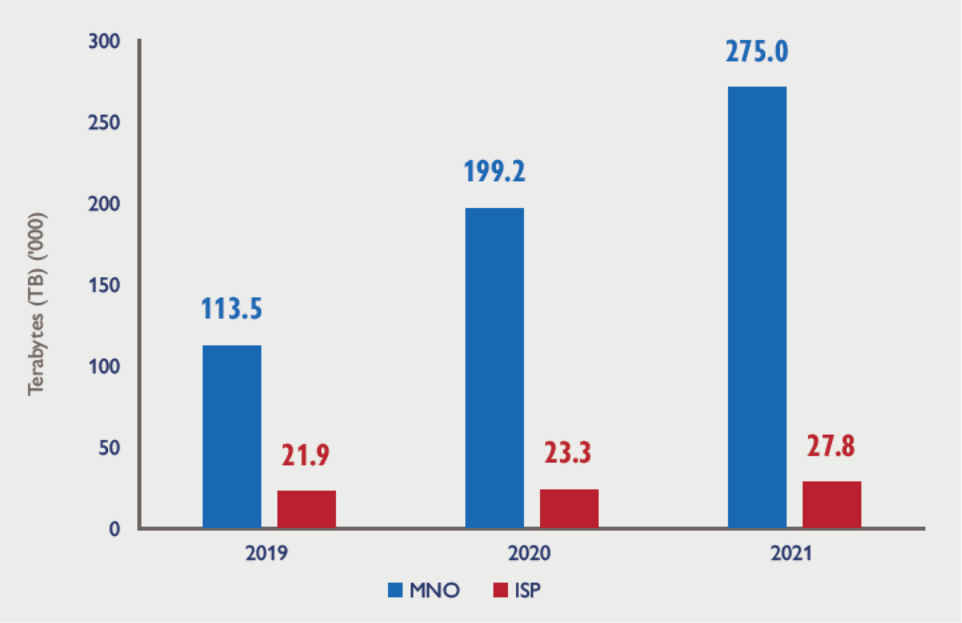
Comparatively, there is more data usage among mobile Internet providers than fixed Internet providers, and this gap is widening as more and more mobile subscribers come online. To give a sense of scale, the throughput volumes for mobile ISPs was nearly ten-fold higher than the fixed ISPs in 2021, nine-fold higher in 2020 and five-fold higher in 2019. On the other hand, the amount of data consumed by fixed Internet subscribers averages

12 Mobile Data Traffic Outlook, Ericsson, accessed June 2022, https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-traffic-forecast

28.7 GB/subscription/month, more than ten times the average 2.2 GB/subscription/month of data consumed by mobile subscribers.

However, looking at the Internet subscriptions growth rate of 1.3 percent from 2020 to 2021, versus a mobile and fixed data throughput increase of 40 percent, and 20 percent, respectively, one can conclude that the growth stems from more intensive use of existing user base rather than from growth in the number of users.

FIGURE 6: Mobile and fixed data throughput volumes: 2019 to 2021



Source: ZICTA, ICT Sector Market Report, 2022

After careful analysis of Internet penetration and data throughput numbers for 2020 and 2021, a few conclusions can be drawn: (a) the Internet subscribers growth rate of 1.3 percent between 2020 and 2021 does not keep pace with the population growth rate of 2.9%, while (b) the existing Internet subscribers, both mobile and fixed, have demonstrated an increased appetite for data, having used 40 percent more data, which resulted in (c) increased network capacity required to keep pace with increasing demand. At the same time, (d) usage rates remain well below network coverage rates.

In other words, Zambians who can afford Internet access have been using it more heavily (which also translated into higher ARPU in 2021 compared with 2020), while those who couldn't afford it are excluded. This points to a widening digital divide, suggesting Zambia might need to focus on access to affordable, quality Internet and devices, the ability to use digital technologies, and the appetite to use them.

TELECOM SECTOR TAXATION IS A PERSISTENT BARRIER TO INVESTMENT IN EXPANDING 4G COVERAGE AND IMPROVING AFFORDABILITY OF SERVICES

One of the most significant impediments to expanding the coverage and capacity of Zambia's connectivity infrastructure is excessive sector taxation, which emerged as an overarching concern during interviews with stakeholders.

According to the GSMA, the mobile sector makes a disproportionate contribution in taxes and fees relative to its economic footprint. For instance, the mobile market revenue in Zambia accounted for 2.1 percent of

Zambia's GDP in 2017, while the sector's tax and fee payments accounted for around 4.8 percent of government total tax revenue. This means the mobile tax contribution is more than double its proportion in the economy. It also represents the highest proportion of mobile-specific consumer taxes and of corporation tax in a large sample of Sub-Saharan African countries[13].

TABLE 1: Main taxes faced by mobile consumers and MNOs

MOBILE CONSUMER TAX	RATE	MNO TAX	RATE
Value Added Tax (VAT)	**16%**	Corporate income tax	**40%**
Airtime excise duty	**17.5%**	Personal income tax (top rate, for amounts exceeding 6900 ZMW)	**37.5%**
		National pension scheme	**5%**
		Annual license fee[14]	**3%** of the annual gross revenues

Source: EY, Worldwide Corporate Tax Guide, 2021, national legislation

As detailed in this section, the biggest sector challenges revolve around affordability, particularly among low-income individuals in rural areas, and the need for investment in mobile infrastructure to upgrade from 2G to 4G. Reducing the cost of mobile ownership, while increasing individuals' usage and incentivizing investments through a more balanced and efficient taxation structure would generate considerable socio-economic benefits for Zambia, including a spillover effect on its digital economy, stimulating the launch of new digital services as more industries benefit from greater digitalization of consumer and business interactions.

Another tax-related barrier to network expansion is the taxation of fiber optic cables and other telecommunication equipment after the Zambia Revenue Authority changed the harmonized system codes for fiber from 900.11.00 to 8544.70.00[15], thereby requiring a 25 percent customs tax, which substantially influences the cost of network deployment.

INFRASTRUCTURE-SHARING MOSTLY WORKS WELL AND ALLOWS FOR FOCUSED INVESTMENTS

Despite a Herfindahl-Hirschman Index[16] of 0.369 pointing to a highly concentrated telecommunications market, the infrastructure sharing among passive telecom infrastructure providers, mobile network operators, and

13 "Reforming mobile sector taxation in Zambia: Promoting economic and social development through a more efficient tax system," GSMA, 2018, https://www.gsma.com/publicpolicy/wp_content/uploads/2019/07/GSMA_Zambia report_80pp_WEBv2.pdf

14 The current licensing scheme is more complex and for the purpose of this report, the annual license fee has been considered the most relevant. The full licensing scheme is detailed in ZICTA 2022 Licensing Guidelines. The licensing framework is being amended by ZICTA, but the annual license fee rate remained unchanged (proposed fee structure).

15 "Harmonized Commodity and Coding System, Zambia Revenue Authority," accessed June 2022., https://www.zra.org.zm/wp_content/uploads/2019/12/UPDATED_CUSTOMS TARIFF BOOK AS OF 04 01 2019_1.pdf

16 *The Herfindahl-Hirschman Index (HHI)* is a commonly accepted measure of market concentration and is often used by telecom regulators to monitor the distribution of market power and anticipate the effect of merger and acquisition activity on competition. An unconcentrated market measures less than 0.1 on the index, a moderately concentrated market between 0.1 and 0.18, and a highly concentrated market above 0.18.

Internet service providers works fairly well. The passive telecom infrastructure space is shared by IHS Towers (IHS), a private entity that operates 1,768 towers, and INFRATEL, a government-owned company incorporated under the Industrial Development Corporation (IDC) in 2018,[17] with 1,253 towers. Together, they compete for tower deployment and operation services. The 3 MNOs currently in operation (AirTel, MTN, and Zamtel) deploy active telecommunication infrastructure on existing towers, having transferred most of their towers to either IHS, in case of AirTel and MTN, or to INFRATEL in case of Zamtel. The two major ISPs, Liquid Telecom and SmartNet, use open access network principles[18] to expand coverage areas. Airtel and MTN also have agreed to share fiber backbone to increase coverage of their respective networks.

Even so, there are issues expanding mobile and fixed connectivity in unserved and underserved areas, as it requires consensus among multiple players (passive infrastructure providers, MNOs, ISPs, and local governments), while there are few incentives to do so, given a lack of subsidies and low profitability.

During the interviews, stakeholders noted several challenges that the telecommunications regulator ZICTA could address to prevent abuse of the dominant position of some market players. Tower companies are charging high fees for termination of fiber at their sites, suggesting a potential abuse of dominance by the tower companies. Also, several operators indicated that the cost of in-country transit and transport costs for connectivity were quite high, potentially pointing to dominant positions held by the owners of the international transit lines. Finally, some reported that under-pricing of services by vertically integrated operators[19] on the market could potentially constitute anti-competitive market conduct.

While the market regulator is aware of these issues and mentions them in the ICT sector market report 2022, the fact that they have not been addressed may indicate a lack of institutional independence, ZICTA being subordinated to the Ministry of Technology and Science.

DATA CENTERS HAVE ENOUGH CAPACITY TO SERVE GOVERNMENT'S NEEDS BUT THOSE CENTERS ARE NOT USED TO THEIR FULL POTENTIAL

With the adoption and enactment of the Data Protection Act in 2021, the issue of data localization emerged, as the new law mandates that personally identifiable information be physically stored in Zambia. As such, there are several data center and cloud infrastructures set up in compliance with international standards and capable of handling Zambia's data storage and management needs for the foreseeable future.

In 2013, NDATA, a subsidiary of NetOne-IT, launched Zambia's first Tier-III data center, which is located in Roma, Lusaka. Paratus Telecommunications Zambia, a supplier of corporate Internet, cloud, satellite, and other services, launched another Tier III data center in late 2021, offering reliable hosting and cloud services, including backup-as-a-service, disaster-recovery-as-a-service, storage-as-a-service, virtual servers etc.

The government-owned INFRATEL, an IDC subsidiary, currently owns and operates three state-of-the-art, interconnected Tier III national data centers (NDC). The NDC were built by Huawei Technologies as part of the National ICT Development Project – Smart Zambia Phase 1 project, funded with a US$440 million concessional

17 The core mandate of INFRATEL is to consolidate, own, manage, and commercialize all government's passive and shareable ICT and telecommunications infrastructure. INFRATEL provides wholesale telecommunications infrastructure as a service to MNOs, ISPs, government organizations and other licensed entities. INFRATEL holds a network license and a service license to operate a national optical fiber transmission network, national telecommunication towers, and data centers.

18 An open access network refers to a horizontally layered network architecture in telecommunications, and the business model that separates the physical access to the network from the delivery of services.

19 A vertically integrated operator means a telecommunications operator that provides both wholesale and retail services.

loan from the Chinese government through the Export-Import Bank of China. Currently, the NDC is serving a mix of 60 percent private customers (primarily financial institutions), and 40 percent government organizations. Most of the services focus on providing Infrastructure-as-a-Service (IaaS) and Software-as-a-Service (SaaS), offering only email as of now.

BOX 2: What are data center tiers?

Data center tiers are a standardized ranking system that indicates the reliability of data center infrastructure. A data center receives this international ranking from the Uptime Institute, an independent organization that determines the facility level primarily based on uptime guarantees, fault tolerance (the ability to handle both planned and unplanned disruptions), and service cost. The four data center tiers are:

- *Tier 1:* A data center with a single path for power and cooling, and no backup components. This tier has an expected uptime of 99.7 percent per year.
- *Tier 2:* A data center with a single path for power and cooling, and some redundant and backup components. This tier offers an expected uptime of 99.7 percent per year.
- *Tier 3:* A data center with multiple paths for power and cooling, and redundant systems that allow the staff to work on the setup without taking it offline. This tier has an expected uptime of 99.982 percent per year.
- *Tier 4:* A completely fault-tolerant data center with redundancy for every component. This tier comes with an expected uptime of 99.995 percent per year.

In practice, Tier 4 data centers are not common due to their high cost. Many organizations prefer to use two or more Tier 2 or Tier 3 data centers to create convergent infrastructure equivalent to a Tier 4 data center.

According to INFRATEL, there is currently around 40 percent spare capacity in the data centers. However, government entities (e.g., Ministry of Finance, Ministry of Health) continue to operate their own, lower tier, older data centers and use only the national data centers for backup and disaster recovery purposes. According to some of these institutions, this is largely due to INFRATEL's cost model, which makes the services prohibitively expensive and prevents the migration of all systems in the national data center. This creates more expense for the government to operate and maintain the data centers and prevents the public sector from hiring and maintaining enough trained staff to operate all infrastructures, ultimately leading to lower levels of availability and increased cybersecurity threats.

Besides the national and departmental data centers, as part of Zambia's SafeCity program, 11 regional data centers were deployed throughout the country as part of regional command centers to capture and process traffic-camera data. At least one of those data centers is rated a Tier III. Although the Ministry of Home Affairs and Internal Security is the government partner in the SafeCity project, the Smart Zambia Institute owns these data centers.

Thus, in order to consolidate government computing resources, avoid unnecessary spending for data centers, and ensure appropriate quality and availability of services, further interventions are required such as reviewing the national data center costing models, consolidating existing data center infrastructures, and implementing a "cloud-first" policy for government resources to avoid further fragmentation. A cloud-first policy was used by the U.S. government to require agencies to evaluate cloud computing options before making any new investments in their own data center infrastructures.

In order to be competitive with private cloud offering, government data center providers should further embrace cloud technologies such as better management and provisioning, continuous integration and continuous delivery (CI/CD), use of containerization for system deployment, use of hybrid cloud[20] services, etc.

PRC-BASED TECHNOLOGY PROVIDERS' DOMINANCE IN SOME SECTORS IS NOTABLE AND MAY HAVE ADVERSE EFFECTS ON SUSTAINABILITY

The significant presence of Huawei, ZTE, and other China-based technology providers has been noted in Zambia, particularly in the telecom and law enforcement sectors, threatening the development of Zambia's digital ecosystem. The three INFRATEL-owned Tier III national data centers have been deployed by Huawei using Huawei's equipment and technology stack. Reports from system integrators indicate significant delays in supplying infrastructure for hosting mission-critical applications, mostly due to a lack of knowledge about the Huawei-specific technology stack. Some of the major issues Zambia faces with regard to such technological dominance are (a) supply of uncompetitive equipment, much of it obsolete, or either near or past end of life (EoL), or duplicating similarly specced equipment, (b) lack of proper support and documentation, most of which is written in Mandarin, and (c) a lack of certified specialists (as stated by the Zambia ICT college, few of their students pursue a Huawei certification, with most pursuing alternative certifications such as Cisco Systems. These issues may ultimately slow the country's digital transformation and increase the total cost of ownership (TCO) of its infrastructure.

In addition, most of the 5G equipment deployed in testing environments by some MNOs like MTN was manufactured by Huawei. Most entry-level consumer devices such as phones, feature phones, smartphones, modems, and routers are also manufactured in China by Huawei, ZTE, and other smaller manufacturers.

DEVICE AND INTERNET AFFORDABILITY IS LOW, WITH LITTLE COMPENSATORY MEASURES FROM THE GOVERNMENT

Although the price of data bundles in recent years has dropped continuously, according to ZICTA's ICT sector market report for 2022, the price of the average consumption bundle (voice and data) for Zambia was estimated at US $3.06 or about 5 percent of the country's Gross National Income (GNI). That measure is significantly higher than the UN Broadband Commission's target of 2 percent of GNI, pointing to relatively low affordability of such services for much of Zambia's population (see Table 3).

20 Hybrid cloud refers to a mixed computing, storage, and services environment composed of on premises infrastructure, private cloud services, and a public cloud, with orchestration among the various platforms.

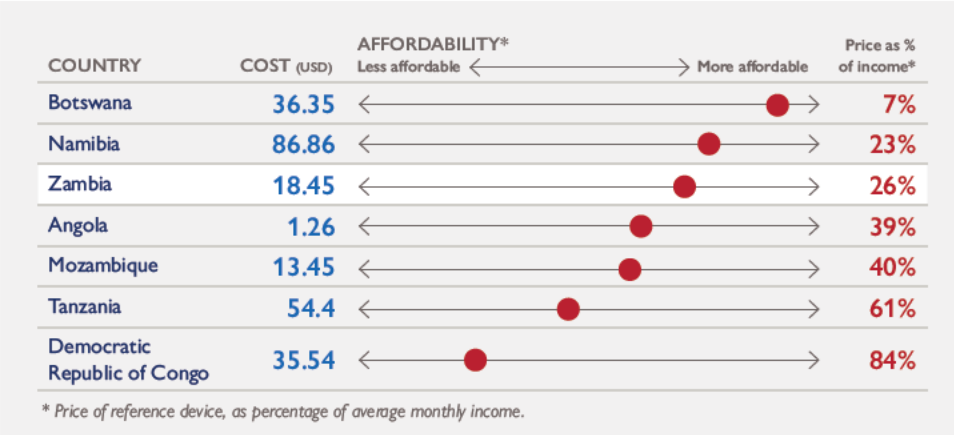
TABLE 2: Regional benchmarking of 15 African countries' data and voice bundles

Country Name	Price 2GB Data Monthly Validity (USD)	Rank	Country Name	Price of Data and Voice consumption Bundle as % of GNI	Rank
DR Congo	0.29	1	Nigeria	1.84	1
Rwanda	2.37	2	Angola	2.13	2
Kenya	2.59	3	DR Congo	2.17	3
Nigeria	2.63	4	Botswana	2.59	4
Uganda	2.92	5	Kenya	3.54	5
Zambia	3.06	6	South Africa	3.54	6
Angola	3.80	7	Namibia	3.72	7
Tanzania	4.00	8	Eswatini	4.54	8
Mozambique	4.39	9	Zambia	5.07	9
Madagascar	4.85	10	Tanzania	5.72	10
Lesotho	8.40	11	Rwanda	5.80	11
South Africa	9.75	12	Madagascar	8.05	12
Eswatini	9.80	13	Uganda	14.82	13
Namibia	13.13	14	Mozambique	18.88	14
Botswana	14.00	15	Lesotho	21.31	15

Source: ZICTA, MNOs' websites

The latest update of the Affordability Drivers Index (ADI) by the Alliance for Affordable Internet indicates that, overall, conditions continue to yield greater affordability of devices (see Figure 7). However, progress remains slow. The cost of an entry-level smartphone in Zambia was $18.45, even though the smart devices are exempt from customs duty. This represents 25.5 percent of the average monthly income and therefore cost prohibitive for a broad swath of Zambia's population, particularly the most vulnerable citizens.

FIGURE 7: Affordability of smartphones relative to countries' average income



Source: Alliance for Affordable Internet, A4AI prices and affordability of smartphones and feature phones by country, 2021

The Universal Service and Access Fund (USAF)[21] has not been used to enact device affordability programs, focusing instead on expanding network coverage under the government's Tower Connectivity project. Apart

21 *Universal Service Access Funds (USAF) or* Universal Service Funds *(USF)* are communal public funds managed by telecommunications regulators and ministries that are used to expand internet connectivity and make it accessible to all. Most commonly, USFs are used to subsidize last-mile internet network infrastructure build-out to lower-density, rural areas or to so-called "social facilities" (schools, hospitals, health clinics, etc.) where the business case for private-sector driven expansion does not exist.

from the exemption of customs duty for (smart)phones, there were no notable efforts by the government to address device affordability issues.

In fact, as detailed in a study on USAFs across 18 African countries[22], though most of those nations have established USAFs, they largely fail to address and achieve digital equity because they are more committed to increasing coverage. In the five SMART Africa countries that publish details on USAF spending (Benin, Kenya, Rwanda, Togo, and Uganda), an estimated $59 million–enough to provide basic digital skills training to more than 18 million women–is either unspent, or has been diverted to other non-ICT agencies. Only two countries (Kenya and Uganda) consider gender in their universal service and access policies and plans.

At the same time, some MNOs admitted that they consider introducing decently specced smartphones, with a cost of up to US $60 and an opportunity to pay in monthly installments, to increase the number of first-time smartphone owners and have made requests to the Ministry of Technology and Science to support VAT exemption of such devices to further increase their appeal to the unconnected.

Hence, there is tremendous potential to increase the number of Internet users provided the affordability of devices and data continues to improve and new, attractive digital services are launched (the importance of services to increase adoption is further explored in Pillar 2 findings section).

TEACHING AND LEARNING DIGITAL LITERACY AND SKILLS, IN THEORY

USAID's definition of digital literacy is "[t]he ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital devices and networked technologies for participation in economic, social, and political life."[23] This definition includes both technical knowledge and skills (capacity) and the awareness and skills needed to understand and address online risks (safety). As digital technologies become increasingly embedded in everyday activities, ensuring every person's digital literacy becomes more critical, but doing so can be overlooked or not prioritized.

Zambia's newly elected government has signaled its commitment to prioritizing ICT education in its agenda. In addition to the recently developed 8NDP that raises the importance of skills, one of the pillars of the draft National Digital Transformation Strategy is focused on digital skills and literacy development. These are both positive developments. However, achieving universal digital literacy and skills at levels necessary for beneficial economic development and social and political inclusion in Zambia's near-term will be challenging.

22 "Universal Service and Access Funds: An Untapped Resource to Close the Gender Digital Divide, World Wide Web Foundation and Alliance for Affordable Internet, March 2018, http://webfoundation.org/docs/2018/03/Using USAFs to Close the Gender Digital Divide in Africa.pdf.

