



**DIGITAL
ECONOMY**

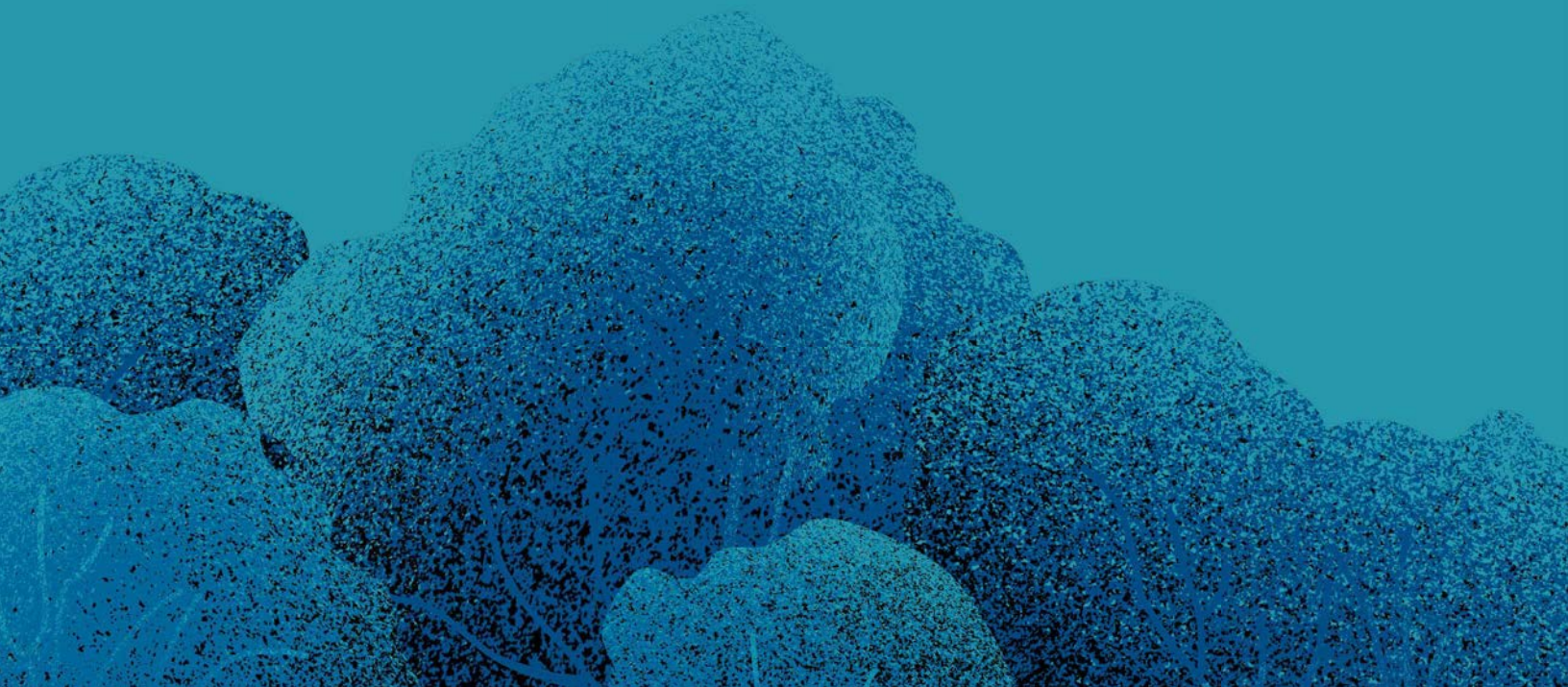


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Fostering an inclusive digital economy in Africa¹

Introduction

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In the face of a rapidly evolving digital frontier, African economies can either seize the opportunities by investing in an inclusive digital economy or can be at risk of falling further behind due to significant gaps in infrastructure, technology, and skills.² There are undoubtedly myriad relevant and appropriate policy interventions which can be designed and proffered to aid a country or region's digital development. While improving all components of the digital ecosystem should be considered as part of a balanced digitalization strategy, we suggest three key areas for policymakers to prioritize to accelerate digitalization across African economies in 2024: (i) Improving access to digital infrastructure and platforms, (ii) Developing digital skills in line with trends in demand for them, and (iii) promoting digital financial inclusion.

