

Democratic Republic of Congo Digital Economy Assessment



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Digital Economy for Africa

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About the DE4A Assessment

An assessment of the Democratic Republic of Congo's (DRC) digital economy has been launched as part of the World Bank Group's Digital Economy for Africa (DE4A) Initiative, which leverages an integrated and foundations-based diagnostic framework to examine the present level of digital economy development across Africa. The assessment maps the current strengths and weaknesses that characterize the national digital economy ecosystem in DRC as well as identifies the challenges and opportunities for future growth.

Digital transformation is rapidly re-shaping our global economy, permeating virtually every sector and aspect of daily life – changing the way we learn, work, trade, socialize, and access public and private services and information. In 2016, the global digital economy was worth some US\$ 11.5 trillion, equivalent to 15.5 percent of the world's overall Gross Domestic Product (GDP). It is expected to reach 25 percent in less than a decade, quickly outpacing the growth of the overall economy. However, countries like DRC are currently capturing only a fraction of this growth potential and need to strategically invest in the foundational elements of their digital economy to keep pace, and avoid being left behind.

The overarching analytical framework that shapes this assessment is guided by the premise that **five foundational digital elements** create the building blocks for unlocking digital transformation in DRC, and thus determine the country's ability to build a robust digital economy:

1. **Digital Infrastructure** that provides the means for people, businesses, and government to get online, and subsequently access local and global digital services, thus effectively embedding users in the global digital economy. Broadly speaking, digital infrastructure consists of high-quality, accessible and affordable connectivity services, but also includes internet of things and data centers, as well as institutions and rules that foster a competitive telecommunications market.
2. **Digital Skills** that support the creation of a digitally savvy workforce. These are critical to building a robust and competitive digital economy, where innovative services, industries and business-models can emerge. Broad-based digital literacy and basic skills acquisition are instrumental to supporting wide adoption and use of digital products and services by the average consumer, and hence critical to ensuring digital inclusion. However, the level of intermediate, advanced and highly specialized digital skills will determine a DRC's ability to embrace digital innovation.
3. **Digital Platforms** that enable digital transactions and exchange, support new digital businesses and service delivery models. Related systems, applications and services thus have the power to transform the way people, government, businesses and civil society interact with each other in all aspects of life. Digital platforms help create economies of scale and leverage network effects to create value and support productivity gains.
4. **Digital Financial Services** (DFS) that provide individuals and households with convenient and affordable means to pay, as well as to save and borrow, using digital tools and platforms. Firms can leverage DFS to transact more easily with their customers and suppliers, as well as to build digital credit histories allowing access to finance. Governments can use DFS to increase efficiency and accountability in various payment streams, including for the disbursement of social transfers and receipt of tax payments. Digital payments are often the entry point for DFS and provide the "rails" through which additional products and use-cases can be developed.
5. **Digital Entrepreneurship** and innovation ecosystem that helps bring the digital economy to life and accelerate digital transformation – with both young ventures and innovators helping to generate new products and services that leverage technologies and digitally-enabled business models, as well as traditional industries adopting related solutions – contributing to net employment, enhanced competitiveness and productivity. Digital entrepreneurship thus helps expand products and services on offer but can also create new markets.

In addition, several **cross-cutting themes or areas** shape these foundational elements, which determine DRC's ability of create an enabling institutional and policy environment. A clear strategy and strong leadership are both needed to spearhead the agenda at national level. Equally, the digital economy creates new legal and regulatory challenges, such as protecting consumers and their right to privacy, supporting cybersecurity and data protection, as well as effective taxation and competition, which need to be effectively addressed to ensure that innovative services continue to emerge, and guarantee their safe and affordable access. Moreover, for all Congolese to reap the digital dividends associated with the digital economy, it needs to be inclusive to ensure that anyone, regardless of age, gender, income and geography has the ability to access digital tools and services.

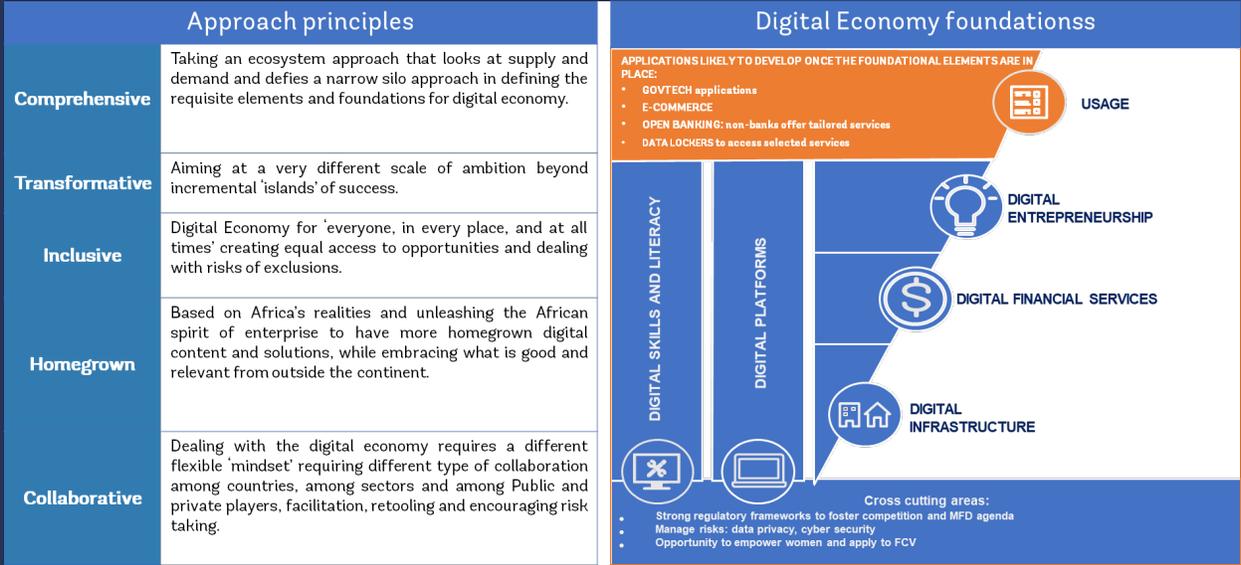


Figure 0.1: Approach and foundations of the DE4A Initiative

The DE4A Initiative forms part of the World Bank Group's support for the African Union's Digital Transformation Strategy (DTS) for Africa. As part of the DTS, ambitious, high-level targets have been established for all five foundational pillars of the digital economy, articulated in the DE4A assessment framework, as a way to define and measure success against the overarching goal of ensuring that every individual, business and government is digitally enabled by 2030. Many of these targets have in turn been embedded in the World Bank Group's IDA19 Commitments.

Table 0.1: High-level targets of the African Union's Digital Transformation Strategy

DIGITAL INFRASTRUCTURE	DIGITAL SKILLS	DIGITAL PLATFORMS	DIGITAL FINANCIAL SERVICES	DIGITAL ENTREPRENEURSHIP
Universal Internet network coverage Affordable Internet for all at less than 2% of GNI per capita Interim Milestone Doubling broadband connectivity by 2021	All 15-year-old students with basic 'digital skills' competencies 100,000 graduates in advanced digital skills programs annually	Doubling of Online Services Index rating for all Governments All individuals are able to prove their identity digitally At least 50% of the population regularly uses the Internet to access Government or Commercial services	Universal Access to Digital Financial Services Africa-wide payments infrastructure platforms in place	Tripling the number of new digitally-enabled businesses created annually Financing for Venture Capital to reach .25% of GDP

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Every African individual, business and government is Digitally Enabled by 2030



DIGITAL INFRASTRUCTURE



DIGITAL SKILLS



DIGITAL PLATFORMS



DIGITAL FINANCIAL SERVICES



DIGITAL ENTREPRENEURSHIP



Acknowledgements

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Diagnostic Methodology

Data collection

In light of Covid-19, a **virtual fact-finding mission** was undertaken in May 2020. In addition to initial desk **research** conducted, this virtual mission allowed for broad-based stakeholder consultations with both the public and private sector, as well as civil society and development partners. The following **stakeholders** were consulted as part of this country assessment:

- **Public sector:** Special Advisor to the President on Digital, Ministry of Planning, Ministry of Finance, Ministry of Budget and Economy, Ministry of Post, Telecommunications and Information Communication Technology, Ministry of Interior, Ministry of Foreign Affairs, Ministry of Commerce and Industry, Ministry of SMEs, Ministry of Portfolio, Ministry of Public Administration, Ministry of Urban Development, Ministry of Youth, Ministry of Health, Ministry of Transportation, Ministry of Labor, Employment, Social Protection and Vocational Training, Ministry of Primary, Secondary, Technical and Literacy Education, Ministry of Higher Education, Ministry of Social Affairs, the National Post and Savings Office, the Congolese Central Bank, the General Directorate of Customs, the General Directorate of Taxes, the National Organization of Social Security, the Regulatory Agency for Posts and Telecommunications, Insurance Regulatory Agency, and the Congolese Society of Optic Fiber (SOCOF).
- **Private sector:** Congolese Business Confederation (Fédération des Entreprises du Congo- FEC), Vodacom, Airtel, Orange DRC, Smile Telecom, Helios Towers, Liquid Telecom, Orioncom, Standard Telecom, FTTx DRC Council, Ecobank, FBN Bank, Equity Bank, Afrilandfirst Bank, FINCA, SONAS, M-Pesa, Africash, Baobab, Money Trans, SchoolAp, Ingenious City, Kinshasa Digital, Advans, Facebook, Rawsur, Activa Insurance, Microcom, Cadeco, Agricole, Level Communication, Immofamilia, Fosmark Corp, YPARD, Congo BD, Owa Shawarma, WENZEASY, Roadway Tracking, Hazetu Services, Ozeysservices Consta, Naledi Services, MICT Solutions, Kivubuy, Bweteta Holding, Endeleya Corp., Kabemba Co., Conebase, Faysal Company, Fidba Graphics, Find Solution Technology, KivuGreen Corporation, TaxiON, La Balbasse-Kivu Entrepreneurs, Stick RDC, MaishaPay, AgriKonekt, DHL, Tinda, Llab, Flash Congo, MAGO, ITOT Africa, and Uptodate developers.
- **Civil society, academia, foundations, and associations:** Kinshasa University, Lubumbashi University, Great Lakes University, Kisangani University, Shalom de Bunia University, Superior Institute of Commerce, ISAM, IFSIC, ISPT, ISTA, Parents Association of Private Schools, Parents Association of Catholic schools, and Vodacom Foundation.
- **International, regional and bilateral organizations:** African Development Bank (AfDB), European Union (EU), United Nations Capital Development Fund (UNCDF), United Nations Development Program (UNDP), UNESCO, UNICEF, DFID, Elan, Agence Française de Développement (AFD), French embassy, Belgian embassy, JICA, and USAID.

The analysis presented also draws on **regional and global benchmarking**, based on standardized indicators that form part of the DE4A diagnostic methodology. The analysis also draws on government statistics and data shared by the private sector.

List of acronyms

2G	Second Generation
3G	Third Generation
4G	Fourth Generation
ADN	Agence Développement Numérique
ARPTC	Autorité de Régulation de Poste et de Télécommunication
AU	African Union
BCS	Bandwidth and Cloud Services Group
CAB5	Central African Backbone
CAR	Central African Republic
CDMA	Code Division Multiple Access
CNN	Conseil National du Numérique
DE4A	Digital Economy for Africa
DRC	Democratic Republic of Congo
ECCAS	Economic Community of Central African States
FTTx	Fiber to the X or Fiber in the Loop
Gb	Gigabyte
GDP	Gross Domestic Product
GNI	Gross National Income
GSM	Global System for Mobiles
HDI	Human Development Index
ICT	Information and Communications Technology
IXP	Internet Exchange Point
IFC	International Finance Corporation
ISP	Internet Service Providers
Kbps	Kilobits per second
LTE	Long-Term Evolution
MB	Megabyte
Mbps	Megabits per second
MHz	Megahertz
MNO	Mobile Network Operator
MPTNTIC	Ministère des Postes, Télécommunications et Nouvelles Technologies de l'Information
PACDICE-AC	Plan Consensuel de Déploiement des Infrastructures de Communications Electroniques en Afrique Centrale
PNN	Plan National Numérique
PNSD	Plan National Stratégique de Développement
PPP	Public-Private Partnership
SCPT	Société Congolaises des Postes et Télécommunications
SNEL	Société nationale d'électricité
SOCOF	Société Congolaise de Fibre Optique
STM-1	Synchronous Transport Module level 1
Tb	Terabyte
TVET	Technical and Vocational Education and Training
USF	United Service Fund
VSAT	Very Small Aperture Terminal
WACS	The West Africa Cable System
W-CDMA	Wideband Code Division Multiple Access
WBG	World Bank Group
WiMAX	Worldwide Interoperability for Microwave Access

Executive Summary

In September 2019, the Democratic Republic of Congo (DRC) adopted a new vision for the digital economy, captured in the *Plan National du Numérique (PNN) – Horizon 2025*. Despite being one of the poorest countries in the world (close to 80% of the population are estimated to live under the poverty line of US\$ 1.90 a day), and facing several structural constraints to basic service delivery, DRC has shown an undeniable enthusiasm in developing its digital economy, accompanied by a number of small-scale successes. However, strong social and economic inequalities as well as poor institutional coordination have limited the operationalization of the propositions included in the PNN.

The recent COVID-19 pandemic has disrupted and accelerated these plans. While social distancing and administration and business shutdown have highlighted the importance of a digital enabling environment, the crisis is also laying bare several facets of the digital divide along income levels, location, age, education and sector of activity. Large parts of the population remain unconnected, but as needs arise, businesses and Government will rely more than ever on digital infrastructure and services, which may further amplify the digital divide. It is also highlighting the crucial under-investment in digital infrastructure and the services that run off it. Foundational elements needed to leverage e-applications in government solutions and key sectors like health, education and agriculture are inexistent or weak in DRC. However, following the start of the crisis, the Government reached out to the budding startup ecosystem to devise innovative solutions using distance learning, e-commerce and health technology. Developing these solutions and others helps to ensure both immediate response and better preparedness for future crises and a faster economic recovery.

Following the 2018 election, the new Government made reforming the digital economy one of its top priorities. The vision stated in the PNN is to make the digital economy a lever for integration, good governance, economic growth and social progress. To achieve this, the PNN introduces four pillars on infrastructure, content, application uses and governance, which are extended into 68 priority actions, such as revising digital skills curricula, providing universal electricity access, and implementing internet community centers.¹ However, developing a vibrant digital economy requires strong collaboration and dialogue within key ministries and relevant stakeholders, including the private sector and associations. Clear roles need to be attributed and coordinating structures need to be created to implement this vision. Moreover, the strategy sets ambitious goals that only massive private investments can help achieve. However, potential investors are aware of the lack of regulations, of high levels of taxation, and have been waiting for the new Telecommunication Framework Law promulgated in November 2020, which prevented large-scale investments in a fragile environment. The new Law will replace the previous one from 2002, but key regulatory aspects will still be missing, including cybersecurity and data protection standards.

DRC has one of the most under-developed and under-invested broadband markets in Africa with low internet and mobile phone penetration respectively at 9% and 38.7%. Affordability is a major constraint with elevated prices (58th most expensive country out of 61 in Africa) and very low purchasing power. DRC's underperformance in digital infrastructure is a binding constraint to the emergence of a digital economy. The internet market is relatively competitive, although it is concentrated around the top-3 players who follow similar pricing strategies, and roughly equivalent market shares: Vodacom (37%), Airtel (31%), and Orange (29%), (Section 3.2.2). Challenges arise from lack of policy enforcement, slow-changing regulatory framework² (the new Telecoms Framework Law took two years from being voted to being promulgated – as of March 2021 it is not published in the *Journal Officiel*), long-held monopolistic positions of the national posts company SCPT, insufficient

¹ Government of DRC (2019). *Plan National du Numérique – Horizon 2025*.

² The new Telecoms Framework Law took two years from being voted to being promulgated. As of March 2021, it is not yet published in the *Journal Officiel*

international connectivity, sparse and narrow national backbone and limited last-mile connectivity (only 65% of the DRC population is covered by 3G service).

The country is marked by an incongruent backbone infrastructure, held back by years of under-investment in all segments of the broadband value chain (Section 3.2.3). The 620km of SCPT fiber optic network between Kinshasa and the WACS landing station in Matadi is poorly maintained. The ongoing World Bank-funded CAB5 project is building a new fiber optic infrastructure on the same route to ensure high quality international connectivity, through a PPP scheme. International connectivity has also recently improved in the main traffic corridors (e.g., through Goma and Lubumbashi), but missing backbones and last-mile access have created regional disparities and poor service quality. The 1700km of fiber optic network along the SNEL high-voltage line between Kinshasa and Kasumbalesa is yet to be operational. However, this new infrastructure crossing the DRC will be privately managed (PPP) by Airtel, Vodacom, and Liquid, and should significantly boost the penetration rate of broadband services. The coming on board of additional fiber infrastructure in the key frontier axes in Western, Eastern and Southern, and recent set-up of a cache system and two internet exchange points (IXP in Kinshasa and Lubumbashi) have increased available bandwidth. There is still a crucial need to accelerate key aspects of the connectivity value chain. As the new Telecom Law was recently promulgated, investment in some segments by the private sector will happen, but progress and coverage are likely to be slow and largely unequitable. Thus, promoting public-private partnerships and coordinating with other infrastructure works (e.g., roads), would create a positive flywheel much more quickly than otherwise. Designing demand-side policies through the Universal Service Access Fund could help develop the world's largest francophone market in terms of population size and incentivize new investments from domestic and international actors.

DRC recognizes that digital skills are a critical component of a digital economy, as highlighted in the PNN. Although the country made significant progress in the education sector, the formal education system's low quality has resulted in a limited and fragmented availability of both basic and advanced digital skills of the workforce. While DRC's education authorities recognize the growing importance of digital skills, significant challenges remain, including gaps in ICT infrastructure to connect education and training premises, lack of qualified teachers and trainers, and misalignment of curricula and teaching materials with market needs. High drop-out rates impede on the formal education system's ability to reduce existing digital skills gaps. In this setting, DRC has started to apply innovative approaches to expand digital literacy and up-skilling, crowding in both the private sector and development partners. The COVID-19 pandemic also provided opportunities to boost the development of digital skills and distance learning, through online education platforms such as SchoolAp and VODAEDUC. The Government of DRC quickly responded to the pandemic by soliciting non-State actors for distance learning (Box 6). With more than 250 active members, CoqDig connects people who have digital skills and knowledge with those who need it. Innovation incubators such as Kinshasa Digital, Tech4Mining and a new digital agency which organized the 2019 Hackathon Ebola, and started running intensive trainings on digital skills. As the digital economy develops, the demand for digital skills will continue to rise, considering government's and SME's digitization efforts, communication and learning needs, the development of mobile financial services and use of digital in the informal sector. To achieve this, increased coordination is needed, better data collection and monitoring of labor market needs are needed, as well as the development of a clear roadmap for digital education at all levels.

The Government has undertaken multiple digitalization initiatives over the years but lacks many of the core building blocks needed to support a whole-of-government approach and for the development of a large-scale e-commerce industry. While some administrations have implemented operational applications, each has done so independently to serve its own needs. The result has been poor service delivery, questionable data integrity and large-scale inefficiencies. Overall, DRC is still way behind most of the other African Countries, with an E-Government Development Index score of 26 out of 100 against the 32.9 average in Sub-Saharan Africa (SSA). Similarly, the Online Services Index, which measures a government's capability and willingness to provide services and communicate with its citizens electronically, stands at 21 out of 100 for DRC against 35.4 for the SSA Region average in

2018. Most of the recent digitalization initiatives have been driven by the need to improve fiscal revenue generation and public financial management³ while largely ignoring the quality of service delivery to the public (Section 5.2.1). For instance, the tax authority recently started piloting an “e-Filing” for the VAT (in May 2020), the Customs (DGDDA) have introduced and rolled out the Automated System for Customs Data (ASYCUDA) World application, but the system cannot often be accessed due to slow internet bandwidth. Poor service delivery is exacerbated by limited use of digital tools and instruments, weak government coordination, lack of key enablers such as a digital ID system. There is a need to seize the opportunity of the COVID-19 response, donors’ willingness and the growing appetite of DRC’s youth to improve back-end systems (e.g. IFMIS), craft an overarching strategy and interoperability framework for public digital platforms, and implement “quick-wins” for a strong demonstration effect that will boost users appetite.

The report outlines a slightly different story for private digital platforms. Given the nascency of the ecosystem, there are a few successes stories (Section 5.2.4). There is an increasing number of incubators, hubs, events, and competitions dedicated to digital entrepreneurs, which have given rise to a small-scale e-commerce industry. Services such as eMart.cd, Tinda or Sualoo, which are either e-commerce or logistics operators active in Kinshasa and other cities, are contributing to an enabling environment for private digital platforms in DRC – the need of which is largely reinforced by the COVID-19 pandemic. This is driving the broader entrepreneurship ecosystem, in Goma for example, when DHL partnered up with a local e-commerce startup that can now procure its inventory from abroad at a preferential rate. However, e-commerce startups face the challenges of high costs, difficult last mile logistics and lack of trust from the population. These result in entrepreneurs needing to deliver products themselves or have their clients pick up their purchase, which weighs in on transaction costs and limits the potential of their businesses. Overall, innovation is happening but needs a wider push to mainstream payment services, education on the use of technology and better access to connectivity in order to fully enable private digital platforms business models.

Digital financial services (DFS) are on the rise, both through low-tech solutions such as SMS- and USSD- based mobile money services and through advanced technologies such as blockchain. However, financial inclusion remains low in the country. In 2017, only 15% of adults had a bank account (against 32.8% on average in SSA), 29% of account owners used their mobile or the internet to access their bank accounts, and 16% of adults owned a mobile money account (21% for the Africa average), according to the Global Findex database. The money transfer market shows high potential in the country, with an important demand and more than 80 money transfer companies available in 2019. However, growth of DFS is constrained by inadequate connectivity, low usage of electronic payments by the Government, stringent taxation and know-your-customer (KYC) requirements, lacking regulation on data privacy and absence of key components such as digital ID, credit reporting system or even basic regulation of capital markets. In the short term, digital financial inclusion can be improved by finalizing the national financial inclusion strategy, operationalizing multilateral interoperability, promoting the use of shared / common platforms for MFIs, building the capacity of the regulator and adopting regulations in line with international best practices, and of course, developing a unique biometric financial identification system (based on a universal ID system), which remains the main barrier to service access in poor countries. Nevertheless, innovation is disrupting the sector with the example of Maishapay, a startup initially launched for the Congolese diaspora in China, which enables mobile money transaction and merchant purchases through SMS and USSD technology, using a blockchain-based application (Box 8).

Harnessing the potential of DRC’s fast-growing population, the private sector ecosystem, through technology incubators and digital entrepreneurship, could contribute to economic transformation and help the country leapfrog to a new growth trajectory. However, digital entrepreneurs still face many important constraints, such as poor infrastructure, high costs of IT equipment and financial services,

. See *Le numérique au service de la maximisation des recettes et de la bonne gouvernance des finances publiques*, Rapport Matinée Fiscale DGDA, 17 & 18 décembre 2020, for a list of useful recommandations on the topic.

limited digital skills among the population, or lack of funding. Despite these challenges, an ecosystem of digital entrepreneurs is emerging. A first-of-its-kind survey run with 122 digital startups showed that they are mostly concentrated in the three urban hubs in Kinshasa (59%), Lubumbashi (17%), and Goma (10%), as discussed in (Section 7.2.1). The nascent ecosystem is structuring itself around a few enabling organizations that pave the way to technical support and investment opportunities to the Congolese digital entrepreneurs. Some success stories of digital entrepreneurs have already emerged. To become a digital power, DRC will need thousands more. To achieve that, the country would need considerable improvement in all ecosystem conditions and a dedicated set of enabling policies such as interoperable payment platforms, digital signatures and simplified taxation.

According to a survey of more than 2,000 Micro, Small and Medium-sized Enterprises (MSME) in Kinshasa, Matadi, Lubumbashi, and Goma, the use of technology by MSMEs in their business process and routine remains low. 77% of MSMEs identify the lack of modern equipment and technology as a constraint to productivity, and only 29% use information and communication technology (ICT) to improve their company’s visibility. Websites are used for communication with a broad customer base and to reach out to new clients, 9% of MSMEs use social media for networking and information sharing with their customers and partners, 7% use technology to access training and develop new skills and competencies, and 6% use technology to facilitate their commercial operations (such as sales, purchases, or production). Most entrepreneurs are interested in improving this area: 37% of respondents believe that technology can increase production through automation and economies of scale. Doing so will require a cross-cutting effort to implement the recently adopted National Program for the Development of Entrepreneurship in Congo (PRONADEC), and to foster digital education and trust in digital services among the population.

Figure 2: Summary of DRC's digital ecosystem development

	Nascent	Growing	Advanced
Digital Infrastructure	Access to undersea internet cables, backbone networks	Backbone networks, data clouds, IXPs, privacy, cybersecurity	4G/5G networks, rural connectivity, internet of things
Digital skills	Bootcamps, digital skill training	Business and management skill training	Digital-savvy workforce
Digital platforms	Shared services, digital ID, digital financial management	E-Government, open data, e-commerce	Mobile apps, artificial intelligence, software-enabled platforms
Digital financial services	Basic digital payments, e.g. person-to-person payments	Broad digital payments, e.g. B2P, G2P	Digital financial services, e.g. savings, credit, insurance
Digital entrepreneurship	Talent development, business mentoring	Angel/seed financing, innovation centers, regional hubs	Venture financing, M&A, IPOs, BPO, local tech industry

Based on report findings, the proposed top priority recommendations are as follows (a complete table of all recommendations is available in Annex 2):

Figure 0.3: Selected top-3 recommendations per chapter (please refer to each chapter for details)

Action	Time Frame	Priority
Institutional Framework and Governance		
R1 Ensure that new National Digital Plan (PNN) is reviewed and repositioned, where necessary, and fully embraced.	ASAP	High
R2. Broaden the scope of the legal and regulatory framework to include all aspects of the Digital Economy (personal data, cybersecurity, electronic transactions, etc.).	ASAP	High
R3. Define roles and responsibilities for various bodies responsible for oversight and regulation.	2021	High
Digital Infrastructure		
R4. Fully liberalize and improve access to the landing station, international breakouts and the transportation of internet capacity on fiber to Kinshasa	2021	High
R8. Reinforce and extend the national backbone and ramp up high-capacity connectivity in key economic hubs (e.g. through PPP financing scheme)	2022-2023	High
R9. Remove direct taxes on devices and internet services	2021-2022	Medium
Digital Skills		
R1. Increase coordination and develop a clear roadmap	ASAP	High
R4. Provide additional training opportunities in basic digital skills, with an emphasis on teachers and government employees	2021	High
R5. Leverage non-state actors of basic and advanced digital skills training	2021-2022	Medium
Digital Platforms		
R1. Craft an overarching strategy an interoperability framework for public digital platforms	ASAP	Medium
R8. Advance the implementation of a government-wide integrated financial management information system (IFMIS)	2021	High
R9. Roll out 'quick-win' solutions (e.g. YSIS Regie, SIGMAP)	2022	Medium
Digital Financial Services		
R2. Develop and implement a unique biometric financial identification system	ASAP	High
R3. Modernize Government and SOE digital platforms and increase the use of e-money in Government to Persons (G2P) and Persons to Government (P2G) payments (taxes, utilities)	Medium	High
R4. Finalize and adopt the national financial inclusion strategy (NFIS) including the national payments strategy	ASAP	Medium
Digital Entrepreneurship		
R1. Make overall improvements in the business climate and entrepreneurship ecosystem. In particular, develop and adapt a legal framework to the needs of digital startups	ASAP	High
R6. Foster collaboration among ecosystem players, including digital entrepreneurs, innovation hubs, academia, big corporates, investors, and the government	2022-2023	Medium
R9. Incentivize and de-risk investments in early-stage digital entrepreneurs	2021-2022	High

1 Introduction

1.1 Country at a glance: Democratic Republic of Congo

Despite being endowed with abundant natural resources, the Democratic Republic of Congo (DRC) remains one of the poorest countries in the world, with extremely low levels of human development. With a surface area the size of Western Europe, the third largest population in Africa, abundant mineral wealth, and largely untapped agricultural and hydropower stores, DRC is one of the most resource-rich countries in the world.⁴ Yet, in 2019, Gross Domestic Product (GDP) per capita was only US\$ 564, and an estimated 76.6 percent of the population lived in extreme poverty⁵ (below the international poverty line of US\$ 1.90 per day). DRC accounts for 7 percent of the world population in extreme poverty and ranks third (after India and Nigeria) in terms of absolute number of extreme poor— about 62 million people.

Political instability, poor governance, and the resulting lack of basic service delivery all contribute to limited development and persistent poverty. DRC is still recovering from a series of conflicts that broke out in the 1990s. After several postponements of the presidential elections, Félix Antoine Tshisekedi Tshilombo — the son of Etienne Tshisekedi, the country’s longstanding opposition leader — won the December 2018 election, succeeding Joseph Kabila who had been at the country’s helm for 18 years. DRC’s turbulent history, including a prolonged civil war in the 1990s and continued active conflict in parts of the country, has prevented the establishment of stable institutions and constructive power coalitions, while at the same time allowing for elite capture of the country’s abundant resources and fueling endemic corruption.

The poor conditions of transport infrastructure aggravate social and economic inequalities across provinces and between urban and rural areas. Only 34 percent of households live in a five kilometers proximity to the nearest road; 15 percent of the population has access to electricity; and 52 percent of the population has access to clean drinking water. With an annual population growth rate of 3.2 percent, even maintaining these low levels of services is a challenge in the fragile context of DRC. The DRC ranks 146 out of 157 countries in terms of human capital, with a human capital index score of 37 out of 100, which is below the sub-Saharan African average of 40.⁶ Congolese children spend an average of 9.2 years in school and 43 percent of children are malnourished.

Recent macroeconomic performance has been robust, but the COVID-19 pandemic implies substantial downside risks for the country’s growth and fiscal outlooks. Economic growth averaged 7.5 percent between 2010 and 2015 fueled by strong commodity prices and large inflows of international aid. But as COVID-19 spreads rapidly across the world and reaches the DRC, it is likely to create additional challenges, affecting growth and fiscal outcomes in a negative way. After reaching 5.8 percent in 2018, economic growth slowed to 4.4 percent in 2019, owing to a drop in commodity prices, particularly for cobalt and copper, which account for over 80 percent of the country’s exports. Higher spending and revenue stagnation widened the fiscal deficit from close to balance in 2018 to a deficit of 2 percent of GDP in 2019. Additional public expenditures covered mainly civil service salary increases, free basic education, and infrastructure projects. Declining tax revenues are attributable in part to low corporate income tax collection, especially in the mining sector.

DRC has initiated several reforms aimed at improving business climate and strengthening governance in natural resource management. However, the country remains at the bottom of the Doing Business ranking, placed 183th out of 190 countries in 2020 with transversal challenges on access to electricity, access to credit, enforcing business regulations and protecting investors. It must therefore address a host of challenges in order to create investment opportunities that can leverage digital technologies.

⁴ World Bank. 2018. DRC Systematic Country Diagnostic.

⁵ World Bank. 2020. DRC Macro Poverty Outlook.

⁶ World Bank, Human Capital Index 2018

Table 1.1: Democratic Republic of Congo at a glance: key top-level figures and map

Population (2018)	84 M
GDP, Current US\$ (2018)	47.2
GDP per capita, PPP \$ (2018)	1,111
Urban population (2018)	44%
Adult literacy rate (2016)	77%
Access to electricity (2018)	19%
Labor force participation rate (2019)	63.9%
Labor force participation rate, ages 15-24 (2019)	35%
Agriculture jobs in total employment (2019)	65%
Doing Business Index, score 1-100 (2020)	36
Digital Adoption Index, score 1-100 (2016)	21



Source: World Bank World Development Indicators (WDI), World Development Report 2016.