23 Digital Literacy Primer: How to Build Digital Literacy into USAID Programming, USAID, April 2022, https://www.usaid.gov/sites/default/files/documents/USAID_Digital_Literacy_Primer.pdf

Zambia has not developed or adopted a general digital competencies framework[24] which makes tracking current digital literacy and skills attainment difficult.[25] The Ministry of Education does not regularly monitor or collect data on digital literacy and skills development among students. While ZICTA's 2018 ICT survey found that a majority of people say they have some foundational digital skills, only 7 percent say they know how to use a computer, and of those, only 7 percent are proficient in specialized skills such as programming.[26]

Zambia's policymakers have made some efforts over the past decade to integrate ICT education into schools. The Ministry of Education (MinEd) adopted an ICT Strategic Plan in 2011. Curricula for teaching ICTs in schools were adopted in 2014. More recently, the MinEd approved an ICT Competence Framework for Teachers, based on a framework developed by UNESCO.[27] However, these initiatives appear to have lacked the sustained political commitment, institutional capacity, and resources to implement and maintain them successfully. Attempts to update the 2014 ICT school curricula, for example, have stalled, and it is unclear whether or how the teachers' competence framework has been implemented. Despite the fact that the ICT Policy until 2022 notes the need for investment and support for the deployment of ICT infrastructure across the country, no plan exists for bringing quality Internet into all of Zambia's schools and educational institutions.

The MinEd, together with other important institutions in Zambia's education policy-making space such as the Curriculum Development Center, Zambia Qualifications Authority, Center for Educational Broadcasting Services, and Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA), also have not been prioritized for digital transformation within the government. This adversely affects their capacity to integrate digital literacy and skills training across the educational system. They lack the infrastructure, knowledge, data-collection tools, and coordination mechanisms needed to drive system-wide reforms successfully. Even those tools that do exist do not appear to be used to their full potential (see Box 3).

BOX 3: Mapping ICT readiness of Zambian schools and other socially significant buildings using Geo-Referenced Infrastructure Demographic Data for Development (GRID3)

Zambia Data Hub is an online platform for hosting and sharing geospatial data developed by the government of the Republic of Zambia together with GRID3. The platform allows government institutions to generate, validate, and use geospatial data on population, settlements, infrastructure, and boundaries, providing capabilities to generate open-source data, combining high-resolution and up-to-date satellite imagery, dynamic modeling to ensure sustainable use of geospatial data nationally.

The Zambia Data Hub currently maps educational institutions across the country with a basic set of attributes for each school (see example of Mondola Basic School in image, below). By leveraging and integrating the platform with the Education Management Information System (EMIS), it can be turned into a real-time dashboard, with a lot more

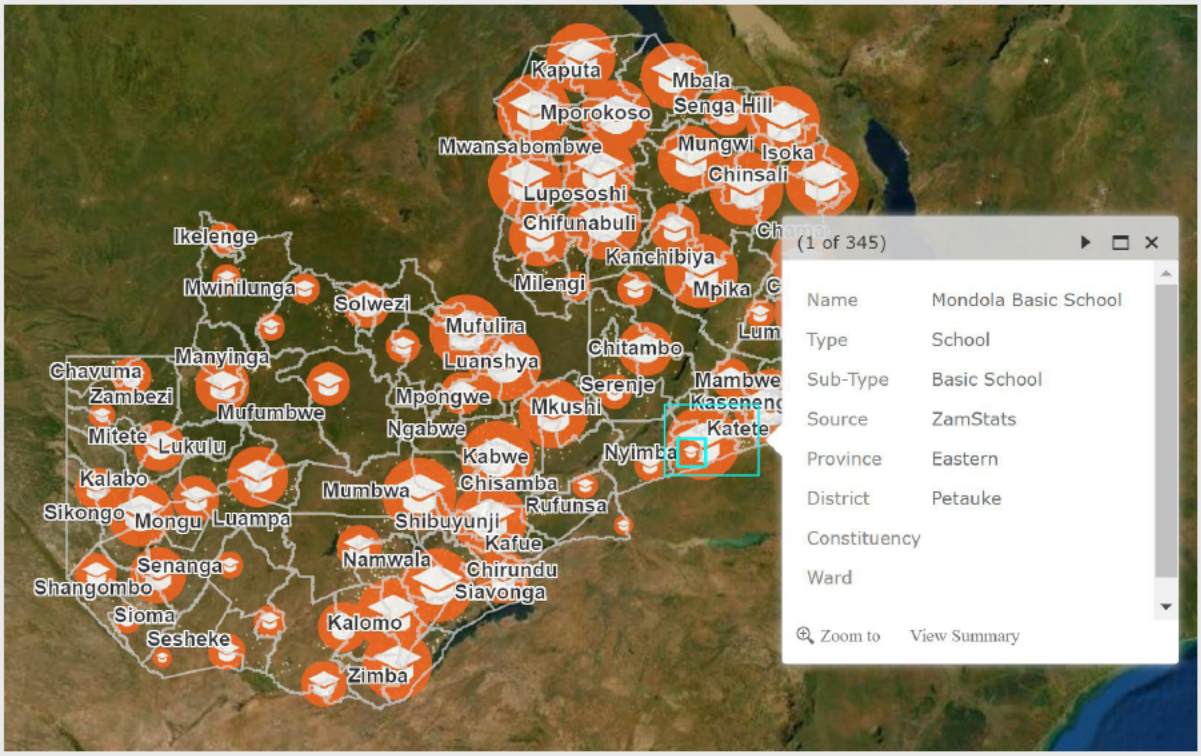
24 To help understand, structure and measure digital skills and literacy attainment, various frameworks have been developed, including the EU's DigiComp 2.2 Framework. This framework includes five key competency areas: *information and data literacy* (whether a person can search for and find information online, understand and manage it) https://www.zamstats.gov.zm/backup/phocadownload/Other_Institutions/ZICTA%20ICT%20Survey%20-%202018.pdf; *communication and collaboration* (a person's ability to interact productively with others online and manage their identity); *digital content creation* (whether a person knows how to develop online content, including copyright, licensing, and computer programming); *safety* (includes knowing how to protect devices and personal data from hackers and increasingly this also includes the knowledge and skills to stay safe from harassment, bullying, and criminal abuse online); and *problem solving* (ability to understand and solve technical problems, and use new technologies creatively); https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en

25 Under SDG Goal 4, UNESCO tracks countries' digital literacy and skills attainments, but no data on these indicators are available for Zambia; SDG 4 Country Profile Zambia, UNESCO, accessed June 2022, http://uis.unesco.org/sites/default/files/documents/countryreview_sdg4_zmb.pdf

26 "2018 National Survey On Access And Usage Of Information and Communication Technologies by Households and Individuals, ZICTA, 2018, https://www.zamstats.gov.zm/backup/phocadownload/Other_Institutions/ZICTA%20ICT%20Survey%20-%202018.pdf

27 "ICT Competency Framework for Teachers," UNESCO, 2018, https://teachertaskforce.org/sites/default/files/2020-07/ict_framework.pdf

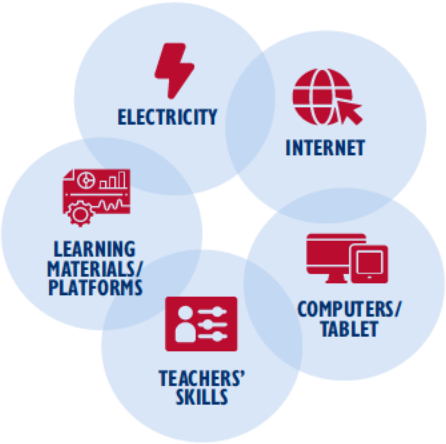
information such as access to electricity, quality and type of Internet connectivity (if any), computer and and digital device inventory, and details (type, age, software, etc), allowing authorities to plan for and monitor the ICT readiness of schools. Moreover, the platform can be used to track ICT readiness of other socially significant functions, such as health care, police, and government.



Source: Zambia Data Hub

Achieving broad based, general digital literacy and skills across Zambia's population faces many challenges. In schools, these challenges include inadequate infrastructure (electricity, Internet availability, computer equipment), teachers, and school leaders without the required digital skills, outdated or no curricula, and materials to teach digital literacy and skills (see Figure 8). Efforts within the international donor and CSOs community to address these challenges have been fragmented and have not been scaled beyond program limits.

FIGURE 8: Challenges for teaching digital literacy and skills in Zambia's schools



Source: Authors

According to Ministry of Education data from 2018, less than half (4,356 out of 5,054) of Zambia's schools have power, and of those with power, nearly one-third are not connected to the main power grid. Data are not available on the number of schools in the country that have access to broadband Internet or, where available, the number of schools that are connected to the Internet.

Even without Internet availability or access, schools are investing in computer equipment and facilities for both educational and administrative purposes. From 2014 to 2018, the number of computers in Zambian schools more than doubled, from 14,490 to 38,418.[28] As of 2018, 2,811 schools had computer laboratories, an 87 percent increase over 2017.[29] Still, even with these significant investments, a study of ICT infrastructure in secondary schools in four provinces (Copperbelt, Eastern, Luapula, Lusaka) highlighted continuing limitations and challenges.[30] Computer laboratories, for example, are usually converted classrooms and are not designed for long-term use and storage (lack power surge protections, ventilation, etc.). At least one DECA interviewee reported that in some schools laboratories are locked, making student access difficult. Poor maintenance, security, and technical support for equipment also may reduce usage.

In those schools that have been unable to procure or maintain computer equipment, ICT classes are taught entirely in the abstract. Several interviewees noted that this can be true even for schools in urban or peri-urban areas and not limited to rural schools. As a result, they observed, among students who had received some ICT education in school and continued on to university, many have little or no actual computer experience and need significant basic digital skills training upon matriculation.

In addition to the infrastructure challenges, digital literacy and skills among school leaders and teachers are low. As noted above, it is not clear how effectively or systemically the ICT Competence Framework for Teachers has been implemented, including incorporating digital proficiency requirements into teacher diplomas and bachelor's degrees.[31] This creates significant barriers both to effective use of ICT tools and materials as part of education programs and to the teaching of digital skills themselves. Without the ability to use digital technologies effectively, school leaders and teachers do not understand or value them. They also may not promote or support the use of digital technologies among students, which is reflected in the relatively small number of students who pursue an IT-specialized degree at the university level.

For youth who never enter or have not completed school, or for adults who finished school before ICT education was added to the curriculum, formal opportunities to gain or improve generalized digital skills and literacy are limited. The TEVETA offers training programs in software development, ICT management, and entrepreneurship in ICT. No programs exist that are built around general digital competences like information and data literacy, online communication and collaboration, digital content creation, safety, and problem-solving. In addition, teachers with the requisite knowledge to lead such programs are lacking. These are significant gaps in Zambia's digital literacy and skills-training education space. As a result, even those who might have the

28 "Implementation Status and Challenges of ICTs In Zambian Schools," Policy Monitoring and Research Centre, January 2020, https://pmrczambia.com/wp content/uploads/2020/01/Implementation Status and Challenges of ICTs In Zambian Schools Research Report.pdf.

29 See id.

30 Nsama, Peggy, et al., "Challenges in the Investment of ICT Infrastructure at Secondary School in Zambia, in Promoting Quality Education Delivery, International Journal of Research and Innovation in Social Science," July 2021, https://www.rsisinternational.org/virtual library/papers/challenges in the investment of ict infrastructure at secondary school in zambia in promoting quality education delivery/

31 A survey of teachers conducted shortly after the Covid pandemic began found that among teachers with ICT skills, 46% had learned those skills in professional development programs and 28% through on the job training; "Rapid Survey on Teachers' Competencies on the use of ICT in Teaching in Zambia," UNESCO, 2020, https://teachertaskforce.org/sites/default/files/2020 07/report___unesco_teacher_rapid_assessment_survey_v.3.1_14_07_2020 merged.pdf

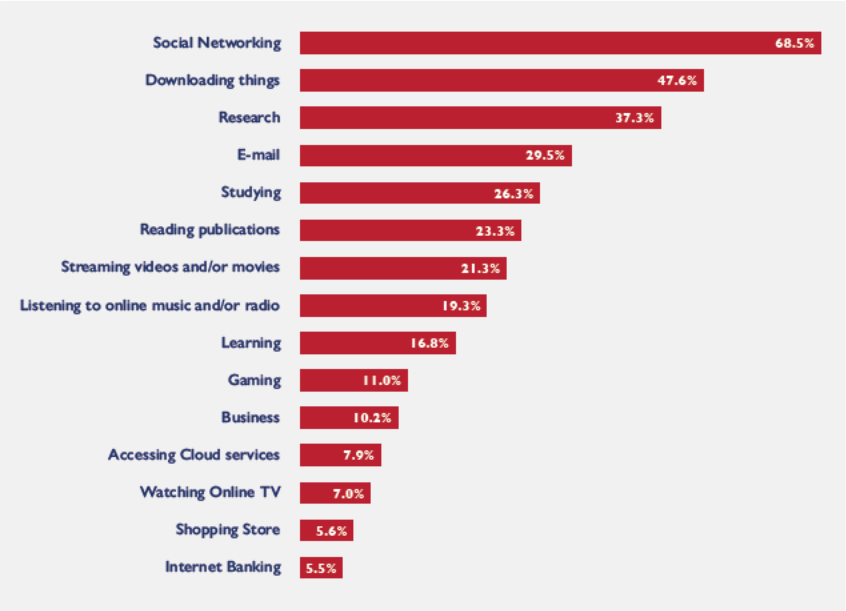
interest and resources to pursue digital upskilling–such as government employees, healthcare providers, or small business owners–have few options.

Digital literacy is a challenge for many Sub-Saharan Africa countries. One example of a program that is addressing this challenge is a three-phased Kenya Digital Literacy Program.[32] Initiated in 2016, it focuses on entrenching ICT in the teaching and learning process, training the teachers, and creating content for the learners. The program is about to conclude its second phase. As a preliminary result, it has enhanced the ICT skills among teachers through the teacher capacity building component. By 2021 more than 80,000 teachers had been trained.[33] Additionally, more than 6,000 kilometers of fiber have been laid across the country, thereby ensuring internet connectivity to enable digital learning in all schools.[34]

ONLINE ENGAGEMENT IS GROWING, BUT MORE PRODUCTIVE, INCLUSIVE CONTENT AND SERVICES ARE NEEDED

In 2018, just 14.3 percent of Zambians were reportedly active users of the Internet.[35] Among those users, online activity was overwhelmingly dedicated to social networking platforms. Learning, business, shopping, and banking, all of which are considered more economically and socially productive, constituted less than 17 percent of time spent online.

FIGURE 9: Online activities among active Internet users, 2018



Source: ZICTA 2018 Survey

32 "Kenyans Urged to Support the Digital Literacy Programme," UNESCO, June 2020, https://www.kenyanews.go.ke/kenyans urged to support the digital literacy programme/

33 Barasa, Peter L., "Digitalization in teaching and education in Kenya Digitalization, the future of work and the teaching profession," International Labour Organization, 2021, https://www.ilo.org/wcmsp5/groups/public/ ed dialogue/ sector/documents/publication/wcms 783665.pdf

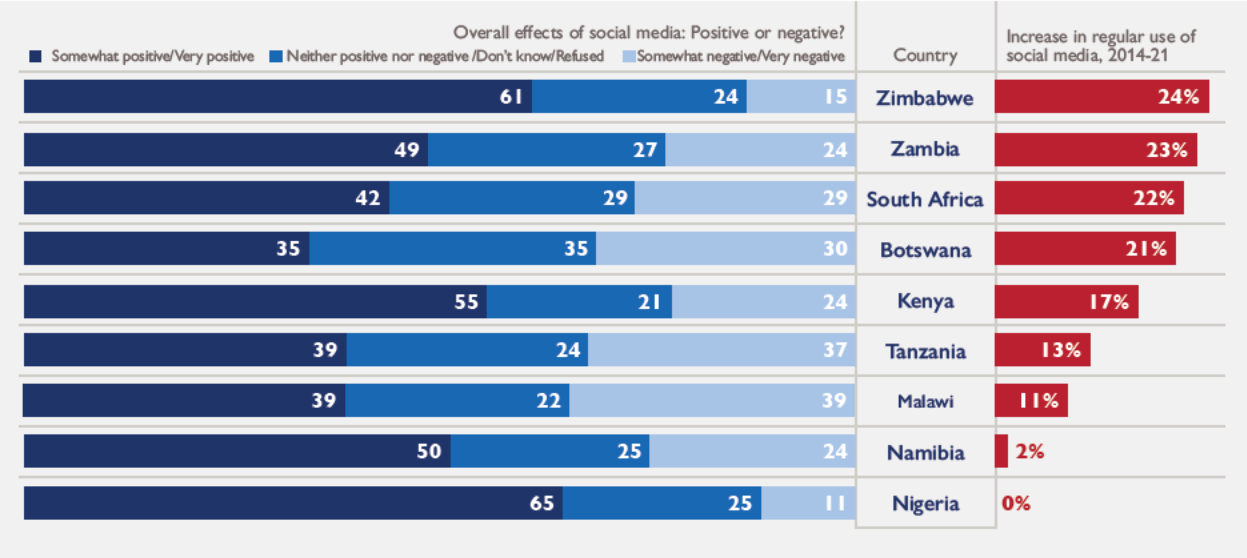
34 Ogolla, Kennedy, "Digital Literacy Programme in Kenya; Developing IT Skills in Children to align them to the Digital World and Changing Nature of Work Briefing Note," accessed June 2022, https://thedocs.worldbank.org/en/doc/967221540488971590 0050022018/original/KennedyOgolaEntryDigitalLiteracyKenya.pdf.

35 "2018 National Survey On Access And Usage Of Information and Communication Technologies by Households and Individuals, ZICTA, 2018, https://www.zamstats.gov.zm/backup/phocadownload/Other Institutions/ZICTA%20ICT%20Survey%20 %202018.pdf

Community-building services such as Facebook, YouTube, and WhatsApp/Telegram that rely on user-generated, localized content have attracted new online users. For Zambians who access information online, most do so via social media, primarily Facebook. As of January 2021, Zambia had approximately 2.6 million active social media users, about 13.9 percent of the population, of which 2.4 million were Facebook users.[36] Overwhelmingly, users access social media using their mobile phones (90.4 percent) while 8.3 percent of users employ both both mobile phone and computer.[37]

No recent data are publicly available concerning the reasons Zambians use social media. However, a comprehensive survey by Afrobarometer looked at where Zambians get their news, including social media channels. Around 39 percent of respondents said they accessed digital media (Internet, Facebook, Twitter, WhatsApp, etc.) "at least a few times a week."[38] The percentage who view the use of social media as somewhat or very positive was, at 49 percent, just shy of a majority; approximately one-quarter of survey respondents (24 percent) consider social media somewhat or very negative (see Figure 10). This helps spotlight the "Appetite" element (see further discussion in Geographic and Gender Digital Divides section, below) of digital adoption and inclusion in Zambia and offers an indication of whether people understand and value online content.

FIGURE 10: Social media use and perceptions, regional comparisons



Source: Afrobarometer

Besides social media, the creation of other content and services that would appeal to a large portion of the population is crucial for digital transformation. Many times, the interest and perceived added value of online services can stimulate people into prioritizing connectivity and device purchases over competing domestic needs. For example, providing government subsidies programs paid out with mobile money can stimulate creation of DFS and help bring more people online. Mobile health (mHealth) services are another important way to increase the online user base, especially those targeting (1) education and awareness on health issues, (2) health-related

36 The estimated audience numbers that can be reached on other platforms are: Instagram (370,000), Facebook Messenger (220,000), LinkedIn (470,000), Twitter (95,000). The majority are male (13 to 40%). Kemp, Simon, Digital 2021: Zambia, DataReportal, https://datareportal.com/reports/digital_2021_zambia.

37 See id.

38 "Promise and Peril: In changing media landscape, Africans are concerned about social media but opposed to restricting access," Conroy Krutz, Jeffrey et al., February 15, 2022, Afrobaromter, https://www.afrobarometer.org/publication/ad509_promise_and_peril_in_changing_media_landscape_africans_are_concerned_about_social_media_but_opposed_to_restricting_access.

helplines, (3) remote diagnostic and treatment support, (4) communication and training for healthcare workers. Agricultural services and platforms that increase small farmers' competitiveness have also been known to be a great stimulus to onboarding new users. Opportunities to support businesses that create more online content and services are discussed in more detail in Pillar 3.

GEOGRAPHIC AND GENDER DIGITAL DIVIDES

The primary dividing lines between those who have been able to adopt digital technologies in their lives and those who have not can be described as the four "A's": *Availability* of Internet, *Access* to affordable, quality Internet and devices, *Ability* (literacy and skills) to use digital technologies, and *Appetite* to use them (relevant content/interest). Key factors associated with these digital dividing lines include gender, geography, economic and educational status, and age. Overlying all of these factors are social norms around using digital technologies, particularly for women and girls.

ZAMBIA'S GEOGRAPHIC DIGITAL DIVIDE

The ZICTA 2018 ICT Study indicates that there are significant geographic (urban/rural) divides in the availability and accessibility of the Internet among Zambians aged 10 and older. Rural residents' Internet usage (1.8 percent) and smartphone ownership (4.7 percent) rates were well below the national average. Over five times more urban residents than rural residents have used the Internet, and eight times more urban residents than rural use the Internet at least once a day (see Figure 11). Mobile phone usage (versus Internet usage) is much higher among both urban and rural residents, but urban usage is nearly double rural usage, and smartphone ownership among urban residents is more than six times higher than among rural residents (see Figure 12).

FIGURE 11: Internet Usage in Zambia, age 10 and older: Urban-Rural Distribution, %

ZAMBIANS AGE 10 AND OLDER...

	That ever used the internet	That use the internet at least once a day	That have an email address	That have any social media account
Zambia	14.3	6.9	7.3	11.2
Rural	5.2	1.8	2.4	3.7
Urban	28.1	14.8	14.8	22.7

Source: World Bank Report 2020, using ZICTA, 2018

FIGURE 12: Digital Device Usage in Zambia, age 10 and older: Urban-Rural Distribution, %

	That used a mobile phone in the past three months	That used a mobile phone	That own a smartphone	Use of over-the-top applications		
				Messaging	Video calling	Voice calling
Zambia	53.5	44.6	13.2	11.5	5.9	9.7
Rural	42.1	33.0	4.7	3.9	1.3	3.0
Urban	71.0	62.5	26.3	23.2	12.9	19.9

Source: World Bank Report 2020, using ZICTA, 2018

According to the ZICTA 2018 ICT Study, once again, urban/rural divides appear to be deeper than the gender divide. Rural residents are significantly less likely to have an email address or social media account (see Figure11, above) or to use so-called "over-the-top" (OTT) applications such as WhatsApp for messaging, video, or voice calling (see Figure 12, above).