Policy recommendations for an inclusive digital economy in Africa

Digital infrastructure: Bolstering access, affordability, usage, and competitiveness

Our new Digitalization and Digital Skills Index confirmed that African countries lag behind G20 countries on indicators related to digital infrastructure.³ Since access to digital infrastructure is the foundational element upon which the broader digital ecosystem is built, investment in this area is critical. In order to strengthen Africa's digital infrastructure, policymakers in 2024 should:

Expand fixed broadband. While the increase in use of mobile phones across Africa in recent years is encouraging and the potential for 5G infrastructure exciting, fixed broadband should be a priority to ensure that high-speed internet becomes more accessible and affordable and that firms are able to digitize within the continent.

Our new Digitalization and Digital Skills Index confirmed that African countries lag behind G20 countries on indicators related to digital infrastructure.

- 1 This report builds on our recent publication: Bhorat, Haroon, Landry Signé, Zaakhir Asmal, Jabulile Monnakgotla, and Christopher Rooney. 2022. "Digitalization and digital skills gaps in Africa: An empirical profile." The Brookings Institution. <https://www.brookings.edu/articles/digitalization-and-digital-skills-gaps-in-africa-an-empirical-profile/>.
- 2 Digital Skills and Jobs Platform (DSCAP). 2021. "Digital Skills: The Why, the What and the How." Methodological Guidebook V 2.0. <https://thedocs.worldbank.org/en/doc/a4a6a0b2de23c53da91bf4f97c315bee-0200022021/original/DSCAP-Guidebook-Part2.pdf>.
- 3 Bhorat, Haroon, Landry Signé, Zaakhir Asmal, Jabulile Monnakgotla, and Christopher Rooney. The Brookings Institution. 2022. Ibid.

Address broadband affordability. Digital technologies rely on affordable electricity and connectivity, yet mobile phone and internet connectivity remains expensive for many countries.⁴ To address affordability, policymakers can consider cross-subsidization by regulating prices for lifeline packages, increasing competition between ICT firms by auctioning spectrum licenses, and aggregating demand from public buyers to encourage network expansion.⁵

Increase access to digital infrastructure. This is critical to addressing gender and regional divides. Ultimately, a lack of digital infrastructure means that individuals are prevented from making use of digital technologies and performing activities online. In some economies, the digital gap is a symbol of exclusion, poverty, and inequality, which is worsened by the effects of unemployment, poorly functioning digital skilling programs, and sociocultural norms that deny women equal access to digital services.⁶

Governments can play key roles to prioritize underserved communities, including subsidizing the loss of revenue for ICT companies in marginalized or poor communities by requiring the industry to raise the cost of services in cities or by using Universal Service Funds that derive from ICT industry taxes, as long as management of the funds is more transparent than it has been in the past. Strategies should also be in place to prevent ICT companies from operating as oligopolies that exclude lower-income users by only providing high-cost bundles.⁷ Broadband strategies should promote regional integration that will grow networks and digital hubs to make them available to marginalized communities.

Digital skills development: Accelerating skilling, upskilling, and reskilling for the future of work

At the core of a competitive digital economy is a strong foundation in digital skills and human capital.

At the core of a competitive digital economy is a strong foundation in digital skills and human capital. Yet every African country with sufficient data lags behind the G20. At a time when demand for foundational digital skills is increasing (projected to account for 70% of the total demand for digital skills by 2030), African countries need to prioritize strategies to enhance the digital skills of a country's population at the basic, intermediate, and advanced levels.⁸

4 Fox, L. and Landry Signé. The Brookings Institution. 2022. "From subsistence to disruptive innovation: Africa, the Fourth Industrial Revolution, and the future of jobs." <https://www.brookings.edu/articles/from-subsistence-to-disruptive-innovation-africa-the-fourth-industrial-revolution-and-the-future-of-jobs/>.

5 Pathways for Prosperity Commission. (PfPC). 2018. "Charting Pathways for Inclusive Growth." <https://pathwayscommission.bsg.ox.ac.uk/sites/default/files/2019-11/charting-pathways-report.pdf>.