1.2 Digital Economy in the Democratic Republic of Congo: key opportunities and barriers

A snapshot of DRC's digital ecosystem illustrates that the country is borderline between nascent and growing, with many foundational elements missing:

- Digital Infrastructure:** DRC's digital infrastructure is one of the most under-developed in Africa, with only 8.6 percent internet users in 2017 according to the International Telecommunications Union (ITU) and high prices of broadband services. Many gaps persist across the connectivity value chain, especially the incongruent backbone infrastructure, held back by years of under-investment, *de facto* state-backed monopoly incumbent, insufficient international connectivity and limited last-mile networks. The poor state of digital connectivity is a constraint to the takeoff of the digital economy, many elements of which require fast connections, large user base with data access and data-driven business models.
- Digital Skills:** The current stock of formal digital skills in DRC is low and is often misaligned with market demand, as coordination for defining curriculum is lacking. From foundational skills such as literacy and numeracy, to basic digital skills that enable the population to effectively use Information and Communication Technology (ICT), the current education system does not adequately prepare its learners to acquire these skills, thus hampering the government's ability to reach citizens through digital service delivery. As DRC strives towards digitalization, a lack of basic skills required to use and engage with these new platforms could potentially further increase inequalities and exclusion.
- Digital Platforms:** The government has undertaken multiple digitalization initiatives with limited service improvement and efficiency gains. While some administrations have implemented operational applications, each has done so independently to serve its own needs. Government lacks many of the core building blocks needed to support a holistic approach to e-government and expand digital public service delivery. These include weak government coordination, access to shared digital infrastructure and services, and key enabling platforms such as a robust foundational ID system. As a result, DRC has a poor showing in the 2019 UNCTAD B2C e-Commerce Index, ranking 148th out of 152 countries. For commercial platforms, DRC's fast-growing and increasingly urban population provides a springboard for the growth of digital companies that create new products, leverage new technologies and open up new markets.

- **Digital Financial Services:** DRC has one of the lowest levels of financial inclusion in sub-Saharan Africa (SSA) with 26 percent adult owning an account (with a financial institution or a mobile money provider) in 2017, according to the Global Findex database. Usage and demand in mobile money has increased significantly in urban population centers. Nevertheless, accessibility and usage rates remain low for many in rural areas. Given the geographic expanse of the DRC, and the high costs of brick-and-mortar structures, digital channels such as mobile money and online banking can drastically drive down costs, enabling providers to reach customers in underserved areas. The Government can contribute significantly to the uptake of digital financial services by upgrading its own digital platforms and increasing government to person payments.
- **Digital Entrepreneurship:** Digital entrepreneurship in DRC is still nascent, despite recent growth in the ecosystem. As noted above, DRC ranks 183th of 190 in the WB Doing Business 2020, scoring 36.2 out of 100, behind the SSA average of 51.8, due to factors such as difficulty of starting a business, dealing with construction permits, and low access to electricity. The digitalization of financial and non-financial services offers the opportunity to expand local markets, but there is a need to educate consumers, businesses and the public sector about digital skills and solutions. The public sector needs to intensify the digitization of its systems and operations and open its market to local digital entrepreneurs.

1.3 Structure of this Report

The chapters that follow will present a summary of key diagnostic findings, an analysis of key strengths, weaknesses, opportunities and threats (SWOT) as well as summary of main recommendations that arise from the DE4A Country Assessment. The first chapter will discuss the current access, quality and resilience of digital infrastructure, as well as availability and affordability of connectivity, which are instrumental to bringing more people online. The second chapter looks at the current state of digital skills attainment and coverage, in relation to the basic, advanced and e-business skills needed to support further uptake of digital services, and application of digitally enabled solutions. The third chapter looks at the presence and use of digital platforms that can support greater digital exchange, transactions and access to public and private services online. The fourth and fifth chapters turn to examining the current state of the digital financial services and the digital entrepreneurship ecosystem.

2 Strategic, Institutional & Legal Framework

Key messages:

- ❖ An overall, cross-cutting vision for the development of the digital economy in DRC has been proposed through the PNN 2025 but implementation capacity is weak and uncoordinated.
- ❖ The institutional arrangement for leading and supervising the digital agenda lacks consensus and clear roles need to be attributed.
- ❖ Different ministries and agencies are developing siloed approaches. Several networking and computerization projects have been initiated by different public entities, often in an independent and uncoordinated manner.

2.1 Importance of High-Level Leadership and Coordination

Lessons from digital economy development programs suggest that Government's clear vision, understanding and commitment to underlying pathways and principles are essential. While DRC is aiming to diversify the economy and accelerate growth, the continuation and enforcement of key legal and regulatory reforms is paramount. In order to match the Government's ambition with a positive development trajectory, strong and capable institutions are needed to define a strategy that will help focus resources on high-pay-off models of development, ensure sustainable and equitable evolution and maximize the benefits of technological progress. At the same time, defining an institutional framework for both public authorities and all stakeholders in the sector, helps to create a positively reinforcing cycle for the digital economy. Box 1 below presents some of the international best practices in establishing such governance framework for the digital economy.

Box 1: Best practices for establishing an effective institutional framework

International best practices suggest that there are two main approaches for supporting effective leadership related to the digital agenda:

1. **Entrusting leadership to a supra-ministerial entity.** In most cases leadership is conferred to the highest political office through the introduction of an agency that reports directly to the President's or Prime Minister's Office. This model is currently being employed by Brazil, Chile, South Korea, Estonia, Luxemburg, Mexico, and Slovakia. This model helps ensure high-level leadership and supports centralized strategic coordination. Several variations of this approach exist, depending on the degree of involvement of other ministers.
2. **Strategic coordination is ensured by a lead ministry.** This model is currently being employed by Belgium, the People's Republic of China, Japan, Poland, Portugal, Slovenia and Rwanda. Here too, there are several variants depending on the nature of the ministry in charge of this coordination: whether it is exclusively in charge of digital; has other areas of responsibility; or shares its prerogative with several other ministries.

The choice of the best configuration depends on national specificities such as institutional capacity, administrative set-up and culture etc.

Source: OECD (2019). [Going Digital: Shaping Policies, Improving Lives](#). OECD Publishing, Paris.

Government vision, strong institutions and relevant legislation enable clarification of roles, responsibilities and mechanisms for government and non-government stakeholders. On the contrary, A lack of a coherent framework within which private and public initiatives can be carried out can lead to economically inefficient behavior on the part of public service providers and private operators. There is a risk that investors will focus their efforts only on the market segments (geographic areas or specific customers) with the highest levels of profitability, leaving out large segments of the population underserved.

2.2 Diagnostic Findings: Governance of the Digital Economy

2.2.1 Vision and strategy for the digital economy

The reform of the ICT sector was one of the first projects of sectoral reforms implemented by the Government. Its vision aims to make digital economy a driver of economic growth, lever for integration, good governance, and social progress.⁷ To achieve this, its objectives focus on improving the sector governance, modernizing and extending existing infrastructure. A vision for digital transformation can potentially refocus the country's capacity for a knowledge economy and enable it to leverage digital as an important factor in the modernization of the state, economic growth and social progress.

The current national strategy of DRC is the *Plan National Stratégique de Développement (PNSD)*, launched in 2015, which provides the strategic framework for addressing development challenges overall. The document sets high ambitions to propel DRC to middle-income country status by 2021, emerging country by 2030, and developed country by 2050.⁸ Unfortunately, digital economy sectoral policies are not very well reflected in the PNSD, although the strategy does mention the creation of Technological and Scientific Park.

A new strategy for the digital economy, *Plan National du Numérique (PNN)* was developed and launched in 2019,⁹ but it is yet to be widely embraced. It focuses on four strategic pillars, namely infrastructure, content, application uses, and governance (see Box 2). While the PNN has the endorsement of the President, much of its proposed framework depends on the Telecom Law promulgated in November 2020 (discussed further in Section 3.2.3.4). The PNN established a Steering Committee, coordinated by the President's office, in charge of supervising its implementation. However, despite the adoption of the PNN, the ICT sector remains without a sectoral strategic framework since the Sectorial Policy Document (DPS) of 2009, which is now largely outdated.

2.2.2 Institutional framework

At present, several networking and computerization projects are initiated by public administrations, but they are carried out in an independent and uncoordinated manner. Several

Box 2: The Plan National du Numérique, DRC's first strategic vision for the digital economy

Launched under the auspices of the Presidency's office in September 2019, the PNN is DRC's overall vision for the digital economy. However, much remains to be done to operationalize this new strategy. It establishes four pillars to guide the development of the digital economy in DRC:

- **Infrastructure** includes broadband infrastructure, secure data centers, incentives to increase access to connectivity
- **Content** includes the local digital industry, human capital and leadership, and leveraging big data and open data.
- **Application uses** include the digital culture, e-Government, secure norms and standards
- **Governance** includes the legal and regulatory framework, cybersecurity and data protection.

The PNN proposes to establish a National Council of Digital (Conseil National du Numérique) to monitor its implementation. However, such structures are currently missing and operationalization of the PNN remains at its starting point.

⁷ Government of DRC (2019). Plan National du Numérique – Horizon 2025.

⁸ Ibid.

⁹ https://www.numerique.cd/pnn/pnn/Plan_National_du_Nume%CC%81rique_HORIZON_2025.pdf

ministries have specific networks (MoI, MoH, Education) and some have implemented projects (namely MoF, PTNTIC and large institutions such as the Central Bank of Congo, Customs and Lands Registry). An inter-ministerial Commission for Public Information Services was set up to unite all the computerization projects across various ministries of government, but its influence has been very limited.

The institutional challenges stem from two levels. First, the consultation process and research leading to the ordinance fixing the powers of the various ministries could have been broader. Due to constraints encountered by the members of the drafting commission, many ministerial and institutional roles remain poorly defined, giving rise to a potential conflict in the chain of decision making and control. Second, many of the new institutions conceived to fix certain institutional gaps (such as the ICT coordinating agency) are yet to be established. The enabling legislations (such as the Framework Law for the telecom sector) have either taken a very long time to be promulgated, or are yet to be drafted (as indicated in section 2.2.3 below).

2.2.2.1 Leadership

The governance structure of the digital agenda includes the ICT Ministry and the Regulatory Authority, under the leadership of the President of the Republic.

- The **Presidency Office**, which initiated and coordinates the implementation of the PNN. The President of the Republic established the overall framework in its September 3rd, 2019 allocution for the launch of the PNN, acknowledging the transversal characteristic of the digital economy and proposing the four pillars mentioned above.
- **The Prime Minister's Office** plays a leading role in coordinating the digitalization of various ministries. This is an essential harmonization role in the absence of the digital development agency planned to be established under the new digital strategy.
- **The Ministry of Posts, Telecommunications and New Technologies (PTNTIC)** is the line ministry that is charged with leading the digital agenda in DRC. The institutional arrangement places the planning and implementation of state information and communication systems under the responsibility of the Minister.
- **The Post and Telecommunications Regulatory Authority (ARPTC)** is the regulator of the telecoms sector, in charge of enforcing existing Laws, regulations and conventions for posts, telecommunications and new technologies. The ARPTC must notably ensure that citizens can access ICT-enabled services.

2.2.2.2 Other line ministries, departments and agencies

A few other ministries and institutions are also at the forefront of spearheading digital initiatives in DRC:

- **The Ministry of Finance (MoF)** is the driving force behind most digital initiatives, partly because of its frontline, fiduciary role as a counterparty to official development assistance in DRC. Most of these digital initiatives are focused domestic resource mobilization, financial management and value-for-money motivations such as efficiency and development relevancy. Many of the organs and agencies under the Ministry such as General Directorate of Customs and Excise (DGDA) and the Directorate General of Taxes (DGI) are the most digitalized.
- **The Ministry of Budget** makes monetary provisions for many of the government's digitalization initiatives.
- **The Ministry of Plan** is the line ministry for developing long-range plans for the economy into which it embeds the digital dimension.

- **The Ministry of Interior (Mol)** has been leading with digitalization strategy for digital identification, e-passports and e-visas.
- **The Ministry of Health (MoH)** has recently launched the Agence Nationale d'Ingénierie Clinique, de l'Information et de l'Informatique de Santé (ANICiis) – See Box 7, Section 5.2.3.1.
- **The Ministry of SMEs** has been leading with work on digital entrepreneurship, especially for the youth and women.

2.2.3 Legal and regulatory framework

As discussed in Section 3.2.3.4, as of March 2021, the Framework Law of 2002 is the principal regulatory framework for the telecommunications sector, but it is now largely outdated. The law is based on a market model where the public operator develops a reference network providing other operators with interconnection and domestic and international transmission capabilities. To date, the statutory reference network has not been set up and each operator or independent user has developed its own transmission infrastructure according to its own needs. In particular, the presidential vision of developing the digital economy goes far beyond the scope of the Framework Law of 2002. A new Framework Law was under preparation, it has just been promulgated two years after being voted by the Parliament but must still be published in the *Journal Officiel*.

No structure has been put in place to coordinate activities in other ICT areas not covered by the 2002 legislation. The PTNTIC recently created an ICT Technical Unit but several gaps remain:

- ✓ **Electronic communications** – The implementation of the 2002 Framework Law faces the absence of certain regulatory texts, which are still in the draft stage and the regulatory texts relating to the management and control of the radio spectrum.
- ✓ **eCommerce Law** – The regulatory text for electronic commerce has been at drafting stage for many years, due in part to the delays in passing the new Telecom Law and regulatory apathy.
- × **E-transactions** – E-transaction and use of digital signatures are not covered by the existing on electronic communications law. E-transaction provisions are a prerequisite for conducting legal transactions online, as they recognize the legal equivalence between paper-based and electronic forms of exchange and are thus instrumental to support the expansion of both public e-service and commercial transactions.
- × **Cybersecurity and cybercrime** – There are no regulatory texts for cybersecurity and cybercrime under the 2002 Framework Law.
- × **Data protection and privacy** – There is no comprehensive law of data protection and privacy, but the Constitution recognizes the right to privacy in correspondence, telecommunications and other forms of communication. The 2002 Framework Law only contains partial penal stipulations. Problems relating to the protection of privacy, access to private or public information, and intellectual property rights have yet to be taken into consideration.

A comprehensive review of private sector regulation suggest that many laws are outdated and that capacity for enforcement is low. For example, laws on public finance, VAT, Fiscal Code, Customs Code and other related texts need to be revised to take into account digitalization of public administration.¹⁰ A new investment charter and public-private partnership (PPP) law has been adopted, but implementation regulations still need to be developed. Weak legal recourse and application tends to stifle business development in DRC. Similarly, regulatory and legal texts guiding the ICT industry in

¹⁰ *Le numérique au service de la maximisation des recettes et de la bonne gouvernance des finances publiques.* Rapport Matinée Fiscale DGDA. 17 & 18 décembre 2020.

DRC are either outdated or in conflict with one another, and capacity to effective application has been called into question. In this context, it may be beneficial for the Government to seek inspiration from existing regional frameworks, as explored by Box 3 below.

Box 3: Benefiting from existing legal and regulatory frameworks through regional bodies
 DRC is a member of several regional economic blocks, such as the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA) and the Economic Community of Central African States (ECCAS). DRC’s accession to OHADA will help the country update and improve its business readiness. OHADA has issued many legal frameworks pertinent to stimulating digital entrepreneurship and business in DRC. The OHADA laws and regulations are meant to decrease investment risks and improve transparency with respect to financial and accounting information. The OHADA treaty provides that any legislation adopted by the organization becomes immediately effective in all member countries. However, implementation capacity and political will have often been weak and have prevented regulation enforcement.

2.3 Recommendations & Next Steps

Table 2.1: SWOT analysis on institutional framework

Strengths	Weaknesses
<ul style="list-style-type: none"> - High momentum generated by the current government, including the initiation of a new strategy - Multiple entry points for engagements on digital development - High-level support and acknowledgement of the importance of digital infrastructure and service delivery. 	<ul style="list-style-type: none"> - Absence of a genuine sectoral strategy and coordination - Outdated and limited legal and regulatory framework - Inadequacies in the regulatory function, particularly in frequency management - Absence of certain enforcement measures, incl. frequency planning and procedures
Opportunities	Threats
<ul style="list-style-type: none"> - A national digital strategy has been prepared, providing a start - Several regional frameworks are in place, which if implemented could support integration of digital markets in DRC - Support of the International Community, including the World Bank 	<ul style="list-style-type: none"> - Inadequacies in operators' licenses and specifications, particularly in terms of service objectives and quality - Inconducive corporate law, and complex and cumbersome taxation - Inadequate engagement with key ecosystems stakeholders

The DE4A Country Diagnostic considers the recommendations below to support digital governance:

Objective 1: Establish a shared high-level strategic framework

R1. Ensure that new National Digital Plan (PNN) is reviewed and repositioned, where necessary, and fully embraced. There is need to solicit wider buy in through consultation by the Prime Minister’s Office and the Presidency for the National Digital Plan. Doing this would help endow the digital sector with an over-arching strategy, which will reduce waste, marshal resources and accelerate the pace of digital-led growth. There is also a need to develop a clear roadmap for the implementation of the digital

agenda in DRC, in contrast to the current practice where several national strategies stop short of embedding clear funding and implementation arrangements.

R2. Broaden the scope of the legal and regulatory framework to include all aspects of the Digital Economy (personal data, cybersecurity, electronic transactions, etc). The new Telecom Law, although aligned with best international practice, focuses on digital infrastructure. To ensure a successful implementation of the PNN (R1 above), the legal framework needs to be completed with a set of laws and legislation pieces encompassing all aspects of the digital economy.

Objective 2: Establish an effective institutional framework

R3. Define roles and responsibilities. It is essential to clarify the respective roles and responsibility of key institutions in order to avoid jurisdictional conflicts that ultimately affect all other players in the sector: operators, service providers, potential investors and end-users. This clarification of roles should be carried out in the light of international best practices, including considering DRC's commitment to and recommendations from regional institutions. This allocation will be considered in the formulation of the future legislative framework as well as the regulatory implementing texts.

3 Digital Infrastructure

Key messages:

- ❖ **DRC has one of the most under-developed connectivity markets in Africa** with low internet and mobile penetration and elevated prices. DRC’s underperformance is driven largely by lack of policy enforcement, unfit Telecoms Law that followed unwinding of long-held monopolistic positions, insufficient international connectivity, sparse and narrow national backbone and limited last-mile connectivity.
- ❖ **DRC is a historically under-invested market, despite its high potential and large population.** Mobile operators that have braved the tough operating environment have largely invested the bare minimum and deployed price models based on accelerated payback periods.
- ❖ **International connectivity has recently improved in the main traffic corridors, but deep regional disparities and service disruptions persist.** The coming on board of additional fiber infrastructure in the key frontier axes in Western, Eastern and Southern, and recent set-up of a cache system and internet exchange points have increased available bandwidth.

3.1 Importance of Digital Infrastructure

3.1.1. Socioeconomic Rationale for Digital Infrastructure Development

The impact of digital technology on economic growth is documented through an extensive body of research. World Bank research estimates that a 10 percent increase in broadband penetration in developing countries is associated with a 1.4 percent increase in Gross Domestic Product (GDP) (Kim, Kelly, and Raja, 2010). While digital connectivity can indeed accelerate growth and development, harnessing the full extent of this potential calls for not just more investments, but also reforms that address constraints in supply and access.

Achievement of the laudable goals of DRC’s National Development Plan will require a bigger push. Funding for the massive infrastructure development plan of the government will require a good, enabling environment for public-private sector investment. Additional investments and dedicated attention are needed to ensure better sector governance, increased international bandwidth on an open-access basis, a denser national backbone, robust data centers and higher penetration of broadband internet through a mix of access methods.

3.1.2. Alignment with Country Strategy

The use of digital is recognized by the Government of DRC as one of the essential

Table 3.1: Key indicators of digital infrastructure

Indicator	DRC	SSA
Penetration:		
Internet Usage, % (2017)	8.6	24.1
Unique Mobile Cellular Subscription, % (2020)	38.7	87.9
Unique Mobile Broadband Subscriptions, % (2020)	20.9	32.9
Fixed Broadband Subscriptions, % (2019)	0.04	1.6
Affordability:		
Price of mobile broadband 1GB, % of GNIPC (2019)	26.2	7.8
Coverage:		
2G Population Coverage, % (2019)	65	87.3
3G Population Coverage, % (2019)	64.5	70
4G Population Coverage, % (2019)	17.9	34

Source: ITU, GSMA, A4AI

factors for the emergence of economies, the development of human capital, and the improvement of economic growth. The Government of DRC has developed a new National Development Plan (PNSD) whose strategic objectives for ICT include attaining developed country status through a knowledge society. It emphasizes the transformation of structures of the economy and achieving international competitiveness through technical progress.

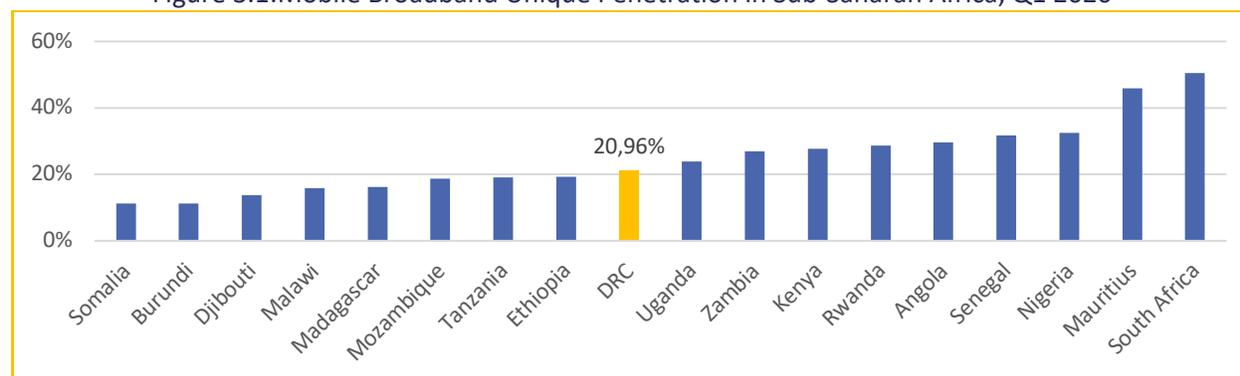
3.2 Diagnostic Findings: Current State of Infrastructure Development

3.2.1 Availability, access and affordability of broadband internet

3.2.1.1 Uptake of broadband

Internet penetration in DRC continues to languish at less than 10 percent according to ITU, one of the lowest rates in the region. As of Q1 2019, there were an estimated 343,000 4G subscriptions, up from 34,000 a year before. Total number of true broadband subscribers (including fixed connections) is around 87,000, equating to a household penetration rate of less than half of a percent – below the regional average of 8 percent. The rate of unique mobile broadband subscribers, the preferred way to access broadband services, stands at around 20 percent according to the latest data from GSMA (Figure 3.1). No other direct factor explains this underperformance than the low mobile penetration of 40 percent in a country of 80 million. Contributing factors have also included insufficient international connectivity, sparse national backbone networks, limited last-mile connectivity, and elevated prices for internet services and devices. Delay in the landing of the submarine cable until 2012, belated issuance of 4G licenses and accompanying spectrum, and late deployment of the first fiber link put DRC behind peer countries and limited coverage to a handful of major cities.

Figure 3.1: Mobile Broadband Unique Penetration in Sub-Saharan Africa, Q1 2020

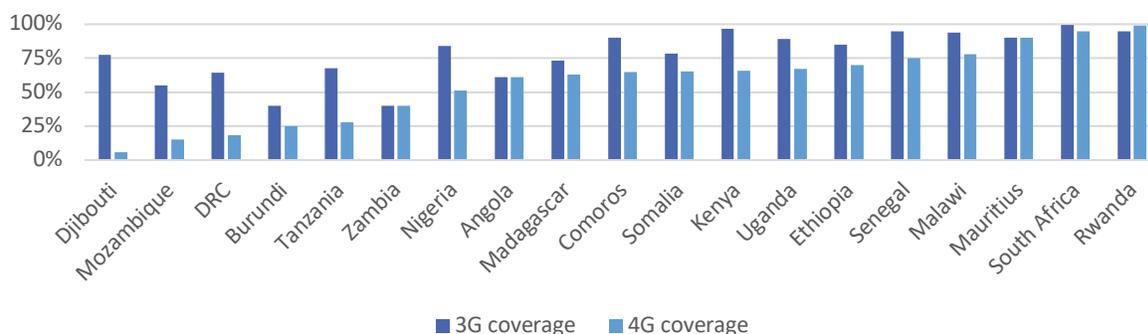


Source: GSMA Intelligence

3.2.1.2 Network coverage

Network coverage is sub-optimal beyond large cities and towns, impacting service quality in many areas of DRC's interior. Overall coverage in DRC is 64 percent for 3G and 18 percent for 4G, way behind many peer countries in Sub-Saharan Africa (SSA). Rwanda (3G coverage at 95 percent) and Tanzania (67 percent), for instance, fare significantly better. DRC also lags other populous countries elsewhere in Africa such as Nigeria and Ethiopia (Figure 3.2). While three of the four major mobile network operators (MNO) operate in all 26 provinces, coverage of 3G and 4G networks remains limited to a small handful of major cities, including Kinshasa, Lubumbashi, and Goma. The least covered regions are in the interior, particularly in the North West. The fixed broadband sector is much more limited in coverage, with most operators limiting their service to the capital of Kinshasa. While the vast and challenging terrain of DRC has made network infrastructure deployment problematic, coverage has suffered from years of underinvestment, late uptake of newer technologies such as 4G, and lack of coherent schemes such as a universal service fund (USF).

Figure 3.2: Population coverage of 3G and 4G networks in Sub-Saharan Africa



Source: GSMA Intelligence

3.2.1.3 International bandwidth usage

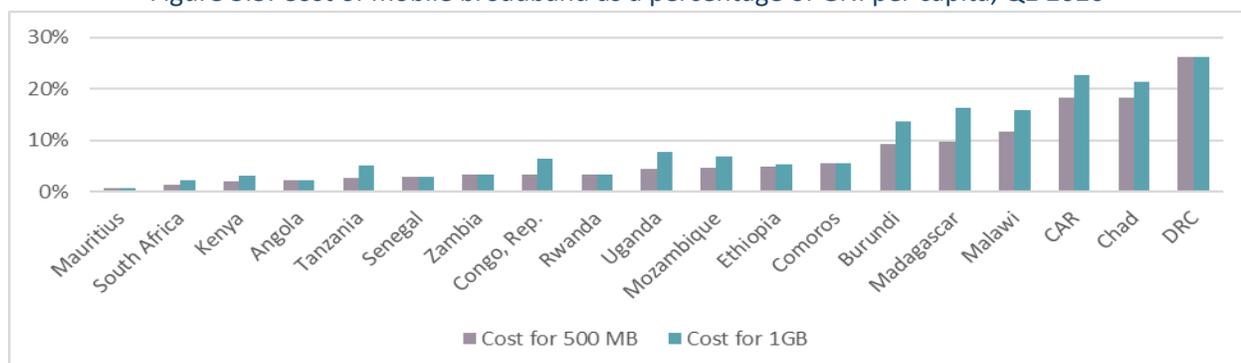
DRC depends largely on only one submarine cable system,¹¹ which 12 years ago ended the dependence on satellites. There are three international connectivity corridors in the West, East and South. Most of DRC's total available international connectivity of 20 Gbs comes from the western corridor, which is connected to the WACS submarine cable and served by fiber and radio links. The corridor is served by fiber from the landing station in Muanda to Kinshasa as well as an under-river cable from Brazzaville to Kinshasa. In the eastern corridor, DRC is connected to the Seacom cable system from Rwanda in addition to microwave links. On the southern corridor, DRC is connected by terrestrial fiber and radio links to Zambia. The arrival of fiber connectivity has reduced the role of satellite, but operators continue to source international connectivity through satellites, especially for the several locations in the hinterland and for backup needs.

The biggest hurdle to international bandwidth is the lack of redundancy to the WACS cable, monopoly over the landing station by the public incumbent, and insufficient capacity on the fiber link access technology. As result, bandwidth prices are high, service quality is poor, and reliability is low. While wholesale prices have trended lower from recent years, international bandwidth (at ~US\$ 20k for STM-1) is still double the rate in international markets.

3.2.1.4 Affordability

DRC is one of the most expensive connectivity markets in Africa, sitting at 58th out of 61 countries on affordability (compared with Uganda 36th, Nigeria at 19th). In terms of absolute cost of access, 1 GB of internet subscription costs a staggering US\$ 10.71 on average, compared to US\$ 3.17 in Burundi, US\$ 4.19 in Kenya and US\$ 3.43 in Cameroun. Affordability is one of the most important constraints facing further penetration of broadband internet in DRC, as described in Figure 3.4 below.

Figure 3.3: Cost of mobile broadband as a percentage of GNI per capita, Q1 2020



Source: Alliance for Affordable Internet (A4AI)

¹¹ A project proposal connect DRC to the ACE submarine cable has not materialized

The pricing structure for internet bundles does not incentivize usage, pricing communication is often too complex for the average subscriber and billing is not transparent. Like in most countries, the prices for mobile broadband have been decreasing over the years, due in part to decreasing cost of wholesale connectivity and consumers' shift to substitutes. However, operators in DRC are yet to implement any substantial prices reductions, despite some new tactical promotions.

Table 3.2: Pricing of mobile broadband products

	One-day validity	Seven-day validity	30-day validity
Vodacom	70MB for US\$ 0.11 1GB for US\$ 1.00	1GB for US\$ 6.00	20 GB for US\$ 50 101 GB for US\$ 100
Airtel	1GB for US\$ 1.00	512 MB for US\$ 2 2GB for US\$ 5	300GB for US\$ 60 100GB for US\$ 100
Africell	10MB for US\$ 0.10 1GB for US\$ 1.00	100MB for US\$ 1.00 500MB for US\$ 5	2.5GB for US\$ 10 125GB for US\$ 100
Orange	20MB for US\$ 0.20	1 GB for US\$ 10	16GB for US\$ 50 100GB for US\$ 100

Source: Interviews and review of MNOs' price lists

3.2.2 Analysis of Market Structure & Competition

The key players in the connectivity market are the mobile operators, wholesale connectivity providers, pure-play internet services providers (ISPs), tower companies, satellite providers and state-owned incumbent. There are ten major internet service providers in DRC, including four that operate in the mobile broadband market.¹² These players offer customers several internet services via different access networks: VSAT, WiMAX, mobile networks, etc. Pure-play ISPs have struggled in DRC due to lack of capital, high operating costs and low purchasing power in the retail market. Facing high mortality, most of the surviving ones have thus focused on the higher-margin enterprise segment.

Four MNOs are licensed by the regulator ARPTC to offer mobile cellular and mobile internet services (see Box 4). These are Airtel, Vodacom, Orange and Africell. The mobile broadband market in DRC took off with the issuance of 3G licenses in the 2010-12 period. Vodacom was the first to launch a 3G network in 2012, followed by Orange and Airtel, while Africell only switched on a W-CDMA network

Box 4: Services offered by the main MNOs in DRC

Vodacom has extended 2G coverage to 907 towns/cities across all provinces. It has rolled out 3G to 49 towns/cities and 4G to at least three cities. Alongside its mobile offerings, Vodacom offers a wireless broadband service in selected areas of Kinshasa, Lubumbashi and Goma, providing theoretical peak download speeds of up to 80Mbps. Vodacom initially had installed 350 base stations, primarily concentrated in Kinshasa and Lubumbashi with 3G coverage largely static until late 2018.

Airtel with 981 sites has achieved population coverage of 65 percent for 2G and 45 percent for 4G. Airtel's 2G network offers substantial coverage in all provinces, but 3G and 4G are limited. Following the signing of a sale-and-leaseback agreement with tower infrastructure with Helios Towers, Airtel has benefited from the latter's network expansion program.