There are also significant urban/rural gaps in digital literacy and skills. Only 2.8 percent of rural residents report knowing how to use a computer compared with 11.8 percent of urban residents. Gaps in proficiency on specific skills are striking, for example, copying or moving a file or folder (81.9 percent urban/18.1 percent rural); sending emails with attachments (86.2 percent urban/13.8 percent rural); connecting and installing new devices (83.7 percent urban/16.3 percent rural); and creating electronic presentations (84.8 percent urban/15.2 percent rural).[39]

Zambia's urban/rural digital divide reflects a broader pattern across much of Africa. For example, the rural-urban gap in mobile Internet use is present across Sub-Saharan Africa, standing at around 40 percent, on average.[40] The Afrobarometer survey highlighted urban/rural divides in social media use among regular news media consumers, including Zambia.[41] For respondents who said that they get their news via social media "every day" or "a few times a week," there was a wide gap between urban and rural consumers, with 60 percent of regular social media news consumers in urban environments and 25 percent in rural.

ZAMBIA'S GENDER DIGITAL DIVIDE

The ZICTA 2018 ICT Study also revealed gender divides on availability and accessibility of ICTs, though not as deep as the urban/rural divide. Among Zambians aged 10 and older, 5.9 percent of women reported using the Internet at least daily versus 8.3 percent of men (national average is 6.9 percent) (see Figure 13). With regard to mobile phone usage, 41.1 percent of women reported using that technology compared with 49.2 percent of men (national average is 44.6 percent). Smartphone ownership registered the smallest discrepancy between women and men, at 12.4 percent and 14.3 percent, respectively (national average is 13.2 percent) (see Figure 14).

Making regional comparisons with Zambia's gender digital divide is difficult because comprehensive, country-level data are not collected and/or reported in most countries. However, according to the most recent GSMA data,[42] the gender gap in mobile phone ownership in Sub-Saharan Africa is 13 percent, only a 1 percent decline since 2017. In 2018, Zambia's gender gap on the same metric was 6 percent, less than half the current regional average.[43] This is a positive indication that the gender digital divide in Zambia may not be as pronounced as in some other African countries.

FIGURE 13: Internet Usage in Zambia, age 10 and older: Male-Female Distribution

ZAMBIANS AGE 10 AND OLDER...

	That ever used the internet	That use the internet at least once a day	That have an email address	That have any social media account
Zambia	14.3	6.9	7.3	11.2
Male	17.3	8.3	9.1	13.1
Female	12.0	5.9	5.9	9.7

Source: World Bank Report 2020, using ZICTA, 2018

39 ZICTA 2018 Survey, https://www.zamstats.gov.zm/backup/phocadownload/Other_Institutions/ZICTA%20ICT%20Survey%20_%202018.pdf

40 "Mobile connectivity in Sub Saharan Africa: 4G and 3G connections overtake 2G for the first time," Wyrzykowski, Robert, November, 16, 2020, GSMA, https://www.gsma.com/mobilefordevelopment/blog/mobile_connectivity_in_sub_saharan_africa_4g_and_3g_connections_overtake_2g_for_the_first_time.

41 The DECA Research team has requested access to Zambia specific data from the Afrobarometer and is awaiting response.

42 "The Mobile Gender Gap Report 2022," GSMA, 2022, https://www.gsma.com/r/gender_gap/

43 Shanahan, Matthew, The Mobile Gender Gap Report 2022, GSMA, 2022, https://www.gsma.com/r/wp_content/uploads/2022/06/The_Mobile_Gender_Gap_Report_2022.pdf

FIGURE 14: Digital Device Usage in Zambia, age 10 and older: Male-Female Distribution

	That used a mobile phone in the past three months	That used a mobile phone	That own a smartphone	Use of over-the-top applications		
				Messaging	Video calling	Voice calling
Zambia	53.5	44.6	13.2	11.5	5.9	9.7
Male	56.9	49.2	14.3	12.8	6.3	10.5
Female	50.9	41.1	12.4	10.6	5.6	9.0

Source: World Bank Report 2020, using ZICTA, 2018

The differences in women's and men's use of OTTs was on average less than 2 percent, while the divides in having an email address (3.2 percent) and social media account (3.4 percent) were a bit wider (see Figures 13 and 14, above). Another indication of the difference in women's and men's interest in and ability to use digital technologies is that significantly fewer women go on to choose IT-specialized degrees at universities,[44] though this may also stem from cultural and societal norms, which was noted by several interviewees.[45] Also, fewer women than men use mobile money.

The Afrobarometer social media usage survey among regular news media consumers found that the gender gap was 7 percent among "every day" or "a few times a week" users, with 37 percent of women and 44 percent of men saying they get their news via social media "every day" or "a few times a week." While the majority of Facebook users are men (56 percent male versus 44 percent female), women are overall more active (see Figure 15), a pattern seen in other countries, as well.

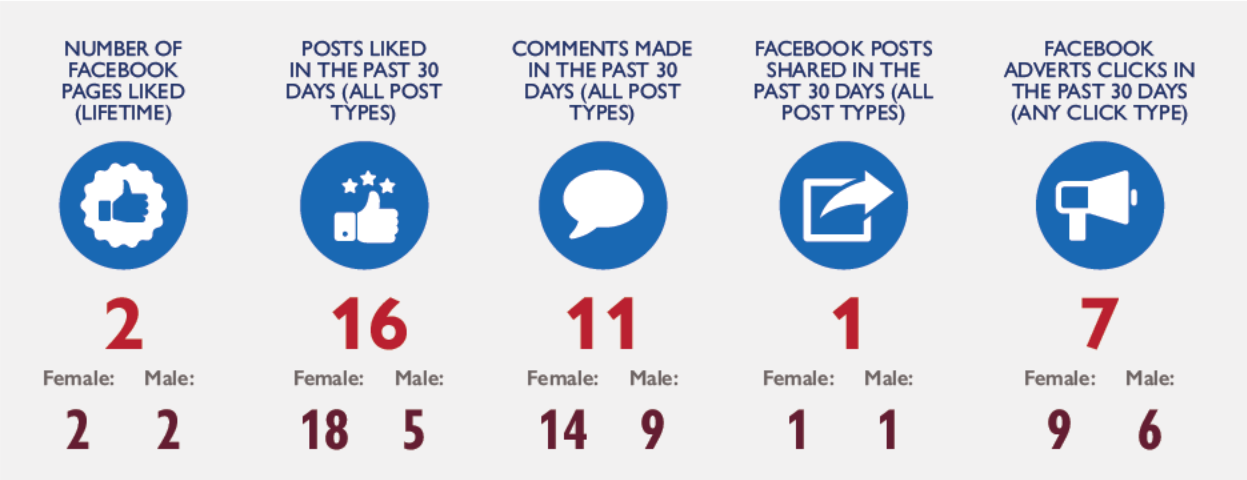
Gender gaps in digital literacy and skills also exist. Only 8 percent of males report knowing how to use a computer compared with 5.8 percent of females. Gaps in proficiency on specific skills are wider, for example, copying or moving a file or folder (56.3 percent male/43.7 percent female); sending emails with attachments (58.7 percent male/41.3 percent female); connecting and installing new devices (63.3 percent male/36.7 percent female); and creating electronic presentations (71.3 percent male/28.7 percent female).[46]

44 According to the Zambia Higher Education Authority, Bachelor Degree enrollment stands at around 52% men, 48% women. Interviewees with the Schools of ICT at several leading universities reported that the percentage of women enrolled in the ICT degree programs ranged from 10 20%.

45 This was confirmed by multiple DECA interviewees, but the DECA team could not find any studies that assess the reasons for women's lower enrollment in ICT degree programs.

46 "2018 National Survey on Access and Usage of Information and Communication Technologies by Households and Individuals," ZICTA, 2018, https://www.zamstats.gov.zm/backup/phocadownload/Other_Institutions/ZICTA%20ICT%20Survey%20_%202018.pdf

FIGURE 15: Facebook activity frequency in Zambia, by gender



Source: DataReportal

As USAID's Gender Digital Divide Primer notes, in many countries, the digital divide between women and men often reflects social norms around women's use of technology. Communities may declare women's use of the Internet "immoral" and institute bans on women's ownership of mobile phones. Less directly, in households with limited funds where the family can afford only one phone, the man will own and use it. Time constraints due to womens' home and childcare responsibilities also may affect women's Internet usage or their ability to commit to classes in digital upskilling. Without opportunities or encouragement to take training courses, women may become less confident with regard to trying and using new technologies.

While the data in Zambia show that the urban/rural digital divide is much wider than the gender divide, it is important to keep in mind that there may be significant intersectionality between these two "divide" demographics. Of those rural residents who do have the availability, access, ability, and appetite to use digital technologies, the majority may well be men. Social norms in rural communities would tend to be more prohibitive for women. Though the DECA team could not access data to confirm this, interviewees suggested this was likely true.

2.2. PILLAR 2: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE

Digital Society, Rights, and Governance focuses on how digital technology intersects with government, civil society, and the media. This intersection includes policies and regulations, the use of social media and social norms around technology, digital tools for accountability and openness, and digital ID systems. Digital society and governance also assesses risks associated with access to digital platforms and information and how they are managed. This includes data privacy, cybersecurity, censorship, disinformation, and misinformation.

KEY TAKEAWAYS

DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE	
• Government powers to police the online information space have grown and are cause for concern. • Stakeholder inclusion in the development and implementation of the digital transformation agenda needs strengthening. • The governance of the digital transformation agenda has improved with the creation of the Ministry of Technology and Science, but mandate overlaps remain, suggesting that further improvements in governance are necessary to avoid duplication and a lack of synergy. • There have been notable efforts to increase the interoperability between government systems; however, digitalization initiatives remain siloed, focused on non tax revenue services and lag at the local level. • A lack of foundational and digital ID systems represents one of the most significant barriers for Zambia's digital transformation.	**RELEVANT RECOMMENDATIONS** 1. Improve governance and broaden stakeholder commitment to the digital transformation agenda. 2. Increase government transparency and engagement with citizens, businesses, media, and civil society. 3. Support the implementation of inclusive and accessible foundational identification for all Zambians. 4. (Cross cutting) Strengthen capacity to develop and maintain secure, resilient cybersecurity infrastructure in Zambia.

As more and more people go online, Zambia must strike a proper balance between freedom of expression and protection against abuse and cybercrime. A number of key laws enacted in 2021, before the August 12 elections, provide a strong online governance framework for addressing security concerns but fail to protect online freedoms as evidence has surfaced of attempts to silence voices of undesired political opponents and civic activists, a situation the government is reportedly attempting to amend. Data on cybersecurity incidents also point to an alarming increase of online threats, such as scams, phishing, and cyber bullying, with only a limited response from the government in the form of small-scale cybersecurity awareness campaigns.

The government has made important progress in transitioning operations and services onto digital platforms, with more than 200 revenue-related services (not taxes) coming online in the last two years. There exist several core citizen service platforms and numerous government internal IT management systems, but Zambia still has much work ahead to achieve full digital government transformation, some of the biggest barriers being lack of a foundational and digital identification systems and limited interoperability of government databases.

The Ministry of Technology and Science is leading the digital transformation efforts, including the development and implementation of the new ICT Policy and National Digital Transformation Strategy, but there are still conflicting institutional mandates between the main players, risking duplication of efforts and a lack of synergy. To expedite the implementation, better inter-institutional coordination is required, as well as closer collaboration among the key development partners operating in this field.

SAFEGUARDING ONLINE FREEDOMS WILL REQUIRE STRENGTHENING AND GROWING STAKEHOLDER ENGAGEMENT

A trusted online information space should be both secure and open. This requires balancing the state's interest in protecting citizens and preventing crimes online with society's broader interest in ensuring that human rights, such as freedom of expression and association, are not repressed. Zambia's Electronic Government Act (ZEGA), Electronic Communications and Transactions Act (ECTA), Data Protection Act (DPA) and Cybersecurity and

Cyber Crime Act (CSCC), all enacted shortly ahead of elections in 2021, provide an Internet governance framework that adequately addresses online security but does not protect online openness and freedoms.

During interviews, media, civil society organizations, and activists all expressed concern about the government's ability to engage in online monitoring, surveillance, and censorship. These issues are of increasingly critical concern as social media has become an important platform for political discussion and debate in Zambia, as well as a tool for promoting political agendas and mobilizing political action and movements. Both main rival parties in Zambia's 2021 general election used websites, WhatsApp groups, popular bloggers and influencers, and social media pages to advance their election narratives and reach potential voters.[47] Facebook, Instagram, and Twitter also provide platforms that independent media organizations in Zambia use to reach their audiences. At the same time, the prior government's interference in the online landscape is well-documented, including slowing, filtering, and shutting down the Internet for several days ahead of the 2021 election and arresting political opponents for opinions expressed online.[48] Many activists and advocates viewed the push to pass the package of online governance laws ahead of the 2021 elections as a power grab intended to expand and entrench government powers for exactly this purpose.

Zambia's 2021 Internet governance laws are cause for concern when it comes to protecting online freedoms.[49] They leave open and may even expand the legal grounds for the government to target opposition voices and control online spaces. The CSCC, for example, has overly vague, broad, or missing definitions on key provisions, including hate speech, harassment, and what words or images might qualify as "corrupt[ing] morals." These leave too much room for interpretation and discretion with prosecuting authorities. The CSCC also does not sufficiently limit the government's powers of online surveillance by law enforcement authorities and places heavy demands on service providers to install and maintain the technical systems necessary for such surveillance. Service providers also must collect sensitive, personal data from customers. When viewed alongside provisions of the DPA, which require lengthy data retention periods and an undefined "national security" exemption for providing sensitive data to law enforcement authorities, the government holds significant power to infringe upon individuals' privacy and to pursue potential rivals.[50]

A legal action initiated prior to the 2021 elections and led by the Chapter One Foundation[51] resulted in a consent judgment in which the government (ZICTA) agreed "not to act outside its legal authority and/or control to interrupt the flow or access to the Internet going forward."[52] While this is an important victory, it does not appear to require the government to address the provisions of the Cybersecurity and Cybercrimes Act that adversely affect online freedoms. Encouragingly, more than one DECA interviewee within the government informally reported that the government plans to amend the disputed sections of the Acts to address civil society and independent media concerns, although this process has not yet been launched as of this writing.

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47 Ruwe, Field, "Dr. Field Ruwe Takes on "Kaizar Zulu" and PF Bloggers," Lusakatimes.com, May 21, 2021, https://www.lusakatimes.com/2021/05/17/dr field ruwe takes on kaizar zulu and pf bloggers/ and UPND's "Propaganda and Social Media Obsession Can't Win Elections," July 13, 2021, Lusakatimes.com, https://www.lusakatimes.com/2021/07/13/upnds propaganda and social media obsession cant win elections/ and "UPND Play Social Media Politics and Assume there is a Wind of Change GBM," July 9, 2021, Lusakatimes.com, https://www.lusakatimes.com/2021/07/09/upnd play social media politics and assume there is a wind of change gbm/

48 "Freedom on the Net 2021," Freedom House, 2021, https://freedomhouse.org/country/zambia/freedom net/2021

49 Cybersecurity specialists interviewed by the DECA team said that the laws set up a good framework for building out a technically and institutionally strong cybersecurity ecosystem in Zambia while also noting the human rights concerns.

50 See Implications of Zambia's Cybersecurity and Cyber Crimes Act 2021 on Digital Rights, CIPESA, and Zambia: Insights into the Data Protection Act 2021, CIPESA

51 https://www.cof.org.zm/; https://www.lusakatimes.com/2021/04/02/new cyber law goes to court/

52 https://www.cof.org.zm/index.php/2022/04/07/press release on the consent judgement between chapter one foundation and zicta over internet shutdowns/

While Zambia has a few local organizations that are strong advocates for online freedoms, local chapters of global organizations such as the Internet Governance Forum and Internet Society are weak. This means that Zambia's Internet governance advocates miss important opportunities to engage with global networks and leaders and to follow and contribute to evolving standards and best practices. The government also has shown limited capacity to engage productively with interested stakeholders. DECA interviewees reported that many of them are not invited to meetings on issues within their scope of interest, notifications of meetings are sent out late, and even when feedback is provided, concerns are not addressed or reflected in subsequent drafts of proposed policies or regulations. While the new government has voiced its commitment to strengthening its stakeholder engagement processes, DECA interviewees reported that they have not yet seen meaningful improvement.

DEVELOPING A TRUSTED INFORMATION LANDSCAPE IN ZAMBIA IS CRUCIAL FOR EXPANDING DIGITAL ADOPTION

The need to address the safety and security of Zambians using digital technologies and engaging online is apparent. According to the Zambia Cybersecurity Initiative Foundation, there was a 70 percent increase in data security breaches in Zambia in 2021,[53] and statistics also show increases in phishing scams designed to steal from mobile money users.[54] Iin 2019, of the consumer complaints ZICTA fielded, 64 percent were associated with digital financial services.

Cyberbullying and cyberstalking of women and children also appear to be on the rise, though reliable data tracking these issues are difficult to find. In 2020, ZICTA received 551 reported cases of cyberbullying while the national child helpline received 1,150.[55] In a research survey of Internet industry stakeholders, more than 90 percent of the 105 respondents named hate speech, social media addiction, and cyberbullying as prominent Internet risks children are likely to encounter.[56] A project run by the Zambia National Women's Lobby found increased cyberbullying of female politicians during election periods.[57] Sexual exploitation online and trafficking persons using online means also are receiving attention.[58] To help address issues around children's safety, the Zambian government has adopted a Child Online Safety (COP) Strategy, which is in early stages of implementation. No similar national strategy or policy exists to address gender-based violence and harassment online.

According to a recent study on gender gaps in ICT access and usage,[59] male internet users are more aware of the risks of online activity, although they also are marginally more likely to be victims of online crime and harassment. Overall, among Internet users, most were aware of risks related to fake news (misinformation/disinformation) and pornographic materials. Issues such as cyberbullying, hacking, phishing, and identity theft had lower rates of awareness (see Figure 16). Among schoolchildren, however, awareness levels were much lower. Just 23.5 percent of children knew about cyberbullying, 16.3 percent about identity theft, and only 5.8 percent about hate speech.

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53 While no official explanation is given, this may reflect the overall increase in users and volumes of mobile money.

54 Zambian Cyber Security Initiative Foundation, publications, https://zcsi foundation.org/publications/

55 Iyombwa, Noel, "Fake News, Cyber Bullying Big Headache for Govt Minister," February 23, 2021, Daily Nation, https://dailynationzambia.com/2021/02/fake news cyber bullying big headache for govt minister/

56 Zulu, Gezile, et al., "An Assessment of Child Online Risks and Effects in Zambia: A Remedy for Child Online Protection," International Journal of Information Science, 2020, http://article.sapub.org/10.5923.j.ijis.20201001.01.html#Sec2.3

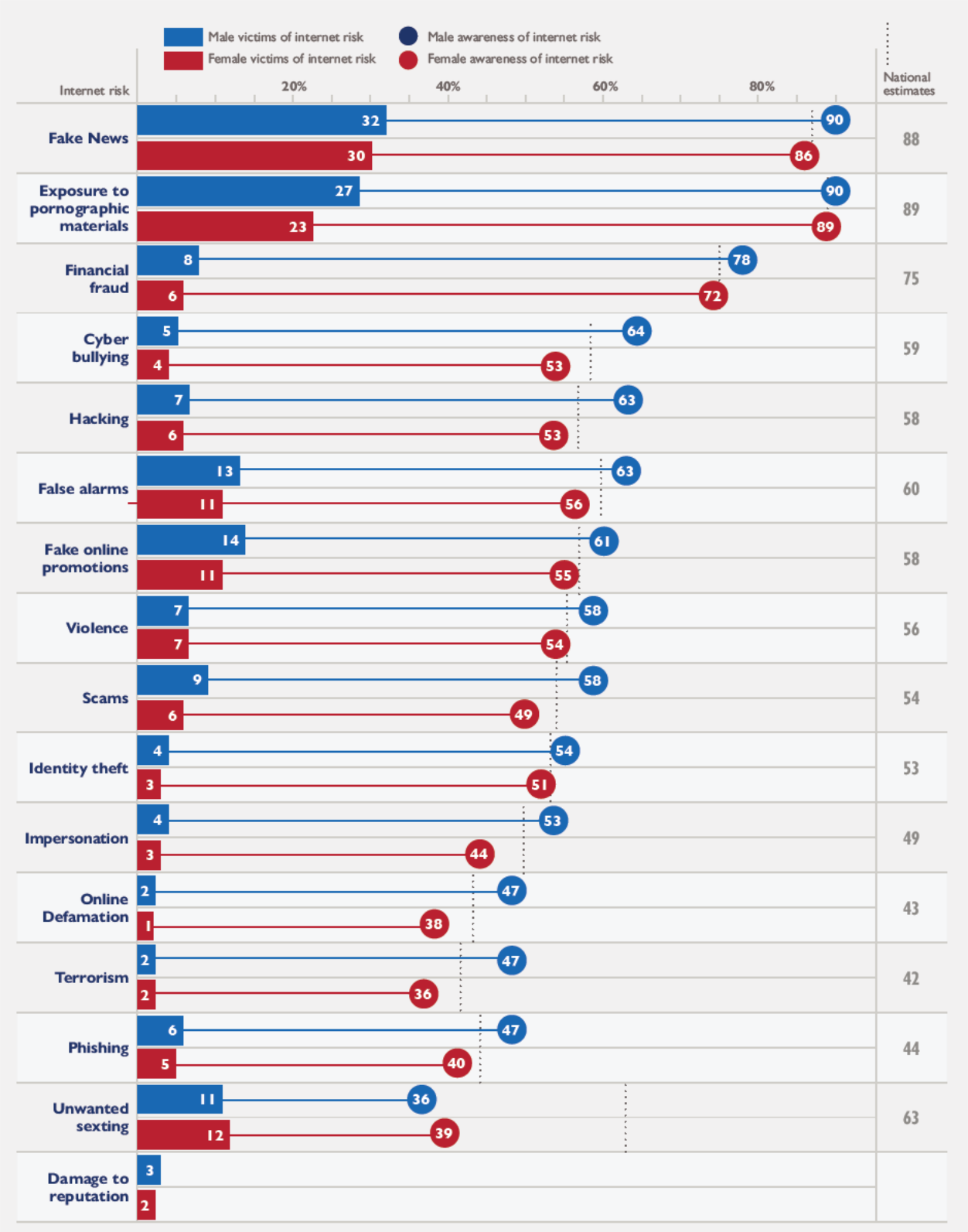
57 "Increased Cyberbullying Against Women in Politics During Campaign Period Exposed," SHOUTZAMBIA, September 15, 2021, https://www.shout zambia.com/increased cyberbullying against women in politics during campaign period exposed/ and Kunda, Sharon, "Cyber Bullying on the Rise," Zambia National Broadcasting Corporation, 2021, https://www.znbc.co.zm/news/cyber bullying on the rise/

58 "Women, Girls Internet Vulnerability on the Rise," Times of Zambia, November 22, 2021, https://www.times.co.zm/?p=113072

59 Nankonde, Ngabo, et al., "Evaluating the Gender Gaps in Access & Usage of ICTs in Zambia," Zicta, Spider, 2020, https://www.zicta.zm/storage/posts/attachments/rlWXeVFLPfUkalluFK9Sgt57HwURWiE0Si8X31il.pdf.