6 Chetty, K., et. al. Economics. 2018. "Bridging the digital divide in the G20: skills for the new age."

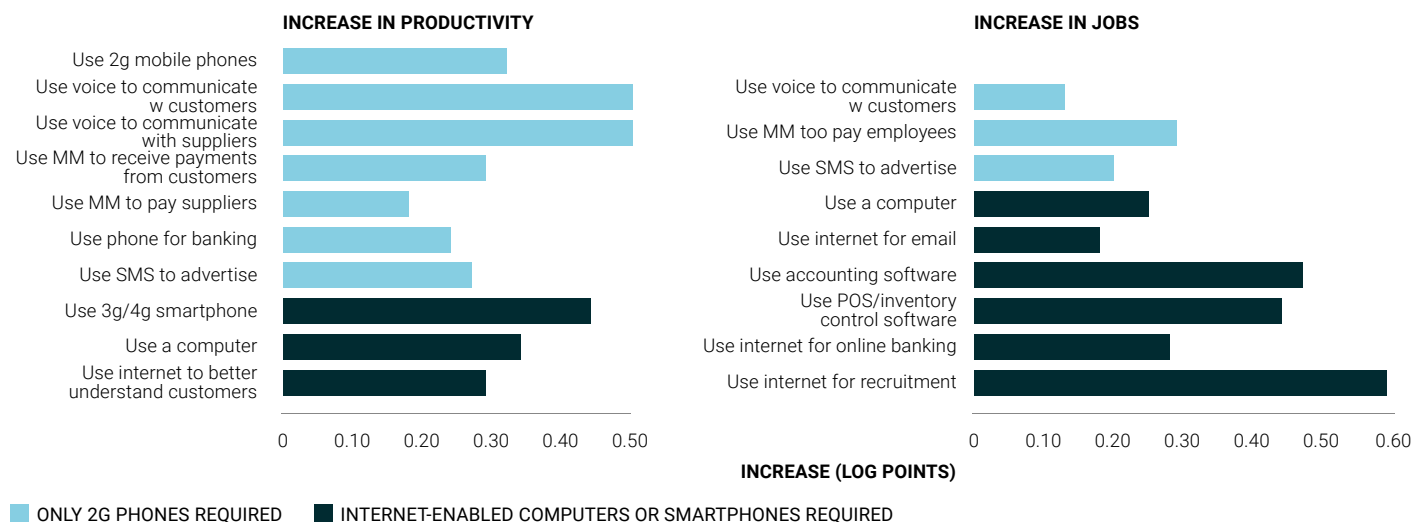
7 Fox, L. and Landry Signé. The Brookings Institution. 2022. Ibid.

8 International Finance Corporation (IFC). 2021. "Demand for Digital Skills in Sub-Saharan Africa: Key findings from a five-country study: Cote d'Ivoire, Kenya, Mozambique, Nigeria, and Rwanda." <https://www.datocms-assets.com/37703/1623797656-demand-for-digital-skills-in-sub-saharan-africa.pdf>.

FIGURE 18

INVESTMENTS IN DIGITAL TECHNOLOGY INCREASE BOTH PRODUCTIVITY AND JOB GROWTH FOR MICROENTERPRISES

In a world that is rapidly digitizing, not all technologies are created equal. Research from Africa reveals which digital technologies are associated with the greatest increase in jobs and productivity. The data suggests that using the internet to recruit new employees is associated with a 0.59 percentage point increase in the number of employees firms have, making it the most impactful technology African firms can adopt. For productivity, using voice calls to communicate with customers and suppliers are the most impactful.



Source: World Bank. 2023. Digital Africa: Technological Transformation for Jobs. Research ICT Africa (RIA) 2017-2018 Data.

Given limited resources, it is unrealistic to assume that investing in both basic education and technological postsecondary education to the extent needed is possible, creating a difficult tradeoff. Apart from a few more advanced countries in Southern Africa, primary schools are unlikely to have the minimum infrastructure required to conduct digital skills training specifically. Policymakers should therefore:

Prioritize investment in upgrading primary and secondary education due to its implications for lifelong learning. Lifelong learning will be impossible without students acquiring basic education: Technical, vocational, and other higher-order skills can only be built on a strong foundation of basic cognitive skills.⁹

Focus curriculum at all levels on developing socioemotional skills such as problem-solving, teamwork, tolerance, responsibility, and independence, which are associated with higher rates of entrepreneurship, mobility, and earnings.¹⁰ While STEM skills are