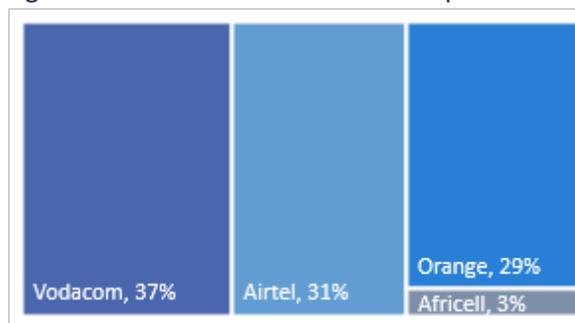
Orange covers all the provinces, riding on the legacy network footprint of its acquisition, Tigo. It has achieved 50 percent coverage with 80 percent of its cell sites now 3G enabled. The 4G coverage, initially limited to the main cities of Kinshasa, Goma and Lubumbashi, is now expanding.

Africell, with the most limited coverage of all operators, operates a W-CDMA network in Kinshasa, Bas-Congo and Katanga as well as 4G LTE services in Lubumbashi and Kinshasa. Africell launched in DRC with a W-CDMA network in 2015 offering 3G services in Kinshasa, but it has now upgraded to 4G as well as extend service to Lubumbashi.

¹² These are Airtel, Vodacom, Africell, Orange, Afrinet, DHI, GBS, Microcom, Orioncom and Standard Telecom.

early 2015. 4G licenses were issued in May 2018 to the four mobile operators and Orange and Vodacom launched commercial LTE services the same month, whilst Airtel and Africell followed suit in 2019. There are now some 340,000 4G-LTE customers. However, vast populations of the country are still grossly excluded.

Figure 3.4: Market Share of Mobile Operators



The mobile internet market is relatively competitive, although the market is concentrated around the top-3 players (Figure 3.4).

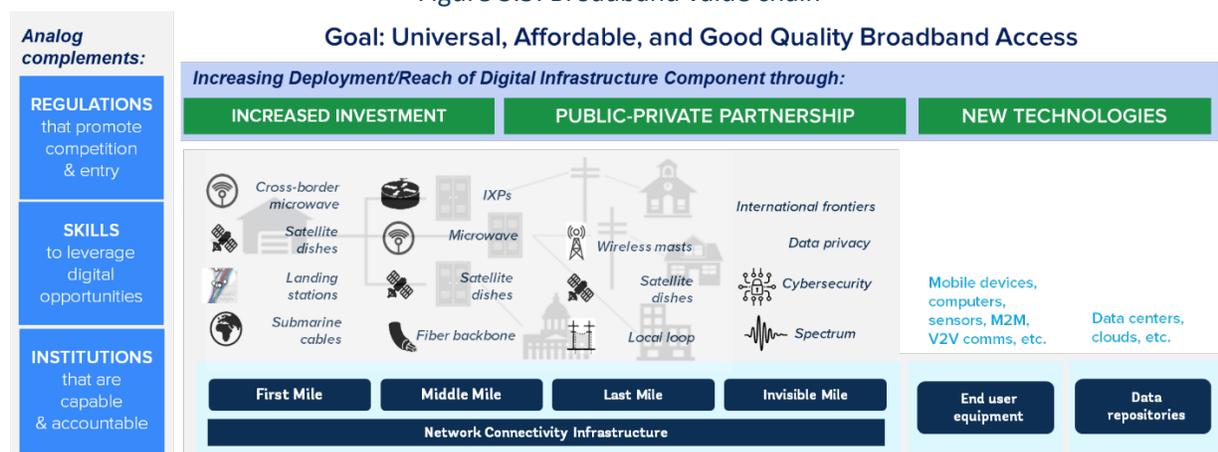
Vodacom leads the market with 13.4 million voice subscribers and 974,299 data subscribers. It accounts for 36.91 percent of data customers and 195,000 users of 4G and 3,650,000 customers on 3G. Airtel controls 30.8 percent of the mobile data market with 5.2 million subscribers, followed by Orange at 4.8 million (28.9 percent market share) and Africell at 498,000 (2.9 percent market share). Africell is active only in the three provinces of Kinshasa, Bas-Congo and Katanga, and is planning to launch in eastern DRC by 2021. It operates 4G LTE services in Lubumbashi and Kinshasa.

3.2.3 Developing the broadband value chain

Development of broadband connectivity in DRC requires an in-depth understanding of the industry value chain (Figure 3.5). The sections below explore the broadband value chain in DRC, which consists of the following key segments:¹³

- **First Mile:** how internet enters the country. Understanding how DRC is connected to international and regional networks.
- **Middle Mile:** how internet passes through the country. Looking at the national backbone, related regulation and business practices, as well as Internet Exchange Points (IXPs), datacenters/hosting arrangements, etc.
- **Last Mile:** how internet arrives at a population center and reaches end-users. Examining local access and mobile networks (2G, 3G, and 4G), as well as telecom market dynamics, structure, regulation and business practices.
- **Invisible Mile:** how hidden elements are vital to ensure the integrity of the value chain. This includes cybersecurity and components such as the radio spectrum and network databases. This also includes the policy and regulatory aspects governing the market, including those related to competition, cybersecurity, spectrum allocation and data protection.

Figure 3.5: Broadband value chain



Source: World Bank DE4A

¹³ This framework was developed in the World Bank's World Development Report 2016 Digital Dividends.

Significant supply gaps exist along virtually every element of the broadband value chain in DRC, with profound implications for availability, access, usage, affordability, quality, competition and growth. Rather unsurprisingly, telecom operators and other investors tend to align their market strategies alongside the value chain elements and the geographical corridors. While adjusting for certain minimum investment requirements, operators usually target the most profitable or doable “element” or corridor at first and grow progressively through a series of adjacency moves.

Frontier cities of Matadi, Kinshasa, Goma, Bukavu and Lubumbashi are doing better than the national average on the first and middle mile, due to their proximity to international corridors. MNOs have all (except Africell) covered the entire country with some form of connectivity, although infrastructure providers like Liquid and BCS are focusing on small zones with opportunities rather than the entire country. The next phase of industry evolution and, where public intervention bears potential, is to connect the entire country as an integrated whole, through a unified national backbone or set of backbones.

3.2.3.1 First Mile: International Connectivity

There are three main international connectivity corridors (often corresponding with the main city in each corridor), namely West (Kinshasa), South (Lubumbashi) and East (Goma in North Kivu). Figure 3.6 hereafter shows DRC’s national backbone and its entry points with the Republic of Congo (RoC), Rwanda and Zambia.

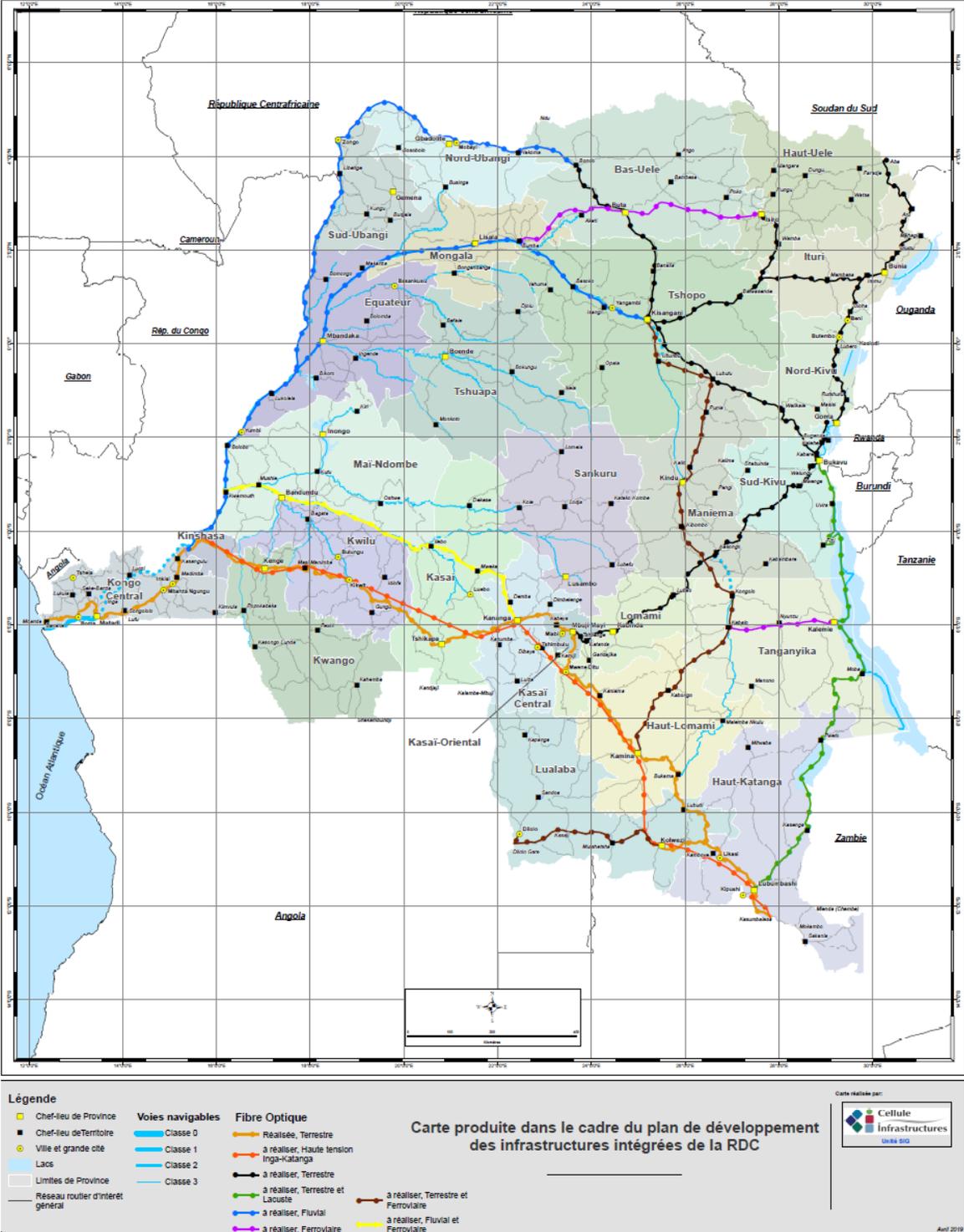
- **DRC is connected mainly to one submarine cable, the WACS, along its western corridor via the Muanda landing station.** Much of DRC’s international connectivity comes through this corridor, given its proximity to the capital Kinshasa. The state-owned incumbent, *Société Congolaise des Postes et Télécommunications* (SCPT), maintains a monopoly over the market for access international capacity at the landing station and the market for wholesale capacity transport from the landing station to the capital over fiber. On this axis, there is also the Kinshasa-Brazzaville-Point Noire international exit over fiber, although the link has been operationally weak.
- **Eastern DRC is connected to Rwanda, and Rwanda itself is connected via Uganda to the undersea cable systems landing in Tanzania and Kenya.** DRC is served on this corridor via two terrestrial fiber links and two microwave links. Liquid Telecom, the pan-African wholesale provider, operates a 10 Gbps link via Rwanda. About 4 Gbps of internet bandwidth is currently being consumed on the link. BCS, another wholesale infrastructure provider, connects DRC to through another 10-Gbps capacity fiber via Rwanda. Mobile operators, Vodacom, Airtel and Orange lease capacities on both fiber links. Mobile operator, Airtel operates its own 1-Gbps microwave connection via Rwanda.
- **On the southern corridor, DRC is connected to international traffic via Zambia.** Agreement between DRC’s state-owned incumbent, SCPT and its Zambian equivalent resulted in the interconnection of the two countries’ networks, following SCPT’s deployment of fiber to the Zambian border in October 2017. This link is reportedly in bad state, but a similar cross-border connection offered separately by Liquid Telecom and Airtel are providing international exit via DRC’s second largest city, Lubumbashi.

MNOs and several other ISPs continue to source a limited amount of international connectivity through satellites and cross-border radio links. Although satellite is now playing a more limited role in DRC, many operators still maintain satellite linkups to serve harder-to-reach population centers and for backup purposes.

There are two internet exchanges in DRC – one each in Kinshasa and Lubumbashi. The newly built internet exchange point (IXP) in Kinshasa is enjoying traffic growth in the order of 12Gb and the associated data centers have improved latency, internet browsing experience and services. Internet traffic used to be predominantly exchanged through international hubs that increase cost, reduce reliability, and hurt user experience. Through internet exchange points, IP networks can now connect

directly, shifting traffic to via local, affordable infrastructure. A third IXP is planned in Goma, in Eastern DRC, although funding has not been secured.

Figure 3.6: DRC's national backbone infrastructure



Source: Infrastructure Cell, Ministry of Infrastructure, Public Works and Reconstruction

A key challenge is the risk posed by a single point of failure in the WACS cable. Frequent cuts have caused significant service destructions in recent times and continues to pose uncertainty. A planned 160-km fiber from Angola to Kinshasa has not yet materialized, and connectivity via eastern DRC on

the Seacom cable offers very low capacities. Connections through the south of the country is suffering a similar fate.

3.2.3.2 Middle Mile: Backbone Networks

DRC's backbone segment is heavily under-invested and is mostly serviced by low-capacity microwave links. Two of DRC's longest backbone fiber links (~2300km each) are concentrated on the west-south direction with extensions to the capital Kinshasa and the mining city of Lubumbashi. The most functional link is the newly operational Inga–Kasumbalesa fiber, which is owned by the electrical utility SNEL. Wholesale operator Liquid and mobile operators are leasing fiber pairs and capacity on this link. The second fiber backbone is the defective Muanda-Kinshasa-Kasumbalesa link owned and operated by the state-owned incumbent SCPT. This link, with available capacity of 10 Gb, was until recently the only fiber backbone in the whole of DRC and is notorious for frequent cuts and service disruption.

Large MNOs such as Vodacom and Airtel operate their own separate microwave backbones. The main routes for radio links are the Muanda-Kinshasa, Ilebo–Kananga–Bujimayi–Kindu and Kananga–Lodja. These backbones as well as their backhauls are not optimized for high-capacity transmission. Unlike fiber that can be easily scaled up to terabytes per pair, microwave links average 1.2 Gbps on major backbones and 350 Mbps on local sites and loops. Mobile operator Africell, for example, has deployed a 3000-km microwave infrastructure to link all its sites in DRC.

The priorities of service providers are mirroring the demand for much needed middle-mile extensions. The immediate expansion priority for mobile providers is to extend high-speed fiber backhaul to more of their cell sites as well as to leverage the metro fiber to offer fiber-to-anywhere service (FTTx) for premium customers at first. The priority for infrastructure providers is to extend their metro fiber, meet operators' deployment needs by creating more multiple international breakout, develop a regional infrastructure coverage and monetize the existing metro rings by leasing it out to more ISPs who extend the fiber to customer premises. BCS's 50km metro ring was built on a co-build basis with Vodacom and Airtel, initially for backhauling their cell sites.

New backbone fiber links are either under construction or in the design phase (See box 5). Two new fiber links are in the works on the busy Muanda-Kinshasa route. SCPT is investing in a new terrestrial fiber on the route while the World Bank-financed, 620-km fiber line is under construction. This new link is funded from a portion of the US\$ 92.1 million IDA grant approved in 2014 under the CAB5 project.

Box 5: Muanda-Kinshasa Fiber Under Central Africa Fiber Optic Backbone (CAB) Project

A 620-km fiber link is being constructed under the CAB5 project. The CAB5 is an IDA grant of US\$ 92.1 million to DRC, approved in 2014. The main component of the project is the deployment of the missing backbone links to connect the country's largest economic regions in the west (Kinshasa, Matadi, and Muanda), east (Goma, Bukavu) and south (Lubumbashi, Kalemie, Moma, and Kisangani), amongst others. The project also provides Technical Assistance to strengthen the line Ministry (MPTNTIC) and the industry regulator (ARPTC) to improve the governance of the sector and enable private sector investments.

The largest component of the project and much of the backbone build have faced long delays hinged on meeting prior actions. Only one of the four initial disbursement conditions was met. Disbursement conditions were aimed at ensuring that the Government puts in place the legal, regulatory, and instructional framework necessary to achieve the development objective. The largest component (the Southern and Eastern clusters) is still subject to the publication of the new Telecom Law, which has yet to happen.

Preparations are ongoing for the recruitment of an operator to manage and commercialize the fiber on PPP basis when completed. Its deployment would provide a reliable and cheaper connection to the internet to Kinshasa population, and eventually from Kinshasa to other regions. Thus, the construction of this link can contribute to considerable gains to the country economy, and the creation of direct and indirect jobs, among many other benefits.

Other complementary infrastructures, such as towers and data centers are still in limited supply in DRC. Despite the more than 5,000 cell towers in the country, tower density (a measure of coverage) is still low in terms of geographical expanse, even when adjusting for low population areas. There is no high grade, open-access data center in DRC. Since the leading tower company only builds on the request of MNOs, areas where the MNOs see no compelling commercial rational will remain underserved or unserved. Lack of supporting infrastructure like roads pose additional problems. And as infrastructure providers incur additional capex, MNOs are paying more for the lease of these towers, further keeping prices high for subscribers.

DRC's vast territory requires enormous investment and a coherent strategy for nationwide fiber backbone. Despite increased deployments in recent years, many parts of DRC, including large populations are still grossly underserved. Many potential investors are sitting on the sidelines, partly constrained by the outdated legal framework and a difficult operating environment. Developments in the external environment (e.g. connectivity pricing) have put downward pressure on wholesale prices, but even as bandwidth prices are decreasing, internet capacity and the transmission network have stagnated. In the current environment, the pace of development is likely to be long and slow, and the nature of coverage may be less equitable if interventions are not carefully designed and deployed. In keeping with the need to cascade funding, the most powerful interventions might well consist in accelerating or shaping the most promising trends rather than classic subsidization.

3.2.3.3 Last Mile: Internet Services

At just 42 percent according to ARPTC in Q4 2019,¹⁴ DRC has one of the lowest mobile penetration rates in the world. The picture is even bleaker when multiple sim card ownership and internet usage are considered, with unique mobile internet subscribers dropping to just 20.9 percent. As discussed in Section 3.2.1, mobile penetration is held back in DRC by high costs of data and devices, insufficient coverage and poor bandwidth quality.

In much of DRC, mobile internet is by far the predominant access technology for most internet. There are currently some 37 million mobile subscribers, netting the industry about US\$ 1 billion in annual

¹⁴ GSMA data is slightly lower for Q1 2020, standing at 38.7 percent unique cellular subscriptions, like due to a different time to observe the data and slightly different data collection method.

revenue. There is now a total of 16.95 million mobile internet subscribers in DRC, up from 13.36 million a year earlier, though the majority of connections consist of slower speed 2G (2G at ~59 percent versus 4G at ~1 percent). MNOs have deployed a combined total of about 1400 cell sites in the country. The three biggest mobile operators (Airtel, Vodacom and Orange) have relatively large customer bases across all provinces, except Africell, the smallest operator which is present in only three. Figure 3.6 shows the market share of all four MNOs on the mobile internet market.

Demand for mobile data is growing, driven by the arrival of cache services from providers such as Facebook and Google. The usage of internet in the retail segment amounted to some 25 Gb in the first quarter of 2020, up from 15Gb two years ago. The increase in consumption is spurred by cache services, which by keeping local traffic local, is reducing bandwidth requirement, and increasing speed. Today, almost all of YouTube and Facebook content is now exchanged within DRC.

High network equipment and deployment costs have meant elevated prices for potential end-users of faster 4G and fiber-based data packages. Many of the equipment at the end-user premises do not have fiber interfaces, so operators have had to invest in converters. Grid-based electricity, the alternative infrastructure for deploying aerial fiber is not available in many areas. Security situation is also a concern in places like Beni, Kalehe, Manyema, Kongolo and Bembe. As prices are still out of the reach of many households, ISPs are currently focused on connecting businesses and institutions. But with decreasing bandwidth cost and the move of wholesale providers into an increasingly competitive retail market, access is expected to become available to households, albeit the more affluent.

Metro fiber already exists in some of the large cities, but utilization is very limited. Standard Telecom has deployed 300 km of fiber in the capital Kinshasa and is planning to extend to the entire country, including Goma. In the capital Kinshasa, Standard Telecom and Orioncom operate a 300-km and a 40-km fiber-optic network, respectively. Liquid Telecom and BCS have each deployed a 40-km metro ring in the eastern city of Goma. In the southern corridor, Liquid Telecom operates a metro ring, which serves mobile network providers deploying last-mile connectivity. Microcom has arguably the largest footprint, providing coverage in ten cities. While FTTx holds tremendous promise, the metro rings on which they depend are still limited due the right-to-build exclusivity that used to be exercised by SCPT, hazy regulatory framework and small addressable market. Operators Vodacom and Orange have installed equipment for starting FTTx, but they have not yet commenced, because they are yet to complete installations and commercial arrangements.

Despite recent growth in demand for mobile and fixed data services, challenges remain. Only 10 percent of fiber is underground due to difficulties of their deployment exacerbated by lack of regulation defining the norms. As a result, there are 3-4 operators deploying in a disorderly manner. In addition, the current legal framework is not clear on FTTx services, as ISPs juggle to make the best of an outdated legal regime. They mostly rely on concessions and negotiations with the authorities. Additionally, there is a lack of local supply chain for fiber-optic deployment and maintenance. On a regional basis, the north of the country is almost entirely disconnected, and where present, available speed hardly amounts to 2G, because the network is not sufficiently dense nor robust. Capital budget for deploying FTTH is very limited in DRC, given the government's lack of fiscal space, poorly developed commercial finance sector and difficulties attracting external capital.

3.2.3.4 Invisible Mile: Legal, Policy and Regulatory Environment

The principal telecommunications legislation is still the Framework Law No. 013/2002 of 16th October 2002. The law established the structure for the sector, whilst Law No. 014/2002 16th October 2002 detailed the establishment of an independent regulator for the sector, the ARPTC. The regulator operates under the direct supervision of the President of the Republic (Article 2), however, the new Law that was voted by Parliament in November 2018, will place it under the authority of the MPTNTIC.

The new Telecom Framework Law aimed at modernizing the regulatory structure of the sector was promulgated by the president in November 2020. However, its publication in the Official Gazette

(*Journal Officiel*) still isn't effective. In the absence of an updated legal framework, sector governance actors have been issuing decrees and authorizations on an ad hoc basis. Given the uncertain regulatory environment in many respects, there is pressure for rent from all sides. It is thus very important to streamline the licensing process (spectrum license, international transfer, equipment, deployment) because whenever there is a demand for authorization, there is a bottleneck that creates opportunity for rent seeking. Other relevant laws are listed in Table 3.3.

Table 3.3: Key laws applicable to the telecommunication sector

Framework Law No. 013/2002 of 2002	This established the structure for the sector and introduce Governance Bodies.
Framework Law No. 014/2002 of 2002	This Law detailed the establishment of an independent regulator ARPTC.

The 2002 Telecommunications Act provides for a Universal Service Fund is to be managed by the regulator (until the creation of an Agency for that purpose) but does not mention any periodic reviews of the fund or service obligations. The upcoming legal framework will make a provision for a “public establishment”, which will manage the universal service fund, accruing from 3 percent of turnover of telecoms operators. This governance has been tried for about 18 years (since Law 014/2002 establishing the industry regulator, ARPTC) but has never been able to effectively fund the sector. This is because all the sector's revenues (16 percent VAT + 10 percent Excise + 3 percent of turnover) go directly into the Public Treasury to contribute to the National Budget. In addition, a ministerial decree that should govern fund's organization has not yet been issued. This is partly why, for example, ARPTC sometimes creates *ad hoc* taxes to funds its own costs.

As noted in Section 2.2.3, certain aspects of the regulation are largely outdated and have had adverse effects on the development of the broadband industry. Haphazard license regimes have contributed to the demise of a dozen operators either by failing to launch or by exiting the sector after a short stint. In 30th January 2018, the government issued a decree and a contract for the implementation of traffic monitoring system, but on 12th February 2019, the new President instructed the same government to cancel the contract, which was done on 27th April 2019. In May 2018 4G licenses were awarded to Orange, Vodacom, Airtel and Africell. Much of the spectrum bands sold by the government were not fully available until the country started to progressively migrate from analogue to digital TV¹⁵. The government recently issued a new decree imposing taxes on existing and new phones to fund a phone database (CEIR), a development capable of slowing the growth of the digital economy.

3.2.4 Constraints to high-speed internet development

3.2.4.1 Outdated legal framework

The overall legal and regulatory framework for the digital sector in DRC is out of date and largely restrictive. The framework law, already passed in parliament in 2018, was promulgated by the President. The current framework is vague, a characteristic which permits wide room for interpretation, which favors the government most of the time and which increases the scope for potential corruption. Additionally, many regulations are out of date, including data privacy and ecommerce.

The conduct of regulatory oversight is often unpredictable in the face of poor policy coordination. Industry checks suggest the lack of true independence and basic technical shortcomings at the industry regulator ARPTC.

3.2.4.2 Difficult policy environment to operate in

The existing coordination environment is sub-optimal, with different organs and institutions working largely at cross purposes. The regulator is not cooperating with the ICT ministry and the presidential

¹⁵ 2G frequencies have been reformed by operators to use 4G technologies in the allocated frequencies. The new licenses issued in 2018 have allowed them to do so, thus contradicting the global licensing “concession” regime which attached a technology to a frequency band.

advisers are not cooperating well enough with the regulator. New taxes and fees are often applied without due consultation and they sometimes run counter to promoting the growth of the digital sector. An example is the recently announced tax on mobile phones.

Very little progress has been made since the government announcement the establishment of a USF in 2017. Monopolistic tendencies of providers such as SCPT have gone largely unchecked, keeping prices higher than the optimum. High taxes rent capture and high capex requirements are creating bottlenecks for operators and leading to high prices. DRC is one of the highest mobile taxation markets in Africa and one of the few that imposes specific taxes on mobile devices. Industry checks indicate high taxes and pervasiveness of ad hoc fees and taxes.

3.2.4.3 Lack of sizable investment

DRC is one of the most under-invested digital sectors in the region. DRC’s backbone and last-mile segment especially are particularly under-invested as government funding has been sparse, existing operators invest only the barest minimum and potential investors continue to sit on the side, partly constrained by a difficult and uncertain operating environment.

DRC’s backbone system remains patchy, and the country remains vulnerable to being connected to only one submarine cable. As a result, prices are high, capacity is constrained, vast swathes of territory are uncovered, basic foundations of the digital economy are lacking, and only half of potential markets are penetrated. Lack of investment in complimentary infrastructure such as data centers and fiberized towers complicates the outlook further.

3.2.4.4 Large demand-side weaknesses

Lack of consumer readiness and low purchasing power are putting a break on the flywheel of digital development. DRC is an expensive digital market, compounding the internet penetration problem. Affordable devices are very limited. Entry-level data plan costs 14.33 percent of monthly income and entry-level, broadband capable devices cost at 40 percent. End-user price points are high due to (a) high wholesale pricing due to SCPT monopoly¹⁶; (b) high taxes and nature of industry structure; and (c) operational costs.

Complements such as electronic payment and digital ID are underdeveloped, and where they exist, they are not integrated with more ubiquitous services like mobile payment. This issue is explored further in Chapter 6 on Digital Financial Services. Start-up incubators and large-scale production centers for digital content are starting off at a very low base, as noted in Chapter 7 on Digital Entrepreneurship.

3.3 Recommendations & Next Steps

Table 3.4: SWOT analysis on digital infrastructure

Strengths	Weaknesses
<ul style="list-style-type: none"> • DRC is one of the most populous countries in Africa with a large market potential • Very young population, eager to explore the digital possibilities • Presence of large multinational operators 	<ul style="list-style-type: none"> • Outdated legal framework • High rent seeking behavior • Lack of supporting infrastructure • Low coverage, access and affordability • Huge gaps along the value chain, especially backbone • No operational USF

¹⁶ Monopoly of the SCPT was removed with Law (013/2002 of 16 October 2002). A temporary exclusivity in some segments of the business (removed in 2008) continue to accord SCPT a *de facto* monopoly.

Opportunities	Threats
<ul style="list-style-type: none"> • Rising demand and arrival of cache system • Strong interest from many private investors are lining up to invest, subject to improving environment • Additional connectivity from the upcoming CAB5 fiber with reduce wholesale and retail prices and improve service quality. • Publication of the National Digital Plan (PNN) is building momentum 	<ul style="list-style-type: none"> • Lack of proven PPP and commercialization structure could threaten new investment arrangements and projects • Weak policy coordination and governance • Insufficient spectrum causing launch delays and poor network resilience • SCPT's <i>de facto</i> monopoly and threat of new monopoly • Ad hoc taxes such as those recently announced for mobile phones

The DE4A Country Diagnostic considers the recommendations below to support digital infrastructure:

Objective 1: Improving meaningful access to existing digital infrastructure and incentivizing new investments

R1. Update the regulatory environment and enhance the competency and independence of the industry regulator. Specific actions in this area are to (a) publish the framework law in the *Journal Officiel* and clarify hazy provisions through follow-on decrees; (b) strategically unbundle the industry value chains and issue micro licenses; (c) establish regulation and norms for fiber-optic infrastructure to bring order, especially in the FTTx and tower segments; and (d) enhance the capacity of ARCT, especially with regard to in-country data processing and ability to resist political pressure.

R2. Accelerate key aspects of the connectivity value chain. Certain elements of the value chain such as FTTx are good candidates for acceleration because they are crucial to the emergence of a true digital economy in DRC. Investment in these sectors would happen anyway, but progress and coverage are likely to be slow and largely inequitable. Thus, an initiative designed to accelerate private or public-private investments will help bring about the desired changes much more quickly than otherwise.

R3. Extend connectivity to areas of patchy or no coverage –There is need for a coherent and actionable national strategy to address gaps in rural access in order to benefit from available internet bandwidth. Potential action areas include (a) operationalizing the universal service fund (USF) and (b) floating a plan to mutualize cell towers and other passive and active infrastructure to provide 3G and 4G coverage in areas where only one provider has reception. Infrastructure sharing and USF remain untapped resources for working towards improved coverage.

R4. Fully liberalize and improve access to the landing station, international breakouts and the transportation of internet capacity on fiber to Kinshasa – There is a need to fully remove the monopoly of SCPT and wholesale providers to allow able mobile operators to build international breakouts¹⁷. The market for transporting internet capacities on fiber from the landing station must also be liberalized. There is also a need to carry out a major repair to the SCPT and incentivize new builds, given the crucial nature of the western corridor.

R5. Operationalize the Universal Service Fund (USF) with well-designed funding and governance mechanisms –There is the need to set up the governance process and define the fund allocation for

¹⁷ Liquid Telecom would soon have access to a landing station under license from ARPTC (via Decision N008/ARPTC/CLG.2020 of 24 February 2020)

the USF, which will help extend network coverage to rural and underserved regions. One quick step is to align the creation of the proposed Digital Development Agency (ADN) with the upcoming legal framework and the vision of the entire government. To reach the coverage goal of the DRC government, connectivity in smaller towns and cities, as well as the interconnection between provinces must be increased. Investment by the USF in under-served areas will complement mobile operators whose incentive have focused on more profitable, urban locations. support this.

Objective 2: Incentivizing new investments in digital infrastructure

R6. Increase spectrum availability – There is a need to increase the number and scope of spectrum licenses to support high-speed broadband both for coverage and capacity. Three important ways to do this are (a) refarming some important frequencies (such as the 800 MHz and 1800 MHz); (b) dividing issued but unused frequencies to willing operators; and (c) shifting frequency fees from initial fees to annual fees. These changes have the potential to generate more revenues for the public treasury, reduce costs for telecom operators and offer subscribers better quality of service.

R7. Encourage the landing of new sub-marine cable systems and invest in new landing stations – DRC, on its most important connectivity corridor, is connected to only one under-sea cable system (WACS). This lack of backup means that DRC largely is exposed to a single point of failure, with attendant consequences for service disruption. There is need to design a new commercial model for leading technology companies and open access providers who are now the fastest growing source for new builds. An updated policy environment and a set active incentive will go a long way.