It is important to keep in mind that this study looked at awareness of online risks among those Zambians who are *already online*. No data is available on the levels of awareness of online risks of the millions of Zambians who are currently not using digital technologies regularly.

FIGURE 16: Internet Risk Awareness And Victims, by Gender



Source: Evaluating the Gender Gaps in Access & Usage of ICTs in Zambia, ZICTA, SPIDER

BETTER GOVERNANCE IS NEEDED AROUND THE DIGITAL TRANSFORMATION AGENDA TO AVOID DUPLICATION AND A LACK OF SYNERGY

The Zambian cabinet has recently approved the draft of the eighth national development plan, a new framework to guide the country's national development for 2022-2026, with digital transformation activities playing an important role. Proper governance is a key enabler of digital transformation and one of the key success factors in achieving the goals of digital strategies. Without such mechanisms, implementation is always siloed, bureaucratic, slow, and inefficient.

Recently, Zambia has strengthened its governance mechanisms for the digital transformation agenda with the creation of the Ministry of Technology and Science to spearhead it. On the other hand, without a proper functional analysis of existing players, there are multiple mandate overlaps of the main actors such as INFRATEL, ZESCO FibreCom, Zambia ICT Authority, Smart Zambia Institute, and the Ministry of Technology and Science, suggesting that further improvements in governance are necessary to avoid duplication and a lack of synergy. For instance, the Zambia ICT Authority has a broad mandate, which exceeds the functions of an ICT regulator (functions include cybersecurity, root certification authority, skills development, and eCommerce, among others), creating potential conflicts of interest. Efforts from the Government of Zambia to address this are outlined in chapters 8. Good governance environment and 9. Implementation and coordination framework of the 8NDP.

At the same time, there are a few institutional gaps, the bridging of which is critical for the digital transformation agenda, namely (a) the lack of a Data Protection Authority, which, according to the Ministry of Technology and Science should be established by June 2022, (b) placing the national cybersecurity function in a department under ZICTA instead of creating a separate Cybersecurity Agency, as prescribed by the Cybersecurity and Cyber Crimes Act, (c) mixed Smart Zambia Institute subordination and reporting lines between the President's Office and the Ministry of Technology and Science, and (d) subordinating the ICT regulator to the MoTS. Proper implementation of the Electronic Government Act, Electronic Communications and Transactions Act, Data Protection Act, and Cybersecurity and Cyber Crime Act is lagging behind in the lack of corresponding statutory instruments that would operationalise them. According to the Ministry of Technology and Science, several of the regulations have been drafted and are in various phases of consultations. This includes (a) regulations for the Data Protection Act, including creation of a Data Protection Authority, (b) two cybersecurity-related statutory instruments for licensing of cybersecurity service providers and protection of Critical Information Infrastructure.

BOX 4: Experience of other countries in establishing their data protection function

Data protection requires a holistic approach that incorporates a combination of legal, administrative, and technical safeguards. The European Union's General Data Protection Regulation (GDPR) is a widely known example of comprehensive regulation of data protection and privacy and an important reference point for global work in this area[60]. According to the Regulation, EU Member States are required to provide for a supervisory authority to monitor its application.

Data protection and privacy are often subject to the oversight of an independent supervisory or regulatory authority and the **genuine independence of such an authority is a key factor**, with independence being measured by structural factors such as the composition of the authority, the method of appointment of members, the power and timeframe for exercising oversight functions, the allocation of sufficient resources, and the ability to make meaningful decisions without external interference.

60 Greenleaf, Graham, "Global Data Privacy Laws 2021: Despite COVID Delays, 145 Laws Show GDPR Dominance," University of New South Wales Faculty of Law Legal Studies Research Paper Series, 2021, https://ssrn.com/abstract=3836348#.

Examples of data privacy and protection oversight agencies:

The Estonian Data Protection Inspectorate, founded in 1999, is an independent supervisory authority, empowered by the Data Protection Act, Public Information Act, and Electronic Communication Act. The inspectorate's mandate is to protect the rights to obtain information about the activities of public authorities, the inviolability of private and family life in the use of personal data and to access data gathered about oneself.

In South Africa, the Protection of Personal Information Act 4 of 2013 established the Information Regulator, an independent body subject only to the Constitution and to the law. This body is appointed by the President on the recommendation of the National Assembly and it is ultimately accountable to the National Assembly. It has a broad range of supervisory functions.

In the Philippines, the Data Privacy Act of 2012 established the independent National Privacy Commission, attached to the Department of Information and Communications Technology, and headed by a Privacy Commissioner who is assisted by two Deputy Privacy Commissioners. All three Privacy Commissioners are appointed by the President for three year terms and are eligible for reappointment for a second term of office. The Commission's many duties include monitoring compliance with the data privacy law.

In the United Kingdom, the Data Protection Act introduced the role of Information Commissioner, an independent official appointed by the Crown who operates the UK Information Commissioner's Office (ICO). The ICO is sponsored by the Department for Digital, Culture, Media, and Sport (DCMS) and ultimately reports to Parliament. It is an independent regulatory body which seeks to monitor, investigate, and enforce all applicable data protection and privacy legislation in the UK.

Source: World Bank Group, Identification for Development Initiative, ID4D Practitioner's Guide

Another important gap noted by the team is the insufficient coordination among key players. According to the Ministry of Technology and Science, this shall be addressed through the creation of a Digital Transformation Steering Committee, which has been recently approved by the Secretary to the Cabinet. The Smart Zambia Institute has recently developed the guidelines of the Steering Committee and the functions of technical committees and working groups, but these have not been published so it remains to be seen what the functions and the Steering Committee's authority will be.

At the technical level, there is a coordination mechanism instituted by the Smart Zambia Institute that connects the ICT unit heads in key ministries with local governments; however, this coordination is focused on facilitating implementation of specific digital transformation projects and is more technical than strategic.

According to the Cybersecurity and Cyber Crime Act, a Cybersecurity Advisory Coordinating Council should be instituted, but due to a lack of a relevant regulation, it has not yet been established. The Council should bring together various security institutions and help break the barriers between different agencies, including law-enforcement, with regard to cybersecurity topics.

SECTORAL POLICIES AND STRATEGIES ARE REQUIRED TO ALIGN THE VISION FOR DIGITAL TRANSFORMATION AND AVOID SILOED APPROACHES

Together with creating the necessary governance around the digital transformation agenda, it is important to align the strategic vision of various stakeholders in the form of policies and strategies. The government is engaged in several initiatives aimed to achieve this. In the cybersecurity space, a Cybersecurity Policy and Action Plan have been developed as well as the National Child Online Protection Strategy.

In 2022, Zambia issued two overarching strategic documents under the responsibility of the Ministry of Technology and Science: the National Digital Transformation Strategy, and a National ICT Policy. The latter replaced the ICT Policy of 1996. Both set an approach in facilitating the digital transformation of the country, and ICT sector development, in particular.

To ensure better cross-sectoral alignment and synergy, the Ministry of Technology and Science is planning to develop sectoral Digital Transformation Strategies for the key sectors. To make the strategies simple, more focused, and easier to implement, the strategies will be limited to transforming the core business of the sectors, rather than aiming to be all encompassing and universal. The Smart Zambia Institute, whose mandate is to coordinate and implement electronic government for citizens, businesses, and government for improved service delivery, will support the respective ministries to ensure alignment with the overall government vision and to avoid duplications and siloes.

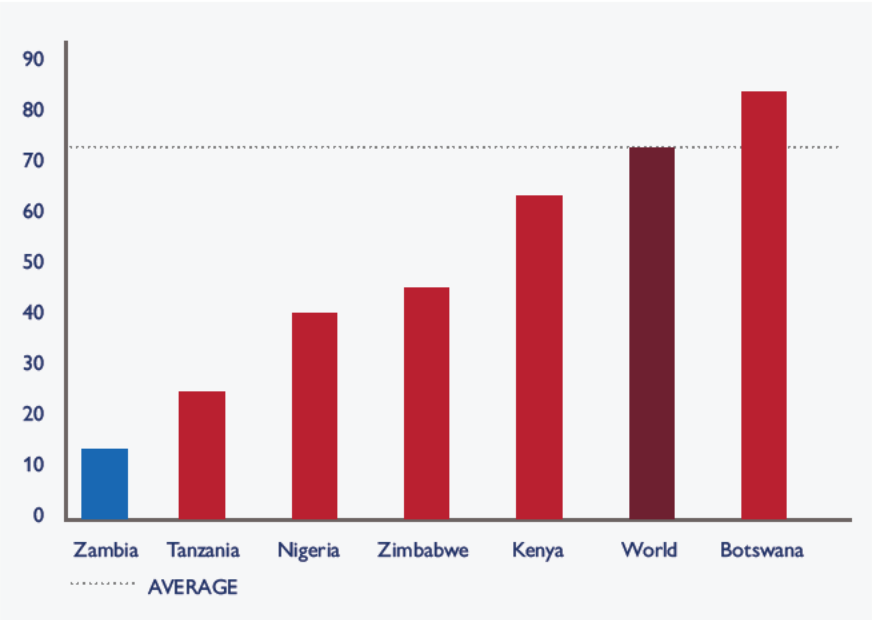
LACK OF PROPER IDENTIFICATION MECHANISMS IS ONE OF THE BIGGEST BOTTLENECKS FOR THE COUNTRY'S DIGITAL TRANSFORMATION JOURNEY

Though the current identification scheme based on plastic National Registration Cards (NRC) covers more than 80 percent of the adult population (of 16+ age), it relies on paper records and insecure credentials. Cards can easily be forged. This forces many ministries, departments, and agencies (MDAs) such as the Zambia Revenue Authority, the Zambia Elections Commission, and the Ministry of Health to develop their own identification schemes, resulting in duplication of records, efforts, and funds, and an inability to uniquely identify individuals.

Zambia also has the 4th lowest birth registration in the world, covering slightly more than 20 percent of children under 16 years of age. There is no data for death registration, but the figures are low.[61] While a unique identification number started being issued at birth, along with a birth certificate, with the launch of the Integrated National Registration Information System (INRIS) in March 2022, there is no integration or data exchange with health institutions for the exchange of vital statistics required for civil registration. By interconnecting the SmartCare+ system operated by the Ministry of Health, it would be possible to register newborns in health facilities and issue them birth certificates.

61 Officials at the DNRPC acknowledge during interviews that they do not track or enforce requirements to register deaths.

FIGURE 17: Birth registration (%)



Source: UNICEF, 2018

INRIS is the national and civil registration information management system, intended to replace the 1965 manual national registration system, and provide biometric-enabled (fingerprints) national registration cards and issuance of birth and death certificates by the Ministry of Home Affairs and Internal Security through the Department of National Registration, Passports, and Citizenship (DNRPC). INRIS has recently been made operational and currently covers 11 districts. Further expansion is subject to Government Wide Area Network (GWAN) coverage, which, according to the Smart Zambia Institute, is expected to cover 72 districts before the end of 2022. Enrollment of Zambians started in March 2022, but the number of enrolled persons is still low. At the end of March, there were fewer than 5,000 people enrolled, mostly civil servants, in an attempt to identify and eliminate ghost workers in the public sector. According to DNRPC representatives, the enrollment process is time-consuming, each individual taking around 25 minutes to register. This is due to the fact that full civil registration records are being created in parallel.

A mass enrollment of the population is envisaged, but there are no clear plans at this moment, the main barriers being the lack of mobile biometric registration kits and training of the mobile enrollment teams. Malawi's experience can serve as an example for Zambia, having managed to enroll about 9.2 million citizens over 16 years of age in a mass registration campaign, which lasted 180 days.[62] As of October 2021, over 10.3 million Malawi citizens were enrolled in the National Registration and Identification System.

Lack of integration and interoperability of INRIS with sectoral databases and information systems of national importance to exclude duplication and low enrollment numbers prevent it from being used as the single point of truth for identity data.

A new type of credential in the form of digital National Registration Card (eNRC) is planned for issue in 2023, based on the data from INRIS. It will have a dual interface and will store digital certificates, along with biometric and biographic data. This will require rollout of the national public key infrastructure (PKI) for generation of digital

62 Malik, Tariq, "Malawi's Journey Towards Transformation: Lessons from its National ID Project," Center for Global Development, August 19, 2020, https://www.cgdev.org/publication/malawis journey towards transformation lessons its national id project.

certificates, which is now missing. The national PKI is instrumental for issuance of digitally enabled credentials, ensuring security of eNRC data stored on the chip and future roll-out of ePassports.

The new credential is intended to enhance transaction security through proper identification of citizens, resulting in improved service delivery and identity verification, as well as significant savings in social cash transfers, Farmer Input Support Program (FISP), Support to Women Livelihood (SWL), pension benefits, and other such social protection programs. As stated by Stephen Kapyongo, now former Minister of Home Affairs in a Ministerial Statement to the Parliament in December 2019, biometric citizen identification has the potential to enhance tax compliance and increase domestic tax revenue mobilization to about 9.5 percent of GDP in the medium term.

Source: World Economic Forum, How digital identity can improve lives in a post-COVID-19 world

BOX 5: Key Identity-Related Terms

An identification system consists of the *databases, processes, technology, credentials, and legal frameworks* involved in the capture, management, and use of personal identity data for a general or specific purpose. The main technical infrastructure of an ID system are typically databases (or registers) of identity data and the credentials used to prove one's identity or particular attributes, such as ID cards. In addition, ID systems include mechanisms through which third parties can use these databases and/or credentials to verify or authenticate identities.

ID systems can be categorized into *foundational* and *functional*. Foundational ID systems are created with the goal of providing general identification and credentials for a variety of purposes and typically include civil registers, national ID cards, population registers, and so on. In contrast, functional ID systems are designed primarily to provide identification for a specific purpose or sector such as voter registers, tax ID numbers, social protection registers, driving licenses, and so on.

Together, the collection of foundational and functional ID systems within a country make up the identity ecosystem.

Source: USAID's Identity In A Digital Age: Infrastructure For Inclusive Development, The World Bank Group, Identification for Development (ID4D) Initiative

THE GOVERNMENT SERVICE BUS ENABLES BRINGING ONLINE MANY PUBLIC, SERVICES BUT ADOPTION IS LAGGING

One of the main objectives of the government's digital transformation program is streamlining the interaction with people and businesses in the form of digital services. In this aspect, Zambia, through the Smart Zambia Institute, which is responsible for the development, management, and promotion of electronic government services and improvement of service delivery to enhance citizens' access to government services, has made great progress in the last three years.

The flagship digital government initiative launched in 2019 and named the Government Service Bus[63] (GSB), aimed to make government information systems and databases interoperable, bring online 200 digital services, and create a digital one-stop-shop for service delivery, all by the end of 2021. To date, under the Ministry of Finance's guidance, which has financed the GSB project implementation, the Government Service Bus has been deployed, allowing government-owned databases and information systems to exchange data. Thanks to the deployment of GSB, around 267 services are provided online while another 60 services being developed and tested. Most of these services are aimed at increasing non-tax revenue, and preference has been given to fee-based services, which has left behind important services that are provided at no cost, including information obligation types of services such as tax declarations and business reporting. A lot of work still needs to be done to connect existing 'islands' of unconnected sectoral systems and databases.

The Zambia Government Services Portal (ZamPortal), which serves as the starting point and one-stop shop for government services for people, businesses, and civil society organizations, has also been developed as part of the GSB project. It offers the possibility to browse services by categories, target beneficiary, or as life scenarios, which are complex events encompassing multiple steps, agencies, and services, such as vehicle and business registration or employment for non-residents. To apply for services, portal users must create low-assurance self-registered accounts. Users are able to pay the service fees online, using Credit/Debit Cards (Visa and Mastercard, processed by Cybersource/ABSA), ZamTel Mobile Money, MTN Mobile Money.

A major barrier in the digitalization of some services is the lack of foundational ID data and of a mechanism to remotely verify the identity of people and businesses. Current low-assurance self-registered accounts are good for low-risk services like paying certain fees or taxes, but unsuitable for high-security transactions (e.g. reports, declarations, certain registration and certification processes etc.) where this could easily result in identity fraud. As high-assurance authentication mechanisms become available, people will be able to use their digital credentials to securely identify themselves for receiving complex online services.

Despite progress, a lot more work remains to be done in this area, as the last inventory performed by the Ministry of Technology and Science revealed a total number of 910 services. In order to avoid digitizing old and inefficient services, the government will need to start with rationalization of 910 services before putting them online. In many cases, they are simply steps of more complex services that have been broken down for convenience, and, in other cases, such services can simply disappear, as the interoperability platform will be able to provide necessary data to third-party agencies, instead of using citizens and businesses as mailmen to bring in confirmation documents. As the level of sophistication of digital government increases, many services would be provided proactively, without citizens needing to attend service providers offices.

63 The term "bus" (short for "omnibus") comes from the computer hardware field and originally referred to a bundle of parallel wires that connect key components, including the central processing unit, memory, and peripherals. Today, any shared communication channel that allows different components to share information might be referred to as a "bus."

To assist the governments of various countries with their digital transformation efforts, USAID has developed a Digital Government Model,[64] which provides a basis for establishing a shared understanding and language on the core components of digital government, including the contextual considerations and foundational elements that influence the success of digital government investments. The Model can serve as a good reference for ensuring that aspects and components are taken into account and that the GRZ follows a holistic approach to digital transformation of the government, as well as serve as a common denominator for any future USAID programmatic efforts targeting digital government.

However, the biggest challenge for the Government of Zambia is to make sure the available digital services are used to their full potential. To better serve businesses, the Government of Zambia established the Regulatory Services Centers (RSC), operated by the Business Regulatory Review Agency (BRRA), to offer a wide range of services related to business registration by bringing together officers from Zambia Revenue Authority, Zambia Development Agency, and Patents and Companies Registration Agency under one roof. Currently, there are one-stop shops in Lusaka, Livingstone, Chipata and Kitwe.

GOVERNMENT OF ZAMBIA IS MAKING THE FIRST STEPS TOWARD BECOMING MORE OPEN AND ENGAGING WITH CITIZENS AND THE PRIVATE SECTOR

With the establishment of the new government office, there have been attempts to engage people in the governing process, but there is a lot that needs to be done as there are no citizen feedback and engagement mechanisms no centralized avenue for gathering citizens' feedback.

Some ministries and agencies start engaging stakeholders in the private sector in consulting certain regulations, such as the regulations on cybersecurity. However, these efforts are uncoordinated and sporadic and not very transparent themselves.

The Zambian Public Procurement Agency, with support from Open Contracting Partnership, is publishing procurement data in OCDS standard, but due to the low number of contracting agencies using the platform, the usefulness of such data leaves much to be desired. The Zambian Statistical Agency is also publishing certain datasets pertaining to population demographics and the country's economic and social indicators on the Open Data for Africa portal, operated by the African Development Fund, but most of the datasets are obsolete by now.

2.3. PILLAR 3: DIGITAL ECONOMY

Digital Economy looks at how people use money digitally and how businesses are moving online and becoming digitally enabled. This includes digital financial services (credit or debit cards, payment apps, mobile money, and digital savings and loan products), and how they are affected by the regulatory environment. Areas of inquiry include financial inclusion, mobile money usage, and the FinTech enabling environment. E-commerce typically depends on digital financial services for seamless online payments, often across borders. The digital economy depends on a local digital talent pool; a healthy economy requires a supply of ICT skills that match the demand.

64 "Digital Government Model," USAID, June 13, 2022, https://www.usaid.gov/digital_development/digital_government_model.

KEY TAKEAWAYS

DIGITAL ECONOMY

- Existing legal and institutional frameworks provide a solid basis for a digital economy, although some key aspects, such as e commerce and digital trade, are still not regulated and procedural inefficiencies persist.
- Mobile money is driving adoption of Digital Financial Services. However, adoption across MSME supply chains is hampered by high digital channel maintenance fees (such as USSD code annual fees with ZICTA and monthly USSD hosting fees with the Mobile Network Operators) and transaction commissions.
- E Commerce is nascent with a number of active startups, but underdeveloped logistics and addressing systems, a lack of trust, and low digital financial literacy levels remain barriers.
- Tech entrepreneurship is emerging, led by FinTech, but could benefit from incentives to address startup and compliance costs, access to finance, business and technical skills to scale products.
- The national ICT sector is nascent, and while demand for specialists is growing, availability and awareness of opportunities in ICT education and professions is relatively low.