9 Fox, L. and Landry Signé. Brookings Institution. 2022. Ibid.

10 Arias, O., David K. Evans and Indhira Santos. 2019. The World Bank Group. "The Skills balancing Act in Sub-Saharan Africa: Investing in Skills for Productivity, Inclusivity, and Adaptability." <https://documents1.worldbank.org/curated/en/558991560840574354/pdf/The-Skills-Balancing-Act-in-Sub-Saharan-Africa-Investing-in-Skills-for-Productivity-Inclusivity-and-Adaptability.pdf>.

needed, the digital economy will rely on citizens having a more diverse skill set. After-school programs can also support the development of these socioemotional skills.¹¹

Digital finance:

Advancing access, well-being, empowerment, and productive usage

Digital finance is the third key area that policymakers should target to accelerate the development of a digital economy. The first step in digital financial inclusion—ownership and use of a financial service account—has grown rapidly across African countries, likely fueled by the increase in mobile phone use. Yet there still remains a gap compared to G20 country averages, which is especially true for the most vulnerable countries—Benin, Madagascar, Malawi, and Niger. To improve digital finance across the continent, policymakers should:

Enable financial sector deepening by promoting regulation that addresses these barriers and extends the drivers to allow the opportunity for all citizens to benefit from digital finance. Governments can do this by promoting the use of blockchains for financial transactions and establishing a single identity for residents, which currently does not exist for about half of African countries. This will influence gender and urban-rural divides as well, as studies in Kenya and Uganda have found that financial inclusion for rural women increases with both the ownership of a mobile phone and ownership of a national identity card.^{12,13}

Address threats of fraud, cybersecurity, and high transactional costs. Consumer protection policies are critical to instill trust among the general public, without which certain populations will be inclined to stick to traditional forms of banking and cash transactions. Kenya has a strong consumer protection framework which could be a model for other African countries to improve trust.

Further formalize the informal sector. Africa already leads the world in digital financial inclusion, but leadership should continue to use the advantage of the rise in mobile banking to further formalize the informal sector through formal credit access and assessment using tools like AI, blockchain, and record keeping.¹⁴ More transparency and availability of borrower data and better protection of legal rights will also help increase the legitimacy and adoption of financial technology.¹⁵

11 Fox, Louise and Dhruv Gandhi. 2021. The Brookings Institution. "Youth employment in sub-Saharan Africa. Brookings Institution." <https://www.brookings.edu/articles/youth-employment-in-sub-saharan-africa-progress-and-prospects/>.

12 Cheronoh, Beatrice. (2019). The University of Nairobi. "Modelling socio-economic and demographic determinants of financial inclusion among rural women in Kenya." The University of Nairobi. http://erepository.uonbi.ac.ke/bitstream/handle/11295/108836/Cherono_Modelling%20Socio-Economic%20and%20Demographic%20Determinants%20of%20Financial%20Inclusion%20Among%20RuralWomen%20in%20Kenya.pdf?sequence=1.

13 Tusubira, Festo N., and Cynthia Mbabazil. European-American Journal. 2021. "National identity ownership and financial inclusion in Uganda." <https://eajournals.org/ejaaf/vol-9-issue-3-2021/national-identity-ownership-and-financial-inclusion-in-uganda/>.

14 Signé, Landry and Chris Heitzig. The Brookings Institution. 2022. "Effective engagement with Africa: Capitalizing on shifts in business, technology, and global partnerships." https://www.brookings.edu/wp-content/uploads/2022/04/Effective-engagement-Africa_April-2022.pdf.

15 Mugume, Reagan and Enock W. N. Bulime. African Development Review. 2022. "Post-COVID-19 recovery for African economies: Lessons for digital financial inclusion from Kenya and Uganda." <https://onlinelibrary.wiley.com/doi/full/10.1111/1467-8268.12652>.