R8. Reinforce and extend the national backbone and ramp up high-capacity connectivity in key economic hubs (e.g. through PPP financing scheme) – Underdeveloped national backbones remain a binding constraint to digital connectivity for much of the interior of DRC, given the vastness of the country. Key action areas include (a) ensuring full operationalization DRC's longest backbone, the Muanda/Kinshasa – Lubumbashi link. The link is the largest and longest national backbone; (b) conduct a phased and corridor by corridor build out of major trunks of the national backbones; (c) build branch outs from the backbone to adjacent cities so that populations around the routes are well served, further reducing the digital divide; (d) design and implement a network-as-a-service model for building network sites in rural areas and leasing them to operators; (e) national and local authorities should require all major infrastructure programs (such as roads, etc.) to provision fiber.

Objective 3: Improving demand for digital infrastructure

R9. Remove direct taxes on devices and internet services – There is need to conduct proper industry consultations and find less costly means to fund the planned phone registry. Additional tax burden on the mobile sector would negatively impact on incentives to consume and invest.

R10. Innovate on price models and lower barriers to affordability – Suggested actions to bring down prices of mobile phones and data include (a) introducing flexible payment plans (with enhanced credit system) for low-cost smartphones and pay-as-you-go financing model for smartphones; (b) providing special data bundles for use on ecommerce sites and other special use cases; and (c) removing the taxes on devices, and internet and call services (currently at 10 percent).

4 Digital Skills

Key messages:

- ❖ **Formal digital skills training offers in DRC are limited and fragmented.** Nascent informal training structures play an ever-important role and need to be further supported.
- ❖ **There is a significant gap between urban and rural areas in terms of basic infrastructure access, including access to electricity, high cost and coverage of internet, and access to digital devices.** The misalignment between available skills and market demand reveals a lack of coordination in defining training content and curriculum.
- ❖ **A substantial investment will be needed to finance both infrastructures and platforms, as well buildings to effectively house digital infrastructure and equipment in the education system, including in training structures.**
- ❖ **The demand for digital skills is expected to continue to increase considering the government's digitization efforts and modernization of the administration, and the development of e-financial services, including mobile banking.** Additionally, distance learning and digital learning platforms will play an even greater role in the context of COVID-19.

4.1 Importance of Digital Skills

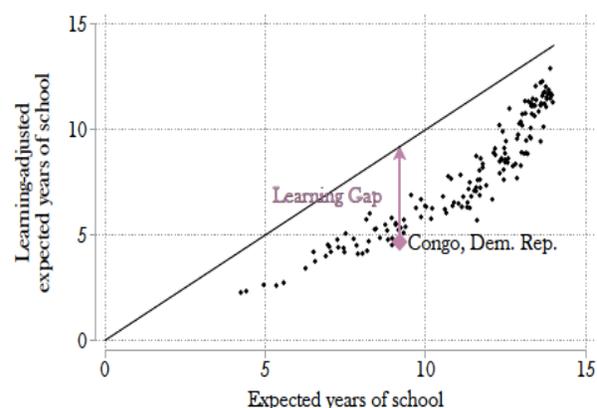
4.1.1 Socioeconomic Rationale for Investing in Digital Skills Development

Digital skills are essential to building an inclusive digital economy. In DRC, both the government and the private sector experience difficulties in finding employees with basic digital skills. The formal education system, which should be the foundation to a better skills development system, struggles to equip the country's youth with even the most basic digital skills, due to several cross-cutting constraints, including the lack of infrastructure mentioned in Chapter 3. The majority of the population is unable to effectively use ICT, which further hampers the government's ability to implement universal digital service delivery. As DRC strives towards digitalization, a lack of basic skills required to use and engage with these new platforms could potentially increase further inequalities and exclusion.

Despite noticeable progress in the education sector, DRC is falling behind. In 2018, DRC ranked 146th out of 157 countries in the World Bank's 2018 Human Capital Index. The quality of basic literacy and numeracy negatively impacts learning of essential skills essential for future needs on the labor market, such as working collaboratively, thinking critically, and communicating effectively. Table 4.1 presents key indicators to situate the lack of enabling environment to teach digital skills in DRC.

The quality of the DRC's education system is poor on many fronts, which hampers the development of digital skills training. Almost half of the working-age population¹⁸ has either no education (28 percent) or less than primary education attainment (19 percent). The learning gap is one of the largest in the world (Figure 4.1). Post-primary education is deficient, and technical and vocational education and training (TVET) lacks quality and relevance. The completion rate in mathematics and sciences at the end of the cycle hovers around 50 percent.¹⁹ Many curricula are outdated, and there is a shortage of pedagogical materials and qualified teachers. Deficiencies in the early years of life, including childhood malnutrition which hampers human capital formation, are very difficult to correct later in life.

Figure 4.1: Learning gap (years) based on the World Bank's 2018 Human Capital Index



4.1.2 Alignment with Country Development Strategy & Goals

The PNN 2025 recognizes that digital skills are a critical component of a digital economy. In particular, Pillar 2 addresses some of the shortfalls related to digital skills in DRC, by building capacity and creating specific digital training programs that are aligned with market demands. Public financing of education has increased substantially in recent years, from 9 percent of public expenditures in 2010 to 23 percent in 2019,²⁰ but it is unclear if this increase in nominal spending will be attributed to reskilling for the needs of tomorrow's labor markets.

Building digital skills starts with a solid education. The DRC Education Strategy for 2016-2025 aims to reform the Congolese education system through three major themes: (a) expanding access and equity; (b) improving quality, and (c) improving the governance and the management of the education system. This long-term strategy is an important starting point, based on which further improvements and stakeholder dialogues can be launched. The strategy acknowledges the need to reinforce ICT in existing curricula, especially in the higher education sector. However, not much is concretely proposed to introduce basic digital skills in the primary and secondary education systems.

4.2 Diagnostic findings: Current State of Digital Skills

4.2.1 Digital skills framework

This chapter applies the DigComp 2.1 Digital Skills Framework²⁴ to analyze the state of digital skills in DRC. According to this framework, digital skills can be broken down into four general proficiency levels:

- **Foundational digital skills:** These skills are typically taught at primary and lower secondary school level, and involve the foundational digital literacy needed to use basic digital devices, tools and applications.
- **Intermediate digital skills:** Should be provided to students in upper secondary school, technology programs at TVET institutions, and undergraduate students in courses that apply technology. Intermediate level proficiency would typically be required in middle-level occupations. However, moving forward, intermediate digital skills are expected to be a ubiquitous requirement for all formal employment.

¹⁸ World Bank. Skills for Economic Recovery and Shared Growth in DRC (P153289).

¹⁹ World Bank. 2018. Democratic Republic of Congo Systematic Country Diagnostic. Washington DC: World Bank Group

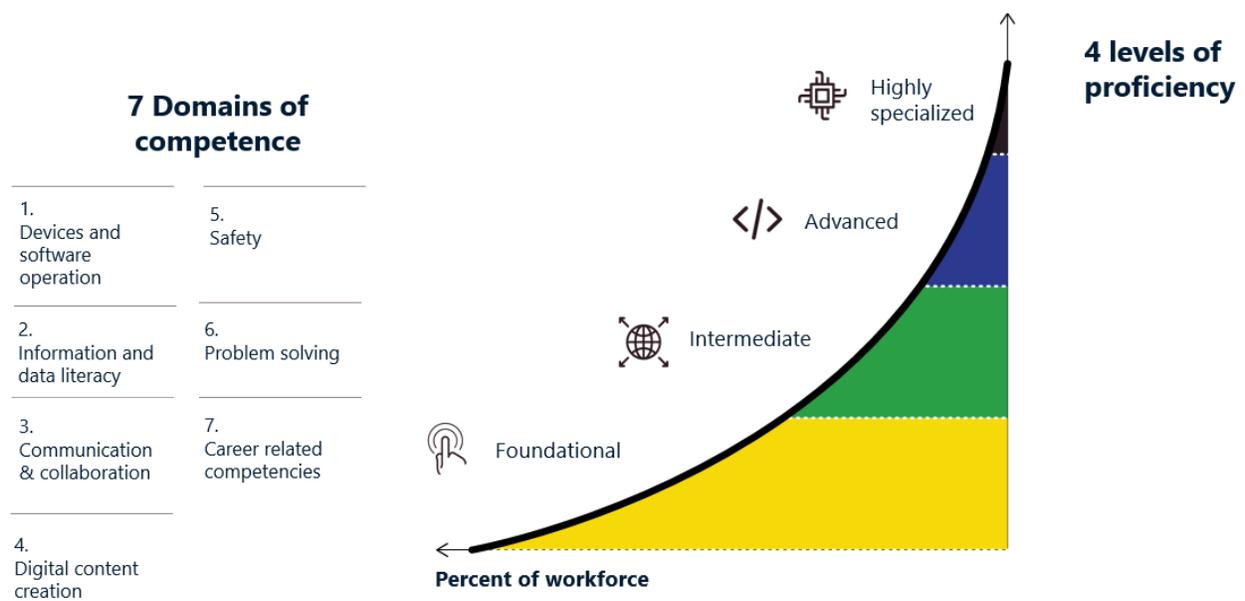
²⁰ Global Partnership for Education, 2019. Appraisal report of the Democratic Republic of Congo Education Strategy.

²⁴ EU (2017). DigComp 2.1: The Digital Competence Framework for Citizens with 8 proficiency levels and examples of use.

- **Advanced digital skills:** Are primarily developed through core engineering programs, especially electrical and computer engineering and science programs. Advanced level proficiency is typically required of occupations with a high level of ICT intensity, involving the application of digital technologies, including IT engineers and, increasingly, finance professionals.
- **Highly specialized digital skills:** Are typically provided at the postgraduate (masters and doctorate) level, focusing on advanced computer science and engineering, as well as applied mathematics and related fields. Highly specialized digital skills are considered a requirement for scientific and advanced ICT professional occupations, which involved the development of new digital technologies, products and services.

More detailed definitions can be found in Annex 4.

Figure 4.2: Four levels of digital skills proficiency



Based on the UNESCO Digital Literacy Global Framework and EU DigComp 2.1

Source: UNESCO (2018)

4.2.2 Supply of digital skills

4.2.2.1 Current status

Underpinning the development of digital skills are basic foundational skills that include literacy and numeracy. However, the current education system in DRC does not adequately prepare its learners to acquire these skills. Despite efforts to revise the national education system, there is a mismatch with market needs. The country's labor market lacks important skills in vocational training due to the low capacity and relevance of TVET.²²

Urban youth unemployment is particularly troubling, which can reach up to 80 percent in some areas. Unemployment rates according to ILO increased from 2.5 percent to 3.2 percent between 2005 and 2012. However, with a relaxed definition of unemployment that includes discouraged jobless people, the rate climbs to 17.7 percent nationally, peaking at 31 percent in urban areas and 39 percent in Kinshasa.²³ Job prospects for the 1 million young Congolese joining the labor market every year are

²² World Bank. 2018. Democratic Republic of Congo Systematic Country Diagnostic. Washington DC: World Bank Group

²³ 1-2-3 Survey in SCD.

particularly limited, as indicated by the high underemployment and joblessness rates. A high share of youth (22 percent²⁴) are both economically inactive and out of school. Kinshasa has the highest rates of such youth in the country (over 40 percent²⁵). The severe weaknesses in the TVET system contribute to the disconnect between youth employment preferences and available jobs, a situation likely to fuel the discontent and hopelessness felt by many young Congolese²⁶. The services of the National Employment Office are only available to a tiny fraction of the unemployed and lack of resources makes it virtually impossible to match job seekers to job openings.

In this context, informal training actors play an ever-important role (see Box 6 and Section 4.2.2.3).

Informal or non-formal education comprises non-state actors such as incubators, non-governmental organizations, foundations and associations. Informal training for advanced digital and e-business skills also plays a critical role in filling the gaps of the formal education system. For example, business skills training is carried out primarily by informal training. Incubators have played an important role in fostering digital entrepreneurial activity, by creating new business opportunities or devising new ways of doing existing business, and there have been a few successful initiatives of digital startups providing informal training, such as Schoolap and Eteyelo, discussed further in Section 4.2.2.3 below.

This situation is both a weakness and an opportunity to reskill unemployed youth. Providing them with foundational and intermediate digital skills could help to improve the country's innovation capacity, which remains extremely weak despite some successes, discussed in Chapter 7 on Digital Entrepreneurship. Specifically, development of specific digital skills will stimulate innovation in the production of innovative digital platforms and entrepreneurship. Activity in ICT-related fields tends to be focused on software development, IT systems installation and maintenance, and training. International events such as Kinshasa Digital Week and Tech4Mining in Lubumbashi are important initiatives to promote digital culture, training, and innovation. It also encourages the young generation to be more involved in digital entrepreneurship.

4.2.2.2 Digital skills pipeline

Primary and secondary education

Formal basic digital skills training offers are limited and fragmented. Basic digital skills training is nonexistent in primary and secondary schooling, both for students and teachers. For most of the school population²⁷, ICT education is an unaffordable luxury, as they have no electricity, no computers, no internet connection, no trained teachers, no appropriate buildings to house ICT infrastructure and training, and little to no teaching materials. Secondary education does not offer a formal structured digital skills training. As a result, there appears to be a low supply of basic digital skills in the general workforce, including in government ministries.

Box 6: Non-State Actors providing informal digital skills training

Non-state actors such as incubators, NGOs, foundations and associations, are important providers of digital skill training in DRC.

Foundational digital skills

Kinshasa Digital and Ingenious City provide foundational digital skills training. Associations such as Matumaini and Lumumba Lab provide basic digital training to women of underprivileged neighborhoods in Kinshasa. This initiative is particularly important to support digital inclusion in vulnerable groups.

Intermediate and advanced digital skills

Advanced digital skills training rely primarily on non-state actors, including Kinshasa Digital, Ingenious City, ITOT Africa (Lubumbashi), and UpToDate Developers (Goma), which provide training to youth in mobile application development, Java, and website design. These incubators also promote digital entrepreneurship and provide e-business skills training.

²⁴ World Bank. 2018. Democratic Republic of Congo Systematic Country Diagnostic. Washington DC: World Bank Group

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ministry of Primary and Secondary Education. 2020.

TVET and Higher Education

Specialist and advanced digital skills developed through higher education degree programs and vocational training appear to be limited and fragmented. General university education in public schools does offer limited professional skills related to digital professions; however, there is a lack of ICT infrastructure and unavailability of trained teachers. Private schools do offer some training programs for specialists and advanced digital skills, including computer science; however, given the lack of standardized certification, the level of their graduates varies greatly. Training programs tend to focus on theory and do not place enough emphasis on practical experience, which is problematic for transitioning graduates to the labor market.

Data on the annual training capacity of trainers, experts and professionals in the national formal education system in the digital field is not available, as there is no mandated structure to monitor the sub-sector. Additionally, the business model of private schools needs to be adapted and should include partnerships with the private sector from the start, to maximize the relevance of the training content, as well as youth employment upon completion of their training program. There is a marked disparity²⁸ between better-equipped urban areas and ill-equipped rural areas, as well as a stark contrast between better-equipped private institutions and less-equipped public institutions.

4.2.2.3 Digital startups providing skills training

Created in 2017, Schoolap is one of the first EdTech startup in DRC, working closely with the Government to improve the quality of education by providing teachers and students with access to quality learning materials digitally. Schoolap provides access to quality learning materials digitally, for both teachers and students. It also provides a Management Information System platform for managing and tracking student performance and allows for greater engagement between parents and school authorities. Additionally, for rural zones without internet access, Schoolap launched a tablet pre-loaded with learning content, that can be powered with solar panels. Schoolap works with the government's Department of Education and Programs and UNICEF to create quality local content and align with the government's syllabus, using local teachers at reputable schools. Schoolap recently signed a partnership agreement with the Ministry of Primary and Secondary Education on the Management Information System platform. Furthermore, Schoolap launched a partnership with KONNECT Africa to connect schools with high-speed internet via satellite across DRC, particularly in unserved or poorly served areas. The first stage of the project aims to connect 3,600 private schools over the next 12 months. As of June 2020, 60 schools in Kinshasa have been equipped with this technology. Schoolap was recognized as the Best Start-up in the DRC-leg of a global competition and is currently scaling its solutions across the country.

VODA EDUC is a digital learning platform created by the Vodacom Foundation's Instant Schools for Africa Program. By working in partnership with the Ministry of Primary and Secondary Education, VODA EDUC provides over 8,000 training videos and interactive exercises for children ages 3 to 18, distance learning for teachers, key messages on healthcare and hygiene, African tales and stories, and is regularly updated with new local content. A key feature of this digital learning platform is that it is available freely, without any credits, everywhere on the Vodacom network. Between February and March 2020, the number of unique visitors in DRC increased from 10,000 to over 33,000. This 239 percent increase was way ahead of peers Ghana and Tanzania, who had modest increases of 14 percent and 1 percent, respectively. These results may be explained by the strong collaboration between VODA EDUC and the government during the school closings due to the COVID-19 pandemic.

4.2.3 Assessing the demand for digital skills

Employers demand for basic and advanced digital skills is high but seems to be underestimated by training institutes. According to the *Fédération des Entreprises du Congo* (FEC), the Congolese business confederation representing private sector entities ranging from small and medium enterprises to large corporations, there is a much higher demand for skilled ICT professionals than is available. Large private sector companies in telecommunications and banking are among the largest

²⁸ Global Partnership for Education, 2019. Appraisal report of the Democratic Republic of Congo Education Strategy.

employers of professionals with advanced digital skills. Mining companies also have an increasing demand for workers with basic and advanced digital skills²⁹, namely for logistics. The lack of qualified local workers often results in companies paying higher costs to access qualified foreign workers. Locally trained IT engineers generally seem to be hired at lower grade levels due to a lack of a standardized certification ensuring the quality of their training, and a lack of practical experience. There also appears to be a disconnect between the needs of the private sector and the locally trained workers³⁰. ICT training needs within companies will continue to increase, along with development of the digital transformation in DRC.

The public sector demand for digital skills at the basic and advanced levels will continue to grow. The current and envisaged rollout of e-government, e-citizen, and e-commerce services brings substantial demand for a wide range of digital skills in terms of technical management and support. The government's digitalization of its services requires a significant shift in the administration. This will involve significant IT training for all agents, as well as increasing the availability of specialized IT staff. Stakeholders cited numerous technical skills needs for improving and expanding digital platforms in the DRC, ranging from digital infrastructure, system design and implementation, procurement and contract management, and performance management. Development perspectives of digital financial services and the African Continental Free Trade Area will further contribute to the rising demand for e-business digital skills.

4.2.4 Constraints to Attracting & Developing Digitally Skilled Labor

Insufficient availability of digital skills is holding back the potential for a vibrant and resilient economy in the Democratic Republic of Congo. The COVID-19 pandemic also exacerbates the constraints raised, but also provides an opportunity to boost the development of digital skills and distance learning. The Government quickly responded to the pandemic by soliciting distance learning solutions provided by non-state actors. SchoolAp and VODAEDUC provide promising examples of public-private collaboration (see Section 4.2.2.3). These types of innovative initiatives need to be further supported. Other solutions are also being implemented to reach areas that do not have internet access, such as an Education TV channel (EDUC TV) and educative radio programs. However, there is a much higher demand than the current supply can satisfy, and many challenges remain.

4.2.4.1 Policy context and education framework

Adequate alignment of curricula and teaching materials with market needs is critical to ensure that the future labor market has the depth and breadth of digital skills required. As noted in Chapter 2, there is limited intragovernmental and public-private dialogue, combined with a lack of coordination in the mechanisms to define curriculums, evaluation, and certification. The absence of a standardized certification is a concern for employers, as they have difficulty finding qualified local talent. Deliberate linkages between digital skills development activities and the needs of the labor market are not apparent. The needs of the private sector should be considered when elaborating the content of curriculums, to better prepare students to enter the job market.

4.2.4.2 Access to key technical and analogue complements

The great majority of schools have no electricity, computers, and other basic requirements for digital skills development. Current school facilities are inadequate to host ICT equipment and training and would require significant investments to upgrade. Access to electricity and computers seem to be primarily reserved to private education in urban areas³¹. Interestingly, geo-localization statistics³² revealed that over 84 percent of secondary schools have access to a cell network, 44 percent of which is VODACOM, followed by Airtel (27 percent), Orange (23 percent), and Africell (6 percent). It would be critical to explore the coverage of secondary and TVET schools to better assess connectivity options.

²⁹ Chamber of Mining. 2020.

³⁰ World Bank. 2018. Democratic Republic of Congo Systematic Country Diagnostic. Washington DC: World Bank Group

³¹ Ministry of Primary and Secondary Education. 2020.

³² Ministry of Primary and Secondary Education. 2019. PEQPESU school geolocation report.

4.2.4.3 Data gaps

Insufficient reliable data and statistics in the education and training sector, as well as for the job market demand for digital skills. Production of reliable statistics is essential to monitor and evaluate progress, and to plan the management of resources effectively. There has recently been some progress in the production of statistics in the education sector, including with the PEQPESU study on geo-localization and mapping of schools. However, additional reliable and timely data is needed to provide an accurate picture of the current state of digital skills, of labor-market demand for digital skills, and the related supply for effective decision-making. There does not appear to be a systematic tracking of employment of young graduates and youth unemployment.

4.2.4.4 Limited supply of teaching talent

Lack of qualified teachers and trainers. Creating a digital learning environment requires teachers to possess basic digital skills to deliver training and translate it into practice. However, research and stakeholder consultations suggest a greater human resources issue in the education sector, with a lack of qualified teachers for the growing population, combined with a lack of proper teacher training. There is a teaching capacity gap at the primary and secondary level, and a very limited supply of qualified teachers and trainers in higher education and vocational and technical training. The limited number of qualified teachers at university and TVET level is adversely affecting the quality and breadth of advanced-level courses in digital skills. Bridging this gap will most likely require a multi-pronged approach, including skills upgrading of existing teachers, provision of ongoing training with relevant content, as well as the recruitment of new or visiting faculty members from the private sector or from overseas.

4.3 Recommendations & Next Steps

Table 4.1: SWOT analysis on digital skills

Strengths	Weaknesses
<ul style="list-style-type: none"> • The Government of DRC recognizes the essential role of education and training to create a strong digital economy. • A strong support from donors and international regulation to improve governance through better and wider use of e-services, including HR management, salary payment, etc. 	<ul style="list-style-type: none"> • Lack of access to basic infrastructure and tools (little to no electricity, little to no internet access, high cost of internet, high cost of devices) • Misalignment between digital competencies and market needs • Lack of advanced technical training, which creates a low supply of qualified workers • Insufficient coordination and coherence, which needs to be implemented through an intra-governmental dialogue and a public-private dialogue
Opportunities	Threats
<ul style="list-style-type: none"> • The context of COVID-19 contributes to the rise of digital services, including distance learning. Digital learning platforms are promising opportunities for PPPs. • Existence of nascent informal training structures, which need to be supported • Growing demand for digital skills with e-government, e-citizen, e-commerce, and the development of mobile financial services 	<ul style="list-style-type: none"> • Low rates of device penetration and low usage of digital platforms • Important gaps between urban and rural areas

The following recommendations could support digital skills development of digital skills in DRC:

Objective 1: Creating a conducive environment and transparency for the growth of digital skills

R1. Increase coordination and develop a clear roadmap. Developing a vibrant digital economy requires strong collaboration and dialogue within key ministries and relevant stakeholders, including the three ministries in charge of education, the ministry of Telecommunications, and private sector representatives from business associations. The national strategy for digital and the national education strategy are good starting points, but a clear roadmap with realistic milestones and concrete actions needs to be elaborated. Vulgarization of the roadmap will be essential for relevant actors to adopt and implement this initiative effectively. Furthermore, public-private dialogue needs to be strengthened, to ensure alignment between training offers and market needs. In particular, the mining industry should be leveraged for its potential to invest in digital training.

R2. Improve digital skills data collection and research. Reliable and timely data that provides an accurate picture of labor-market demand for digital skills and the related supply is needed for effective decision-making. Systematic tracking of young graduates and youth unemployment should be implemented. Information on the number of existing and projected ICT vacancies would also assist efforts to assess and develop the DRC's digital skills base, both for the government and the private sector.

R3. Improve access to electricity, internet and digital devices in schools. Investment in infrastructures to increase access to electricity, internet, and digital devices is an essential pre-requisite to build digital skills. Most school facilities would also require an upgrade to have the capacity to host ICT equipment. Initiatives developed by Schoolap and VODA EDUC present interesting opportunities to explore in terms of public-private collaboration to equip schools with devices, internet access, and solar electricity to access local training content.

Objective 2: Increasing the supply of education talent and resources

R4. Provide additional training opportunities in basic digital skills, with an emphasis on teachers and government employees. Teacher and student training are an essential step towards digitization. Potential options for training include basic digital skills, development of online courses, and use of digital learning platforms. Digital platforms also provide significant opportunities for online and agile learning and could help address gaps in adult education and in basic IT capacity in administrations. Additionally, training content and curriculum needs to be redefined, as contents are outdated and not adapted to market demands. Coordination with the private sector is essential to create opportunities for internships, apprenticeships, and employment.

R5. Leverage non-state actors of basic and advanced digital skills training. The government should also consider leveraging non-state actors more readily to expand access to training to rural areas and to vulnerable groups. This could be undertaken through a more comprehensive mapping of existing providers and their respective strengths, including modest government sponsorship to support their expansion and the replication or scale-up of successful models. Nonetheless, a proper framework should be implemented to ensure that sensitive data is not misplaced and that digital platforms are compatible. Lessons learned from other successful initiatives in neighboring countries should also be examined. Furthermore, the private sector and higher education should expand partnerships to enhance digital skills and foster DRC's competitiveness.

5 Digital Platforms

Key messages:

- ❖ **While some administrations have implemented operational applications, each has done so independently to serve its own needs.** In most Congolese administrations and companies, manual processing currently predominates. The result has been poor service delivery, questionable data integrity and large-scale inefficiencies.
- ❖ **Digitalization has been driven by the need to improve domestic revenue mobilization and public financial management.** However, this has not translated into using digital platforms for improved service delivery, for example in tax revenue collection. There is a need to seize the opportunity offered by donors' interest and growing appetite of DRC's youth to improve both back-end systems and citizen-facing interfaces.
- ❖ **Government lacks many of the core building blocks needed to support a whole-of-government approach.** This includes weak government coordination and key enablers such as digital ID and data governance. Access to shared infrastructure and services would enable productivity gains and increased performance of the administration.
- ❖ **DRC's fast-growing and increasingly urban population provides a springboard for the growing ecosystem of commercial platforms and innovation hubs.** DRC's 80 million population is the largest francophone market in the world, growing at more than 3 percent per year, with almost 40 percent of its population living in urban areas.

5.1 Importance of Digital Platforms

5.1.1 Socioeconomic Rationale for Digital Platform Development

Digital platforms present incredible opportunities for the Government and private sector, in facilitating transactions and the exchange of goods, services and information in more efficient and convenient ways. The digitalization of entire aspects of society and the economy, hastened by the Covid-19 pandemic, can provide cost-effective ways of expanding service delivery to rural parts of the country, as well as helping citizens to access markets through online services. However, so far in DRC, digital platforms have been largely driven by the private sector, who despite large gaps in existing connectivity and logistics infrastructure – as explored in Chapters 3, have managed to produce a blooming e-commerce ecosystem. This chapter analyzes the state of digital platforms with two categories:

- **Public digital platforms** can increase the effectiveness of core government functions and service delivery, reduce unnecessary duplication of systems, combat fraud and corruption by increasing the security and traceability of transactions, and improve civic engagement through increased transparency and accountability.
- **Private digital platforms** can lower transaction costs and support new innovative products and services. They can remove economic frictions and distortions, facilitate matchmaking between producers and consumers, and exploit network effects from economies of scale. However, they may also create risks related to anticompetitive behavior, lack of consumer and contractor protection, as well as infringement of privacy rights.

5.1.2 Alignment with Country Development Strategy & Goals

As noted in Chapter 2, the PNN has elevated digital technology as a central tool for the development of the country. Digital platforms appear to be integrated throughout the PNN, either through the implementation of enabling infrastructure, creation of digital content, development of use-cases or establishment of a governance framework. Interestingly, the PNN includes a whole axis on leveraging big data analysis and open data frameworks, which denotes a certain understanding of advanced uses of digital platforms.

In the public sector, e-government is part of the PNN although the starting point is extremely low, as described in Sections 5.2.1 and 5.2.2 hereafter. Axis III.2 proposes to implement the interconnection of Ministries, Departments and Agencies (MDA) and to increase service delivery directly to its citizens, through digital projects in the health and education sector, as well as increasing digital tools available for public financial management, the judiciary and Ministry of Foreign Affairs. Axis III.3 introduces a National Strategy for Secure Information Systems, which aims to regulate electronic transactions, cybersecurity and data protection. To date, none of these have been implemented, and it remains to be seen whether institutions in place will be able to do it, given present capacity constraints discussed in Chapters 2.

In the private sector, digital platforms are present through support to the e-commerce industry and emphasis on leveraging the potential of data-driven business models. Axis II.1 proposes to support e-commerce websites and incentivize the development of data-driven digital content in the health, education, transport, tourism or agriculture sectors. It mentions the development of e-commerce platforms not just for retail, but also for entertainment including books, music, cinema and video game industries, which already constitute one of the most important uses of digital technologies among the youth. The PNN also introduces several projects aimed to raise awareness of digital solutions and the added value of data-driven services, through the establishment of community centers, cyberlabs and digital libraries accessible to the general public.

5.2 Diagnostic Findings: Current State of Digital Platforms

In 2016, DRC scored 20.8 out of 100 on the World Bank Digital Adoption Index, which places it at the 176th rank out of 183, largely driven by its poor performance in the ‘People’ cluster, which measures the extent to which the population can access digital services. In general, the implementation of digitalization projects is constrained by limited connectivity infrastructures and weak implementation capacity, as discussed in the two preceding chapters. As noted in Table 5.1 below, DRC performs poorly in most of the key indicators of digital platforms.