RELEVANT RECOMMENDATIONS

1. Strengthen the tech startup ecosystem, starting with access to finance.
2. Leverage the successes of the FinTech sector to help drive digital adoption by traditional MSMEs.
3. Grow the IT sector workforce for today and the future.
4. (Cross cutting) Strengthen capacity to develop and maintain secure, resilient infrastructure in Zambia.

In the last ten years, Zambia has moved toward a digital economy by implementing an enabling financial sector legislative framework and key infrastructure such as the Real Time Gross Settlement (RTGS) system and the National Financial Switch (NFS). Financial sector development and financial inclusion strategies have also been implemented. The dark cloud of the COVID-19 pandemic had a silver lining for the banking and financial services sector in that it led to an increased utilization of digital financial services and online platforms in general. This trend is evidenced by a surge in mobile money transactions (at an average annual rate of 127 percent over the period 2017 to 2021) in both volume and monetary value, positively impacting financial inclusion. Similarly, a tech entrepreneurship culture is emerging, supported by active local incubators and innovation hubs. The FinTech space has seen the most startup activity. The newly elected government has not only continued but also heightened the digital transformation agenda through the establishment of the Ministry of Technology and Science and the Ministry of Small and Medium Sized Enterprise Development.

Despite these gains, challenges remain in the digital finance and tech entrepreneurship sectors as well as in e-commerce, digital trade, and the development of the digital talent pool. The legal and institutional framework is lacking for e-commerce and digital trade, while venture capital is beginning to be addressed with the publishing of venture fund guidelines in May 2022. Digital Financial Services (DFS) adoption across MSME supply chains is hampered by high digital channel maintenance fees and transaction commissions. Regulatory procedural inefficiencies, inhibitive compliance and startup costs, a lack of access to financing and limited technical and business skills are negatively affecting the tech startup ecosystem. Limited infrastructure required to support the use of ICTs in schools and a lack of necessary ICT skills among teachers are hampering the preparation of digital talent in early education. At the tertiary level, there is relatively low availability and awareness of training opportunities as well as a low female enrollment across all ICT programs. The technical skills gap is most pronounced in the cybersecurity field. The digital talent pool and the digital economy as a whole are also characterized by significant gender divides.

STRONG EVIDENCE OF GOVERNMENT-BACKED TRANSFORMATION TOWARD A DIGITAL ECONOMY

Zambia liberalized its economy and embraced a free market system in 1991. The reforms led to a Gross Domestic Product (GDP) growth that averaged 4 percent annually until the COVID-19 pandemic. The pandemic led to a contraction of 2.8 percent in 2020; however, 2021 saw a growth of 4.3 percent.[65]

The last ten years have seen a steady push toward digitization of the economy led by the banking and financial services sectors. The push has been enabled by the promulgation of various pieces of legislation in the ICT and financial sectors. The National Payment Systems Act No. 1, 2007[66] provides a legal backing for the operation of the various payment mechanisms in Zambia. This was followed by the Banking and Financial Services Act No. 7, 2017[67] that provides a licensing system for the conduct of banking or financial business and provision of financial services. Others are the Companies Act. No 10 2017[68] and the Competition and Consumer Protection Act No. 24, 2010[69].

In 2021, the government enacted the Electronic Communications and Transactions Act (ECT) No. 4 of 2021[70] to, among other things, provide for the use, security, facilitation, and regulation of electronic communications and transactions; encourage investment innovation in relation to electronic transactions; and regulate the National Public Key Infrastructure. Another law enacted in 2021 is the Data Protection Act No. 3, 2021[71] that is intended to regulate the collection, use, transmission, storage, and otherwise processing of personal data. In addition to the ECT Act No. 4 of 2021, the government has noted the importance of cybersecurity by enacting the Cybersecurity and Cyber Crimes Act No. 2, 2021[72]. The Act provides for the constitution of the Zambia Computer Incident Response Team; the constitution of the National Cybersecurity Advisory and Coordinating Council; the continuation of the Central Monitoring and Coordination Center; the protection of persons against cybercrime; and facilitate identification, declaration, and protection of critical information infrastructure.

Besides enacting the laws, Zambia developed and implemented strategies, such as the National Payment System Vision and Strategy (NPSVS) 2017 – 2022[73], the National Financial Inclusion Strategy 2017–22 (NFIS)[74] and the National Financial Sector Development Policy 2017 (NFSDP)[75] to develop digital financial services and enhance financial inclusion. The NFIS identified widespread and accessible (digital) delivery channels and diverse, innovative, customer-centric products as key drivers for the framework. One of the anchor principles of the NFSDP is

65 "Report for Selected Countries and Subjects," International Monetary Fund, April 19, 2022.

66 "National Payment Systems Act No. 1, 2007," Republic of Zambia, 2007, https://www.boz.zm/NationalPaymentSystemAct2007.pdf.

67 "The Banking and Financial Services Act No. 7, 2017," Republic of Zambia, 2017, https://www.boz.zm/TheBankingandFinanceActNo7of2017.pdf.

68 "Companies Act. No 10 2017," Republic of Zambia, 2017, https://www.parliament.gov.zm/sites/default/files/documents/acts/Companies%20Act%2C%202017.pdf.

69 "Competition and Consumer Protection Act No. 24," Republic of Zambia, 2010, https://www.parliament.gov.zm/sites/default/files/documents/acts/The%20Competition%20and%20Consumer%20Protection%202010.pdf.

70 "Electronic Communications and Transactions Act No. 4 of 2021," Republic of Zambia, 2021, https://www.parliament.gov.zm/sites/default/files/documents/acts/Act%20No.%204%20of%202021%2C%20The%20Electronic%20Communications%20and%20Transactions_0.pdf.

71 "Data Protection Act No. 3, 2021," Republic of Zambia, 2021, https://www.parliament.gov.zm/sites/default/files/documents/acts/Act%20No.%203%20The%20Data%20Protection%20Act%202021_0.pdf.

72 "Cybersecurity and Cyber Crimes Act No. 2, 2021," Republic of Zambia, 2021, https://www.parliament.gov.zm/sites/default/files/documents/acts/Act%20No.%202%20of%202021The%20Cyber%20Security%20and%20Cyber%20Crimes.pdf.

73 "National Payment System Vision and Strategy 2018 2022," Bank of Zambia, 2018, https://www.boz.zm/VisionandStrategy2018_2022.pdf.

74 "National Financial Inclusion Strategy 2017 2022," Republic of Zambia, Ministry of Finance, 2017, https://www.boz.zm/National_Financial_Inclusion_Strategy_2017_2022.pdf.

75 "National Financial Sector Development Policy 2017," Republic of Zambia, Ministry of Finance, 2017, https://www.boz.zm/National_Financial_Sector_Development_Policy_2017.pdf.

inclusiveness, and this is complemented by the NPSVS' goal of increased access and use of electronic payment methods. The Ministry of Technology and Science is leading the development of a National ICT Policy and National Digital Transformation Strategy, raising the importance of DFS for greater inclusion and engagement.

Another step in the digital transformation agenda is the formation of the Ministry of Technology and Science and the Ministry of Small and Medium Sized Enterprise Development (MoSME Dev) by the government. The Central Bank, BoZ, has also helped develop digital financial services by proactively regulating the sector through circulars and directives. Examples include the upward revision of transaction and balance limits for mobile money wallets in March 2020 (during COVID), and the guidelines for Conducting a Regulatory Sandbox in April 2021.[76] BoZ is also researching the formation of a digital currency to cut transaction costs and boost participation in the formal financial system. The bank, however, is cautious with regard to cryptocurrencies, warning that they are not yet legal tender in Zambia[77].

The legal and policy reforms have not covered all aspects of the digital economy. The reforms are missing explicit policy direction toward e-commerce and digital trade. Venture capital is being addressed with the publishing of venture fund guidelines in May 2022. Similarly, the development of Zambia's digital talent pool is being addressed in the National ICT Policy 2022 and the National Digital Transformation Strategy 2022-2026.

BOX 6: Regulatory Sandboxes Explained

A regulatory sandbox is a framework put in place by a regulator that lets financial entities experiment with innovative products, services, and business models in a controlled environment with targeted regulatory and supervisory policies. A sandbox can be seen as a signal to innovators in the financial sector that regulators are willing to engage.

For example, the SEC[78] of Zambia Regulatory Sandbox was established to facilitate testing of new capital market products under a set of conditions and limitations designed to protect investors. The new products (innovations) are not adequately addressed by the existing regulatory framework. In September 2021, Kukula[79] launched Zambia's first discretionary asset management solution (that allows investors to invest in top performing global stocks and bonds, and in which buy and sell decisions are at the portfolio manager's discretion) on the SEC sandbox[80]. Another product on the SEC Sandbox is the Lupiya peer to peer lending platform.

MOBILE MONEY IS PROPELLING THE DIGITAL FINANCIAL SERVICES

Digital Financial Services (DFS) in Zambia include payments, transfers, insurance, and savings spread mainly across the 19 commercial banks operating in Zambia, the three mobile operators (Airtel, MTN and Zamtel) and, to some extent, insurance companies. Between 2015 and 2020, mobile money eclipsed traditional banks and has

76 "Guidelines for Conducting Regulatory Sandbox," Bank of Zambia, 2021, https://www.boz.zm/202104GuidelinesforConductingRegulatorySandbox.pdf

77 Mitimingi, Taonga Clifford, "Zambia Explores Digital Currency but Warns Against Crypto," Bloomberg News, February 9, 2022, https://www.bnnbloomberg.ca/zambia explores digital currency but warns against crypto 1.1720570.

78 "Regulatory Sandbox Guidelines for Capital Markets," Securities and Exchange Commission, Zambia, December 2020, http://www.seczambia.org.zm/wp content/uploads/2021/03/Regulatory Sandbox Guidelines for Capital Markets Final OnlineSharing.pdf.

79 https://kukulacapital.com/

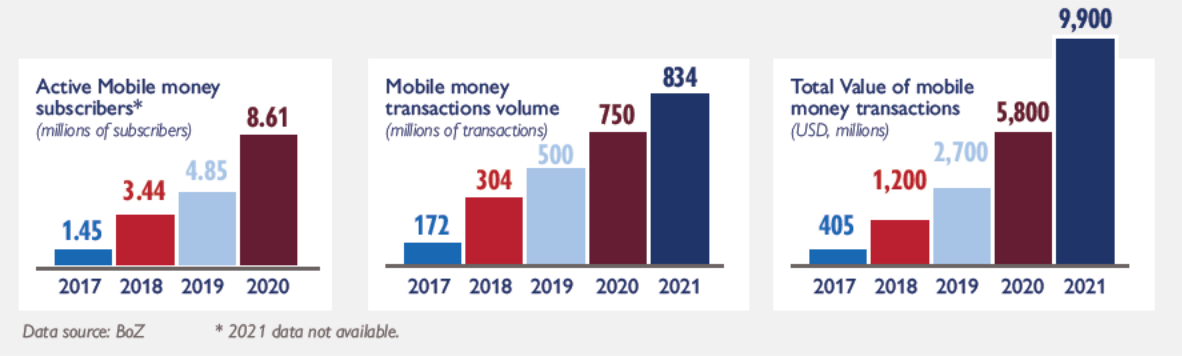
80 "Kukula participates in the successful launch of the Regulatory Sandbox under The Securities and Exchange Commission, Zambia," Financial Insight, November 22, 2021, https://fizambia.com/kukula participates in the successful launch of the regulatory sandbox under the securities and exchange commission zambia/.

become the dominant way Zambians engage in the financial system. This was even before the pandemic pushed yet more people to adopt digital payment, according to the FinScope Zambia survey[81].

The key DFS infrastructure in Zambia are the RTGS and the NFS. The RTGS was implemented by the central bank, Bank of Zambia (BoZ) in 2014, in conjunction with the commercial banks and other stakeholders, to facilitate large-value interbank funds transfers. Zambia, through the Zambia Electronic Clearing House Limited (ZECHL), established an NFS in 2014, to migrate automated teller machine (ATM) and point of sale (POS) transactions from the Visa platform to a local platform. The NFS went live in 2018 and was officially launched in 2019[82]. The NFS project was completed in 2020, following the implementation of mobile money functionality[83] thereby enabling wallet-to-bank, and bank-to-wallet transfers; cash out at ATM or agent; and cross network mobile money transfers.

The last five years have seen remarkable growth of mobile money activity in both volume and value. Several DECA interviewees attributed this to the underlying policies and infrastructure, the facilitative role of BoZ, and attitude changes due to the COVID-19 pandemic. According to BoZ[84], the value of mobile money transactions has increased by an average annual rate of 127 percent over the period 2017 to 2021. The annual value of mobile money transactions increased from US$ 0.4 billion in 2017 to US$ 9.9 billion in 2021. There was a corresponding increase in the annual transaction volumes from 172 million to 834 million in the same period. Figure 18 below details the progression.

FIGURE 18: Mobile Money Volume



Source: Bank of Zambia

This appears to be a trend for many African countries. For instance, in 2021, the volume of mobile money transactions in Ghana increased by 20 percent[85] and in Kenya it grew by 32 percent.[86] Rwanda hit a staggering 206 percent increase over the pandemic 2020 year.[87]

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81 FinScope Zambia, 2020, https://www.boz.zm/finscope_2020_survey_topline_findings.pdf. The FinScope 2020 Survey Topline Findings (Finscope 2020) identified the spread of access to formal financial services among adults as 58.5% through mobile money followed by 20.7% through the banks, while capital markets were least popular at 0.6%. In 2015, the spread was 14% mobile mobile money, 24.8% bank and 0.3% capital markets

82 Ng'andu, Bwalya, 2019, "Official Launching of Going Live of The National Financial Switch, "https://www.boz.zm/Speech_on_the_launch_of_the_NFS_Final.pdf

83 Annual Report, Bank of Zambia, 2020, https://www.boz.zm/BankofZambia2020AnualReport.pdf.

84 Payment Systems Statistics, Bank of Zambia, 2021, https://www.boz.zm/payment_systems_statistics.htm, accessed June 2022.

85 Effah, Evans, "Mobile Money Transactions Value Decline by 3%," Pulse.com, https://www.pulse.com.gh/business/local/mobile_money_transactions_value_decline_by_3_bog/8hqfh7s.

86 Mobile Payments, Central Bank of Kenya, https://www.centralbank.go.ke/national_payments_system/mobile_payments/, accessed June 2022.

87 Mobile Payout, National Bank of Rwanda, https://www.bnr.rw/browse_in/statistics/payment_system_statistics/mobile_payment, accessed June 2022.

In Zambia, the surge in mobile money utilization has promoted financial inclusion. The FinScope 2020 records that Zambia saw a significant increase in the level of financial inclusion among adults from 59.3 percent in 2015 to 69.4 percent in 2020. Despite this, 30.6 percent of adults remained financially excluded, and the most challenged are women (financial inclusion gender gap stood at 4.9 percent), rural based populations as well as MSMEs[88]. The government has committed to addressing this by upscaling the implementation of the NFIS 2017-2022.

This digital financial services environment has also opened opportunities for FinTech solution providers. The FinTech entrepreneurs are offering innovative products and services ranging from digital value for utilities (electricity and water), mobile phone airtime, and subscription television services, micro-finance and micro-insurance services. One DECA interviewee, Karzang, boasts a network of more than 15,000 POS devices across the country. Besides digital value, Kazang is also offering money transfer and agency banking. Lupiya, an award-winning FinTech startup that provides online loans and a peer-to-peer lending platform is another innovative DFS provider. The DECA team observed that the Payments Association of Zambia is also facilitating growth of the sector by providing a unified advocacy platform. The association is in the process of transforming and changing its name to the Payments and FinTech Association of Zambia to reflect the development of the market.

The growth in DFS has not been without bottlenecks. The stakeholders interviewed by the DECA team attributed the low penetration of DFS among MSMEs to slow adoption in their respective supply chains on account of high channel maintenance fees (such as USSD code annual fees with ZICTA and monthly hosting fees with the Mobile Network Operators) and transaction commissions. The ZICTA annual USSD short code fees stand at about US$ 1,700 while the monthly USSD short code rental fees average US$ 350 per mobile network operator. These figures are high for MSMEs. The impact on financial inclusion is significant because MSMEs represent 97 percent of all businesses in the country, 70 percent of GDP, and 88 percent of employment[89]. The sector has experienced a significant rate of fraud incidences in mobile money transactions linked to digital and financial illiteracy. The two sector strategies, NFIS and the NPSVS, are in their last year. The Ministry of Finance could not undertake a mid-term review of the NFIS due to COVID-19. The strategy will be reviewed by the end of 2022. Whereas BoZ and ZECHL have done well in fostering DFS growth, there is room for improvement in the registration of payment system providers. Stakeholders noted duplications in that a payments service startup is required to propose three names for clearance to register with BoZ, even if the startup may already be registered with PACRA. In addition, the onboarding process onto the NFS takes a minimum of 90 days.

88 Musokotwaneof, Situmbeko, "2022 Budget Address by Honourable Dr. Situmbeko Musokotwane, MP, Minister Of Finance And National Planning, Zambia, October 29, 2021, https://www.parliament.gov.zm/sites/default/files/images/publication_docs/BUDGET%20SPEECH%20_%202022.pdf

89 https://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/Promoting_SME_comp_Zambia_web.pdf

BOX 7: National Financial Switch Explained

A national financial switch (NFS) is an electronic payment transaction system that allows customers to make secure, non cash payments from any associated financial institution.

Important considerations for a NFS rollout:

- Other potential payment gateway providers should still be able to enter the market.
- The regulator should have capacity to provide effective oversight to maintain security and efficiency, and to foster inclusion and competition.
- Some financial service providers may need technical support connecting with the NFS.
- Though specific payment types may initiate the launch (e.g., government payments in Nepal), ultimately diverse payment types should be enabled.
- Investments in research and insights upfront are important for ensuring viability, security, and inclusivity.

NASCENT E-COMMERCE

Over the past decade global e-commerce has expanded at an average rate of 20 percent per year as brick-and-mortar shops have languished. E-commerce as a share of total global retails sales increased from 7.4 percent in 2015 to 19.6 percent in 2021, with a big jump between 2019 and 2020[90] due to pandemic rollout.

In Zambia, e-commerce is comparatively underdeveloped. E-commerce as a digital marketplace brings wholesale and retail online. E-commerce participants make transactions of goods and services online, then deliver either offline or online. Around 20 percent of Zambian Internet users shopped online, translating to around 5 percent of the population.[91] According to the UNCTAD B2C E-Commerce Index[92], the country ranked 120th out of 152 countries in 2020. Zambia made progress, jumping five positions ahead from 125th rank in 2019, but since 2014 it has lost 28 positions. This is partly a result of an increase in the use of smartphones as channels for purchases and other financial transactions via credit and debit cards. Notably, the number of ATMs almost doubled in the last decade.[93] This ongoing increase is attributed to improved data networks, affordable data services, and the expansion of networks by operators aggressively competing for customers.[94] Since the COVID-19 outbreak, the use of smartphones for e-commerce has shown rapid growth, especially in domestic payments in retail, wholesale, utility, and obligatory payments to the government.[95] Government policy commitments to support the digital agenda and positive developments on financial inclusion can evidence further development of e-commerce in the country.

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90 "Retail space per capita in selected countries worldwide in 2018," Statista, https://www.statista.com/statistics/1058852/retail space per capita selected countries worldwide, accessed June 2022.

91 The Unctad B2c E Commerce Index 2020: Spotlight on Latin America and the Caribbean," United Nations Conference on Trade and Development, 2020, https://unctad.org/system/files/official document/tn unctad ict4d17 en.pdf.

92 The UNCTAD B2C E commerce Index measures an economy's preparedness to support online shopping. The index consists of four indicators that are highly related to online shopping and for which there is wide country coverage. The four indicators are: (1) Account ownership at a financial institution or with a mobile money service provider (% of population ages 15+); (2) Individuals using the Internet (% of population); (3) Postal Reliability Index; and (4) Secure Internet servers (per 1 million people)

93 "Automated Teller Machines per 1,000 Adults Zambia," International Monetary Fund, https://data.worldbank.org/indicator/FB.ATM.TOTL.P5?locations=ZM, accessed June 2022.

94 "Zambia Country Commercial Guide," International Trade Administration, July 11, 2021, https://www.trade.gov/country commercial guides/zambia ecommerce.

95 "The Effect of Covid 19 Lockdown Measures on Internet Speed: An Empirical Analysis of 18 Countries in Africa," The World Bank, December 2020, https://openknowledge.worldbank.org/bitstream/handle/10986/35148/The Effect of COVID 19 Lockdown Measures on Internet Speed An Empirical Analysis of Eighteen Countries in Africa.pdf?sequence=1&isAllowed=y

In Zambia, e-commerce companies include local e-commerce marketplaces (e.g., eMsika), delivery companies (e.g., Afridelivery, Tigmoo, Ulendo), payment platforms (e.g., Digital PayGo, OPay, Kazang, Swish), banks (e.g., Zanaco Bank, FNB), regional (e.g., Jabu) and international (e.g., eBay, Alibaba, Amazon) players. Notably, the number of local e-commerce start-ups in logistics is increasing, especially in food delivery.[96] Large international companies, though, have a significant advantage over local businesses by providing a diversified range of goods and services, while national ones concentrate on a single sector, such as agriculture. Products range from electronics, footwear, clothing, and accessories to motor vehicle spare parts and motor vehicles. The U.S. International Trade Administration reports[97] challenges faced by international companies, including a lack of information from the service provider such as contact details, a lack of tracking, non-receipt of the item purchased, non-standard or unclear terms and conditions, added costs such as customs duty, value added tax, and import declaration fees. For e-commerce companies, mobile money is emerging as a form of payment systems offered to their customers besides the common cash-on-delivery.