Conclusion

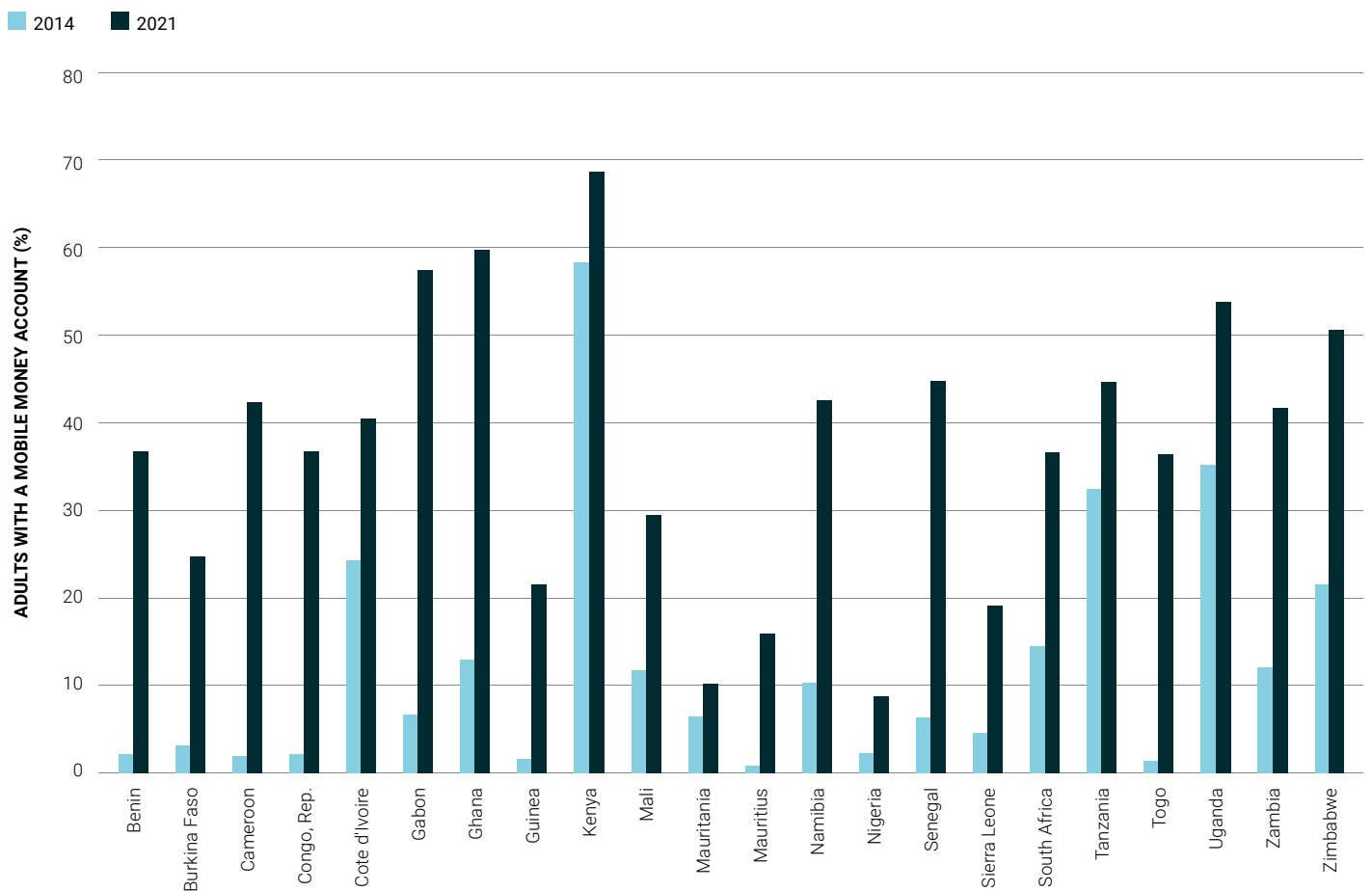
Overall, policy recommendations that promote agile governance and an enabling business environment can help accelerate progress in these three key areas as well as other important factors for the digital economy including digital platforms and entrepreneurship.

By focusing on these three priority areas in 2024, while leveraging potential synergies, African countries can bridge the digital gap to boost Africa's competitiveness in the digital economy with transformative benefits for African-led innovation and economic inclusion.

FIGURE 19

RISE IN PERCENTAGE OF ADULTS WITH MOBILE MONEY ACCOUNTS

Digital financial solutions have become popular in areas of the world where digital infrastructure has outpaced the development of financial and physical infrastructure. Mobile money accounts have been especially common in Africa, where account penetration rates in countries like Kenya, Ghana, Gabon, Uganda, and Zimbabwe have exceeded 50% of the adults.