Table 5.1: Key indicators of digital platforms

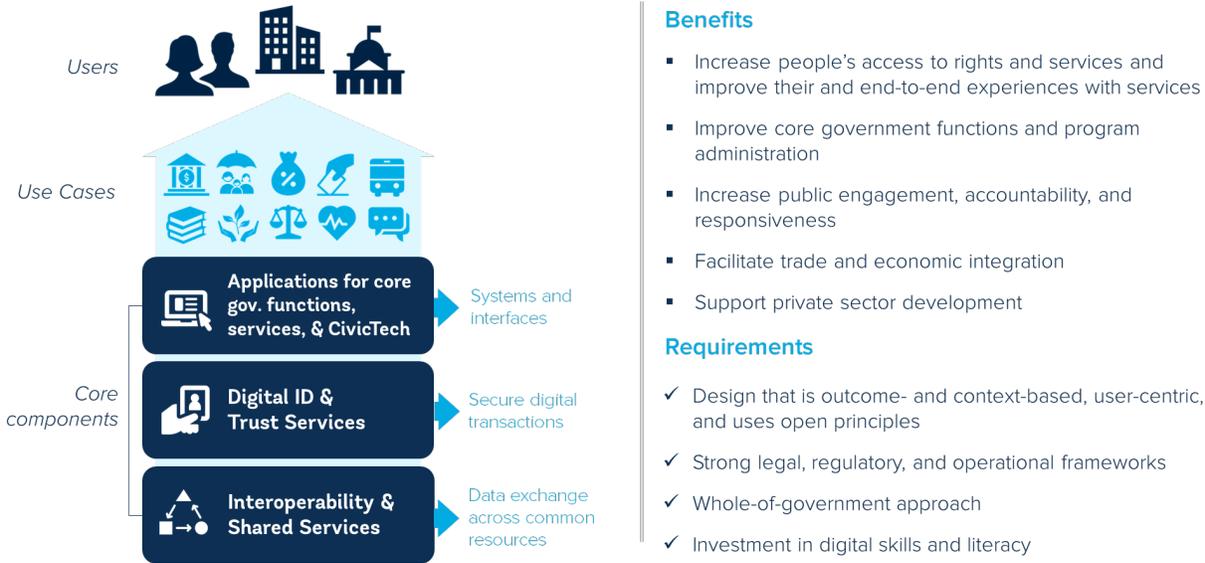
Indicator	DRC	SSA
Digital Adoption Index, score 1-100 (2016)	20.8	32.5
Public platforms		
Digital Adoption Index (Government cluster), score 1-100 (2016)	39.8	39.5
E-Government Development Index, score 1-100 (2018)	26.1	32.9
Online Services Index, score 1-100 (2018)	20.8	35.4
E-Participation Index, score 1-100 (2018)	12.4	34.5
Cybersecurity Index, score 1-100 (2018)	0.8	29.5
Statistical Capacity Score, score 1-100 (2018)	41.1	59.1
Adults with a national ID, % (2018)	60	66.2
Private platforms		
B2C E-commerce Index, score 1-100 (2019)	13.8	29
% of adults who used the internet to buy something in the past year (2017)	1.8	3.6

Source: WB, UNDESA, ID4D, UNCTAD, Global Findex Database

Public Sector Platforms

Figure 5.1: Public digital platforms: benefits and requirements

Digital Public Platforms



Source: World Bank DE4A

In terms of IT infrastructure and equipment, several digitalization projects have been launched, but most are focused on internal government systems, and have been largely developed in silo. There is a crucial lack of interconnection between existing systems, and little information is available online for citizens, let alone transactional services such as tax collection or administrative document processing. Most MDAs rely and work with outdated material and infrastructure. Some have their own data centers, but with limited capacity to actually use them.

5.2.1 Government Capacity to Offer Digital Government Services

5.2.1.1 E-government: Strategic and institutional framework

As noted in Section 2.2.3, as of March 2021 the regulatory framework in the digital sector is largely outdated as it is governed by the Framework Law of October 16, 2002. A new Framework Law was promulgated in November 2020 and is now in the process of publication, but it will not be sufficient to operationalize the digitalization of core Government operations. In particular, the legal framework lacks alignment and standardization for implementation which remains a critical problem. The new Telecom Law is set to update regulations of the telecom market, but it won’t recognize key elements such as digital signature, public key infrastructure, nor will it address issues of cybersecurity, and data protection.

The PNN 2025 aims to create new structures to oversee the Government’s digital transformation but these are yet to materialize. The creation and implementation of new institutional arrangements under the PNN is notably pending the publication of the new Framework Law for the digital sector discussed above. A Steering Committee led by the Presidency’s office is already established, and an ongoing feasibility study will support the creation of a *Conseil National du Numérique* (CNN), which will replace the Steering Committee. However, internal coordination may be difficult as the PNN also recommends the creation of an *Agence de Développement du Numérique* (AND), which conflicts with the CNN. While the PNN defines their role to some extent, the process is highly uncertain given the track record of institutional coordination in the country.

5.2.1.2 Interoperability layers, shared services and infrastructure

While data infrastructure and systems are gradually being set up, interoperability remains low as most digital platforms continue to be developed in silos. As a first step in enabling greater interoperability, the Government of DRC is investing in development and implementation of interfaces between Tax Administration, Customs Agency systems, commercial Banks and the Central Bank (BCC). This project involves the establishment of a revenue collection gateway which includes a shared data center and a dedicated fiber optic network, called C2D, to allow for electronic funds transfer and online monitoring of revenue collection.

There are currently plans to consolidate data infrastructure by pooling resources for data storage, electricity, security, and servers.³³ There is very limited experience in DRC of actual interoperability, data infrastructure and shared systems. MDAs tend to use flash disks and external drives to share data (for instance with the Payroll SYGECPAF or the Education and Health HR management systems). The Customs Agency (DGDA) has its own data center hosting the ASYCUDA system, which is deployed throughout the territory. Though interfacing of IT systems is technically feasible, the fear of increased transparency does not facilitate the completion of these projects, which may cause some civil servants to lose power and influence over the information systems.

A project of Government intranet was started in 2008 with the support of the South Korean Government, but it was never completed. In 2008, four institutions including the Presidency, the Prime Minister's Office, Ministry of Public Service and the Ministry of Foreign Affairs and International Cooperation were connected to the intranet, joined by six other Ministries, including the MPTNTIC in 2009. The intranet has since fallen into disuse. The MoF is now working to establish a data center at the Government's main building, with the objective to centralize data infrastructure for all MDAs. Still, most Ministry applications are not yet planned to be moved to this location. With additional support from the C2D project and World Bank projects (PRRAP and CAB5), the Government aims to upgrade the data center and ensure that it works properly. Until then, and proper standards are established, all MDAs will continue to hold back on transitioning their digital platforms to the Center.

5.2.1.3 Core Government Back Office Systems

The digitalization of core government systems (G2G) can transform service delivery to the Congolese public as internal business processes are leveraged through shared platforms. DRC has devised plans to improve functionalities of its integrated financial management information systems (IFMIS), with support from the French Development Agency (AFD). However, the level of digitalization is uneven between different MDAs. One of the most successful examples of core Government innovation is happening in the health sector, with the implementation of the ANICiS, further detailed in Box 7 below, among other G2G systems.

- **The Customs Administration (*Direction Generale des Douanes et des Droits d'Accises- DGDDA*) has introduced and rolled out the Automated System for Customs Data (ASYCUDA) World throughout the territory,** with support from United Nations Conference on Trade and Development (UNCTAD) and the World Bank. To ensure connectivity among its offices, DGDDA operates its own data centers and established its own virtual private network using infrastructure available through domestic MNOs. However, ASYCUDA is not used systematically for all customs operations, and more notably, some of its functionalities such as the electronic filing and payments of customs declarations are not active, making it prone to errors in reconciling collected data and monitoring arrears.
- **The budget preparation phase is semi-automated using the *Chaîne de la Dépense* IFMIS.** The system has been deployed since 2003 and its modules have been developed in a piecemeal way from an ACCESS version. An SQL version has been in operation since February 2014. This application is centrally managed by the *Cellule Informatique Interministerielle* (C2I) and uses

³³ *Le numérique au service de la maximisation des recettes et de la bonne gouvernance des finances publiques.* Rapport Matinée Fiscale DGDA. 17 & 18 décembre 2020.

radio network to link some budget management actors, such as the Ministry of Budget; the Ministry of Finance; the BCC; the Prime Minister Office and the Defense Ministry).

- **Digital taxation** - The Tax Administration (Direction Generale des Impôts, DGI) has developed several standalone applications. Its main backend application (Gestion des Impôts, GESIMPOT) is used to manage tax processing, including tax filing and collection, in decentralized mode. It is installed on a server specific to each location (around thirty sites) and therefore there as many databases as there are installations. There is also a digital application (ISYS-Regies) developed in 2018 by the Central Bank, but DGI does not yet have a taxpayer interface to access its systems though they have recently started piloting an “e-Filing” for the VAT.
- **The accounting department does not have any professional business solutions and uses rather obsolete, unreliable applications, generally based on Microsoft Excel.** Many activities pertaining to payroll management and human resources are still processed manually.
- **At the provincial level, a simplified expenditure management application has been developed by C2I for four pilot provinces.** It has been installed and in operation for some time in Katanga Bandundu, Kasai Occidental and South Kivu. However, all these pilot systems were short lived and are not operational anymore for several reasons, including poor maintenance and monitoring.
- **The Direction Generale de la Dette Publique (DGDP) uses the Debt Management and Financial Analysis System (DMFAS 6), developed by UNCTAD.** DMFAS is a program for effective debt management and analysis, accessible through a web browser interface.

Box 7: DRC’s National Agency for Clinical Engineering, Information and Health Informatics (ANICiiS)

ANICiiS is DRC’s digital health agency, aiming to promote and develop digital health in the DRC. The agency was set up in March 2019 by the Ministry of Health as the country’s first dedicated digital health agency. ANICiiS is an important step towards modernizing the digital health system in DRC, especially in the face of the recent Ebola and COVID-19 diseases. By providing detailed data and creating opportunities for the growing ecosystem of health tech startups, ANICiiS plans to support digital transformation in the health sector through telemedicine, big data, use of drones in the health supply chain, and bioinformatics.

The agency is also part of the Government’s effort to counter the COVID-19 pandemic through the use of digital tools. ANICiiS and the Ministry of Health, in partnership with Kinshasa Digital, developed a digital communication strategy to fight the pandemic. They also identified appropriate digital tools that could help in decision-making for the response. This translated into numerous initiatives, including:

- (i) An official response information site at www.stopcoronavirusrdc.info/
- (ii) Social media campaigns on ANICiiS’ Twitter and Facebook accounts
- (iii) A WhatsApp chatbot launched in March 2020, which is functional
- (iv) Online population surveys

However, much remains to be done to operationalize the ANICiiS and mainstream its results. For example, the Twitter account used for the social media campaigns has only 156 followers as of June 2020. The PNN lists several options for the way forward, including the development of a strategic framework aimed at identifying, developing and piloting technical solutions in the health sector.

5.2.1.4 Digital Service Delivery

Digital public platforms can also provide new channels for public engagement, feedback, and information sharing, which increase civic engagement and transparency, shortening the accountability loop. Using CivicTech, data sharing portals, and digital services that aggregate public feedback and monitor service quality, digital public platforms can improve public participation, accountability and oversight. Digital platforms provide a new channel for governments and citizens to interact, and for citizens to voice concerns, foster collective action and hold the government accountable. CivicTech can thus increase governments' responsiveness to citizens' needs, which can help improve quality and coverage, as well as overall confidence and trust in public services, which in turn helps to reinforce a positive social contract.

- **e-Citizen** - Very few government services are currently provided online. As discussed above, none of the taxes can be paid online or electronically at the moment, nor do e-Services exist at scale.
- **Human Resource Management (HRM) systems and Payroll systems** – Some government departments (Armed Forces, Police, EPSP, and Health) have developed or acquired applications for HR administration. Systems such as iHRIS (at Ministry of Plan) and iHRIS Retain (Ministry of Health) have workforce planning modules, while others (Civi at the Police department) have decision-making tools.

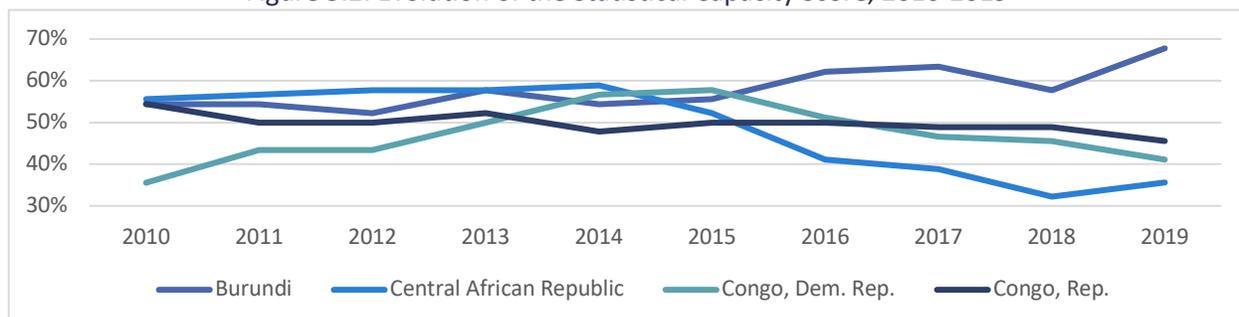
The DRC government has a very limited presence on the internet. There is no official source of DRC laws, complicating citizens' ability to hold officials accountable; challenge or contest wrongful actions by officials; or protect their rights, assets, and access to basic state services and benefits. Some DRC large taxpayers are expected to soon start filing some of their taxes electronically. None of taxes can be paid online or electronically. DRC does not avail an e-Services, or a one-stop shop e-portal. To date, very few government services are provided online:

No "common" technical platform exists for hosting government websites. Only five of 29 referenced websites are hosted in DRC. The others are hosted abroad (mainly in United States, South Africa, France, Belgium, etc.). Within the same entity, several websites exist, which are accommodated by different hosts, in different countries.

5.2.1.5 Open data agenda

Open data, the process of opening Government or privately-owned data, is a key instrument to foster innovation and transparency. Open data is featured prominently in the Government's PNN 2025, through the Axis II.3 on leveraging big data analysis. However, there is presently very little capability to implement this agenda, which constitute an important barrier to innovation. Within the Government, the capacity to manage and make complex datasets publicly available is missing. Figure 5.2 below shows the evolution of the Statistical Capacity Score in the past decade, a proxy for implementation capacity of open data, which has been steadily declining in the case of DRC.³⁴

Figure 5.2: Evolution of the Statistical Capacity Score, 2010-2019



Source: World Bank

³⁴ See <https://opendatawatch.com/blog/indexes-of-data-quality-and-openness/>

5.2.1.6 ID & Trust Services

The Ministry of Interior is currently working with Office National d 'Identification (ONI) to design and roll out a National Biometric Identification System (NBIS) for all citizens and legal residents by 2023. This foundational identification system would assign a unique number to every Congolese citizen enrolled in the system and issues secured, biometric ID cards. It is supposed also to gather and manage several citizen information and data, including civil registry. With support from the African Development Bank, a feasibility study is ongoing and is expected to provide a Road Map and project details to implement the NBIS. However, it is not very clear how the government is organized to deliver on this project which is one of the major public undertaking in DRC. A team of experts is set up at the Ministry of Interior, but they don't have yet a plan or budget to manage the project. With a tab estimated at US\$400 million, the project is also confronted with lack of funding. Constraints facing the development of public digital platforms

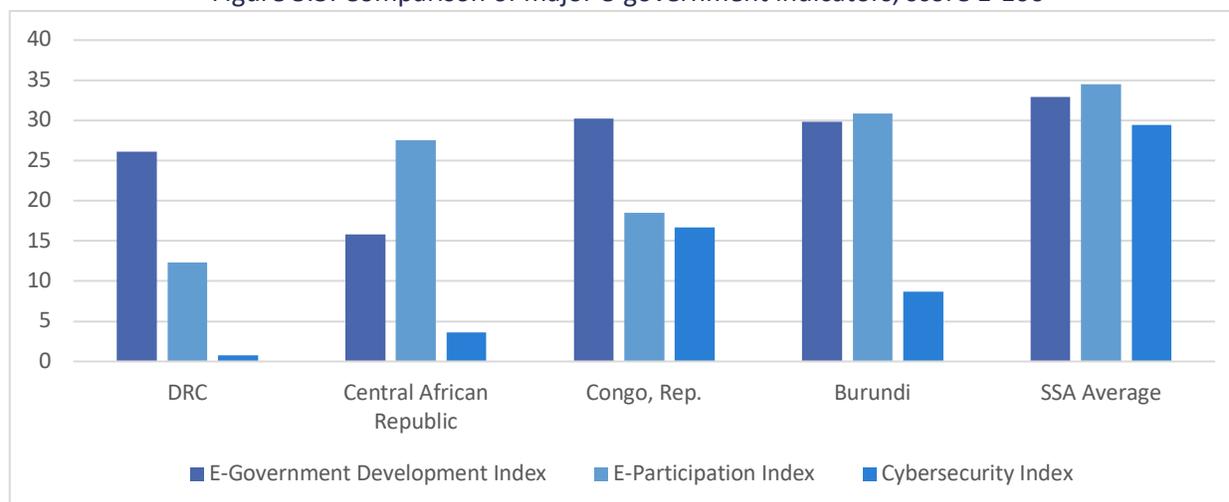
With a biometric system in place, the security sector was able to reduce ghost workers and duplications in payroll and, are now managing a cleaner staff database. However, it is reported the system remains susceptible to fraud and corrupt practices. Another experience supported by the World Bank, which aimed at registering and delivering biometric cards to all civil servants (approximately 1.3 million employees) failed to be completed because of mis-procurement issues. With the ongoing resumption of the Human Resource Management System project, there are tentative plans to relaunch full biometric identification of all DRC civil servants throughout the territory, once a proper staff database is established through desk review and ensuing cleaning work. The French AFD and the World Bank are tentatively contemplating support to this important civil service reform within the pipeline of their next program (i.e. CPF21-23 for the Bank).

5.2.1 Constraints facing the development of Public Digital Platforms

5.2.1.1 Gaps in the legal and regulatory framework

DRC lacks an enabling legal framework for the establishment and uses of digital platforms in the public sector. As noted in Chapter 2, DRC's existing legal framework fails to provide for electronic transactions and the use of digital signatures, which are necessary to provide legal value to electronic signatures. However, the implementation of the new e-procurement system would largely hinge on progress in digital legal and regulation framework, especially digital signature and public key security infrastructure. There is no official source of DRC laws, complicating citizens' ability to hold officials accountable; challenge or contest wrongful actions by officials; or protect their rights, assets, and access to basic state services and benefits. Figure 5.3 below compares the major indicators available on e-government, citizen participation and cybersecurity between DRC and its regional peers.

Figure 5.3: Comparison of major e-government indicators, score 1-100



Source: UNDESA, 2018

5.2.1.2 Weak policy vision and institutional coordination

Institutional leadership in the sector is limited. Coordination in the sector is challenging and would be difficult to overcome given the political divide emerging from the coalition government. The *ad-hoc* approach to providing ICT support for government has been costly and is hindering the pace of implementation of the government's digital agenda. The ICT environment within which government systems function is changing rapidly, and thus without a proactive vision and coordination, many digital projects of government would face rapid obsolescence.

A running theme through all existing government applications is that they do not communicate with each other. There is no global vision, these different applications work in isolation, without any communication between them. Data exchanges are not automated, and therefore require human manipulation of data, which can induce errors. The applications are also very little documented.

5.2.1.3 Limited application services and poor service levels

Though there are few applications that are in use today, most of them require major improvements or a complete overhaul. As noted in Section 5.2.1.3, budget preparation activities require manual handling and inputs from all units involved in budget preparation. The accounting departments in the public service does not have any business solutions and uses rather obsolete, unreliable applications, generally based on office solutions. The other Public Finance departments as well as the Public Service also use old-style solutions, generally developed in Access, for budget preparation and monitoring, payroll management and human resources. Several activities are still processed manually. The tax authority lacks a taxpayer interface to access its systems though they have recently started piloting an "e-Filing" for the VAT (in May 2020). As for all revenue administrations in DRC, DGI is still relying on manual and lengthy processes to track, record, reconcile and report on tax payments

5.2.1.4 Weak capacity, skills and resources, particularly human resources and information security

In general, staff do not have experience with large IT projects and need capacity building. C2I, with its 30+ engineers, with 10 years of experience in applications development and operation, is one of the most important public IT structures in the country. C2I is the only inter-ministerial IT coordination, but it covers just two ministries, the Ministries of Finance and the Budget. A recent study identified that less than 15 percent of administrative entities have implemented some basic elements of an IT systems security framework.

5.2.1.5 Weak connectivity infrastructure & other enabling infrastructure

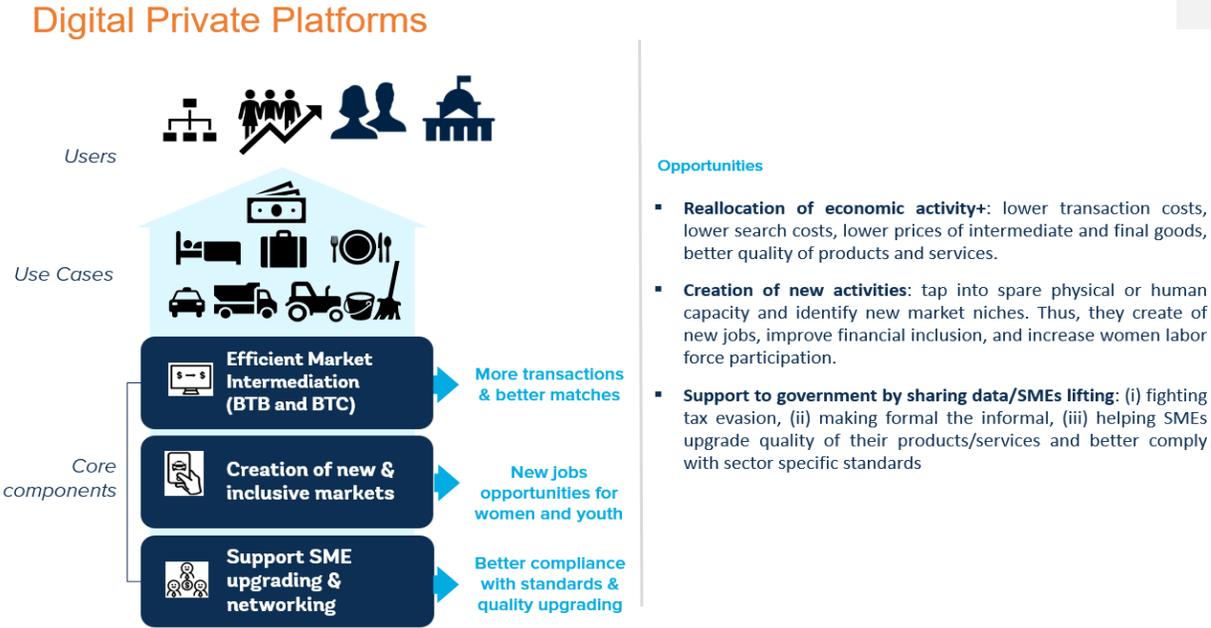
While certain government agencies and ministries have installed some digital applications, lack of connectivity infrastructure has limited their effectiveness. The communication networks of public administrations are either private links or links established on third-party infrastructures. Fiber optic infrastructure to interconnect the provinces is nationwide underdeveloped and current projects do not evolve rapidly enough. As a result, several administrations opted for VSAT technology to connect Kinshasa central services to localities in the provinces, but these are mostly dilapidated and inadequate. On the application side, some agencies such as Customs (*DGDDA*) have introduced and rolled out the Automated System for Customs Data (*ASYCUDA*) World application, but the system cannot often be access due to internet bandwidth. This leads to significant delays and inefficiencies in customs clearances and import operations in main border posts.

5.2.1.6 Lack interoperability, infrastructure and connectivity

While data infrastructure and systems are gradually being set up, interoperability remains low as most digital platforms continue to be developed in silos. Though interfacing of IT systems is not difficult technologically, the human resistance has impeded several, albeit small-scale, efforts to bring about interoperability. There is very limited experience in DRC of actual interoperability, data infrastructure and shared systems. In general, DRC government units use removable flash disks and backups to share data (for instance with the Payroll SYGECPAF or the Education and Health HR management systems).

Private Sector Platforms

Figure 5.4: Digital private platforms: Core components and opportunities



Source: World Bank DE4A

5.2.2 Uptake and development of private digital platforms

The digital startup ecosystem in the DRC is growing but is still at its nascent stage. There is an increasing number of incubators, hubs, events, and competitions dedicated to digital entrepreneurs. Compared to its size, DRC offers a low number of digital hubs, but given the nascency of the ecosystem, there are a few startup success stories. Some startups stand out as examples with potential and an existing track record of revenue, such as emart.cd, an e-commerce platform in Kinshasa, and Schoolap, an inline education platform that works with more than 800 schools and 91,000 students in the country, but these startups are still young (Schoolap is discussed further in Section 4.2.2.3).

The key enabling conditions are sorely missing. DRC ranks 184th of 190 in the WB Doing Business survey, scoring 36.85 out of 100 (behind the SSA average of 51.61) due to factors such as difficulty of starting a business, dealing with construction permits, electricity, etc. According to WEF Global Competitiveness Index (GCI), DRC ranks 126th of 137 with access to financing and corruption being the most problematic factors. The DRC faces many challenges when it comes to furthering its digital entrepreneurship ecosystem, including the lack of funding, entrepreneurial acumen, access to electricity and internet, clear regulation, business development support, infrastructure, and affordable workspace.

5.2.3 State of the domestic e-commerce industry

Logistic and affordable financial solutions are not available to support digital startups, especially in the e-commerce sector. E-commerce startups face the challenges of high transaction costs, lack of trust from the population, and few options for delivery services. These challenges result in entrepreneurs needing to deliver products themselves or have their clients pick up their purchase, which limits the geography of their potential market. However, some digital entrepreneurs are starting to successfully bridge those gaps. Startups in the fintech sectors are educating customers and businesses on how to use digital payments and e-commerce solutions, and a few startups in e-logistics, such as Tinda or Sualoo, are also starting to address the need of e-commerce platforms for delivery solutions. Some international delivery companies are adjusting their offers to the need of

digital startups. In Goma, for example, DHL developed a partnership with a local e-commerce startup that can now procure its inventory from abroad at a preferential rate.

The use of e-payments in e-commerce is starting to grow slowly but suffers from high transaction costs and lack of interoperability³⁵. Only 1.5 percent of the population has a credit card, but 2 percent made online purchases and/or paid bills online in 2017, according to the World Bank Global Findex (Demirgü-Kunt 2018). According to a report published by We Are Social and Hoot³⁶, in 2019, 16 percent of the population had a mobile money account, showing a 78 percent year-over-year increase (DataReportal 2019). However, the use of mobile money remains low. For example, emart.cd, the leading e-commerce platform for grocery shopping, reports that 83 percent of its transactions are paid in cash at delivery, and the remaining clients paying by credit card are mostly expats buying for their relatives (Kabeya 2018). New payments and e-transaction solutions (See Box 8, Chapter 6) are being developed by local entrepreneurs, such as Maishapay, Maxicash, Sobabien or Flash, but digital payment solutions generally face a lack of interoperability, reluctance of mobile money operators (MMO) to open their Application Programming Interface (API), or costly and opaque requirements to access USSD.

Initiatives are popping up across the country to educate individuals, customers, and businesses to boost and democratize the use of digital technology. In November 2019, the fintech startup Maxicash organized a webinar to teach e-commerce platforms how the use of innovative payment methods can boost revenue. Maishapay organizes weekly training workshops on digital payment tools for female merchants across various cities. The Crypto Academy, a consulting and training firm specializing in blockchain and crypto currency, organized the first conference on crypto currency in March 2020 to explain, share, and reflect on the benefits of bitcoins and crypto currencies. Bonni Maya, the founder of TINDA and emart.cd, announced the launch of an e-commerce tour in five cities (Kinshasa, Lubumbashi, Matadi, Goma, and Brazzaville) to educate potential B2B customers on e-commerce and digital marketing, with a focus on women who sell their merchandise through Facebook or WhatsApp.

5.2.4 Constraints facing the development of digital private platforms and e-commerce

5.2.4.1 Regulations, Policies, and Institutions

Government failure and ad hoc taxation by tax officials has reportedly increased with the access to information that government agencies now have on new businesses. As noted in Section 3.2.4.2, tax laws are notoriously ambiguous in DRC, so inexperienced startup entrepreneurs make for ripe pickings for the tax inspectors, who now knock on their doors even before reaching revenue. The government has yet to develop a comprehensive policy on youth entrepreneurship, especially for tech startups.

Many of the laws and policies that regulate digital platforms are lacking in DRC. The regulatory texts for electronic commerce, cybersecurity and electronic signatures – important frameworks for a digital platform. The absence of these laws and rules constitutes a constraint on trusts in the exchange of information and platform-based transactions, undermining the growth of digital businesses.

5.2.4.2 Lack of funding

While startup entrepreneurship and platform acceleration are attracting a lot of attention elsewhere in Africa, DRC is largely left behind. While this reflects a trend in francophone Africa, DRC is missing from the top-five in its region³⁷. Rwanda, Senegal, Morocco, Cameroun and Tunisia lead the way within the Francophone group, ahead of the largest country in Francophone Africa, Democratic Republic of the Congo.

³⁵This chapter uses a broad definition of interoperability: the interconnection of mobile money services with external parties, with the aim to create value for both customers and commercial players.

³⁶ <https://datareportal.com/reports/digital-2020-democratic-republic-of-the-congo>

³⁷ Rwanda, Senegal, Morocco, Cameroun and Tunisia lead the way within the Francophone group, ahead of the largest country in Francophone Africa, Democratic Republic of the Congo according to Partech Venture's research

5.2.4.3 Unbalanced ecosystem

The number of actors in the digital ecosystem is skewed with acute shortages for training, supporting and financing startup entrepreneurs. Among current providers, few have structured programs with relevant content at a price level matching the budget of startups. There is also an over representation of actors focusing on events and competitions, as these are activities that sponsors are interested in. The ecosystem map shows that most platforms are based in Kinshasa, with very little outside of the three main centers of activity of Kinshasa, Lubumbashi and Goma.

There are deficiencies across the lifecycle of platform growth. The ecosystem is still nascent, and as a result there are few successful startup stories to share in DRC. The examples that stand out are eMart14 and Labes Key/Schoolap, which both did not come forth from incubators. Both are still young startups, too young to determine their success.

Digital skills are crucially lacking, as discussed in detail in Chapter 3. Secondary and tertiary education programs do not include courses on entrepreneurship or digital, except for some private universities. Critical thinking on the needs of the market; understanding on what it means to run a business; the importance of financial reporting and control mechanisms; where to turn to for help; knowing the needs of investors, these are all aspects of digital entrepreneurship that are largely unknown. Similarly, there is a lack of knowledge and understanding on the part of mentors and service providers about the specific skills and tools that startups need, simply because they have never been exposed to it in depth.

5.2.4.4 Inadequate enabling infrastructure

Affordable and credible business support: Many of the startup teams are unable to focus on their business because they lack means from family or friends to do so. Most digital businesses and incubators allude to a lack of funding and business support during the various phases of their business.

Information scarcity: It is difficult for starting entrepreneurs to find information that is relevant to their needs, such as where to find support, market information, how to attract financing, etc. Collecting this themselves (especially market information) is very costly and time consuming. This results in business plans of poor quality and decision taking that is very subjective. It also makes due diligence on the part of investors very difficult.

Digital and physical connectivity: DRC despite its vast territory, has one of the least developed digital infrastructures in Africa. Internet penetration is low, coverage is limited and prices for data usage are largely unaffordable to most of the population. This drawback impedes the uptake of digital services, increases cost for businesses and limits production of digital goods, most of which depend on the high-speed internet. In addition, lack of good roads and postal services hamper logistics /distribution and market penetration and profitable growth.

Digital payments: While mobile money penetration has grown over the years, digital payment is still very limited in DRC. The banking system is siloed and outdated compared to leading African markets. Mobile money is costly and not integrated to other modes of payment such as bank payment. Instant bank transfers, card payments and recurring billing are virtually absent. In addition to enforced interoperability, mobile money operators are unwilling to open up their API's to allow fintech solutions to be developed/rolled out. Government is dragging its feet because it wants the local switch to be in place and to be used. The COVID-19 pandemic has pushed the Government into action, and they are now allowing interoperability without the local switch. They have also reduced transaction costs and increased wallet caps.

5.3 Recommendations & Next Steps

Table 5.2: SWOT analysis on digital platforms

Strengths	Weaknesses
<ul style="list-style-type: none"> • Large market for both public and private platforms • Foundational, pilot initiatives already ongoing in digitalization taxation, procurement and payments • Growing willingness to adopt digital technologies in the key ministries • Young, creative, and eager entrepreneurs 	<ul style="list-style-type: none"> • Weak fiscal space for holistic digitalization • Coordination is challenging and would be difficult to overcome, given evolving political economy • Poor connectivity infrastructure and other enabling infrastructure such as digital ID, logistics and ePayment • Lack of interoperability of infrastructure, applications and services • There is no capacity and interconnexion to implement the whole-of-government approach
Opportunities	Threats
<ul style="list-style-type: none"> • Active support from the donor community, who has expressed their support and willingness to help in digitalization • Young and large population, providing opportunity to train digital natives to administer public platforms 	<ul style="list-style-type: none"> • Uncertain political economy could hamper or derail key initiatives • Addressing issues of data security, protection, and privacy is not proceeding as expected. • Skills shortage and generally low motivation among staff

The following recommendations could support the development of digital platforms in DRC:

Objective 1: Creating an enabling framework for digital platforms

R1. Craft an overarching strategy an interoperability framework for public digital platforms. An overall strategy can be achieved by (a) streamlining, prioritizing and adopting the National Digital Plan (PNN) articulated around strategic government digital objectives and activities; (b) developing a consensual and realistic 3-year Action Plan including steps for (i) ID and trust services; (ii) government IT infrastructure; (iii) back-office systems; (iv) data management; (v) shared services, security and access; and (c) operationalizing the National Committee on Digital to guide and monitor implementation.