As discussed in the Pillar I, Zambians are active users of social media. Citizens are increasingly using it to buy and sell products (e.g., Facebook Marketplace, Instagram, WhatsApp) in addition to business networking and socializing. In the last few years, there has been a surge in social media usage, with a 13 percent increase in social media users in Zambia in 2021 as compared with 2020.[98]

In contrast to other Sub-Saharan African countries (e.g., Kenya, Botswana) that have e-commerce policies under development or discussion, Zambia has not initiated any so far. Generally, countries have better-developed e-commerce legal frameworks in place to help businesses navigate and run legally (covering payments, logistics, skills, sales, for example). Zambia does not have specific e-commerce legislation and strategies, nor does it have an inter-ministerial coordination body on e-commerce. None of the Seventh National Development Plan (7NDP)[99] Working Groups explicitly covered e-commerce, and it was not a priority topic in formal inter-ministerial mechanisms.[100] Nor is it highlighted by the recently developed 8NDP and draft National Digital Transformation Strategy. However, several important regulatory provisions directly affect the use of online purchases and sales in the country: Specifically, 1) The Information and Communication Technologies Act of 2009 that regulates the telecommunication sector; 2) The Cybersecurity and Cyber Crimes Act, that allows cyber inspectors to access any ICT equipment reasonably believed to have been used in connection with an offense; 3) the Data Protection Act of 2021, that sets data localization requirements for sensitive data. Such directive regulatory solutions are considered to be a significant obstacle for e-commerce to flourish by imposing strict requirements for businesses working with personal data.[101]

Some important government-led initiatives have been launched. For instance, in 2017 the Zambian government supported the development of a B2B portal[102] to strengthen the relationships between local MSME suppliers and large corporations. The portal includes a database of suppliers and buyers and provides electronic tools to enable buyers to submit tender information and receive bids from suppliers. The portal is funded by FCDO and

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96 Mwachi, Lucky, "Creating sustainable impact in Zambia's food delivery industry: Meet Ubuntu Meal Deliveries," Growth Africa, June 4, 2020, https://growthafrica.com/creating sustainable impact in zambias food delivery industry meet ubuntu meal deliveries/

97 "Zambia Country Commercial Guide," International Trade Administration, July 11, 2021, https://www.trade.gov/country commercial guides/zambia ecommerce.

98 Kemp, Simon, Digital 2021: Zambia, DataReportal, https://datareportal.com/reports/digital 2021 zambia.

99 "National Development Plan," Ministry of National Development Planning, Republic of Zambia, 2017, Development Plan (7NDP). https://www.mndp.gov.zm/wp content/uploads/2018/05/7NDP.pdf

100 "Republic of Zambia: Rapid eTrade Readiness Assessment,"United Nations Conference on Trade and Development, 2018, https://unctad.org/system/files/official document/dtlstict2018d10 en.pdf.

101 Ibid.

102 "Increasing trade between local SME suppliers and large corporations in Zambia," https://zamb2b.com, accessed June 2022.

the Private Enterprise Program Zambia (PEPZ). There is also a G2B platform that facilitates the full lifecycle of the government tendering process for buyers and sellers.[103]

Key administrative bodies involved in e-commerce policy-making include ZICTA, the main ICT regulatory body, Zambia Postal Services Corporation (ZAMPOST), the main mail and courier services authority, the Zambia Chamber of Commerce and Industry (ZACCI), key business association, and the Ministry of Commerce, Trade and Industry (MCTI), and the Ministry of SME Development.

Major obstacles for Zambians to trade online remain cash-based habits (Box 8) as well as logistics infrastructure: long distances and high logistics costs that affect the viability of both domestic and cross-border trade. Only a small proportion of the population in Zambia has a home address which creates a challenge for goods-based e-commerce activity. The lack of home addresses and a general addressing system is a barrier to e-commerce development that several interviewees reiterated. According to the latest iteration of the World Bank Logistics Performance Index, Zambia rose more than 10 positions in four years, from 123rd in 2014 to 111th in 2018.[104] During this timeframe, Zambia revealed progress on timeliness of shipments and international shipments dimensions. The government has recognized this obstacle and, in 2019, launched the National Logistics and Transport Policy [105] to develop transport infrastructure and facilitate seamless transportation of goods.

BOX 8: E-Commerce potential

E commerce is an efficient tool to promote sales not only within the borders of the country but cross border too. Online marketplaces allow smaller businesses and individual entrepreneurs to reach out to global markets, increase their visibility, and connect with customers locally and abroad. However, many African countries, including Zambia, face an issue of underdeveloped environment to trade online. Many work in silos to solve emerging issues, develop sustainable e commerce, and incentivize trade. Lack of online payment methods, cash economy habits, and poor digital literacy remain challenges for many countries in the Sub Saharan region to boost online sales. Globally, some countries embraced online shopping, circumventing the issue of the underdeveloped online payment systems. For instance, the experience of Indonesia (Lazada.com), Jordan (CashBasha.com), and China (JD.com) shows that local e commerce platforms adopted an online shopping with offline payment mode (frequently referred to online to offline commerce with cash on delivery payments), where courier companies collect payments from the consumer when they deliver the items. The platforms often collaborate with retail chains and use their stores to collect payment when shoppers come to pick up their orders. Such an approach gains its popularity, specializing in cold chain logistics and service. This allows e commerce to reach a wider population, particularly those in rural areas who do not have cards or have not yet habituated to online payment.

A skills gap also thwarts full-fledged rollout of e-commerce services in Zambia. E-commerce related educational programs such as web development, application development, and digital products development, are limited. The training programs[106] required for e-commerce are offered by some universities and start-up hubs (e.g., BongoHive, Hackers Guild), but the hubs themselves are under-resourced.[107]

103 https://eprocure.zppa.org.zm, accessed June 2022.

104 "Global Rankings 2018," The World Bank, https://lpi.worldbank.org/international/global, accessed June 2022.

105 https://www.mtc.gov.zm/wp_content/uploads/2019/08/2019_National_Transport_Policy.pdf

106 "Republic of Zambia: Rapid eTrade Readiness Assessment,"United Nations Conference on Trade and Development, 2018, https://unctad.org/system/files/official_document/dtlstict2018d10_en.pdf.

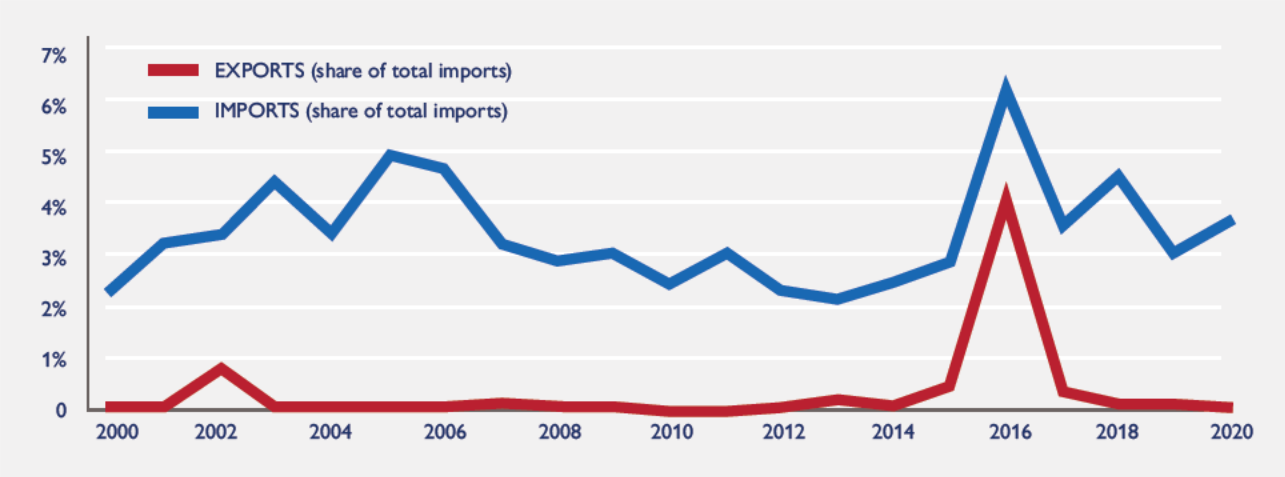
107 https://www.zicta.zm/storage/posts/attachments/WYXonZzjMUGCj2RKUmX8g9hdq4jgcqPIxd1DqBv.pdf

The DECA interviewees also noted that the sector regulations are not fully aligned with an e-commerce business model in terms of parcel handling. The need for a streamlined and focused consumer protection mechanism for the sector was observed. Limited digital financial literacy and the lack of trust for online platforms were also noted.

ICT TRADE IN A LOW DEMAND

Long distances, toll fees, and many non-tariff barriers make trade logistics expensive in Zambia. This affects all cross-border trade, including cross-border e-commerce activity. In 2020, Zambia was 85th in total exports and 123rd in total imports out of 226 countries analyzed, and 92rd out of 127 economies ranked in the Economic Complexity Index.[108] The top exports of Zambia are not in the ICT field. Zambia exports copper, gold, precious stones, and sulfuric acids, and mostly to Switzerland, China, and Namibia. ICT goods[109] exports constitutes a mere 0.05% of total exports. This share has not seen major change for the last 20 years (see Figure 19).[110] ICT imports have also not changed significantly in recent years, demonstrating low demand on information technologies in the country. In 2020, ICT goods imports for Zambia was less than 4 percent.[111] A similar ratio applies to ICT services[112] over the same period (see Figure 19).[113]

FIGURE 19: Trade of ICT goods, Zambia, 2000-2020



Source: World Bank

Zambia has established international trade relations, both regionally and globally, that may help expand trade of ICT goods and services in the coming years. By 2022 Zambia had become a member of the WTO and a range of African single market trade agreements, including Common Market for Eastern and Southern Africa (COMESA), African Continental Free Trade Area (AfCFTA), and Southern African Development Community (SADC). These

108 Tech Entrepreneurship Ecosystem in Zambia: A Network Analysis of Institutions Supporting Entrepreneurship," International Trade Centre, https://oec.world/en/profile/country/zmb, accessed June 2022.

109 ICT goods imports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and miscellaneous technology goods.

110 ICT goods exports (% of total goods exports) Zambia," United Nations Conference on Trade and Development, https://data.worldbank.org/indicator/TX.VAL.ICTG.ZS.UN?locations=ZM, accessed June 2022.

111 "Zambia ICT goods imports as a share of total goods imports," knoema, https://knoema.com/atlas/Zambia/topics/Foreign Trade/Import/ICT goods imports, accessed June 2022.

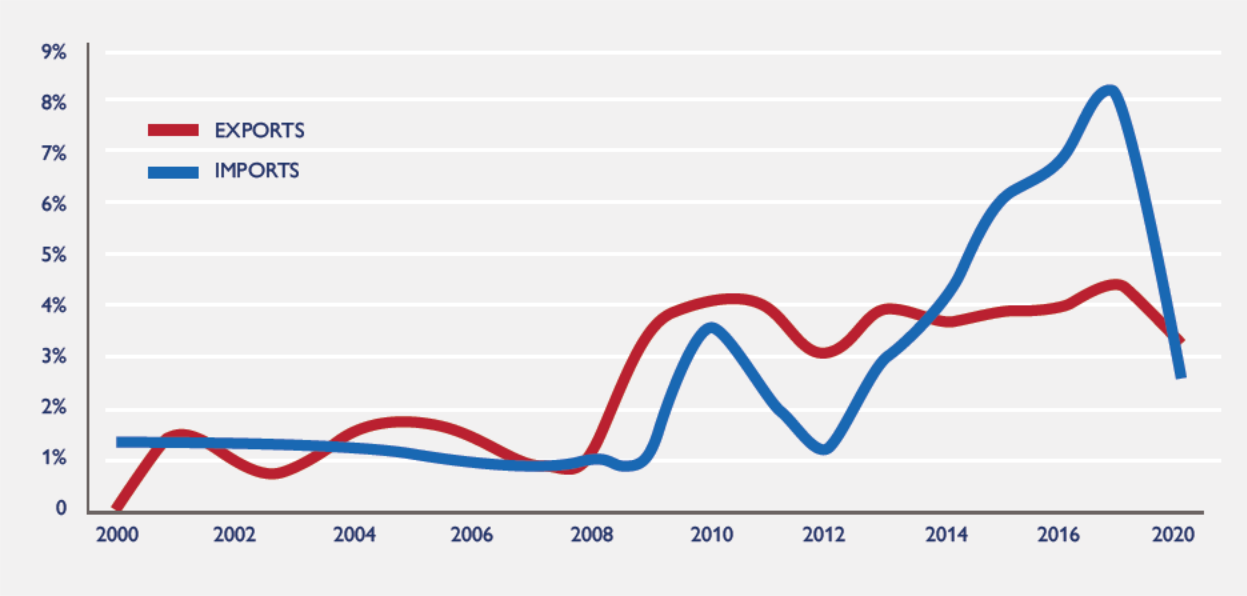
112 ICT (or telecommunication) service trade includes transactions that cross national borders, such as telephone calls or electronic mail sent from one country to another. It also covers foreign investment, such as the purchase of telephone companies by foreign investors or joint ventures between local and foreign partners to establish new telecommunication service companies.

113 The DECA team was unable to find any explanation for the apparent import export spikes in 2016.

agreements allow for preferential tariff duties among member states and can guarantee smoother cross-border trade for Zambian MSMEs in the ICT sector. Zambia has duty-free and quota-free access to the EU market, under the "Everything but Arms" (EBA) program for the world's Least-Developed Countries (LDCs). Zambia is also eligible for trade benefits under the African Growth and Opportunity Act (AGOA), which provides duty-free/quota-free access to the U.S. market for most goods.[114]

Zambia has integrated into two regional payment systems: The Southern African Development Community (SADC), Integrated Regional Electronic Settlement System (SIRESS), the Common Market for Eastern and Southern Africa (COMESA), and the Regional Payment and Settlement System (REPSS) for purposes of settling cross-border transactions.[115]

FIGURE 20: Trade of ICT services, Zambia, 2000-2020



Source: OEC, World Bank

Another trade facilitation measure is the Zambia Electronic Single Window that brings transparency, efficiency, and predictability in the international Trade supply Chain. It aims to facilitate trade by allowing stakeholders to obtain certificates, trade import and export permits for all ministries and other government agencies. The platform currently offers permit issuance services from the Ministry of Agriculture. The Zambia Revenue Authority is in the process of implementing a Customs-to-Customs electronic data exchange mechanism with Botswana for the Kazungula one-stop border post.[116]

114 "Zambia Country Commercial Guide," International Trade Administration, July 11, 2021, https://www.trade.gov/country commercial guides/zambia trade agreements.

115 "Regional Payment Systems," Bank of Zambia, https://www.boz.zm/regional payment systems.htm, accessed June 2022.

116 "Zambia and Botswana make progress in Customs Systems Connectivity and Data Exchange," World Customs Organization, May 10, 2022, http://www.wcoomd.org/en/media/newsroom/2022/may/zambia and botswana make progress in customs systems connectivity and data exchange.aspx

EMERGING TECH STARTUP ECOSYSTEM

A tech startup is a temporary organization formed to search for a repeatable and scalable business model that brings technology products and services to the market.[117] This is different from a traditional tech company, which is a permanent organization designed to execute a repeatable, scalable business model. Tech startups include both social enterprises and profit-oriented businesses. Startups require a supportive ecosystem that includes universities and research institutions; support organizations (incubators, accelerators, co-working spaces); and funding organizations. Figure 21 below provides an overview of the support network for Zambian startups.

FIGURE 21: Overview of Zambia startup ecosystem

	Ventures			Private, NGO, Donors			Government Support	
	Private	Public	Grants	Universities	UN/DONORS/ NGOs	Private	Universities	Government
Pre-Startups	N/A	N/A	N/A	ZCAS University University of Lusaka (UniLus) ICT University	UNDP Zambia Accelerator Lab	BongoHive Jacaranda Hub Impact Hub Zanaco Innovation Hub Asikana Network	University of Zambia (UNZA) Copperbelt University Mulungushi University	Min of Youth Sport & Child Development
Startups	N/A	N/A	N/A	N/A	Private Enterprise Program (DFID program) UNCDF	BongoHive Asikana Network Impact Hub Jacaranda Hub WECREATE SHE Entrepreneur Alliance for Youth Entrepreneurs Zambia Association of Chambers of Commerce & Industry (ZACCI) Zambia Chamber of Small & Medium Busi Association (ZCSMBA) Kukula Seeds Prospero Amano Capital wCAP	N/A	National Technology and Business Council Min of Youth Sport & Child Development ZICTA Zambia Development Agency Citizen Economic Empowerment Commission Ministry of Small & Medium Enterprise Development
Scale-up	Zambia Business Angels Network National Advisory Board for Impact Investments	Zambia Credit Guarantee Scheme	N/A	N/A	UNCDF	BongoHive WECREATE Prospero Private Enterprise Program (DFID program) ZACCI ZCSMBA	N/A	National Technology and Business Council Ministry of Small & Medium Enterprise Development Citizen Economic Empowerment Commission Zambia Development Agency

Source: ZICTA, 2020. TECH ENTREPRENEURSHIP ECOSYSTEM IN ZAMBIA A network analysis of institutions supporting entrepreneurship

Zambia has an emerging tech entrepreneurship culture, and the FinTech space is enjoying the most activity. Three examples standout. The first is Union54, a FinTech company that provides APIs for African corporations to easily

117 Blank, S. & Dorf, B., "The Startup Owner's Manual: The Step By Step Guide for Building a Great Company," 2012.

issue debit cards. Union54[118] is the first Zambian startup to enter the Y-combinator (an American technology startup accelerator launched in March 2005, it has been used to launch more than 3,000 companies, including Stripe, Airbnb, Cruise, PagerDuty, DoorDash, Coinbase, Instacart, Dropbox, Twitch, and Reddit) and in April 2022 it raised US$12 million led by Tiger Global.[119] The other is Lupiya,[120] an online marketplace for microloans that received an investment of $1 million from Enygma Ventures, a U.S. venture capital fund in 2020. The third, in AgTech, is Good Nature Agro[121], a tech-enabled Zambian agriculture company working from end-to-end within the specialized legume value chains. The company has raised Series A equity funding worth US$2.1 million[122] to help it accelerate its growth, which is led by Goodwell Investments with participation from existing seed investors Global Partnerships and FINCA Ventures. Zambian startups have also participated in other high profile accelerator programs such as: Alibaba eFounders (Probase and BroadPay),[123] and Google Black Founders' Fund (Lupiya).[124] Another sector with startup activity is AgTech with players such as Good Nature Agro and eMsika. The DECA research team observed little activity in the other sectors such as EdTech, HealthTech and WASH.

BOX 9: Lupiya: A FinTech Trailblazer

Lupiya is a trailblazer of the emerging tech entrepreneurship culture in Zambia. Co founded in 2016 by Evelyn Kaingu (CEO) and Muchu Kaingu (CTO), Lupiya is an online marketplace for microloans. It is a branch less, innovative digital microfinance platform that leverages technology to simplify the borrowing process so that people and businesses located across the country, even in remote, rural areas can access financial services.

Lupiya is a female led startup and in 2020 received an investment of US$1 million from Enygma Ventures, a U.S. venture capital fund. The company has also attracted non dilutive capital (that doesn't require them to give up equity or ownership) of US$ 300,000 and US$ 125,000 from Google and Amazon respectively. The funding has boosted Lupiya's thrust of fostering financial inclusion, encouraging women's participation in the economy, and enabling access to capital for entrepreneurs and women, all key strategic initiatives to enable job creation, enterprise stimulus, and economic growth. The company's revenue grew by more than 500 percent, and its loan book by more than 380 percent in 2021.

In March 2022, Lupiya was authorized by the Securities Exchange Commission of Zambia to operate a Peer to Peer Lending Platform through its Capital Markets Regulatory Sandbox. The platform enables individuals to obtain loans directly from other individuals. As of April 2022, the platform had registered more than 200 lenders and issued about 60 loans with a total value of US$30,000. The platform provides access to alternative sources of financing for SMEs that might not qualify for support through traditional funding avenues.

Interviews noted that startups could benefit from a favorable taxation regime and streamlined registration processes by the regulators. For example, a payments service startup has to independently propose three names for clearance to register with both PACRA and BoZ. It was also noted that there is limited access to financing and mentors, coupled with a lack of business and technical skills to scale their products and services.

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118 https://union54.com/, accessed June 2022.

119 Kene Okafor, Tage, "Zambian card issuing startup Union54 raises $12M led by Tiger Global," April 18, 2022, https://techcrunch.com/2022/04/18/zambian card issuing startup union54 raises 12m led by tiger global/.

120 https://lupiya.com/, accessed June 2022.

121 https://goodnatureagro.com/, accessed June 2022.

122 Jackson, Tom, "Zambian tech enabled agricultural startup Good Nature Agro raises $2.1m Series A funding," October 5, 2020, https://disrupt africa.com/2020/10/05/zambian tech enabled agricultural startup good nature agro raises 2 1m series a funding.

123 https://activity.alibaba.com/supplier/efounders fellows class 3.html

124 Chibesakunda, Lombe, "Lupiya Zambia selected for Google's K60 million Black Founders Fund," October 7, 2021, https://fizambia.com/lupiya zambia selected for googles k60 million black founders fund.

Zambia has a critical mass of innovation hubs and accelerators supporting the ecosystem, albeit largely in Lusaka. The hubs provide incubation, mentorship, training, co-working space, and acceleration services and reach provinces through programs and competitions. BongoHive is Zambia's pioneer start-up and innovation hub. Established in 2011 and based in Lusaka, the hub has made an impact on the Zambian tech space.[125] Jacaranda Hub is a non-profit organization that aims to develop young people by providing collective services, infrastructure, and specialized tools and equipment for common use among the young and aspiring Micro Small and Medium Enterprises (MSME) with growth potential.[126] The Women's Entrepreneurship Access Center (WEAC) is an entrepreneurial community for women and youth supported by the U.S. Department of State.[127] WEAC (formerly known as WECREATE) focuses on providing a safe environment for women entrepreneurs to gain access to important resources and tools for economic empowerment. Other hubs include Asikana Network, Impact hub, and ZANACO innovation hub.