Source: World Bank. (2021). Global Findex database. World Bank Group.

Rwanda's data governance: Navigating data governance in the public sector: A 2024 perspective

Data: A national asset for Rwanda's Vision 2050

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In the past four years, the world has witnessed an unprecedented surge in data generation. By 2021, global data creation reached 79 zettabytes and is projected to double by 2025.¹⁶ In 2020 alone, every individual generated an astonishing 1.7 megabytes of data per second, contributing to a daily total of approximately 2.5 quintillion bytes of data globally. This explosion of data, propelled by advancements in digital technology and accelerated by the COVID-19 pandemic, has transformed numerous sectors, playing a crucial role in driving innovation, competitiveness, and economic growth. Its increased availability in personal, non-personal, and public data, coupled with advancements in storage and processing technologies, has unlocked immense potential.

For Rwanda, data is a vital national asset, essential for fueling digital progress and advancing the country's social and economic goals. Rwanda's commitment to responsibly using data is a cornerstone of its ambition to become a high-income nation by 2050. Moreover, data's role in achieving the Sustainable Development Goals cannot be overstated, as it significantly improves monitoring systems, tracks progress and setbacks, and fosters data sharing for informed decision-making.

Building a robust data governance framework

Recognizing the importance of data privacy and protection, Rwanda enacted its Law on Data Privacy and Protection (DPP) on October 15, 2021. This legislation mandates the protection of personal data processed by individuals and organizations, regardless of their geographic location, concerning Rwandan residents.¹⁷ The DPP law aligns with Article 23 of the Rwanda Constitution, emphasizing the right to privacy and is inspired by international standards like the GDPR (Regulation (EU) 2016/679), regional laws from Kenya and Mauritius, and the Malabo Convention.¹⁸ The law's objectives include ensuring data privacy, integrating data ethics to inspire trust, and promoting responsible data processing. These steps are critical in maintaining public trust in technological systems by guaranteeing privacy and data security. The formulation of the data privacy law involved comprehensive multistakeholder

¹⁶ International Data Corporation. 2023. "Worldwide IDC Global DataSphere Forecast, 2023-2027."

¹⁷ Republic of Rwanda. (2010). Law No. 18/2010 of 23 July 2010 on Electronic Messages, Signatures and Transactions.

¹⁸ The New Times. 2018. Four years later, 95% of Rwanda covered with 4G Internet.

consultation, with significant input from private sector, public sector, academia, civil society and industry. This collaboration reflects a keen awareness of the nuanced needs of different economic sectors in data governance

The DPP law is part of a broader framework of data governance in Rwanda. It complements other key regulations such as [Ministerial Order No. 001/MINICT/2012](#), which centralizes government data in a national data center, and the Organic Law on Statistics No. 45 of June 2013, coordinating the production, access, and dissemination of statistical data.^{19,20} Additionally, [the Penal Code and Law No. 18/2010](#), focusing on electronic messages, signatures, and transactions, underline Rwanda's commitment to data protection and privacy.²¹

Infrastructure investment underpins digital transformation

Rwanda's commitment to data governance extends beyond enabling policies and regulations. The country has achieved impressive network coverage by investing heavily in broadband and fiber optic infrastructure, laying a solid foundation for adopting emerging technologies.

Rwanda's commitment to data governance extends beyond enabling policies and regulations. The country has achieved impressive network coverage by investing heavily in broadband and fiber optic infrastructure, laying a solid foundation for adopting emerging technologies. The country boasts extensive network coverage, including 95% population coverage of 4G LTE networks. Additionally, Rwanda has developed a significant national optic fiber network, spanning 7,000 km across its 26,338 km² area.²² These strategic investments have laid a solid infrastructure foundation for adopting emerging technologies and for the evolution of next-generation networks.

However, Rwanda's data strategy encompasses more than just infrastructure development. It also includes the systematic cataloging of public records, improvement of information management systems, and advancement of cloud-based data-sharing capabilities among government agencies. The widespread adoption of mobile devices and digital platforms, particularly in vital sectors like finance, healthcare, and communication, has fostered a dynamic data environment. This environment is crucial for the development of innovative products and services, transforming government and business operations, and reshaping citizen engagement with various services. These comprehensive measures illustrate Rwanda's holistic approach to building a robust digital ecosystem.