R2. Establish an independent entity that will promote the digitization of the Congolese society, piloting and monitoring key programs. A digital agency that is separate from the entity in charge of telecommunications and post regulation, will correspond to models set up around the world. But because regulation is broken out between several entities under the supervision of the Ministry of ICT, it is essential to clarify the respective roles and responsibilities of these institutions. This clarification must be effective between the Ministry and the entities under supervision and between the regulatory entities.

R3. Create the general set of standards for data protection, interoperability, databases and access. Within the framework of the National Digital Plan, it is important to create reference documents that

will define a technological framework, principles, common rules, and best practices under which a state information system can develop in a controlled and organized manner. These documents need to ensure interoperability of systems, data shareability, the security of information systems.

R4. Intensify platform acceleration partnerships focused on the youth. There is need to leverage the entrepreneurship zeal of young people who are eager and capable of thriving under an envelopment of enormous lack when given a push. A concrete way forward is to scale up public and donor partnerships with incubators and large training centers like Ingenious City and Kinshasa Digital. Allocating funds to support entrepreneurial ecosystems through grants to incubators, support for networks as well as selected startups would help reverse the fading behind of DRC from the ranks of digital platform hubs.

Objective 2: Investing in enabling infrastructure, services and applications

R5. Support roll-out of fiber network and interconnection of government offices. Government is in urgent need of enhanced connectivity. The digitalization of public services cannot practically be made operational without (i) resolving the IT infrastructure and equipment gaps; and (ii) to properly connecting all the users through a common network. There is need to take advantage of the upcoming fiber optic network to interconnect key government offices and agencies, most of which are within a 5 kilometer of this future network. Equipment is also distributed unevenly, and unused equipment could help other MDAs instead of purchasing new equipment on the market (cf *Rapport Matinée Fiscales*).

R6. Improve VSAT coverage in areas of low fiber reach. There is a need to rationalize the use of the VSAT networks for public administration while improving the services provided and optimizing costs. This project can be sequenced on (a) carrying out a detailed and exhaustive inventory VSAT networks, (b) needs identification for administrations which have not deployed a VSAT network, (c) defining the implementation and maintenance arrangement. It is important that the scope of the study and subsequent projects be clearly defined, including responsibility and accountability matrices.

R7. Ensure a technical platform for hosting the various public websites. A practical solution is to rent capacity of industry grade hosting platforms rather than build one from scratch. Two potential options are (a) subscription to a software-as-a-service (SaaS) platforms which generally offer access to a very wide range of tools; and (b) subscription to an infrastructure-as-a-service platform, which will entail the acquisition of one or more servers. Information security and available technical competences must be considered in parallel. A lack of standards in network architecture also prevents interoperability and efficiency of information sharing.

Objective 3: Realizing crucial digital transformation projects at risk of delay or abandonment

R8. Advance the implementation of a government-wide integrated financial management information system (IFMIS). There is need to accelerate and guide the deployment of the IFMIS platform by developing an updated, three-year action plan. A consultancy should review and develop technical and functional specifications, and draft Request for Proposal to help the government procure the core application. If funding is secured, this would bolster the government efforts: (i) to track and record all financial and budgetary transactions; (ii) to get a consolidated financial and budget reporting, and; (iii) to facilitate and automate accounting and bank reconciliations for all government revenue and expenditures.

R9. Roll out 'quick-win' solutions: There is a need to conclude certain initiatives and projects that have high impact and clearer path to completion, but lack funding and steering power. These include (a) ISYS Regies which focuses on digital tax payment and tracking; (b) LOGIRAD (an accountancy and

information System); (c) SIGMAP (a procurement tracking and information system); (d) SYDONIA/ASYCUDA (linking other users' applications to facilitate customs clearance and one-stop shop). These could be achieved through through technical assistance (example from PROFIT Congo; PRRAP and PATM), consensus building (example from C2D), and regulatory reform.

6 Digital Financial Services

Key messages:

- ❖ Given the geographic expanse of the DRC, and the high costs of brick-and-mortar structures, DFS can drastically drive down costs for financial institutions and other payment service providers, enabling them to reach customers in remote and underserved parts of the national territory.
- ❖ The Government of the DRC could contribute significantly to the uptake of DFS by upgrading government digital platforms, increasing Government-to-Person (G2P) and Person-to-Government (P2G) payments and expanding on financial education.
- ❖ FinTech solutions are growing in DRC, using both low and advanced technologies, despite the lack of regulation towards interoperability and difficulties to access USSD codes or APIs.

6.1 Importance of Digital Financial Services

6.1.1 Socioeconomic Rationale for Digital Financial Services Development

Digital financial services refer to the broad range of financial services accessed and delivered through digital channels, including payments, credit, savings, remittances and insurance. Digital technologies have the potential to unlock new pathways for development – accelerating economic growth, job creation and service delivery in DRC. Advanced technologies are already altering traditional business and service delivery models, yielding significant efficiency and productivity gains, increased convenience and transparency. Access to broadband and digital financial services have, for example, been associated with significant GDP and per capita income growth, helping to pull thousands out of poverty. Accelerating the adoption and coverage rate of digital services and connectivity in the Democratic Republic of Congo thus has the potential to generate financial inclusion, employment, support poverty reduction, and increase access to services and markets.

DFS can expand the delivery of basic financial services to the poor through mobile-phone-enabled solutions, electronic money models and digital payment platforms. Digital channels can drastically drive down costs for customers and service providers, opening the door to remote and underserved populations. Mobile money solutions and agent banking offer affordable, instant, and reliable transactions, savings, credit, and even insurance opportunities in rural villages and urban neighborhoods where brick-and-mortar bank branches may never be established.

6.1.2 Alignment with Country Development Strategy & Goals

As noted in Chapter 2, the Presidency of DRC has identified digitization as a priority through the PNN 2025, to enhance good governance, economic growth and social progress. DFS are an important part of Pillars 2 and 3, respectively on Content and Application Uses, with several projects aiming to regulate payment service in particular. In 2018, the Government of DRC passed two legislations covering payment systems (Law No. 18/027 of December 13, 2018 on the Central Bank, and Law No. 18/019 of July 09, 2018 relating to payment and securities settlement systems).

6.2 Diagnostic Findings: Current State of Digital Financial Services

6.2.1 Availability of Digital Financial Services

The DRC’s financial sector is small (16 active banks) with total assets representing about 11 percent of GDP at end-2018). The sector is also extremely bank-centric (banks have 90 percent of total assets), and highly concentrated (the top three banks account for about half of assets). There are over 100 microfinance institutions (MFIs) with the sector having total assets of about 5 percent of GDP. There is no capital market and the insurance sector which licensed its first private insurance companies in March 2019 remains very small. There are four mobile money operators and about 83 money transfer companies.

Digital financial services available in the DRC include internet banking, mobile banking, agency banking, domestic and international remittances and mobile money operations. The issuance and distribution of electronic money instruments by financial institutions and electronic money operators is regulated by the central bank (BCC) under Instruction No. 42. Electronic money institutions are defined as financial institutions licensed under the Banking Law of 2002 with the permission of the central bank to issue electronic money and electronic money instruments. Authorized activities include: issuing electronic money, providing electronic money to the public and managing electronic money.

6.2.1.1 Financial inclusion

According to the latest World Bank Findex data, account penetration in the DRC increased from 19 per cent in 2014 to 26 per cent in 2017, largely driven by an increase in mobile money (Table 6.1). But while mobile money ownership increased from 9 percent to 16 percent over the referenced period, cash remains the dominant means of payment in the DRC. According to FinScope, 36 percent of the DRC population have access to a formal financial service, however the World Bank’s Findex places access to an account at a financial institution at 17 percent of the adult population.

Access to other forms of electronic payments has remained low, with debit and credit card ownership in 2017 at 6 per cent and 1 per cent respectively. Twenty-six percent of those surveyed use informal mechanisms to manage their finances, while 52 percent did not access any type of financial service. For the excluded groups, savings are kept at home and borrowing is done via friends and family. MSMEs in the DRC are just as financially excluded as individuals and far more so than their counterparts in other African countries. According to the World Bank Enterprise Survey, about 43 percent of enterprises in the DRC did not have a checking or savings account in 2013. This is compared to an average of 13 percent for SSA.

Table 6.1: Key indicators of digital financial services

Indicator	DRC	SSA
% of adults with an account at a financial institution	26	32.8
% of adults using a mobile phone to access their accounts	4	20.8
% of adults making or receiving a digital payment in the past 12 months	22	34.4
% of adults owning a debit card	6	17.7
% of mobile money account	16	21

Source: Global Findex database

6.2.1.2 Types of services offered

In the DRC, both banks and MFIs offer internet and mobile banking services, as well as money transfer services to their clients. Many banks and a few MFIs have developed mobile apps for mobile banking. Most of the banks met during the DFS assessment (Afriland First Bank, RawBank, Equity Bank, etc.) offer these services to their clients. Equity Bank, for example (which has a digital strategy to dematerialize banking services), has a platform that integrates with all clients / partners and PSPs including mobile money allowing clients to move funds from their accounts to wallets and vice versa.

ATM and bank branch penetration in the DRC are at some of the lowest levels recorded in sub-Saharan Africa with only 377 bank branches in the country in 2019 compared to 335 in 2018. However, the number of banking agents have increased from 4,186 in 2018 to 5,242 in 2019. The Average cost of opening a brick-and-mortar branch ranges from US\$ 150,000 to US\$ 200,000. It is expected that to have a Banking Agent, the cost is estimated at a range from US\$ 1,120 to US\$3,000. The eventual operationalization of the National Switch to enable interoperability would likely enhance the use of ATMs and mobile money.

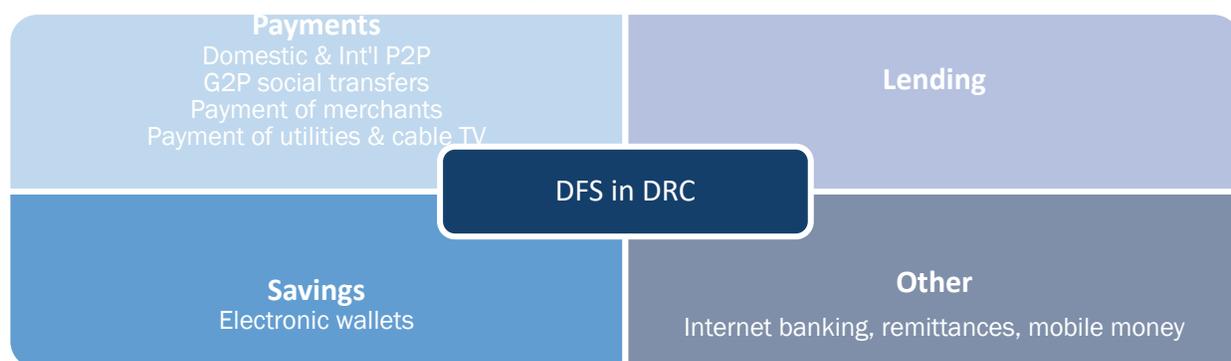
Both banks and MFIs are taking advantage of the law authorizing Agency banking to expand their footprint in the national territory. The leading MFI in the country, FINCA with 21 branches and 350,000 active clients is expanding to serve 1 million customers. SMIKO is digitizing its agent network. IFOD which serves women mainly, is developing a network of agents. Large commercial banks such as Afriland and Equity Bank are also expanding with the former having grown to 19 banking agents and the latter managing banking agents in 20 provinces.

Four mobile money networks had 22.2 million accounts of which only 23,37 percent were active at end March 2020. Of these, 68.9 percent of Vodacash accounts are active, 21.1 percent for Airtel Money, 9.93 percent for Orange Money, and 0.10 percent for Afrimobile Money. There is no appreciable gender gap in account ownership. Mobile money providers have built a distribution network of over 32,681 agents of which over 8,140 are active. While mobile money operators are expanding their services, many impediments remain. Mobile money users can now maintain electronic wallet accounts, make domestic and international transfers and pay bills. But service coverage is still limited in many of DRC's vast territory, data connectivity is limited, and merchants' acceptance of electronic payments is low. Limited use of mobile money by the government and stringent know-your-customer requirements are also impeding growth.

The domestic money transfer market is a significant sub-sector of financial services in the DRC with a large consumer base of over 5 million individuals. In March 2019, there were 83 money transfer companies in the DRC. Nine money transfer companies have partnered with banks to leverage international money transfer services such as MoneyGram, Western Union, Money Exchange, etc. International remittances play a critical role in the economic and social development³⁸, but despite the relatively high level of emigration, inward remittance through regulated channels are relatively small, accounting for just under 3 per cent of GDP in 2017³⁹. Use of unregulated channels is rife.

In the DRC, only 8 percent of start-ups operate in fintech. A prominent example is Maishapay, a fintech startup that uses blockchain technology to provide electronic wallets via internet, SMS, and USSD that allow functions such as withdrawal, deposit, mobile payment, money transfer, current accounts, and savings. Maishapay is presented in detail in Box 8 below.

Figure 6.1: Types of Digital Financial Services available in DRC



³⁸ DRC HIFI, Review of the market for international remittances in the Democratic Republic of Congo: Assessment report on the basis of the CPMI – World Bank General Principles for International Remittance Service, 2018

³⁹ According to data from the BCC

Box 8: Example of a customized digital solution by a local entrepreneur in the DRC

Maishapay is a great example of an innovative digital solution developed by a local entrepreneur to cater to the specific needs of the population in the DRC, including areas with poor internet connection. This fintech solution relies on blockchain technology, which the founder learned about while he was studying in China, where the population widely uses fintech and mobile money instruments.

Initially launched in China for the diaspora in 2017, Maishapay launched in the DRC in late 2018, where it has now more than 11,000 users. It is also present in Ethiopia, Egypt, and Nigeria, where it has more than 3,000 users. The particularity of Maishapay is to offer affordable transaction costs through mobile money and customized payment solutions to its business and individual clients. For example, it allows people living in remote areas where there is no 3G coverage to consult the balance of their savings account with a simple GSM phone through SMS and USSD technology.

It also developed a solution for a customer base of women merchants who travel abroad to buy their inventory. For women who were previously traveling with cash with the risk of losing their money or being mugged, Maishapay provided them with credit cards and mobile wallets and trained them on how to use them. Through weekly training sessions organized across the country, Maishapay has managed to reach and train more than 2,000 women who are now included in the financial system.

6.2.2 Enabling Environment

The regulators in DRC realize the important role of DFS in financial inclusion, but the enabling environment has not evolved fast enough. The telecom regulator has imposed several taxes on e-money institutions (against the advice of the central bank). The resulting elevated cost of usage has partly driven down usage for a population that generally prefers cash and for merchants who scarcely accept electronic payments. Government and SOE platforms are also inadequate, and there is limited enthusiasm for the acceptance of electronic payments.

The growth in mobile penetration and internet penetration and new investment in core switch infrastructure will support further growth of digital payments. The World Bank has financed the modernization of payments system infrastructures, including a national switch but interoperability is yet to be operationalized in the DRC. The eventual operationalization of the national switch to enable multilateral interoperability would likely enhance the use digital financial services.

Secondary components of the financial market are lacking in DRC. There is no stock exchange or capital markets authority in the DRC – there are regulatory provisions for the Central Bank of Congo to issue treasury bills and bonds. With the insurance sector just recently opened to competition (and offering minimal services) and an underdeveloped pension scheme, there is not a strong institutional investors base on which a capital markets can thrive.

6.2.2.1 Laws, Policy & Regulation

The Central Bank of Congo (BCC) has embarked on several initiatives to improve the national payments system infrastructure, although cash remains the dominant payment method. The DRC has a legal and regulatory framework governing banking, payment services and other financial services. The law on the organization and functioning of the Central Bank of Congo (law n° 18/027 of December 13, 2018) empowers the BCC to promote a secure, solid and efficient national payments system, as well as to regulate all banking activities.

Table 6.2: Relevant laws and regulations governing payment systems in the DRC.

Law No. 18/027 of December 13, 2018 on the Central Bank	Ensures the independence of the Central Bank of Congo and its skills in the development and implementation of monetary policy
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The Banking Law of 2002	Provides an appropriate legal framework covering all businesses in the financial sector
Law n ° 18/019 of July 09, 2018 relating to payment and securities settlement systems	Ensures regulation and supervision of payment and settlement systems as well as participants in payment and settlement systems
Instruction on electronic money (Instruction no. 24) 2011	Regulates the issuance and distribution of electronic money instruments by financial institutions, including electronic money operators
Directive on money transfer operators (Instruction no. 006), 1967, as modified in 2002	Regulates and supervise national and international operators of money transfers
Law No. 04/16 of July 19, 2004 on anti-money laundering and countering the financing of terrorism (AML / CFT)	Stipulates on the prevention, detection and, if necessary, the repression of any act constituting money laundering and the financing of terrorism

6.2.2.2 Retail Payments Infrastructure

Having efficient, accessible and safe retail payment systems and services is necessary to be able to extend access to transaction accounts for the population of the DRC. The World Bank recently financed the modernization of the DRC's payment system infrastructures. However, following concerns with anti-money laundering and terrorism financing, the US Treasury requested that the Central Bank of Congo suspend the clearing of US\$ transactions as at end December 2019.

6.2.2.3 Credit Infrastructure

Commercial laws and laws on security interests are weak and unharmonized. Secured transactions in DRC are governed by the OHADA Treaty, but laws concerning individuals and different types of secured transactions are registered in multiple paper-based registries. This scattered legal framework creates uncertainty for lenders thereby limiting access to finance for MSMEs. A well-functioning Centralized electronic Collateral Registry for movable securities could give the much-needed boost to the large agricultural sector in the country as it would allow for entrepreneurs and small farmers to obtain loans against movable securities such as agricultural equipment, crops, warehouse receipts, accounts receivables, livestock, etc. and thus contribute to the financial inclusion of the large rural population.

There is no functioning credit reporting agency. The public credit registry, “*centrale des risques*” partially plays the role of combating information asymmetry and helps in the management of systemic risk, but it generally provides only “negative” information on borrowers who default on their loans. Unlike a credit bureau, it does not provide information from non-financial sector institutions, such as utilities and other billing companies, merchants who sell on credit, etc. While the public credit registry is a useful tool for the banking supervisor to monitor non-performing loans in the financial system, it does not contribute to financial inclusion and access the same way a credit bureau would.

In the absence of a credit bureau, there is information asymmetry which leads financial institutions to refrain from extending loans to MSMEs and households. A private credit bureau would provide lenders with products and services, such as credit reports, fraud alerts and credit scoring, which will support better credit management practices and will also allow lenders to share credit information, increase financial inclusion and facilitate mobility. Modern private credit bureaus do use psychometric tests to assist financial institutions lending to first time borrowers.

6.2.2.4 Delivery Channel & Product Innovation

The DRC has a low level of financial inclusion, compounded by prevailing low levels of financial literacy. Increased use of alternative delivery channels such as mobile payments allow the population to access the formal financial system who are otherwise excluded. ATM and bank branch penetration in the DRC

are at some of the lowest levels recorded in sub-Saharan Africa with only 377 bank branches in the country in 2019 compared to 335 in 2018.

6.2.2.5. Managing Risks of Digital Finance

Risk-based supervision as considered by the Central Bank of Congo (BCC), including for AML-FT purposes, is at a very early stage of development. Tools available do not allow for an adequate AML-CFT assessment of institutions' risk profile, quality of risk management processes, governance, compliance and financial condition nor for the conduct of on-site and off-site supervision which targeted ML/TF risks. The DRC is a member state of GABAC, an organization of the regional body CEMAC which is mandated to coordinate the fight against money laundering and terrorism financing.

There are numerous regulatory constraints that need to be addressed. A review of drafts transposing the CEMAC regulation into national law would be necessary. A legal & regulatory assessment of mitigating measures related to new risks identified would also be necessary before the central bank can consider the drafting of detailed guidelines explaining the obligations emanating of new regulations. GABAC also organizes technical assistance for its member states and facilitates international cooperation.

Financial Consumer Protection and data privacy protection. When using financial products, consumers should know and understand associated risks and benefits to make the right decisions. Yet information asymmetries, power imbalances and behavioral biases in financial markets may result in poor outcomes for both consumers and for financial service providers. It is the role of financial consumer protection and financial education policies, in conjunction with the regulation of financial institutions and markets, to ensure safe access to financial services and support financial stability and financial inclusion objectives. Having these rules in place helps to increase consumer trust and participation in the financial sector, and can increase competition in the market, which can ultimately lead to lower costs and more appropriate products.

The World Bank (through the Harnessing Innovation for Financial Inclusion (HiFi) program) has provided technical assistance to the Central Bank's department for supervision of financial institutions (DSIF) to develop a comprehensive set of consumer protection measures applicable to all types of financial institutions offering transaction accounts and/or payments services. This included assistance with drafting guidelines on disclosure practices, fair treatment, and formal redress mechanisms, as well as: draft instruction on the determination of the Global Effective Rate; draft instruction on the Publication of Bank Terms; draft instruction on the Management of Customer Complaints; draft instruction on Free Services Provided to Customers; draft instruction on the Quality of Banking Services and; draft instruction Relating to the General Terms and Conditions of Deposit Account Management. The Central Bank Governor is currently consulting with stakeholders and yet to issue instructions covering: customer over-indebtedness; data protection; equitable and respectful treatment of customers; and product development and distribution.

Financial institutions have raised concerns that the gratuity of many services as stipulated in the BCC's Instruction no 37, would lead to banks losing revenue as commissions account for about 25 percent of banks' revenues. During the DFS assessment mission, banks indicated that while the new regulations stipulate for ATM services to be offered free of charge, an ATM costs about US\$ 40,000 and the Dollar bills that are made available in these ATMs have to be imported at the expense of financial institutions. One of the banks met during the DFS assessment mission informed the team that gratuity of services would impact the revenues of the bank negatively in a context where the bank's strategy is for commissions and fees income to be at least equal to, or greater than, the interest income from loans. In this vain, some of the financial institutions suggested that it may be desirable for ATMs to incur minimum fees to pay for their upkeep or failing that, the BCC / SMIC (the company to manage the switch) could acquire and manage the ATMs.

6.2.3 Constraints to Digital Financial Services Development

Among the constraints to the development of digital financial services in the DRC cited during the mission by stakeholders are:

- **The low levels of financial inclusion and financial education combine to limit the uptake of DFS.** Payment services providers are trying to extend their networks as much as possible, but their clients prefer cash while merchants consider having POS terminals as an additional expense. There are even merchants who offer discounts for the use of cash (for example, one merchant offers a 7 percent discount for customers who pay in cash)⁴⁰.
- **The lack of a unique biometric financial identification system has the effect of excluding the very vulnerable portions of the population who may not have birth certificates or other forms of verifiable identification.** Digital IDs can help financial institutions comply with the customer identification and verification components of customer due diligence (CDD) (Natarajan et al (2018)) as digital ID supports e-KYC processes, thereby lowering transaction costs for providers through the near elimination of paperwork as well as the burden of keeping paper records, and facilitating audit and forensics through the electronic storage of information⁴¹.
- **The inadequate public digital platforms and low digital of government services are limiting the uptake of digital financial services.** There is limited appetite for the use of digital financial services for collection of revenues and/or payment of utility bills and making payments to beneficiaries of government services. In addition, the tax system unsuitable for promoting digital financial services and regulatory framework is highly limiting.

6.3 Recommendations & Next Steps

Strengths	Weaknesses
<ul style="list-style-type: none"> • The Government is rolling out policies and strategies in the sector, giving good momentum to DFS development • Financial market has several active providers, including both banks and non-banks 	<ul style="list-style-type: none"> • Lack of centralized digital ID • Lack of credit infrastructure (collateral registry and private credit bureau) • Lack of interoperability • Low level of financial education • Low rates of internet and device penetration • Limited capacity of financial market regulators
Opportunities	Threats
<ul style="list-style-type: none"> • The Government can push to roll out G2P & P2G payments • There is a growing startup ecosystem in Fintech and Agtech • Growing agent networks can help job creation 	<ul style="list-style-type: none"> • Regulation of AML / CFT is at an early stage • The country is exposed to a high cybersecurity risk • Privacy and Data Protection

⁴⁰ According to a conversation with Rawbank during the DFS assessment mission.

⁴¹ Payment aspects of financial inclusion in the fintech era – April 2020.

The following recommendations could support the development of DFS in DRC:

Objective 1: Building the Infrastructure for Digital Financial Services

R1. Support full multilateral interoperability. The Central Bank and relevant stakeholders (banks, MFIs and MMOs) should accelerate the operationalization of the Switch and create the management company, SMIC, to support full multilateral interoperability by the end of 2020.

R2. Develop and implement a unique biometric financial identification system. The advantages that such a unique biometric financial identification system provides are that the information is distinctive for every person and it can provide improved security, authentication, privacy or data discretion, authorization or access control, data veracity, and non-repudiation. Such a system would enhance financial inclusion of the very poor (generally also eligible for social transfers) who are excluded because they may not have birth certificates or other forms of verifiable identification. This is a reform that could be carried out by the central bank alone (for the financial sector) or enlarged to the entire population by collaborating with the Ministry of Interior.

R3. Modernize Government and SOE digital platforms and increase the use of e-money in Government to Persons (G2P) and Persons to Government (P2G) payments (especially taxes, utilities, etc). Upgrading government and SOE platforms to enable the population to pay taxes and utilities with electronic money (P2G) and increasing Government to Persons (G2P) payments (currently less than 5 percent) would substantially accelerate the expansion of DFS in the country. Such expansion would be likely to attract Fintechs such as payment aggregators, etc. The relevant ministries (Finance, Energy, Portfolio, etc. should lead these efforts).

Objective 2: Improving the Legal, Policy & Regulatory Environment

R4. Finalize and adopt the National Financial Inclusion Strategy. The Ministry of Finance and relevant stakeholders should accelerate the finalization and adoption of the National Financial Inclusion Strategy, which should include the National Payments Strategy. These documents will be key to ensure the vision and coordination necessary in these topics.

R5. Facilitate the obtention of USSD codes and lower their costs. This will enable non-smartphone owners to be able to have access to financial services. USSD codes currently cost around US\$35,000 for a number. This would require collaboration between the Central Bank (BCC) and the Telecoms regulator.

R6. Promote the use of shared/ common platforms for MFIs. Because the development of platforms is expensive especially for MFIs, consider the adoption of shared / common platforms. Dialogue on this with fintech providers could be led by the relevant microfinance and Savings and Loans Cooperatives industry associations.

R7. Strengthen the consumer protection framework, as well as build financial capability and awareness of regulated remittance channels. While the newly passed National Payment Systems Act (NPSA) includes several provisions on consumer protection, including disclosure requirements and procedures for complaints handling, there is need to raise awareness of these requirements for both remittance services providers (RSPs) and consumers as well as develop more granular guidance for remittance services and enhance compliance monitoring of the industry. There is also need to incorporate education on regulated remittance services in the on-going financial awareness and education programs, with activities targeted at senders and receivers of remittances in the DRC as well as at diaspora communities abroad.

R8. Develop a modern credit reporting system and reform of the public credit registry. Develop a modern credit reporting system (secured transactions and collateral registry reforms; reform of the public credit registry (PCR) and private credit bureau). These reforms would reduce borrower information asymmetry, enhance access to credit for MSMEs and in the case of the PCR, inform prudential bank supervision. These reforms have to be led by the central bank.

Objective 3: Engaging with Key Stakeholders

R9. Build ICT capacity of financial institutions and support financial education of users. Given the low level of skills at the level of financial institutions (especially MFIs), there is a need for capacity-building in the form of training in the use of ITC and digitization and support financial education of users. This would require the implication of structures offering training services to the financial sector such as FPM ASBL and other consulting firms, as well as the Ministry of Education.

R10. Build the supervisory capacity of the regulator and adopt regulations in line with international best practices. The regulation of payment systems is new in the DRC and there is a need to map the risks related to different payment types and from there proceed to establish terms of reference for building the supervisory capacity of the regulator and also adopt regulations in line with international best practices. This is incumbent upon the central bank and Ministry of Finance.

7 Digital Entrepreneurship

Key messages:

- ❖ **Although digital entrepreneurship in the DRC is nascent, its ecosystem managed to produce several successful startups.** Hubs are emerging in Kinshasa, Lubumbashi and Goma, along with a growing community of digital entrepreneurs. The digitalization of financial and non-financial services offers an opportunity to expand local markets, but there is a need to educate consumers, traditional businesses and the public sector about using digital solutions and to build a digital culture in DRC.
- ❖ **Digital entrepreneurs still face many challenges when it comes to starting and growing their business.** Poor infrastructure including IT and energy, absence of policies facilitating business creation and investments in digital startups, and a general lack of digital skills in the population are key obstacles. Digital entrepreneurs are also facing remarkably high costs of internet access, IT devices and digital financial transactions.
- ❖ **The public sector needs to intensify the digitization of its systems and operations and open its market to local digital entrepreneurs.** The public market is still constrained by substandard and opaque procurement processes, defaults on payments for service and the generally poor understanding of digital technologies among public sector employees.
- ❖ **Recent national plans and programs have been adopted in 2019 and 2020 to boost entrepreneurship and the digital economy in the DRC, which should result in an enabling environment for digital entrepreneurs.** However, there is no clarity yet on what the policies will consist in.

7.1 Importance of Digital Entrepreneurship

Digital entrepreneurship can be defined as the creation of new ventures and the transformation of existing business by creating and using novel digital technologies. Digital enterprises are characterized by a high intensity of utilization of new digital technologies to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders through new channels. Digital entrepreneurs can be divided in two types:

1. **Digital firms** that have digital technologies at the core of their business model, that is, they develop and/or transform the digital technology to deliver new and/or improved products and/or services to their customers
2. **Digitally-enabled businesses** that use digital technologies (such as social, mobile, analytics, and cloud solutions) to improve business operations, sharpen business intelligence, and engage with customers and stakeholders through new (digital) channels.

Digital entrepreneurs create an innovation ecosystem to bring the digital economy to life—with new, young ventures and transformation of existing businesses—contributing to net employment growth and helping to enhance the competitiveness and productivity of an economy. Digital entrepreneurship offers new products and services, leverages new technologies and business models, and opens new markets. The digital entrepreneurship ecosystem is a part of the overall entrepreneurship ecosystem that encompasses skill development, support structures, and access to markets and finance, which are detailed further in the following sections.

7.1.1 Socioeconomic Rationale for Building the Digital Entrepreneurship Ecosystem

Considering DRC's fast-growing and increasingly urban population, digital entrepreneurship has the potential to become an engine of economic transformation and to set the country on a new growth trajectory. With nearly 80 million people; DRC's population is fast-growing (population growth rate of more than 3 percent) and increasingly urbanized, with almost 40 percent of its population living in urban areas. Given the high rate of underemployment (noted in Section 4.2.2.1), there are ample opportunities to develop the digital ecosystem to provide job opportunities for the youth. There is a captive market for cross-cutting digital solutions, given the large domestic population, the largest Francophone market in terms of the number of consumers, and the lack of traditional systems and service providers. Further, the growing urban centers are home to an increasingly tech-savvy population.