Government tech startup support is channeled through the National Technology Business Center (NTBC),[128] established in the Ministry of Technology and Science to facilitate technology transfer, commercialization, and innovation. NTBC is providing a nationwide platform for innovators to develop and commercialize their ideas. NTBC also provides Intellectual Property validations and registration advice. NTBC is in the process of developing an innovation strategy and establishing an innovation hub that will include co-working space. There is no formalized collaboration between the startup ecosystem players and the NTBC, nor among the players themselves (an arrangement similar to the FinTech Association of Zambia). The NTBC plays a limited facilitative role for the ecosystem through startup competitions and ad hoc meetings. Zambia's startup ecosystem does not have targeted regulation and policy. The closest is the National Science, Technology and Innovation Policy,[129] which focuses on government interventions and does not address ecosystem players such as innovation hubs and investors. The NTBC, however, did report that the government was in the process of developing an innovation strategy. There was a possibility that the process would lead to a startup law for Zambia, transforming the NTBC enabling law.[130]

In Sub-Saharan Africa many countries have begun to revise their old Science, Technology, and Innovation (STI) policies and to reconfigure their institutional arrangements to support emerging national innovation ecosystems. In 2022 Nigeria approved the revised STI Policy that was first institutionalized in 2012. Over the intervening decade, Nigeria has become one of the most advanced innovation ecosystems in Africa, boasting more than 85 tech hubs and more than 750 startups that between 2016 and 2020 received the highest percentage of funding in Africa.[131] Kenya's National Innovation Agency presented a Strategic Plan 2018-2022 to support technological development and enable innovation startups and SMEs.[132] The Plan emphasized the role of acceleration and R&D hubs across the country, which by 2022 totaled 50 hubs,[133] up from 27 in 2016.[134] Namibia updated National

125 https://bongohive.co.zm/about/

126 https://www.jacarandahub.org/about/

127 https://weaczambia.org/

128 https://ntbc.co.zm/

129 Republic of Zambia, Ministry of Higher Education, 2020; National Science, Technology and Innovation Policy.

130 Jackson, Tom, "SA Startup Act representatives meet with President Cyril Ramaphosa," October 27, 2021, https://disrupt africa.com/2021/10/27/sa startup act representatives meets with president cyril ramaphosa.

131 "Ecosystem Report: Nigeria's Startup Scene," Japan International Cooperation Agency, 2019, https://www.jica.go.jp/nigeria/english/office/topics/gh13tc000000sz4y att/220328_01.pdf.

132 "Strategic Plan," Kenya National Innovation Agency, 2018, https://www.innovationagency.go.ke/uploads/php4d3zjG.pdf, accessed June 2022.

133 "618 Active Tech Hubs in Africa," https://briterbridges.com/618 active tech hubs, accessed June 2022.

134 Latif Dahir, Abdi, "Kenya's Newest Tech Hubs are Sprouting Outside its 'Silicon Savannah' ni Nairobi," Quartz Africa, August, 23, 2017, https://qz.com/africa/1059305/kenyas newest tech hubs are sprouting outside its silicon savannah in nairobi/

Science, Technology, and Innovation Policy 2020-2030 and recognized technologies to be key for economic growth and sustainable development.[135]

The venture capital market is nascent to the extent that some entrepreneurs are ever enrolling for startup competitions to raise capital. Greater collaboration among ecosystem players is required to stem this and to ensure that people are not surviving on contests (often donor-funded) rather than getting real investors and getting products to market. The government provides debt/equity financing toward selected MSMEs through the Citizens Economic Empowerment Commission[136]. On the private front, Kukula Capital, Amano Capital and Prospero Zambia[137], among others, are active on the market.[138] Neither Kukula nore Amano is focussed on tech startups and each has invested in only one startup (of significance) so far: Dot Com Zambia for Kukula and Lusaka Grocery Delivery for Amano. On the other hand, Prospero is active in the growth stage and not in the start-up stage.

The Zambian Business Angels Network offers support services to early-stage entrepreneurs.[139] International Venture Capital firms (VCs) such as Enygma Ventures, Y-combinator, and Ground Squirrel Ventures, have provided investments for different stage startups.

The capital markets are opening up for start-ups through initiatives such as the regulatory sandbox implemented by the Securities and Exchange Commission (SEC). The Lusaka Stock Exchange has also deployed a portal[140] to help tech start-ups raise funding and attain their listing on the exchange. The SEC has developed a Capital Market Master Plan to address existing challenges, and the plan has been submitted to Cabinet for approval.

BUILDING THE FOUNDATIONS FOR ZAMBIA'S ICT SECTOR

The median age in Zambia is only 16.8 years of age, making the nation the sixth youngest in the world by median age.[141] Life expectancy is 52.7 years. As of the 2020 Labor Force Survey conducted by Zambia Statistics Agency, youth unemployment was 19.9 percent (17.6 percent for males, 22.7 percent for females). The combined rate of unemployment, which translates into the potential labor force, was 37.3 percent (44.1 percent for females, 31.8 percent for males.[142])This young population presents Zambia with a reasonable pool of human resources from which to develop its future digital talent pool. The 7NDP, which is to be replaced with the 8NDP (currently in final draft and to be launched before the end of 2022) and the National Youth Policy,[143] highlight scaling-up ICT skills in public and private institutions, and the promotion of ICT for improved productivity, creativity and innovation in youth enterprises, respectively. However, these policies are not being translated into strategies for the development of the digital talent pool.

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135 "Launch of Namibia's Revised National Science, Technology and Innovation Policy," UNESCO, November 23, 2021, https://en.unesco.org/news/launch_namibias_revised_national_science_technology_and_innovation_policy.

136 https://www.ceec.org.zm/

137 https://prospero.co.zm/

138 "Tech Entrepreneurship Ecosystem in Zambia: A Network Analysis of Institutions Supporting Entrepreneurship," International Trade Centre, https://www.zicta.zm/storage/posts/attachments/WYXonZzjMUGCj2RKUmX8g9hdq4jgcqPIxcl1DqBv.pdf, accessed June 2022.

139 "Angel Group Case Study: Zambian Business Angels Network," African Angel Academy, April 2021, https://africanangelacademy.com/zambian_angel_network/.

140 https://www.gemlistings.com/zambia/index.php

141 "Zambia Population 2022," World Population Review, 2022, https://worldpopulationreview.com/countries/zambia_population.

142 "Labor Force Survey Report 2020," Ministry of Labour and Social Security, Republic of Zambia, 2020, https://www.zamstats.gov.zm/download/5449/?v=5473.

143 "2015 National Youth Policy," Ministry of Youth and Sport, Republic of Zambia, 2015, http://www.myscd.gov.zm/?wpfb_dl=46.

A regulatory intervention to note is the Information and Communications Technology Association of Zambia (ICTAZ) Act No 7 of 2018[144] that provides for the registration of ICT professionals and regulation of their professional conduct in the sector. ICTAZ is enhancing awareness of the profession among the youth through student chapters at tertiary institutions and ICTS clubs in primary and secondary schools.

The 2020 Labor Force survey estimated a total population of 17,885,422, and the employed population was estimated at 16.7 percent. Of the employed population in Zambia, the ICT sector contributed only 21,106 employees, accounting for a paltry 0.7 percent. Gender disparity still exists in Zambia's ICT sector with women making up only 21.1 percent of employment in Zambia's ICT sector.

The above statistics, coupled with the government's digital transformation agenda, point to a growing demand for an ICT labor force. The ICT workforce is critical to driving and sustaining digital transformation in both the public and private sectors and across economic (e.g., Mining, Agriculture) and social (e.g., Education, Health) sectors. Another demand driver is the emerging tech entrepreneurship as observed in the tech start-up findings. Further, it is worth noting that the training and skills acquired by the workforce do not meet the demand for specialized skills on the market. Employers end up filling the gaps with training/upskilling schemes of their own which are mostly based on international professional certifications such as ISACA[145] (Certified Information Security Manager), CISCO (Cisco Certified Network Associate).

The supply side of the digital talent pool is in its foundation stages. The Higher Education Authority (HEA) reports[146] that ICT learning programs were only 4.1 percent of the total learning programs offered at the higher education level. Female enrollment in ICT programs in the nine public and 53 private universities was only 21 percent compared with an overall female enrollment of 48.5 percent across all programs. Representatives from two public universities (Copperbelt University and University of Zambia) and two private universities (ZCAS University and University of Lusaka) interviewed for the DECA also reported an average female enrollment of less than 20 percent. The two public universities interviewed also highlighted their limited capacity to accommodate all applicants into the programs, thereby turning down the majority. DECA interviews also noted a low quality of training at the secondary education level. While interest in ICT specialization is growing, it is still not the preferred choice of most tertiary-level students, especially females. Much work needs to be done to raise awareness of the well-paying job opportunities in the ICT fields.

Most university ICT educational programs in Zambia prepare students for the roles of System Administrator and Database Administrator and to some extent Networking Administrator/Engineer and Software Developer. The DECA interviewees noted that the few existing cybersecurity programs were introduced in the last two to five years. In addition, DECA interviewees from both the public and private sectors mentioned that there were few cybersecurity professionals in Zambia. Training programs to prepare skills for emerging technologies such as big data, artificial intelligence, and blockchain are not being offered. Universities have started adding more ICT specializations, such as cybersecurity at both undergraduate and postgraduate level, including professional certifications like Cloud Computing-(Amazon Web Services, Microsoft Azure) and Networking and Security (Cisco, Huawei).

The DECA research team observed that most lecturers and professors need upskilling, which is expensive due to the fast-changing digital ecosystem, although a few exchange programs exist with universities in India and

144 "Information and Communications Technology Association of Zambia Act No. 7, 2018," Republic of Zambia, https://www.parliament.gov.zm/sites/default/files/documents/acts/Information%20and%20Communications%20Technology.pdf, accessed June 2022.

145 https://www.isaca.org/

146 "The State of Higher Education in Zambia 2020: Teaching and Learning in the New Normal," Higher Education Authority, 2020, https://hea.org.zm/?smd_process_download=1&download_id=7932.

China for the public universities. Lecturers could also benefit from closer linkages with industry to appreciate market demand and tailor their curricula and research focus appropriately.

Stakeholders across the board also acknowledged limited partnerships between universities and the private sector to provide internship opportunities for students. The universities did not have innovation hubs to connect market demands with skills supplies. The closest there is to an innovation hub is the Copperbelt University's ICT Center for Business and Innovation[147], a commercial ICT wing of the university. The unit provides internship opportunities for students and has executed key national projects like the Zambia Revenue Authority's domestic tax revenues system (TaxOnline II)[148].

Non-traditional online education courses such as General Assembly[149] (an initiative that has transformed tens of thousands of careers with curricula that focus on skills that today's companies need: software engineering, data science, and user experience design) or School 42 (a computer science training facility educating the next generation of software engineers) have not yet become popular in Zambia. There is a lack of awareness by both the government and the private sector of these platforms.

INCLUSION IN ZAMBIA'S DIGITAL ECONOMY

The United Nations Capital Capital Development Fund (UNCDF), in its Inclusive Digital Economies Score, Zambia 2020 report[150] scored the country at 48 percent. This score placed the country at the top end of the start-up phase, almost at the limit of the expansion phase. The score criteria took into consideration the four indicators of policy and regulation, infrastructure, innovation, and skills. The report further scores the inclusiveness of the digital economy for the rural population at 51 percent, women at 70 percent, youth at 64 percent, and MSMEs at 60 percent. This is correlated by the FinScope 2020, which found financial inclusion (overall, not just digital) at 54.8 percent in rural areas and 67.9 percent for females. The Toronto Centre (TC)[151], in its 2020 'Regtech for Gender Equality and Women's Economic Empowerment country report'[152], noted that most banks were not prioritizing women. The report further highlighted the fact that while some digital financial products' sex disaggregated data (SDD) was submitted to BoZ, some transactional data had not been disaggregated and not many financial service providers used SDD data, not even from a business case perspective. The above challenges for the youth and rural populations notwithstanding, the DECA research found that the digital economy as a whole is characterized by significant gender divides as outlined in Box 10 below.

147 https://www.cbuibic.com

148 https://www.cbuibic.com/site/ https://42.fr/en/homepage/ pages/project details.php?id=1

149 https://generalassemb.ly/

150 "Inclusive Digital Economy Scorecard Report Zambia," Unlocking Public and Private Finance for the Poor, December 12, 2021, https://www.uncdf.org/article/7345/inclusive digital economy scorecard ides report zambia

151 https://www.torontocentre.org.

152 "Regtech for Gender Equality and Women's Economic Empowerment," Country Virtual Visit Report, Toronto Centre, 2020.

BOX 10: At-A-Glance: gender digital divides in the digital economy

LEADERSHIP:

All leadership positions at key government ministries/agencies related to the digital economy are held by men. The ministries are the Ministry of Technology and Science, Ministry of SME Development, Ministry of Finance and Ministry of Commerce. The agencies are Smart Zambia, ZICTA, BoZ, ZECHL, SEC, and NTBC.

FINANCIAL INCLUSION:

Defines access to and informed usage of a broad range of quality and affordable savings, credit, payments, insurance, and investment products and services that meet the needs of individuals and businesses (formal or informal. Females are less financially included (at 67.9 percent) compared with males (at 71.2 percent) yielding a gender gap of 4.9 percent *.

MOBILE MONEY:

Mobile Money portfolio at Airtel (one of the three service providers) shows a female to male ratio for account holders of 47 percent to 53 percent. Similarly, the transaction volume ratio of females to males is 40 percent to 60 percent.

TECH STARTUP:

- National innovation challenges/competitions (e.g by NTBC) and Incubator/Accelerator programs always target 50 percent female participants.
- Incubators/Accelerators targeting women:
  - » WEAC has supported more than 3,500 women and 18 for WCAP.
  - » BongoHive has supported 107 female led startups in the past four years.

DIGITAL TALENT:

- The top four universities interviewed (two public and two private) reported an average of less than 20 percent female enrollment.
- The current membership database of the ICT professional body (ICTAZ) shows 16 percent females and 84 percent males.

Sources: Informant interviews; FinScope Survey 2020.

Appendix

A. DEFINITIONS

Definitions from USAID Digital Strategy 2020-2024 unless otherwise mentioned.

Cybersecurity: The prevention of damage to, protection of, and restoration of computers, electronic communications systems, electronic communications services, wire communication, and electronic communication, including information contained therein, to ensure its availability, integrity, authentication, confidentiality, and non-repudiation.

Cyber Hygiene: The practices and steps that users of computers and other devices take to maintain system health and improve online security. These practices are often part of a routine to ensure the safety of identity and other details that could be stolen or corrupted.[157]

Data Privacy: The right of an individual or group to maintain control over, and the confidentiality of, information about themselves, especially when that intrusion results from undue or illegal gathering and use of data about that individual or group.

Data Protection: The practice of ensuring the protection of data from unauthorized access, use, disclosure, disruption, modification, or destruction, to provide confidentiality, integrity, and availability.

Digital Divide: The distinction between those who have access to the Internet and can make use of digital communications services and those who find themselves excluded from these services. Often, one can point to multiple and overlapping digital divides, which stem from inequities in access, literacy, cost, or the relevance of services. Factors such as high cost and limited infrastructure often exacerbate digital divides.

Digital Economy: The use of digital and Internet infrastructure by individuals, businesses, and government to interact with each other, engage in economic activity, and access both digital and non-digital goods and services. As the ecosystem supporting it matures, the digital economy might grow to encompass all sectors of the economy—a transformation driven by both the rise of new services and entrants, as well as backward linkages with the traditional, pre-digital economy. A diverse array of technologies and platforms facilitate activity in the digital economy; however, much activity relies in some measure on the Internet, mobile phones, digital data, and digital payments.

Digital Ecosystem: The stakeholders, systems, and enabling environment that together empower people and communities to use digital technology in order to gain access to services, engage with each other, or pursue economic opportunities. A digital ecosystem is conceptually similar to, but broader than, a digital economy. Although certain aspects of the digital ecosystem have country-wide reach, other features differ across geographies or communities. The critical pillars of a digital ecosystem include 1) sound enabling environment and policy

157 Brook, Chris, "What is Cyber Hygiene? A Definition of Cyber Hygiene, Benefits, and Best Practices," Digital Guardian, October 6, 2020, https://digitalguardian.com/blog/what cyber hygiene definition cyber hygiene benefits best practices and more

commitment; 2) robust and resilient digital infrastructure; 3) capable digital service-providers and workforce (e.g., both public and private institutions); and 4) empowered end-users of digitally enabled services.

Digital Identity: The widely accepted Principles on Identification define identity as "a set of attributes that uniquely describes an individual or entity." Digital identification (ID) systems often require registering individuals onto a computerized database and providing certain credentials (e.g., identifying numbers, cards, digital certificates, etc.) as proof of identity. Government actors can set up these systems to create foundational, national ID programs, or donors or non-governmental organizations (NGOs) for functional purposes to identify beneficiaries, e.g., for humanitarian assistance and service-delivery.

Digital Literacy: The ability to "access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital devices and networked technologies for participation in economic and social life. This may include competencies that are variously referred to as computer literacy, information and communication technology (ICT) literacy, information literacy, and media literacy."

Gross National Income: The gross national income (GNI), previously known as gross national product (GNP), is the total domestic and foreign output claimed by residents of a country, consisting of gross domestic product (GDP), plus factor incomes earned by foreign residents, minus income earned in the domestic economy by nonresidents.[158]

158 GNI is utilized here over GDP as it is increasingly preferred by the World Bank, the European Union, and other major global players. Chappelow, Jim, "Gross National Income (GNI)," Investopedia, accessed June 2022, https://www.investopedia.com/terms/g/gross_national_income_gni.asp

B. METHODOLOGY

The Zambia DECA included three components:

1. **USAID/Zambia engagement:** USAID/Zambia designated one point of contact (POC) within the USAID/Zambia program office. This POC was responsible for leading communication with the DECA implementation team; helping identify stakeholders; reviewing relevant documents during planning, key informant interviews, and the analysis and report-writing stages; and attending selected interviews during the interview phase.

   The POC also helped organize the introduction and mid-point presentation at USAID/Zambia. These meetings were important to socialize the DECA purpose and preliminary findings across various USAID/Zambia technical offices.

   This engagement was not only important for ensuring an appropriate mix of interviewees, but was also critical to building the research team's understanding of USAID/Zambia's priorities.

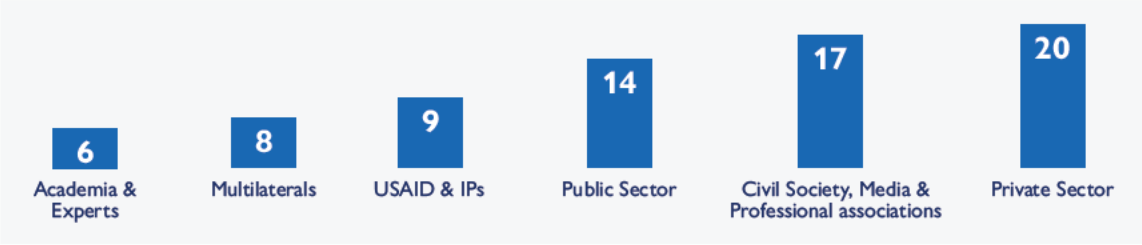
2. **Desk research:** The desk research used a standardized template organized around three pillars (digital infrastructure, access and use; digital society and governance; digital economy). The desk research included three components: 1) review of USAID/Zambia's CDCS, funding allocations, and digitally relevant programming; 2) quantitative analysis of open-source data and indices to produce regional comparisons (e.g., GSMA, World Economic Forum, International Telecommunication Union); and 3) Internet research guided by high-level questions under each pillar about the state of Zambia's digital ecosystem.

   The desk research was shared with the USAID/Zambia POC before interviews and was used to inform the interview guide questionnaires.

3. **Interviews:** The research team collaborated with USAID/Zambia to compile a list of target stakeholders across civil society, academia, international organizations, the private and public sectors, and within USAID/Zambia. Initial key informant interviews were secured through the DECA team and USAID/Zambia networks. Additional interviewees were added throughout the research process via referrals from completed interviews.

   During the interview phase, the DECA team conducted anywhere from one to five interviews per day–more during the in-person phase and fewer when conducting interviews online. Most interviews were attended by at least two team members, with a lead interviewer and a note taker. To best triangulate findings and to test different interview styles, team members rotated whom they paired with on interviews. Each interviewee was asked a general set of questions, which were developed prior to the interview phase and tailored to be targeted to interviewee and based on learnings from previous interviews.

   To ensure a diverse mix of key informants, the research team evaluated the list of scheduled interviews and conducted additional outreach in an attempt to fill identified gaps. The graph below and Appendix C shows the 73 interviews by sector (informed by X female interviewees, and X male interviewees) .



ANALYSIS

The bulk of the preliminary analysis was conducted during the interview phase. During the 6 weeks completing key informant interviews, the DECA team conducted regular team debriefs. These meetings not only ensured that all team members were briefed on each interview, but facilitated the triangulation of emerging themes that could then be tested in subsequent interviews. Mid-way through the interviews, the team identified primary themes based on these initial findings. Upon completing the interview, the team convened to revisit these themes, confirmed their validity against interview notes, and proceeded to organize the findings around the three pillars outlined in this report (digital infrastructure, access, and use; digital society and governance; and digital economy).

LIMITATIONS

The research team was limited, to an extent, by their technical expertise. DECA team members were chosen to provide coverage of key technical areas identified in a preliminary review, particularly around digital infrastructure, digital divides, Internet governance, digital government transformation, e-commerce and digital platforms, and the tech startup ecosystem. This may introduce some bias—weighting the specializations of team members more heavily than areas such as digital financial services or IT sector development.

A large portion of key informants were selected through USAID/Zambia and DECA team networks, which may have excluded stakeholders who are less comfortable engaging with U.S. government representatives. Most interviews took place in-person or virtually with stakeholders in Lusaka, Zambia. As a result, information is mostly limited to Lusaka-based interviewees' knowledge and work across the country. Rather than rigorous qualitative methods (e.g., thematic coding), analysis of interview notes depended on triangulation of findings within the research team, which attempted to balance thematic gaps by consulting technical experts and seeking additional interviewees.