As explored in Chapter 3, the number of internet users in the DRC remains low but is increasing, and the mobile market is expanding at a quicker pace with the inflow of cheap smartphones. According to GSMA, the sector recorded a revenue of US\$1 billion in 2020,⁴² or 2.1 percent of GDP, making it the eighth-largest mobile market in SSA in terms of revenue. There is a large potential market for the digital economy and digital entrepreneurship with a growing market of customers, especially in urban and peri-urban areas. Considering the scale of the country and Kinshasa's market size, even if the percentage of technology adoption remains lower than most Sub Saharan Africa markets, the number of customers is large and growing. For example, Facebook has 1.9 million active smartphone users in Kampala, the capital city of Uganda, a city people usually associate as being among the leaders in African startups, which is only a little larger than Kinshasa's 1.7 million active smartphone users.

7.1.2 Alignment with Country Development Strategy & Goals

The PNN 2025 encompasses several initiatives in support to digital entrepreneurship. Pillars 1 and 4 of the PNN address some of the shortfalls of DRC when it comes to supporting digital entrepreneurship. As noted in Chapter 4, it also addresses the digital skills gap and innovation throughout the education system which is conditional to the success of digital businesses. The PNN proposes to launch contests and competitions, as well as a dedicated fund to promote and boost digital startups. It also aims to create a legal framework for intellectual property (IP) rights and to implement legal and fiscal measures that will incentivize innovation and boost investments.

In June 2020, PRONADEC (National Program for the Development of Entrepreneurship in Congo) was approved by the cabinet of Ministers, with a comprehensive framework for entrepreneurship. It is articulated around three axes: (i) better access to funding through the *Fonds de Garantie de l'Entrepreneuriat* (Guarantee fund for entrepreneurship); (ii) increasing skills of the population, in terms of specific entrepreneurial and soft skills; and (iii) improving access to public and private markets, in particular through allotment in public contracts and subcontracts to the private sector. This program is targeted at startups and SMEs from every sector of the economy with the aim to facilitate their creation and growth. It is therefore a good complement to the PNN in providing an enabling environment for digital entrepreneurs.

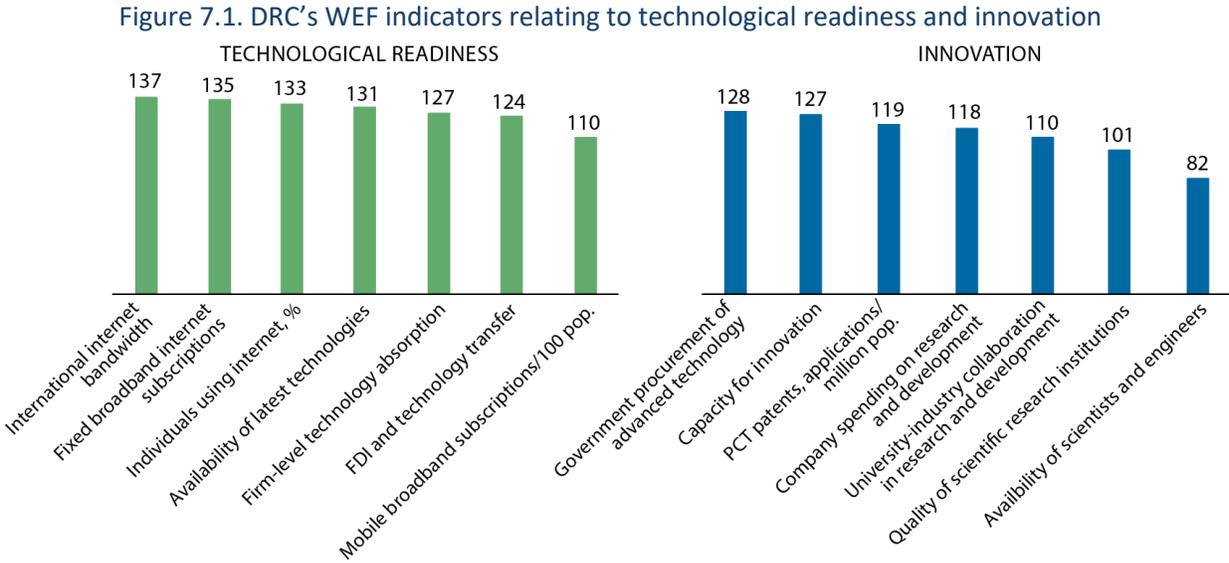
7.2 Diagnostic Findings: Current State of Digital Entrepreneurship

7.2.1 State of the Digital Entrepreneurship & Innovation Ecosystem

The digital startup ecosystem is marked by a lack of supporting organizations and a challenging environment for doing business. Investments in digital startups are still small and primarily fueled by international donors, while private investment lags. Most entrepreneurs reported that the lack of access to finance, especially venture capital and angel investment, restricts their growth potential by their ability to self-finance. The cost of doing business in the DRC is one of the highest in the world. The World Economic Forum's Global Competitiveness Index finds that the DRC lags on all indicators

⁴² GSMA Intelligence

relating to technological readiness and innovation (Figure 7.1). The DRC ranks 127 out of 139 countries for technological readiness and 116 out of 139 countries for innovation.



Source: WEF GCI 2017-2018. Lower rankings are better; rankings are out of 139 countries.

7.2.1.1 Digital firms

The digital ecosystem remains unbalanced across the country. The majority of the ecosystem is concentrated around Kinshasa, however, secondary cities, such as Lubumbashi or Goma, are also emerging as small hubs of digital startups (Figure 7.3). Little activity exists outside of these three main centers, with the exception of Bukavu, where, for example, Kivu entrepreneurs actively support local digital entrepreneurs.

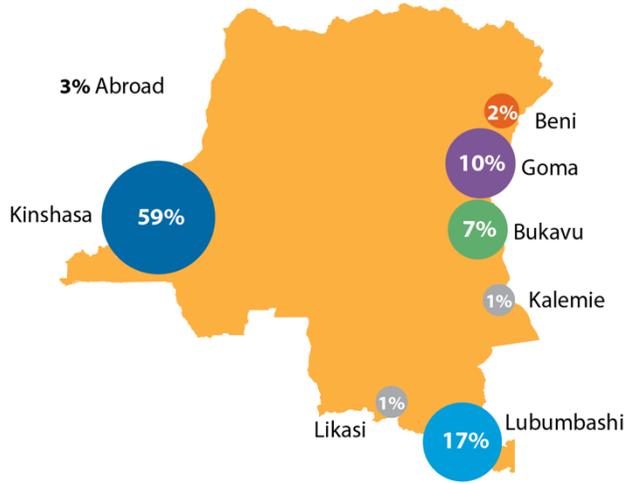
Digital enterprises in the DRC offer products and services with low technology content. To date, no comprehensive assessment of digital entrepreneurship in the DRC has been undertaken, and little data is available on digital firms. Among a sample of more than 120 digital startups in the DRC, the vast majority relies on low technology and offers IT consulting services, basic software, websites, application development, or online platforms, rather than procuring high-value software programming or hardware development (Figure 7.4).

Few digital startups rely on more advanced technologies, such as blockchain or artificial intelligence. For example, Maishapay is a fintech startup that uses blockchain technology to provide electronic wallets via the internet, SMS, and USSD that allow functions such as withdrawal, deposit, mobile payment, money transfer, current accounts, and savings. Another startup, Mashup.AI, uses artificial intelligence technologies, including chatbot and data analysis, to develop solutions for companies.

Digital enterprises in the DRC operate in various sectors of the economy. About half of the startups operate in IT/programming services, but the rest of the startups spread across a vast array of sectors, ranging from e-commerce, fintech, and agritech to healthtech, e-logistics, edtech, or culture and media (Figure 7.4).

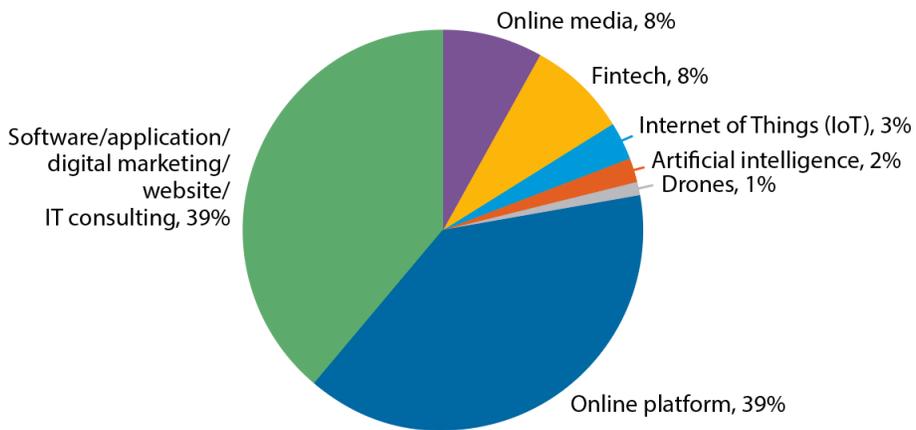
Most digital entrepreneurs in the DRC followed a Science, Technology, Engineering, and Math (STEM) curriculum in local universities, where they acquired basic technical skills, and then trained themselves online to acquire more advanced coding skills. “Self-made” digital entrepreneurs are common—they did not acquire their skills through university but rather taught themselves on the internet or while working in large companies, such as telecom. The founders of the most successful startups in the country, such as Schoolap, Tinda, or Maishapay, are self-made entrepreneurs.

Figure 7.2. Digital enterprise by location



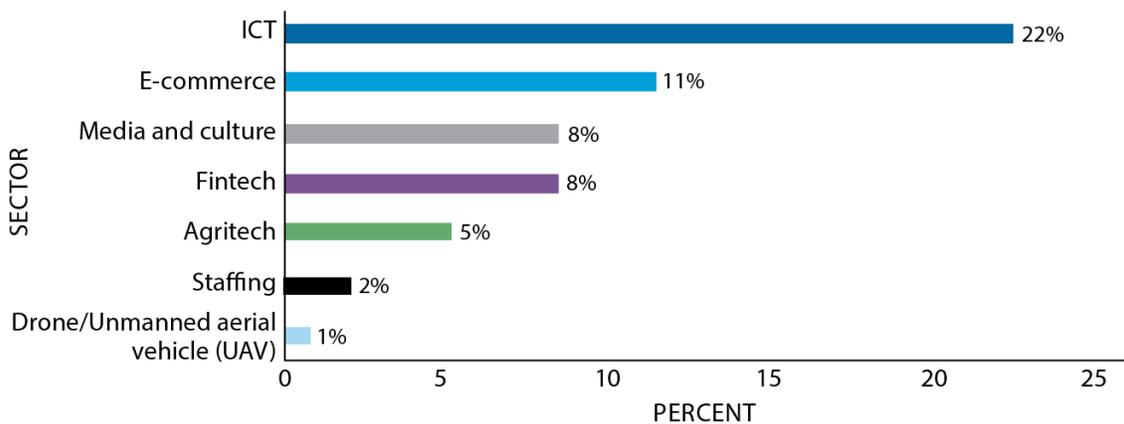
Source: Sample database of 122 digital startups

Figure 7.3. Type of technology used



Source: Sample database of 122 digital startups

Figure 7.4. Digital enterprise by sector



Source: Sample database of 122 digital startups

Women are underrepresented among small and medium enterprise (SME) owners and especially SMEs in technology. Out of a sample of more than 2,000 micro, small, and medium enterprises (MSMEs), 28 percent of them were owned by women, and this rate plummets to 16 percent for MSMEs in technology (Agapitova and others 2019). This survey also reveals a large gender gap in the use of technology, with 57 percent of women reporting that they do not know how to make use of technology compared to 37 percent of male respondents. However, awareness about the gender gap is increasing, and more initiatives are emerging for women in the DRC, such as the Women in Tech event that took place in 2019 in Kinshasa, or the launch of new training and incubation programs, such as the UN Women Tujenge STEM, AGCC in Kinshasa, or the F360 women lab, launched by CINOLU in Lubumbashi.

7.2.1.2 Digitally-enabled businesses

Traditional businesses still have low digital penetration, making it difficult to create business-to-business (B2B) markets for digital goods and services. According to a survey of more than 2,000 MSMEs in Kinshasa, Matadi, Lubumbashi, and Goma, the use of technology by MSMEs in their business process and routine remains low (Agapitova and others 2019). In the survey, 77 percent of MSMEs identify the lack of modern equipment and technology as a constraint to productivity, and only 29 percent use information and communication technology (ICT) to improve their company's visibility. For example, websites are used for communication with a broad customer base and to reach out to new clients, 9 percent of MSMEs use social media for networking and information sharing with their customers and partners, 7 percent use technology to access training and develop new skills and competencies, and 6 percent use technology to facilitate their commercial operations (such as sales, purchases, or production). Most entrepreneurs are interested in improving this area: 37 percent of respondents believe that technology can increase production through automation and economies of scale (including saving time, reducing labor costs, and so on).

Digitalization of financial and non-financial services offers the opportunity for expanding local B2B markets. Increased penetration of digital payments expands the opportunity for digital solutions for local SMEs. Mobile internet platforms have helped SMEs and micro-entrepreneurs expand their customer base with no need of a storefront presence. In agriculture, mobile phones allow farmers to sell to a wider pool of customers, such as Agrikonet for farmers or Monkitunga for appliance and food. However, the lack of cooperation between MMOs and banks on interoperability thwarts the growth of this sector.

The COVID-19 pandemic forced businesses and institutions to use digital tools (remote work, measurement, and analysis, and so on) and accelerated the understanding of the need and use of digital tools. The pandemic has created new consumption patterns, for example, in e-commerce and delivery services such as Tinda/E-mart, which have seen an increase in demand. Government awareness increased on the critical role played by digital services and the need to better train the administration on the use of digital solutions and tools. The crisis pushed them into action and they are accelerating some needed measures to boost the digital sector. To facilitate and increase the use of mobile payments, the Central Bank is allowing bilateral interoperability between MMOs and financial institutions without having to go through a local switch; imposing the reduction of transaction costs until the end of 2020; and increasing wallet caps (Central Bank instruction number 43, March 24, 2020).

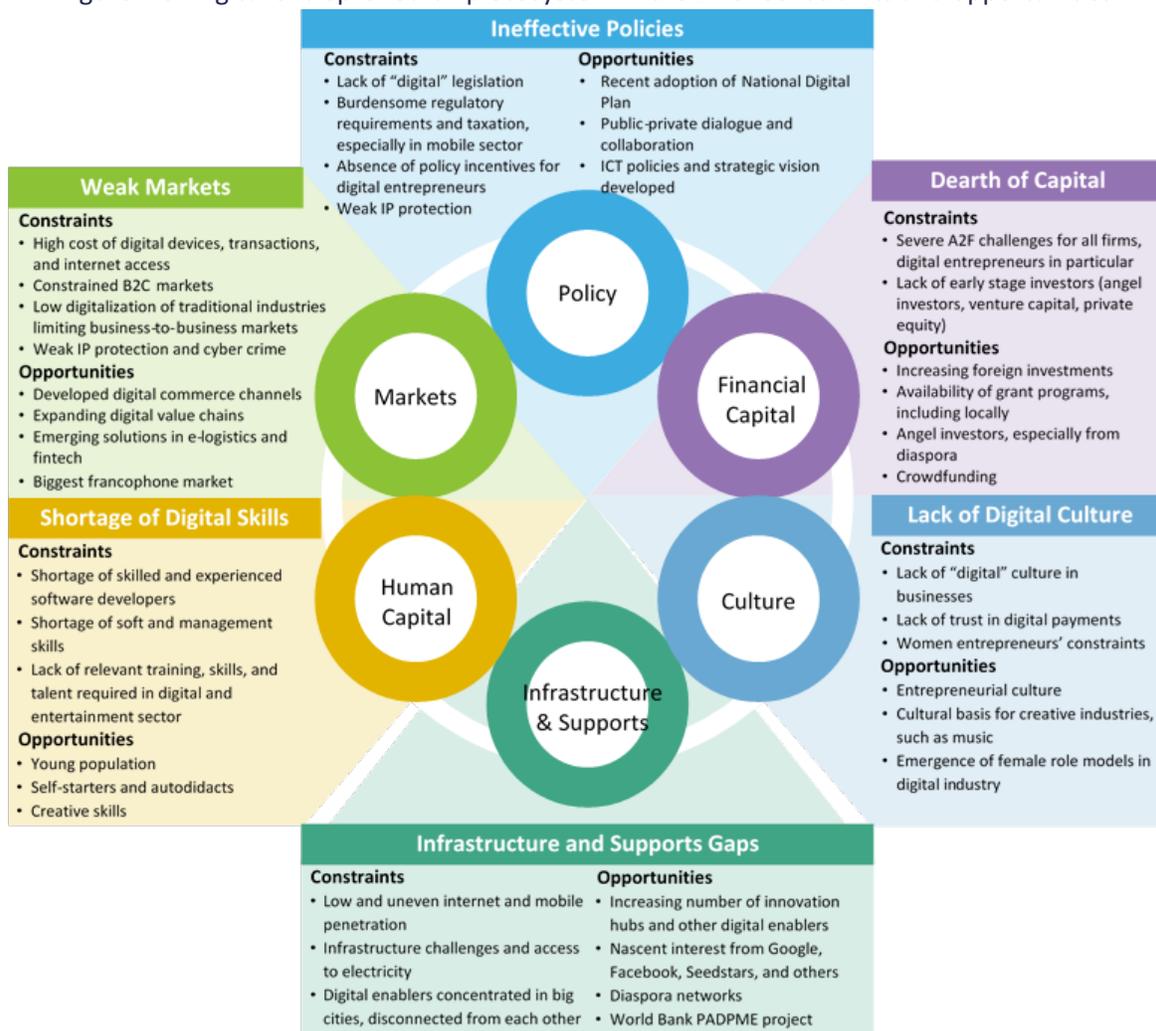
The agriculture sector in the DRC faces many challenges that could be partly addressed by Digitalization for Africa (D4Ag) agritech startups. In Africa, the mid-range estimate for the addressable market (for example, potential revenue size of the market that can be addressed by existing solutions) for D4Ag is estimated to be €2.3 billion, of which only 6 percent are being realized today (Tsan 2019). It is estimated that the addressable market will keep growing over the next decade with the increase in smallholder population, connectivity, and revenues per farmers as D4Ag improve their solutions. Mobile phones allow farmers to link to a wider pool of customers for their output and obtain information about prices in distant markets. Digital technology can also facilitate low-income farmers' integration into value chains for high-quality production for advanced country markets. Despite its

more than 80 million hectares of fertile and arable land and 52 percent of all fresh water resources in Sub Saharan Africa, the DRC shows a decline in food production per capita, and food insecurity and malnutrition are widespread in the country. Agriculture currently accounts for about 20 percent of GDP, employs 70–75 percent of the economically active population (World Bank 2019a), and plays a key role in reducing food insecurity, malnutrition, and rural poverty. The potential of this market is huge, and already a few startups, such as Agrikonet, Smak Corp, Bilanga, Agribros, and Jaune Congo, are trying to seize this opportunity. However, they mostly operate in areas with less added value, such as advisory services and market link. Some more advanced agritech are starting to emerge, for example, Congolese startup Ultra Drone Africa offers various drone-based services, such as surveying.

7.2.2 Constraints and Opportunities for Digital Entrepreneurship & Innovation

Digital entrepreneurship in the DRC has not made the same progress as in the majority of other Sub Saharan Africa countries. The DRC faces many challenges when it comes to furthering its digital entrepreneurship ecosystem, including the lack of funding, entrepreneurial acumen, access to electricity and internet, clear regulation, business development support, infrastructure, and affordable workspace. However, given its young, eager, and creative population, the shift in mentality to digital solutions, and the increase in smartphone usage, the DRC has a great potential to see its ecosystem grow and thrive if the country addresses some of these challenges (Figure 7.5).

Figure 7.5. Digital entrepreneurship ecosystem in the DRC: Constraints and opportunities



Source: Adapted from the Babson Startup Ecosystem Framework, Isenberg 2011.

7.2.2.1 Regulations, Policies & Institutions

The high cost and complexity of procedures involved in doing business within the DRC significantly impedes the development of the digital entrepreneurship ecosystem. The DRC presents one of the most challenging business environments in the world for investors—it ranks 184 out of 190 countries in the 2019 Doing Business report (World Bank 2019b). Unlike in most countries, multiple constraints in all sectors preclude competitively sustainable private investments.

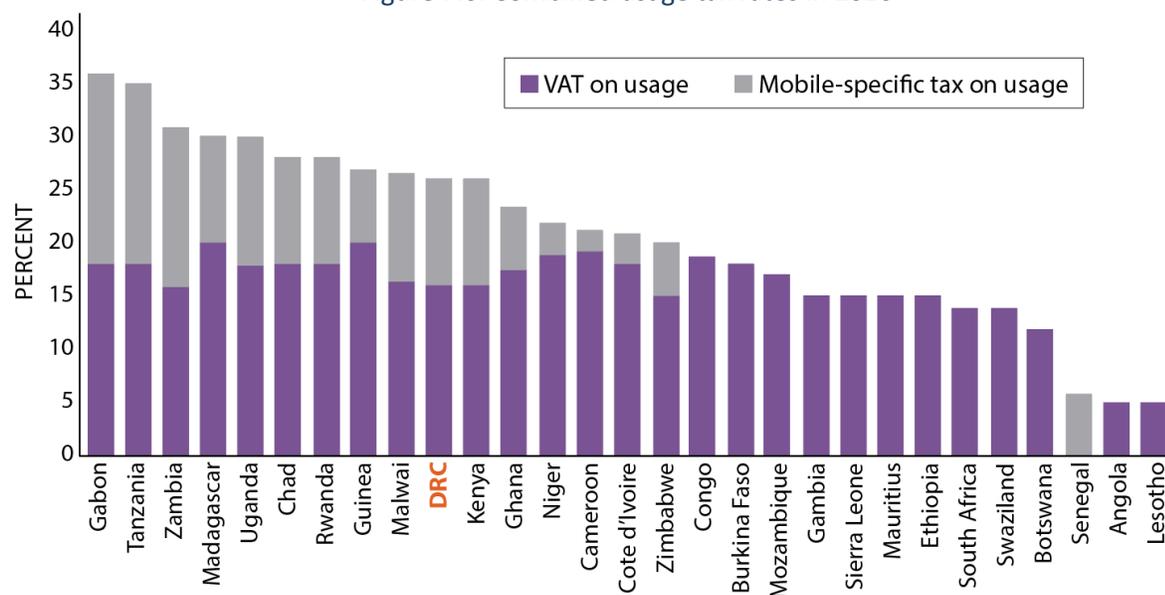
Because digital entrepreneurship is a relatively new phenomenon in the DRC, the country lacks a coherent and comprehensive set of policies and regulations for digital entrepreneurship. No legal framework adapted to the needs of digital startups exists. Digital entrepreneurs must comply with rules meant for other sectors or larger companies that have different business cycles and needs. For example, as soon as they register their business, startups are immediately subject to a large number of taxes. Even the most basic supportive resources are missing, such as including a digital business category in public registries. However, the new National Digital Plan validated in September 2019 and the National Payment Systems Act passed in July 2018 both aim to provide the country with the necessary legal framework and tools to support and boost digital entrepreneurship, even if it has not translated into any concrete measure yet. In parallel, some initiatives are already starting to simplify processes around the creation of a business, like the new one-stop shop for business registration (GUCE) that was developed by the government in collaboration Essor (DFID's private sector development program in the DRC), or the new law on startups that is being drafted with the support of I4policy.org and the Dutch government to create a better enabling environment for startups.

The country lacks regulation on IP. The most recent IP law dates from 1986. The new National Digital Plan plans to address this gap in its *Specific Objective IV.1.1.3*, where it is mentioned that the plan will reinforce trust in the digital economy and digitalization of public services through the safeguard of IP rights, such as copyrights, trademarks, and designs, as well as neighboring rights in digital and IT creation activities.

Sixty percent of the population has a digital identity, yet most of the time has no digital trail attached. Digital identity has the potential to create economic value by fostering increased inclusion and allowing greater access to goods and services, including digital payments services. It also helps to increase transparency, reduce fraud, and protects rights. Promoting digitization can drive efficiencies and ease of use that can benefit the overall digital economy and boost digital entrepreneurship (White and others 2019).

Complex and uncoordinated taxation and regulation increase the cost of providing digital services and the cost of digital products and parts, resulting in higher operating costs and a smaller pool of consumers for digital entrepreneurs. Mobile operators in the DRC are subject to regulation by several government departments with overlapping interests. As a result, operators must submit to many regulatory fees and uncoordinated taxes, such as excise duties on telecom services and VAT on data and voice calls. These fees and taxes are passed on to the customers as higher costs, helping to make the DRC the most expensive country in the world to access mobile data (Alliance for Affordable Internet). On top of that, consumer taxes are also levied on imports of digital products and parts (such as mobile handsets), which increase the overall costs of owning and using a mobile phone for customers. Consumer taxes account for 27 percent of the total cost of mobile ownership in the DRC, which is among the highest in Sub Saharan Africa and significantly higher than the regional and global average of 20 percent (Figure 7.6). Although these taxes led to an increase in revenue for the government, they adversely impact the country's long-term development of its digital economy.

Figure 7.6. Combined usage tax rates in 2016



Source: GSMA Intelligence

The dialogue between the government and digital entrepreneurs is becoming more structured. Digital entrepreneurship still lacks voice and representation, and there is an overall lack of trust between the government and private sector. However, contribution and collaboration seem to be improving as the ecosystem structures itself. For example, some entrepreneurs reported that they were able to contribute directly to the recently adopted National Digital Plan, in particular through a consultation leveraging the WhatsApp group AND (*Acteurs du Numérique*) that gathers more than 150 digital entrepreneurs nationwide. In early 2020, the government commissioned I4Policy to organize the first policy hackathon that was moderated by I4Policy and Facebook. About 60 stakeholders from the ecosystem joined to discuss how to develop innovation and entrepreneurship in the DRC and to formulate policy recommendations that inform the ongoing work on a draft “startup act.”

7.2.2.2 Ecosystem Support & Infrastructure

The overall entrepreneurship ecosystem is still in its nascent stage, but the digital startup ecosystem has grown in recent years, especially in large cities. Focus groups with ecosystem actors estimated that the number of digital entrepreneurs in the cities of Lubumbashi and Goma amount respectively to 250–300 and 100–120. This is a much higher number than was reported during the data collection on SMEs in 2018—the estimate tripled in Lubumbashi and doubled in Goma in the last two years. Support organizations are popping up across the main hubs of the countries. Most of them are young (under three years old) and support only a handful of digital startups. Notable exceptions include Ingenious City in Kinshasa (a DFID/ÉLAN RDC-supported initiative that also works with Orange Corners and is supported by the Dutch government), which supports 20 digital startups per year and a portfolio of more than 40 startups so far; Kivu Entrepreneurs and CINOLU in Lubumbashi, which have a similar performance.

The ecosystem is primarily concentrated in Kinshasa, with three other hubs emerging in Lubumbashi, Bukavu, and Goma, but it remains uncoordinated despite its concentration. To strengthen the ecosystem, many events are being organized in the country (Table 7.1), such as Kinshasa Digital Week (an initiative backed by the President that tried to open up to the entire continent), SAM2019 (mobile app fair), Congo Tech days, DevFest (annual programming conference that hosts codelabs and hackathons), and African Digital Story in Lubumbashi and Kinshasa. Competitions are being held, such as Seedstars World Kinshasa edition and Kinshasa Startup Academy, a televised, knockout-style series of events that ran for a third year. Yet, no culture of solidarity or synergies exist among digital entrepreneurs, who remain quite isolated. However, some initiatives are emerging to coordinate and

connect them. Some networks, such as RAN (*Réseau des Acteurs du Numérique*) at the national level or Resojec in Lubumbashi contribute to creating a community and strengthening the ecosystem. WhatsApp groups are active, such as the local AND in Lubumbashi, which has 158 members, and the national “Ecosystem” WhatsApp group of 25 members, which links all incubator managers and ecosystem champions.

The different hubs and accelerators offer limited quantity and quality of services and support. Most incubators and accelerators limit their offerings to providing infrastructure (such as an office or the internet) and basic training on entrepreneurship skills that should normally be taught during secondary and tertiary education. With a few rare exceptions, such as Ingenious City in Kinshasa, most incubators do not provide expert insight, teach digital innovation, or give the feedback on business plans that is needed by entrepreneurs. Their own network of mentors and investors is limited and does not represent the lever needed for entrepreneurs to improve their concept and raise funds. Additionally, some entrepreneurs reported a lack of secured working space and access to equipment and infrastructure available to growing startups. For example, in Lubumbashi more than 100 entrepreneurs expressed interest in an incubator project to open a secured co-working space as well as the necessary infrastructure to operate a digital enterprise, such as internet access and servers. SME centers that will be rolled out in Goma, Lubumbashi, Matadi, and Kinshasa under the World Bank SME Development and Growth project could be a good option for digital startups to access the equipment and infrastructure they need (World Bank 2018b).

Table 7.1. Events, conferences, and competitions that promote the digital ecosystem in the DRC

Event	Type	City	Website	Description
Congo Tech days	Event	Lubumbashi	http://congotechdays.com/	A major digital summit in the DRC.
Kinshasa Digital Week/African Digital Story	Event/conference/summit	Kinshasa	africandigitalstory.com	African Digital Story derives from Kinshasa Digital Week, a forum promoting digital to Kinshasa businesses. More than 1,500 participants and 300 startups participated in the 2018 and 2019 Kinshasa weeks.
Lubumbashi Digital Story	Conference/summit	Lubumbashi	africandigitalstory.com	See above.
Kinshasa Startup Summit	Conference/summit	Kinshasa	kinshasastartupsummit.splashthat.com	Explores business opportunities among tech players and large groups in Kinshasa.
UNDP and Konnect Digital Economy and Investment Conference	Hackathon	Kinshasa	cd.undp.org/content/rdc/fr/home/presscenter/articles/2018/trois-projets-innovants-de-recyclage-des-dechets-plastiques-prim.html	Hackathon for tech-oriented waste management solutions. Ten projects were selected and three of them received an award. Konnect supports the winning organizations by providing business plan and capacity building support.
SAM2019	Mobile application fair	Kinshasa	samkinshasa.com	Promotes Congolese achievements in mobile apps and introduces and boosts them to the general public.
DevFest19 or “Developer Festival”	Technical conference	Kinshasa	meetup.com/Meetup-GDG-Kinshasa/events/264266620/	For developers around the world. Organized by GDG (Google Development Group), it offers sessions on product areas, codelabs, hackathons, and so on.
BIBI DIGI	Conference	Kinshasa	facebook.com/pg/bibidigikin/posts/?ref=page_internal	Discusses how the digital economy can be used to accelerate women’s autonomy and close the gender gap.
SEF	E-commerce and fintech summit	Kinshasa	facebook.com/events/salle-dexposition-texaf-bilembo/le-salon-e-commerce-fintech-kinshasa-2020/	Organized by Tinda: 2 days, 690 visitors, and 15 workshops.
Google Startup Grind	Event/conference/summit	Kinshasa	https://www.startupgrind.com/kinshasa/	The world’s largest community of startups, founders, innovators, and creators. They hold local events and

Event	Type	City	Website	Description
				flagship conferences and have startup programs, partnerships, and online media and content.
Kin'innov	Forum	Kinshasa	facebook.com/kininnov	Largest innovation forum in the DRC run by Kinshasa Startup Academy.
Seedstars World Kinshasa edition	Competition	Kinshasa	https://www.seedstarsworld.com/event/seedstars-kinshasa-2019/	The DRC edition is one of the major startup competitions in emerging markets. This competition has been held for three consecutive years and is organized by Ingenious City as the local ambassador for Seedstars Switzerland.
Orange Social Venture Prize (OSVP)	Competition	International	startup.orange.com/en/orange-social-venture-prize	Rewards the best technological projects with a positive impact in Africa and the Middle East. Organized into a national competition in 17 countries and then an international jury chooses the grand prize winners. To mark its 10th anniversary, Orange will reward even more startups, with an international women's prize and a special prize for this edition.
Congo Numérique	Specialized media	Kinshasa	congonumerique.com	The main media for tech and innovation in the DRC and its first digital portal.
Wazatech	Specialized media	Kinshasa	waza-tech.com	Blog on entrepreneurship.

International actors show growing support for the development of the Congolese digital ecosystem.

Examples of international companies and organizations supporting the ecosystem are on the rise. For example, Facebook and Microsoft started sponsoring or participating in some events in the country, such as Kinshasa Digital Week, which had more than 1,500 participants and 300 startups participating in its 2019 and 2018 editions. Orange announced interest in opening a lab in the DRC similar to the one they operate in Mali. Texaf opened a digital campus in Kinshasa, which will provide a co-working space and training center for local entrepreneurs and international groups wishing to set up in the DRC. Digital has also become a cross-cutting theme in international donor strategies. International organizations are developing various initiatives to support digital entrepreneurs in the DRC, such as Orange Corners and the UN Women programs (hosted by the incubator Ingenious City), the United Nations Development Programme (UNDP) hackathon, GIZ's and Kinshasa Digital's Tech4mining's initiative (an open innovation program in the mining industry), or the Hanss Seidel Foundation that supports Kinshasa Startup Academy.

Opportunities exist for cross-border collaboration and integration of the DRC into the African digital ecosystem. For example, in North Kivu, the proximity of Rwanda and its booming startup ecosystem represent an opportunity for leapfrogging. Some digital startups are leveraging their proximity to the African market and their bilingual population to expand their activities abroad. For example, Afrika Affaires, an e-commerce platform based in Bukavu, has four subsidiaries in Rwanda, Burundi, Kenya, and Uganda, and Find Solutions technology is going to deploy its learning software for private schools in five schools in Rwanda and three schools in Burundi, in addition to its 700 schools in the DRC. However, cross-border replication is challenging, as demonstrated by the Rwandan on-demand transport startup CanGo (previously SafeMotos), which expanded its operations to Kinshasa in 2019 but had to close in early 2020 due to lack of funding.

7.2.2.3 Access to finance

Access to finance remains a key challenge for entrepreneurs, and it is even more acute for digital entrepreneurs at all stages of growth. Local financial institutions and private investors do not fully understand the digital sector, adding to the lack of financial products for local entrepreneurs. Given the intangible nature of digital entrepreneurship, most businesses do not qualify for lines of credit even under government programs. Banks and investors are unaware of the needs and typical business cycles of digital startups or of the value of intangible assets as collateral, such as software or an

application. Digital entrepreneurs typically have a significant lag time in being able to generate revenues to sustain their operations. Therefore, they require specialized financing in their early years to support upfront costs to prove the technical, and then the commercial, viability of their ideas.

There is historically no public funding scheme dedicated to digital startups. However, the new guarantee funds announced for entrepreneurs in the National Digital Plan show the intention of the new President to strengthen his support for the digital startup ecosystem, even if the process through which those funds will be disbursed is not yet defined. Other initiatives, such as the above-mentioned World Bank SME Development and Growth project, will provide subsidies and grants to young entrepreneurs that will open new opportunities for early-stage funding for digital entrepreneurs.

The DRC has a dearth of early-stage investors, and Congolese digital entrepreneurs are disconnected from global digital investors. Funding does not exist in the ideation stage since banks face their own liquidity constraints and digital enterprises find it difficult to demonstrate tangible profits. According to the IFC, the aggregate nominal amount of startup investments as a percentage of GDP remains the lowest in Sub Saharan Africa at 0.06 percent, compared to India at 0.93 percent, 0.32 percent in China, and 2.53 percent in the United States. According to VC4Africa, an online community of venture capitalists, angels and entrepreneurs, 57 percent of African digital entrepreneurs bootstrap their businesses (self-funding), 11 percent receive support from friends and family, and 15 percent receive grants typically obtained through competitions or local and international donors and foundations, such as the Tony Elumelu Foundation. A few networks of high net worth individuals and diaspora are active in the DRC, such as Makutano Network or Congo Millennium Business Club. According to ÉLAN RDC, a UKAid-funded programme, these actors have the potential to invest in tech startups, but they need to be educated on the specificities of such investments, which differ from investments in the traditional economy (Elan RDC 2018).

However, new investors are entering the market and starting to fund promising digital startups. For example, Flash International supports innovative startups by providing them with financing for their growth as well as a support framework for their projects' success. The company signed one of the biggest rounds of funding for a startup in the DRC, investing US\$500,000 in the startup Schoolap in December 2019. Sycamore Ventures, a local fund managed by the founders of the incubator Ingenious City, has also invested in several startups, such as Gold Group. Congo Business Angels ASBL⁴³ was also created in 2019 with the support of ÉLAN RDC and is an African Business Angel Network (ABAN) member, but their members need training to start investing (which should be conducted by Orange Corners).

Crowdfunding international platforms appear to be one option for startups to attract financing. The success of the campaign led by Sapatu on Kickstarter, an international crowdfunding platform, with the support of the incubator Kobo Hub, is encouraging for the potential of this new source of funding. But this option is limited to international investors so far, such as the South African Thundafund.com, since platforms usually do not accept payments in local currency and no viable local platform yet exists that has managed to scale up. African platforms are emerging, especially for equity crowdfunding, such as Uprise in South Africa or more recently, M-funding, a Rwandan equity crowdfunding platform. Local crowdfunding could be an interesting option for digital entrepreneurs to raise early-stage funds, especially models that are reward-based (that is, you receive a product in exchange for your contribution). Or crowdlending could be an option, through platforms such as Kiva or lendahand. Equity crowdfunding is not yet a realistic option for the DRC given the nascency of the ecosystem, the lack of education of local investors, and the lack of successful exit examples. Local options are being developed in the DRC, such as Kobo Hub, which is working on a DRC crowdfunding platform, and Avenir Bank, which is working on a crowdlending platform. The lack of regulation around this type of funding also constitutes a barrier (Moed 2018).

⁴³ See <http://www.congobusinessangels.com>.

7.2.2.4 Access to Markets

High internet access costs and poor infrastructure and networks result in a low internet penetration that is intrinsically linked to digital markets' potential to grow. Without consumers able to easily access the internet and without reliable internet access available, digital entrepreneurs face many challenges that limit their markets and potential to develop innovative solutions. For example, Agrikonet initially wanted to connect farmers to their consumers through an e-commerce online platform, but it had to adjust its business model when they realized that farmers did not have access to the internet. To reach scale, startups need to target populations at the bottom of the pyramid that do not have access to the internet. That is why solutions using USSD or SMS have a much higher potential to scale-up than 3G or 4G applications that require smartphones and mostly target urban populations.

The lack of digital skills among professionals and customers limits the growth potential of the digital economy in every sector. Cash payments are preferred to mobile money, and online purchases are mostly done through a few channels, such as Facebook or WhatsApp, which present limited technical options that do not meet many industries' needs. For example, Immo Famille, an online real estate platform with its headquarters in Lubumbashi, had to invest in training more than 200 sales agents to use a new digital platform customized to their activity needs. Most agents used Facebook, and there was much upfront investment in education of agents and customers, marketing campaigns, and development and testing of the new software with inexperienced users. Emart.cd, the main e-commerce platform, reports that they had to hire "purchase tutors" to help customers complete their online purchase. Agrikonet, an online e-commerce platform for farmers, had to adapt its business model from an online platform connecting farmers and consumers to a solution closer to the wholesale model (wherein they would purchase in cash produce for farmers and put them on their platforms), because farmers were not able to get a reliable internet connection nor willing to have a mobile money account to process payments.

The public market is constrained by substandard and opaque procurement processes, defaults on payments for services, and the reticence and lack of understanding of digital technologies among public sector employees. Public markets are hard to land for local digital entrepreneurs and most of the time they are awarded to international providers with no real transparency on the selection process. Local entrepreneurs who have been competing for public markets and were able to meet all the technical and legal requirements after months of work lost the market to the benefit of foreign companies without any clear justification. Because of the lack of education of public sector employee, contracting an international established company seems like an easier choice in the absence of capacity from the part of public sector employees to technically assess the need and develop an appropriate solution. The e-government reforms proposed by World Bank Non-Lending Technical Assistance could open public markets for more digital services to local providers. These reforms aim to strengthen core government systems and the transparency and accountability of key institutions and sectors through a combination of capacity building and system strengthening measures, coupled with support to legal and regulatory reforms, technological improvements, and citizen engagement. Some initiatives already aim to digitalize the public sector. For example, in health districts, the government engaged in digitalizing health districts' central offices, which now connect through a network of VSAT Antenna or 2G/3G access. It also created the ANICIIS (National Agency for Clinical Engineering, Information and Health Informatics) in December 2018, which aims to equip public health facilities with IT systems and which could open a market for healthtech startups in the country.

Partnerships between digital startups and the government also exist, even if they are still quite rare. For example, Schoolap, a startup in education, already supports more than 800 private and public schools and 91,000 students. However, in the majority of cases the local startup fails to win public markets and sometimes invests much effort into developing proposals or solutions that end up not being used or chosen by the government, which is reticent to adopt new technologies.

Multinational companies do not typically trust local companies and would rather employ international providers, but open innovation initiatives and international non-governmental organizations (NGOs) in the Goma region present an opportunity for local entrepreneurs. Multinational companies can be a

source of digital technologies and potentially become customers. However, international companies do not typically trust local companies and would rather employ international providers with a stronger track record of delivering a quality, timely product. Digital entrepreneurs face significant competitive pressure and high entry costs to acquire and scale up to be able to cater to those international organizations, especially for younger startups. However, initiatives connecting large groups with startups are emerging. In Kataga, for example, Kinshasa Digital and GIZ launched the Tech4mining initiative. They are working with large mining companies to develop an open innovation process that will help those groups identify their digital needs and connect them with local startups that could provide tech solutions. Additionally, international NGOs in the Goma region tend to be more willing to source locally and offer digitally skilled staff that can assess their needs and are more inclined to adopt digital solutions.

The DRC is the biggest French-speaking market in the world, offering great potential for startups already operating in Francophone countries and looking to expand to new markets. The attraction of international startups to the local ecosystems can contribute to the transfer of knowledge and emulation of the ecosystem. It is also a great opportunity for local startups to expand their activities beyond the domestic market. For example, the edtech startup, Schoolap, plans to scale to other Francophone countries after they have stabilized their growth in their domestic market (Mykhalevych 2019). Congo BD, a web platform and app that promotes African authors of comic books and gives access to a library in a subscription model, has expanded to Cameroon and Senegal.

7.2.2.5 Culture and Human Capital

The shortage of entrepreneurial and digital skills limits the pool of digital startups. Secondary and tertiary education, including Technical and Vocational Education and Training (TVET), rarely include courses on entrepreneurship or digital skills, and most facilities are ill-equipped to impart critical thinking and skills-oriented education. There are very few established and mature digital businesses in the DRC, and the opportunities for coaching, mentoring, and peer learning are limited.

Entrepreneurship is not perceived as a good employment outcome. In the DRC, entrepreneurship is considered to be a secondary option that one would do out of necessity rather than by choice. The lack of role models and success stories as well as entrepreneurship skills not being integrated in the education curriculum can prevent or deter aspiring entrepreneurs from finding the resources and incentive to start their own business.

Few institutions offer digital skill training, but the young population seems eager to teach itself digital skills, such as coding skills required for programming. Many entrepreneurs learned basic coding skills during their studies and then taught themselves more advanced and relevant digital skills through online trainings and forums. To bridge the gap, new initiatives and training centers are emerging in the DRC. CoqDig launched in 2018 as a platform for local programming enthusiasts with varied skills. With now more than 250 active members, CoqDig connects people who have digital skills and knowledge with those who need it. It was created for developers, by developers, to share, request, respond, and learn about the latest technology trends. Training programs are offered, such as the ones by Kinshasa Digital, a digital agency that organized the 2019 Hackathon Ebola and runs the Kinshasa Digital Academy's intensive trainings on tech skills, which registered more than 1,000 candidates for a first cohort of 42 spots. Other examples of training programs are the "*laboueurs du code*," run by Llab, which teaches basic coding skills to youth outside large urban centers, or the Kobo Academy, which aims to provide a training center on IT and new technology.

Regional and global training and education programs are being developed to provide the learning resources necessary to boost technology skills among the young African population. In 2019, the African Development Bank, together with Microsoft, launched a "Coding for Employment" online platform that provides digital skills trainings for African youth, such as digital marketing, data science, coding skills, and web design.

An increasing number of women-centered initiatives are starting to improve women's digital skills and women's inclusion in the ecosystem. Llab, one of Kinshasa's co-working spaces, organized the Women In Tech event in 2019, where more than 30 female leaders from various technology backgrounds (entrepreneurs, STEM researchers, journalists, and so on) gathered to reflect on the role of women in the tech sector and the challenges they face. Several hubs across the country are launching programs dedicated to women. CINOLU, Lubumbashi's innovation hub, launched the F360 women lab, which provides women-centered activities on approaching innovation and entrepreneurship from women's and girls' perspectives and acts as a catalyst for cultural change for women in technology. Ingenious City, in partnership with UN Women, launched its women-centered incubation program, TUJENGE STEM, AGCC, which aims to promote the economic empowerment of women in STEM. The Working Ladies WIA hub and Congolia's Bibi Digi program are other examples of initiatives targeting women to boost their opportunities in tech-related fields through coaching, mentoring, and educational programs. These initiatives promote the emergence of young female talents and role models who will then inspire and increase the interest of women in digital entrepreneurship. For instance, Josephine Uwase won the Miss Geek Africa 2019 edition with her app SOS Mama, and she became an ambassador for the DRC for the Next Einstein Forum.

7.3 Recommendations & Next Steps

Based on the analytical findings of this report, several priority policy issues are proposed to address key constraints to digital entrepreneurship in the short and medium term. These recommendations are grouped around the key ecosystem constraints and opportunities described in Figure 7.5. Because digital entrepreneurship is a relatively new agenda in the DRC and consistent data on various aspects of the ecosystem is not available, several recommendations relate to a more detailed review of the existing policy instruments and additional evidence-based analysis.

Table 7.2: SWOT analysis on digital entrepreneurship

Strengths	Weaknesses
<ul style="list-style-type: none"> • Urban digital hubs are emerging in Kinshasa, Lubumbashi and Goma with a growing population of digital entrepreneurs • Few but effective sources of support (incubators, networks, events, and competitions) for digital entrepreneurs exist • Increasing support to digital entrepreneurship from international companies and donors demonstrate the potential of the ecosystem 	<ul style="list-style-type: none"> • Poor infrastructure and high costs for internet, IT equipment and financial services limit the market for digital entrepreneurs • Access to finance remains a key challenge for entrepreneurs, and it is even more acute for digital entrepreneurs at all stages of growth • An extremely high cost of doing business and limited and opaque public market are responsible for the lack of growth of digital entrepreneurship • Limited population with digital skills to build and drive entrepreneurship ecosystem
Opportunities	Threats
<ul style="list-style-type: none"> • The digitalization of financial and non-financial services offers the opportunity to expand local markets • Cross-border collaboration and integration of the DRC into the African digital ecosystem such as into the booming Rwandan ecosystem, represent an opportunity for expansion 	<ul style="list-style-type: none"> • Expanding regional and global competition in DRC markets • Low incentives to reform digital finance services for MNOs and financial institutions could thwart the development of the ecosystem • Lack of alignment on the reform agenda regarding digitalization among government

<ul style="list-style-type: none"> • Expansion of e-Government reforms increases potential demand from public markets 	<p>agencies could delay the reforms' implementation</p>
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The following recommendations could support the development of digital entrepreneurship in DRC:

Objective 1: Develop Regulations and Policies to Enable Digital Entrepreneurship

R1. Make overall improvements in the business climate and entrepreneurship ecosystem. In particular, develop and adapt a legal framework to the needs of digital startups. The government should continue with overall business climate reforms and should and create a dedicated framework for digital startups. The government should also adopt a new legislation that is adapted to the needs and constraints of the digital economy (regulations on IP, security of data, digital identity, and digital signature).

R2. Build the leadership and capacity of policy makers to better advocate the digital agenda and design national policies. The DRC needs to nurture a new generation of public officials and policy makers who will work jointly with the private sector to design policies and programs that will transform the strategy for a digital DRC strategy into practice. This nurturing could be done through government recognition and award of good practices, training, and capacity development and knowledge exchange with other countries.

R3. Bring down the cost of internet access and IT equipment. One of the main barriers to digital entrepreneurship is the high cost of internet, and IT devices. The government should try to bring down these costs through competition and lower taxation.

R4. Boost the interoperability of digital payment platforms, regulate access to USSD codes and bring down the cost of transactions. Banks, MNOs, and their corresponding regulator need to define a common regulatory framework and be more transparent with requirements to access USSD and API. Financial institutions and MMOs also need to be incentivized to bring down the cost of transactions through for example the ability to earn revenue on other products or other types of operations.

Objective 2: Strengthen Digital Ecosystems

R5. Conduct a review of the innovation hubs and other programs that target digital entrepreneurs in the DRC and develop an M&E framework for innovation hubs in partnership with the private sector. This will promote competition among hubs and resource utilization. It will also help identify good practices and scale up the most impactful models.

R6. Foster collaboration among ecosystem players, including digital entrepreneurs, innovation hubs, academia, big corporates, investors, and the government. The government could play an important role in facilitating the digital entrepreneurship ecosystem by providing open data and statistics, platforms for public-private dialogue, and help the digital industry to self-organize through the capacity building of digital industry associations. However, successful implementation of these initiatives will depend on the private sector's ownership and participation.

R7. Further boost tailored support to women, youth, people with disabilities, and previously disadvantaged communities in digital entrepreneurship. For example, financial institutions can present financial products designed for startups in general and women-led startups in particular. Centers can be created that are specifically designed for startups led by women, using as an example the SME center toolkit provided by the World Bank⁴⁴.

Objective 3: Connect Digital Entrepreneurs to Investment Solutions

R8. Address the accessibility of capital for early-stage enterprises (VC, business angles) and open up alternate funding channels to address the funding gap in the market. Accessibility of funds is a considerable constraint due to information asymmetry between investors and investees. It is imperative for third parties, such as government agencies, intergovernmental organizations, or donor agencies, to play an active role in addressing this market failure through information campaigns for investors (both international and local) on the specificities of digital startup business cycles and on the Congolese landscape and culture and coaching of investees on quality pitching strategies and investment terms. Develop innovative crowdfunding solutions to share risks among several investors could also provide an alternative source of startup capital, especially working capital

R9. Incentivize and de-risk investments in early-stage digital entrepreneurs. This can be done by introducing fiscal advantages for investments in startups and setting up de-risking instruments targeted at digital entrepreneurs, including through blended finance by governments and intergovernmental agencies.

Objective 4: Create Markets for Digital Technologies

R10. Promote adoption of digital technology across all sectors of the economy, including public agencies and among consumers. This can create an important boost for digital entrepreneurs by opening new B2B opportunities in the local markets. Promotion can take place through various incentive mechanisms, such as grants, technical assistance, development of digital platforms, and so on.

R11. Improve collaboration with digital entrepreneurs in the provision of public services through transparent public contracting, digitalization of public services, and ICT upskilling of public workers. The government should expand social contracting of public services through SMEs and actively pursue opportunities to increase the reach and accessibility of services through digital solutions. These solutions should rely on a range of digital technologies that are accessible to the poor, such as basic mobile phones.

Objective 5: Create an Industry-Appropriate, Digitally Skilled Talent Pool

R12. Increase digital-related topics and soft skills trainings in primary and secondary educational institutes as well as universities, to include courses in entrepreneurship, STEM, and basic digital literacy programs, to help create a more confident and employable workforce trained in basic digital skills. Increasing collaboration with the private sector through for example technology labs in university will also allow for bridging the appropriateness gap.

R13. Provide training in digital skills to upskill entrepreneurs and private sector employees to boost the market for digital solutions both from the demand and offer side.

⁴⁴ <https://projects.worldbank.org/en/projects-operations/project-detail/P160806>. The link to the SME centers toolkit will be available in the second semester of 2020.

8 Conclusion: A way forward

❖ Digital technology is becoming increasingly vital

DRC recognizes the role of digital and has demonstrated this commitment in policy and vision, despite slow progress. The Government's vision for the digital economy is to make digital a factor of economic growth, a lever for integration, good governance, and social progress. DRC has embedded digital transformation into its national development plan, prepared a roadmap for a national broadband plan, promulgated a framework law for ICT and set up an independent regulatory body, amongst others.

There are several favorable trends that could, if well harnessed, help realize government's digital ambitions. A young, vibrant population who are curious about and eager to explore the possibilities of digital, a general public demanding more from public service providers, growing smartphone penetration with huge potential, acute necessity for innovation to create jobs, reduce poverty, strengthen peace, and the rising tide of global data platforms driving growth and opportunity.

❖ Reaping the benefit of digital transformation will require building the core foundations

Failing to lay a stronger foundation for digital means that DRC is running the risk of losing out on the opportunity to reap the true benefits of digital. Progress has been slow. The slow promulgation of the framework law has deterred the pace of investment. Digital infrastructure continues to underperform, technology skills and awareness are still in short supply, uptake of digital by businesses and the public sector is low, and the overall enabling environment is far from supportive.

Never before have broadband networks and services been so vital to our lives and to keeping our economy and societies working. Digital is truly the hidden hero of this unprecedented global crisis. But the size of the prize is far greater in the context of the wider society and economy. Digital technology has been shown to accelerate the pace of development, deepen growth and improve welfare. A World Bank study estimates that a 10 percent increase in broadband penetration in developing countries is associated with a 1.4 percentage increase in national output.

There is now an ample window to orchestrate and accelerate critical elements of the digital economy. Covid-19 has re-ignited the need for investing in critical infrastructure, improving the competitiveness of markets, strengthening the integrity, trust and security of data and digital transitions, forging stronger linkages to the 'real' economy and increasing equity in production and consumption of digital content. This is consistent with DRC's ambition to diversify its economy and accelerate growth, leveraging digital technologies. The digital sector is driven by rapid proliferation of innovation, and it is therefore crucial to update and maintain a forward-looking regulatory framework and promote an enabling environment that keeps pace with change.

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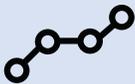
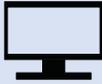
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Annex 1: Key indicators

Pillar	Overall performance	Key indicators			
 Digital infrastructure		Indicator	Source and date	DRC	SSA average
		Internet Usage, percent	ITU, 2017	9	24.1
		Unique mobile Cell. Subscription, %	GSMA, 2020	38.7	87.9 ^a
		Unique mobile BB Subscriptions, %	GSMA, 2020	20.9	32.9 ^a
Price of mobile broadband 1GB, % of GNIPC	A4AI, 2019	26.2	7.8		
 Digital skills		Indicator	Source and date	DRC	SSA average
		Human Capital Index, /100	UNESCO, 2018	0.37 (135 out of 157 countries)	40
		Trained teachers in secondary education (% of all teachers)	UNESCO, 2017	24	72.8
School enrollment, secondary (% gross)	UNESCO, 2015	46	43		
 Digital platforms		Indicator	Source and date	DRC	SSA average
		Digital Adoption Index, Government cluster, /100	WB, 2016	0.21	39.5
		E-government Development Index, /100	UNDESA, 2018	0.26	34.5
		Secure internet servers	WB, 2016	0.3	0.4
		% of adults who used the internet to buy something in the past year	Findex, 2017	3	3.6
 Digital financial services		Indicator	Source and date	DRC	SSA average
		Adults with a bank account, %	WB, 2017	26	32.8
		Adults using a mobile phone to access their account, %	WB, 2017	4	20.8
		Adults using digital payment, %	WB, 2017	22	34.4
Mobile money account, %	WB, 2017	16	21		
 Digital entrepreneurship		Indicator	Source and date	DRC	SSA average
		Ease of doing business score, /100	WB, 2020	36.2 (#183 out of 190)	51.8
		Global Competitiveness Index, Technological readiness	WEF, 2018	127 out of 139	
Global Competitiveness Index, Innovation	WEF, 2018	116 out of 139			

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Annex 2: Table of Recommendations

Strategic, Institutional and Legal Framework			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Establish a shared high-level strategic framework			
R1. Ensure that new National Digital Plan (PNN) is reviewed and repositioned, where necessary, and fully embraced.	Presidency, Ministerial Council, PTNTIC	Short	High
R2. Broaden the scope of the legal and regulatory framework to include all aspects of the Digital Economy (personal data, cybersecurity, electronic transactions, etc).	PTNTIC ARTPC	Short	High
Objective 2: Establish an effective institutional framework			
R3. Define roles and responsibilities for the various regulatory, policy and oversight bodies.	PTNTIC and PM Office	Short	High

Digital Infrastructure			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Improving meaningful access to existing digital infrastructure and incentivizing new investments			
R1. Update the regulatory environment by publishing the Framework Law and enhance the competency and independence of the industry regulator.	PTNTIC	Short	High
R2. Accelerate key aspects of the connectivity value chain by building a national backbone.	PTNTIC	Medium	Medium
R3. Extend connectivity to areas of patchy or no coverage.	PTNTIC	Medium	Medium
R4. Fully liberalize and improve access to the submarine Muanda landing station, international breakouts and the transportation of internet capacity on fiber to Kinshasa	PTNTIC	Medium	High
R5. Operationalize the Universal Service Fund (USF) with well-designed funding and governance mechanisms.	MoF & PTNTIC	Medium	High
Objective 2: Incentivize new investments in digital infrastructure			
R6. Increase spectrum availability.	PTNTIC	Medium	High
R7. Encourage the landing of new submarine cable systems and invest in new landing stations.	PTNTIC, Private Sector	Short	High
R8. Reinforce and extend the national backbone and ramp up high-capacity connectivity in key economic hubs.	Private Sector	Short	High
Objective 3: Improving demand for digital infrastructure			
R9. Decrease/Remove direct taxes on devices and internet services	MoF	Short	High

R10. Innovate on price models and lower barriers to affordability	Mobile operators and other providers, ARPTC	Medium	High

Digital Skills			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Creating a conducive environment and transparency for the growth of digital skills			
R1. Increase coordination and develop a clear roadmap	Ministries in charge of Education (MEPST, MESU, MFPMA)	Short	High
R2. Improve digital skills data collection and research	Ministries in charge of Education	Medium	Medium
R3. Improve access to electricity, internet and digital devices in schools.	Ministries in charge of Education and PTNTIC	Medium	High
Objective 2: Increasing the supply of education talent and resources			
R4. Provide additional training opportunities in basic digital skills, with an emphasis on teachers and government employees	Ministries in charge of Education	Medium	Medium
R5. Leverage non-state actors of basic and advanced digital skills training	Ministries in charge of Education	Medium	High

Digital Platforms			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Creating an enabling framework for digital platforms			
R1. Craft an overarching strategy an interoperability framework for public digital platforms.	PTNTIC	Short	High
R2. Establish an independent entity that will promote the digitization of the Congolese society, piloting and monitoring key programs	PTNTIC & PM office	Short	High
R3. Create the general set of standards for data protection, interoperability, databases and access.	PTNTIC	Medium	Medium
R4. Intensify platform acceleration partnerships focused on the youth	MoF	Long	Low
Objective 2: Investing in enabling infrastructure, services and applications			
R5. Support roll-out of fiber network and interconnection of government offices	PTNTIC	Medium	High
R6. Improve VSAT coverage in areas of low fiber reach	PTNTIC	Medium	High
R7. Ensure a technical platform for hosting the various public websites	Ministry of Interior/ ONIP	Short	High
Objective 3: Realizing crucial digital transformation projects at risk of delay or abandonment			

R8. Advance the implementation of a government-wide integrated financial management information system (IFMIS).	PM and PTNTIC	Short	Medium
R9. Roll out 'quick-win' solutions	MoF & PTNTIC	Short	High

Digital Financial Services			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Building the Infrastructure for Digital Financial Services			
R1. Support full multilateral interoperability	Central Bank, MFIs, MMOs	Medium	High
R2. Develop and implement a unique biometric financial identification system.	MoF/ MoJ/ MoI	Medium	High
R3. Modernize Government and SOE digital platforms and increase the use of e-money in Government to Persons (G2P) and Persons to Government (P2G) payments (especially taxes, utilities, etc.)	MoF/ MoE/ and others	Medium	High
Objective 2: To Improve the Legal, Policy & Regulatory Environment			
R4. Finalize the National Financial Inclusion Strategy, which should include the National Payments System Strategy and Digital Financial Education Strategy.	MoF and relevant stakeholders	Short	High
R5. Facilitate ease of obtaining USSD codes and lower their costs	Central Bank and Telecoms regulator	Medium	High
R6. Strengthen the consumer protection framework and build financial capability and awareness of regulated remittance channels.	Central Bank and MoF	Medium	Medium
R7. Promote the use of shared/ common platforms for MFIs.	Microfinance and Savings and Loans Cooperatives industry associations	Medium	Medium
R8. Develop a modern credit reporting system (secured transactions and collateral registry reforms; reform of the public credit registry and private credit bureau)	Central Bank	Medium	Medium
Objective 3: Engaging with Key Stakeholders			
R9. Build ICT capacity of financial institutions and support financial education of users	MoE and relevant stakeholders	Short	Medium
R10. Build the supervisory capacity of the regulator and adopt regulations in line with international best practices	MoF	Medium	High

Digital Entrepreneurship			
Action	Responsible Agency	Time Frame	Priority
Objective 1: Develop Regulations and Policies to Enable Digital Entrepreneurship			
R1. Make overall improvements in the business climate and entrepreneurship ecosystem. Develop and adapt a legal framework to the needs of digital startups.	MoC	Medium	High

R2. Build the leadership and capacity of policy makers to better advocate the digital agenda and design national policies.	PTNTIC	Medium	High
R3. Bring down the cost of internet access and IT equipment.	PTNTIC	Medium	High
R4. Boost the interoperability of digital payment platforms, regulate access to USSD codes and bring down the cost of transactions	PTNTIC	Short	High
Objective 2: Strengthen Digital Ecosystems			
R5. Conduct a review of the innovation hubs and other programs that target digital entrepreneurs in the DRC and develop an M&E framework for innovation hubs in partnership with the private sector.	PTNTIC / Ministry of SMEs	Medium	Medium
R6. Foster collaboration among ecosystem players, including digital entrepreneurs, innovation hubs, academia, big corporates, investors, and the government.	PTNTIC and relevant stakeholders	Medium	Medium
R7. Boost tailored support to women, youth, people with disabilities, and previously disadvantaged communities in digital entrepreneurship.	PTNTIC / Ministry of SMEs	Medium	Medium
Objective 3: Connect Digital Entrepreneurs to Investment Solutions			
R8. Address the accessibility of capital for early-stage enterprises and open up alternate funding channels to address the funding gap in the market.	MoC and MoF, and Ministry of SMEs	Medium	Medium
R9. Incentivize and de-risk investments in early-stage digital entrepreneurs.	PTNTIC / MoC	Medium	Medium
Objective 4: Create Markets for Digital Technologies			
R9. Promote adoption of digital technology across all sectors of the economy, including public agencies and among consumers.	PM/ PTNTIC	Medium	Medium
R10. Improve collaboration with digital entrepreneurs in the provision of public services through transparent public contracting, digitalization of public services, and ICT upskilling of public workers.	PTNTIC	Medium	Medium
Objective 5: Create an Industry-Appropriate, Digitally Skilled Talent Pool			
R12. Increase digital-related topics and soft skills trainings in primary and secondary educational institutes as well as universities, to include courses in entrepreneurship, STEM, and basic digital literacy programs, to help create a more confident and employable workforce trained in basic digital skills.	PM/ PTNTIC	Medium	Medium
R13. Provide training in digital skills to upskill entrepreneurs and private sector employees to boost the market for digital	PTNTIC	Medium	Medium

solutions both from the demand and offer side.			
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