RESEARCH TEAM

The DECA team was composed of digital development generalists and specialists with technical expertise in digital infrastructure, digital divides, Internet governance, digital government transformation, e-commerce and digital platforms, and the tech startup ecosystem. Team members who were technical experts attended most interviews that were relevant to their expertise.

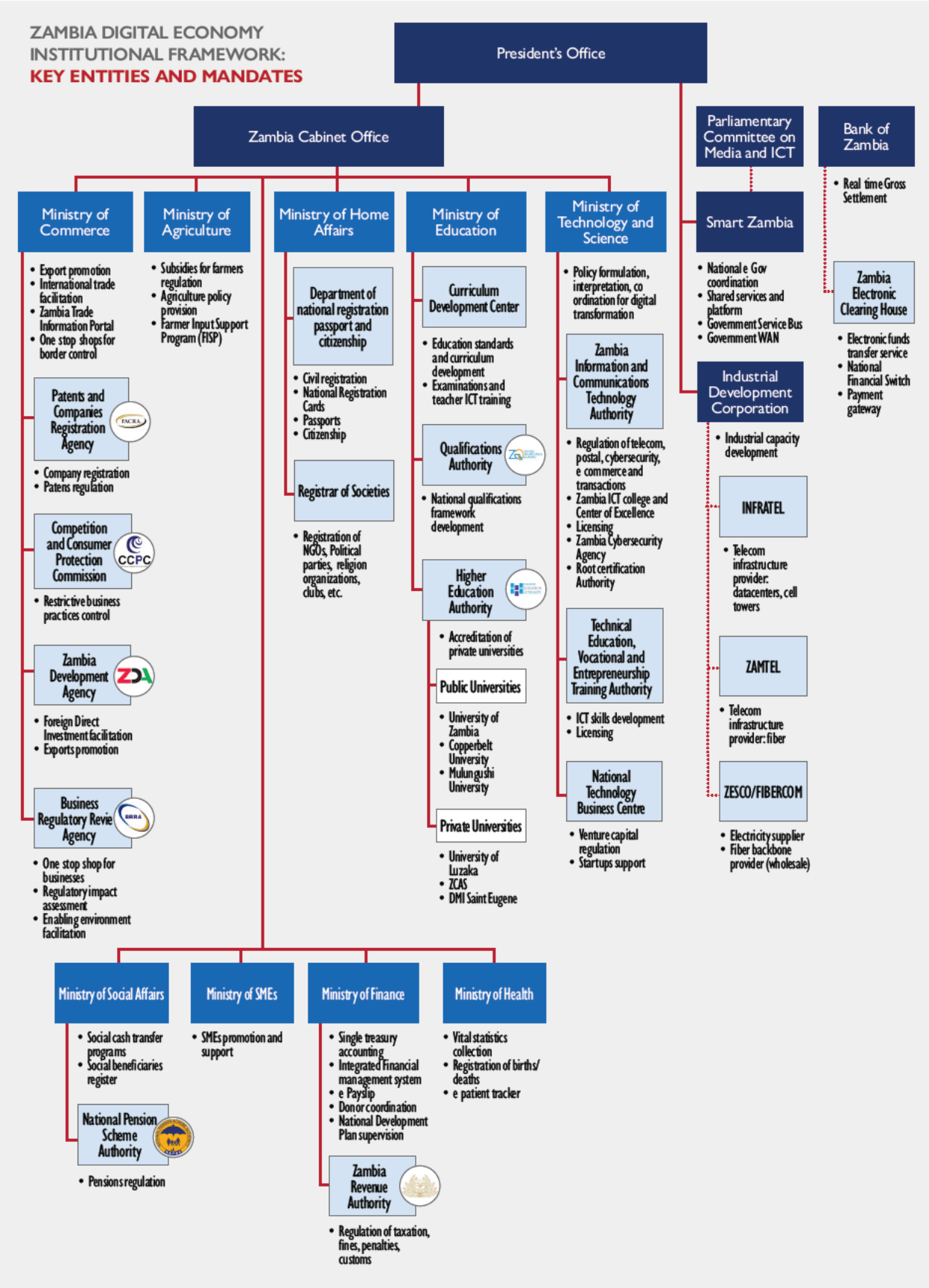
C. KEY INFORMANTS

ACADEMIA/THINK TANKS	
1	University of Zambia
2	Zambia Center for Accountancy Studies University
3	University of Lusaka
4	Copperbelt University
5	Pricewaterhouse Coopers Zambia
6	Choolwe Nalumbamba (Cybesecurity Expert)
GOVERNMENT (NATIONAL AND LOCAL)	
5	Smart Zambia Institute
6	Ministry of Technology and Science
7	National Technology Business Center
8	Ministry of SME Development
9	Zambia Information and Communications Authority
10	Zambia Information and Communications Authority Cybersecurity Department
11	Ministry of Education
12	Ministry of Education Curriculum Development Center
13	Zambia ICT College and Center of Excellence
14	Ministry of Commerce, Trade and Industry
15	Ministry of Finance
16	Bank of Zambia
17	Securities Exchange Commission
18	Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA)
19	Ministry of Home Affairs Department of National Registration, Passport and Citizenship
DONORS, INGO, INTERNATIONAL DEVELOPMENT ORGANIZATIONS	
20	UNESCO
21	UNCDF
22	The World Bank
23	UNDP
24	UNICEF
25	JICA
26	EU Delegation to Zambia and COMESA
27	GIZ
CIVIL SOCIETY/MEDIA/OTHER	
28	Paradigm HQ / IGF
29	Panos Media Institute of Southern Africa

30	Zambian National STEM Foundation
31	Chapter One Foundation Zambia
32	Bloggers of Zambia
33	News Diggers
34	Diamond TV
35	Alliance for Community Action
36	Pilato
37	eNgoma
38	fsdZambia
39	ASIKANA Network
40	CAMARA
41	Zambian National Advisory Board for Impact Investment (Nabii)
42	ICT Association of Zambia (ICTAZ)
43	Bankers Association of Zambia
44	Zambia Chamber of Commerce and Industry (ZACCI)
PRIVATE SECTOR	
45	INFRATEL
46	SmartNET
47	Probase integrator
48	LIQUID intelligent technologies
49	Digital Safe (Cybersecurity)
50	Kukula Capital
51	EiAH Capital
52	Zambia Business Angels Network (ZBAN)
53	wCap
54	MTN
55	ZAMTEL
56	Afridelivery
57	Kazang
58	eMiska
59	Mwiya Musokotwane
60	Rivuuz
61	Lupiya
PRIVATE SECTOR: STARTUPS/ACCELERATORS	
62	BongoHive
63	Women Entrepreneurs Access Center (WEAC)

64	Jacaranda Hub
65	UNDP Accelerator Lab
USAID IMPLEMENTING PARTNERS	
66	Internews (Open Spaces Program)
67	Socha/ZMELP
68	ACDI/VOCA (Enterprise Development & Growth Enhanced)
69	Cardno (Business Enabling Project)
70	DAI (Southern Africa Trade and Investment Hub)
72	Open Contracting
USG, USAID/ZAMBIA	
73	USAID/Mission

D. KEY GOVERNMENT BODIES FOR ZAMBIA'S DIGITAL TRANSFORMATION



E. ZAMBIA ICT LAWS, POLICIES, STRATEGIES

NATIONAL STRATEGIES

NAME	YEAR OF APPROVAL	SOURCE
The Eighth National Development Plan 2022 2026	2022	URL
National Digital Transformation Strategy 2022 2026	2022 (draft)	N/A
National Child Online Protection Strategy	2020	URL
The Seventh National Development Plan 2017 2021	2017	URL
National Payment System Vision and Strategy 2017 2022	2017	URL
National Financial Inclusion Strategy 2017 2022	2017	URL
Zambia National Broadband Strategy and Action Plan	2016	URL

LAWS

NAME	YEAR OF APPROVAL	SOURCE
The Electronic Communications and Transactions Act	2021 (replaced 2009)	URL
Cybersecurity and Cyber Crimes Act	2021	URL
Data Protection Act	2021	URL
ICT Association of Zambia Act	2018	URL
Banking and Financial Services Act	2017	URL
Companies Act	2017	URL
Banking and Financial Services Act	2017	URL
Competition and Consumer Protection Act	2010	URL
Information and Communications Technologies Act	2009	URL
National Payment Systems Act	2007	URL
Zambia Development Agency Act	2006	URL
Income Tax Act	1997	URL
National Registration Act	1965	URL

OTHER RELEVANT PROVISIONS, POLICIES, AND PLANS

NAME	YEAR OF APPROVAL	SOURCE
National ICT Policy	2022	URL
National Cybersecurity Policy Implementation Plan	2021	URL
Technical Vocational and Entrepreneurship Training Policy	2020	URL
Science, Technology and Innovation Policy	2020	URL
National Transport Policy	2019	URL
National Higher Education Policy	2019	URL
National Financial Sector Development Policy	2017	URL
Education and Skills Sector Plan 2017 2021	2017	URL

F. INTERNATIONAL DONOR PROGRAMS CONTRIBUTING TO ZAMBIA'S DIGITAL ECOSYSTEM DEVELOPMENT

Zambia enjoys partnership and support from international funders and donors. Over the past decade Zambia received support from the World Bank, JICA, UNDP, UNIDO, UN Habitat, FAO, European Union, national governments, and many others. Some of their partnership programs aimed at the development of the Zambian digital ecosystem.

DONOR	PROGRAM	DESCRIPTION	DECA PILLAR RELEVANCE
AFDB	Zambia's Public Finance and Economic Management Project 2019 2022	The project is designed to help unlock Zambia's economic growth potential by improving capacity to manage public resources.	Pillar 1 Pillar 2
JICA	The Project for Enhancement of Science and Mathematics Education at STEM Secondary Schools	The objective of the project is to improve the environment for implementing STEM education and enhance the quality of classes and learning effects of mathematics and science in STEM schools by constructing facilities and providing equipment, both of which are necessary for implementing STEM curriculum and teacher training.	Pillar 3
JICA	NINJA Business Plan Competition 2020 2021	JICA organized a business contest in 19 countries of Africa, including Zambia, for businesses emerging or growing during and after the COVID 19 outbreak. In total, 69 startups were highlighted by JICA; ten finalists received grants. From Zambia, three startups were short listed: ACE Smart Technologies startup, an e learning portal developer, E medical Services, an agriculture marketplace, and Zpos, a POS applications developer.	Pillar 3
JICA	Project for strengthening Management Capacity of the First Level Hospitals in Lusaka District 2021 2026	JICA launched a pilot project for developing a digital platform for hospital management. The project aims at capacity building of hospital management in five target hospitals in Lusaka.	Pillar 1
GIZ	Enabling Access to Justice, Civil Society Participation and Transparency Program (EnACT) 2021 2025	The program's objective is the improvement of access to accountable institutions and to transparent decision making processes for the Zambian population, with a specific focus on vulnerable groups such as women, youth, and people with disabilities.	Pillar 1 Pillar 2
GIZ	Decentralization for Development Program (D4D) 2018 2021	The program supports the efforts of the Zambian Government to steer the decentralization reform process and to promote local administration. It aims to improve the administrative capabilities of 24 municipalities in the Southern and Northwestern provinces.	Pillar 1 Pillar 2
GIZ	Strengthening Good Financial Governance 2019 2022	Financial governance in Zambia is aimed at strengthening transparency, accountability, responsiveness to citizens' needs and efficiency. The project also aimed at optimizing tax collection by the Zambia Revenue Authority. The project has been financed by the European Union since 2019.	Pillar 2
SIDA	Women and Youth in Financial Inclusion (WIN) Program 2020 2025	The goal of the program is to promote financial inclusion and capabilities for women, youth, and people with disabilities.	Pillar 1

UNCDF	Leaving No One Behind in the Digital Economy	The goal of the program is to build digital economies that support women, youth, refugees, migrants, and MSMEs to enhance their market participation, resulting in poverty reduction, improved livelihoods, and economic growth.	Pillar 1 Pillar 3
UNCDF	Making Access Possible (MAP) Program	This program is a multi country initiative to develop a robust evidence base on which to base financial inclusion and financial sector policy.	Pillar 3
UNESCO	Capacity Building Program for Teacher Educators on Education for Sustainable Development 2018 2022	The program supports teachers for teaching sustainability across the curriculum, using a whole school approach which involves the entire school community and facilities in sustainability practices.	Pillar 1
UNDP	National Innovations Initiative / Accelerator Labs in Zambia 2020 2021	UNDP operates accelerator labs to facilitate testing and dissemination of innovative solutions and startups. For instance, in 2020 the lab led the identification of innovative responses to COVID 19 by conducting experiments to develop standardized cloth masks.	Pillar 3
UNICEF	The Internet of Good Things	The project aims at hosting mobile packaged content designed to make lifesaving and life improving information available for free, even on low end devices. The project helps Zambian communities and frontline workers access educational and lifesaving information at the point of care.	Pillar 2 Pillar 3
UNICEF	U Report Text Project	U Report Project is a UNICEF initiative aimed at developing a free text counseling and social monitoring tool for young people in Zambia. Cloud based system RapidPro builds on the tool and is developed to gather accurate real time information on vital areas such as health, nutrition, education, and child protection.	Pillar 1 Pillar 2
UNICEF	Girls 2030 Internship Program	The project aims to give teenage girls training in life skills and financial literacy, and a broader vision for their careers. More than 200 school clubs are up and running, complemented by an annual motivational camp and two rounds of internship programs in the spring and summer.	Pillar 1
UNIDO	Increasing Competitiveness and Market Orientation of Innovation Driven Goat Processing Value Chains in the Republic of Zambia 2020 2024	The project sets a goal to create new jobs and improve skills and competences of the national agriculture expertise, thereby ensuring value addition and enhancing overall economic performance of Zambian SMEs. The project covers a broad capacity building program with training activities designed for farmers, feed makers, and food processors to ensure a sustainable impact of the project activities.	Pillar 3
World Bank Group	DigiLab Finance program	The DigiLab Finance program aims to increase financial inclusion and support the digital transformation of financial institutions across four African countries, including Zambia. DigiLab Finance is a capacity building program that equips banks, microfinance institutions, and digital financial services providers with practical knowledge and tools to help them develop digital strategies.	Pillar 3

G. CHINESE COMPANIES ACTIVE IN ZAMBIA'S DIGITAL ECOSYSTEM

China's presence in Zambia is concentrated mainly in copper and manufacturing industries. China is the world's largest consumer of copper, and Zambia is the world's second largest producer of copper[159]. It is estimated that more than 600 Chinese enterprises operate in Zambia, the majority of which are based in the Copperbelt region, primarily to serve Chinese mining companies.

China is a major loan-provider for the Zambian economy. Around 30 percent of Zambia's total loans were disbursed by China, compared with around 20 percent owed to development banks–mostly the World Bank and African Development Bank. Studies estimate that from 2000 to 2021 approximately $8 billion in loans had been disbursed to Zambia and its state-owned enterprises by 18 major and minor Chinese banks or funds[160].

China provided most of its loans through the Belt and Road program, a Chinese investment program for supporting infrastructure projects (building rails, roads, sea, and other routes) around the world. Results in Zambia include financing hydropower station, international airports, regional railway lines, stadiums and hospitals, mostly in Southern provinces[161].

China also retains a share in Zambia's national broadcaster, ZNBC. In 2017, Chinese media conglomerate StarTimes funded the rollout of a migration to a digital TV signal, and controls around 60 percent of a joint digital venture with ZNBC[162]. The project was part of the Access to Satellite TV for 10,000 African Villages[163].

In the Zambian ICT sector, China is represented mostly by Huawei and ZTE, major tech companies and international providers of telecommunications and consumer technology solutions. Other Chinese tech companies such as Hikvision and Cloudwalk are less active in Zambia, though they secured government contracts to build smart cities, data centers, e-governance platforms, and surveillance systems across the region.

HUAWEI

In recent years, Huawei was among the most active Chinese telecommunication companies being involved in developing the Zambian digital ecosystem. Huawei acted as a partner to help the government implement the Smart Zambia ICT Master Development Plan. Over the last decade, Huawei was involved in the deployment of more than 1,000 telecommunication towers across the country, the commissioning of the country's first data center, as well as the 5G network launched in a partnership with mobile service provider MTN Zambia[164]. The latter was launched in early 2022, placing Zambia among the first 10 African countries currently piloting the

159 Orr, William, "The Curse of the White Elephant: The Pitfalls of Zambia's Dependence on China," Global Risk Insights, December 1, 2020, https://globalriskinsights.com/2020/12/the_curse_of_the_white_elephant_the_pitfalls_of_zambias_dependence_on_china.

160 "Zambia's Chinese Debt Nearly Twice Official Estimate, Study Finds," Reuters, September 28, 2021, https://www.reuters.com/world/africa/zambias_chinese_debt_nearly_twice_official_estimate_study_finds_2021_09_28

161 "As China's Belt and Road Initiative Steams Ahead in Africa, West Plays Catch Up," Committee on the Belt and Road Local Cooperation, https://uclg_aspac.org/brlc/2021/10/12/as_chinas_belt_and_road_initiative_steams_ahead_in_africa_west_plays_catch_up, accessed on June 2022.

162 Smith, Elliot, "Zambia's Spiraling Debt and the Future of Chinese Loan Financing in Africa," CNBC.com, January 14, 2020, https://www.cnbc.com/2020/01/14/zambias_spiraling_debt_and_the_future_of_chinese_loan_financing_in_africa.html

163 "Zambia launches China funded digital TV project to benefit 500 villages," Hinxua, June 28, 2018, http://en.cidca.gov.cn/2018_06/26/c_261135.htm

164 "China's Huawei upbeat on Zambia's digital transformation," April 7, 2022, Xinhua, http://english.news.cn/20220407/185de5fedc294f47b0982cf67d901fce/c.html

technology. 5G pilot demonstration rollout sites are announced to be in Lusaka and Copperbelt Provinces. The continuous support from Huawei and ZICTA in launching the 5G platform is expected[165].

MTN previously worked with Huawei to develop and pilot other generations of networks: in 2013, the MTN partnered with Huawei to build the first 4G and GSMR network and later built the first 4.5G network in 2016[166].

A US$ 392 million contract signed on February 24, 2017 between the Government of Zambia and Huawei Technologies to supply National and Metropolitan Optic Fiber Broadband Network was later canceled on accusations of duplicating ZESCO FiberCom's existing infrastructure, while providing equipment that reached end-of-life and was not compatible with ZESCO's.

Huawei contributed to building the Zambian National Data Center with its cloud-based solutions, including cloud hosting, data center equipment provision, software for security, and continuity of government services and data[167].

Huawei has supplied a number of telepresence conferencing systems to the Zambian government, including three-screen and two-screen systems[168]. According to the mandate, 26 ministries have access to the telepresence facilities, with coverage that includes the President's Office, Cabinet Offices, and the Ministries of Finance, Home Affairs, and Defense.

Huawei plans over the next four years to cover the development of digital skills of Zambians. Its officials announced[169] the company would plan training for 500 students and 50 instructors in digital skills, construction of a premier digital innovation hub to act as a center of excellence for ICT, and a digital innovation scholarship under the president. Previously, Huawei launched the ICT 'Star Instructors' certified vocational training course that gave trainees the opportunity for Zambians to travel to China to receive guidance and engage in hands-on experiments.

ZTE

China's ZTE story in Zambia starts in the late 1990s, when the first GSM network of ZAMTEL was established by ZTE, and ZAMTEL later began providing digital mobile services in 2002[170]. In 2004, ZTE supplied nationwide GSM/GPRS equipment for the implementation and development of the ZAMTEL GSM network in Zambia. During that period, ZTE invested in physical infrastructure. For instance, in 2004 it started building a mobile phone assembly plant.

By 2022, ZTE contributed to building the national backbone network, radio tower communications, and the LTE network, thereby making the company an important player in the development of Zambia's ICT sector and the implementation of the Smart Zambia Master Plan. For instance, in 2020 MTN partnered with ZTE to construct a cross-border Optical Transmission Network backbone in Zambia to connect Lusaka and the border

165 "MTN Zambia partners with Huawei to launch the country's first 5G network," January 13, 2022, Telecom Review Africa, https://telecomreviewafrica.com/index.php/en/articles/telecom_operators/2624_mtn_zambia_partners_with_huawei_to_launch_the_country_s_first_5g_network

166 Ibid.

167 "New ICT Helps Build Smart Zambia," https://e.huawei.com/en/publications/global/ict_insights/201806041630/success/201808170846, accessed June 2022.

168 Ibid.

169 "China's Huawei upbeat on Zambia's digital transformation," April 8, 2022, Xinhua, https://global.chinadaily.com.cn/a/202204/08/WS624f966ea310fd2b29e55c33.html

170 "ZTE expands Zambia GSM network," https://www.zte.com.cn/global/about/magazine/zte_technologies/2004/9/en_283/161356.html, accessed June 2022.

of Namibia. By providing the backbone network with a large bandwidth, ZTE aimed at breaking the bottleneck of the international traffic and reducing Internet costs.

In another deal with the Government of Zambia, through the Ministry of Home Affairs and Internal Security, ZTE is implementing a public security information system to enhance internal security, a $210 million project, which included construction of 36 communication towers, installation of radio communication and video surveillance systems, and construction of a national command center in Lusaka and regional command centers in 11 districts. While the installation of equipment is 90 percent complete, many voices in the public space question the need for spending such amounts of money on cameras when some areas did not even have police facilities.

Similar to Huawei, ZTE is starting to invest in the digital skills of Zambians. In 2021 it was announced that the company was in the process of building partnerships with major educational institutions in Zambia to provide students learning opportunities by virtue of short-term ICT courses in China at ZTE's Technology University[171].

171 "ZTE seeks to deepen cooperation with Zambia's ICT sector," June 15, 2021, Lusakatimes.com, https://www.lusakatimes.com/2021/06/15/zte seeks to deepen cooperation with zambias ict sector/#

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