19 Republic of Rwanda. 2012. Ministerial Order No. 001/MINICT/2012 of 18 July 2012 on the Establishment of a National Data Center and the Centralization of Government Data.

20 Republic of Rwanda. 2013. Organic Law No. 45/2013 of 18 June 2.

21 Republic of Rwanda. 2010. Law No. 18/2010 of 23 July 2020 on Electronic Messages, Signatures and Transactions.

22 Rwanda Utilities Regulatory Author. 2023. ICT Access and Usage Survey 2022.

As Rwanda integrates its digital market both regionally and with the African Continental Free Trade Area, the emphasis on cybersecurity and data protection becomes more pronounced.

As Rwanda integrates its digital market both regionally and with the African Continental Free Trade Area, the emphasis on cybersecurity and data protection becomes more pronounced. The country is focused on narrowing the digital skills gap and improving the accessibility and affordability of digital services, with the National Cyber Security Authority (NCSA) playing a crucial role in ensuring adherence to data protection laws and securing cross-border data flows.

Irembo: A model for government-citizen interaction

The Irembo platform exemplifies how data is driving government efficiency and citizen engagement. This digital portal offers convenient access to a wide range of government services, reducing the need for physical visits. Irembo serves as a key facilitator of government-to-citizen (G2C) interactions, promoting transparency and democratic participation.

Government services on Irembo go through a continuous service/process improvement that is informed by the insights generated from the transactions made through Irembo platform. Insights are derived from citizen feedback, volume and nature of transactions per service, and trends to simplify services and how they are delivered on the platform. One example is how Irembo leveraged data-driven insights to improve the delivery of provisional driving licenses. The sheer volume of citizens applying for a driving license necessitated a shift from manual, written driving license exams to electronic means.

Rwanda Economy Digitalization Program: A model for data-driven, evidence-based policymaking

The Rwanda economy digitalization program seeks to **accelerate the inclusive digitalization of the Rwandan economy** by leveraging data insights to support data-driven policymaking, catalyze innovation, and support a sustained shift to a digitalized society. Rwanda's approach to innovation is driven by our proof-of-concept hub strategy, which has positioned Rwanda as a test bed for innovations that leverage digital technologies and data to create impact. Similarly, our approach to data governance required that as a government we implement select data use cases that would inform Rwanda's Data governance policy, with notable data analysis use cases in mobile money, tourism, education, agriculture, and transport sectors.

Specifically on transport, commuter data was analyzed to assess the demand for affordable and reliable public transportation. The data analysis further looked into different public transport modes (buses, motorcycles, and cabs), existing public bus routes and whether they adequately serve regular commuters, and complementarities of buses, cabs and motorcycles. The analysis revealed that bus transport was not used for regular commuting: over 60% of customers in January 2023 purchased five or fewer tickets in the month, while fewer customers appear to be using bus transport for a regular work commute (20 or more tickets in a month). This has been the trend since 2020.

This situation is largely a result of bus capacity constraints that result in long waiting times, inconvenience, and uncertainty for users. While bus tickets are significantly cheaper than any other mode of transport, massive delays at bus stops discourage commuters from using buses, opting for the more expensive options. In addition, trips follow existing bus routes, indicating that moto-taxis are seen as a substitute for bus services, rather than a transport mode that complements buses.

With these insights, policymakers were able to better understand mobility patterns and the interplay between customer demand, bus operator incentives, and public policy. Further, the analysis and data insight generated also supported bus operators in making better investment decisions against the projected demand.

Challenges and opportunities in data governance

Despite efforts to improve data privacy and protection, challenges persist. Many African countries, including Rwanda, face resource and capacity constraints, making it difficult to effectively enforce violations of data protection laws. Additionally, many people are not familiar with data protection and their privacy rights, which means that substantial efforts are needed to educate the general public. This challenge is compounded by the fact that the law is new and global trends in data protection may not be widely known or understood by the public and institutions.

Better data governance presents opportunities for innovation. However, the challenge of balancing data privacy and the need to innovate competitively remains. One approach Rwanda is undertaking to strike this balance is establishing data-sharing agreements for institutions. These agreements **ensure that data that is shared is anonymized and aggregated to address privacy concerns.**

Going forward, we need to transition to quality open data, with common frameworks of usage.

Recommendations for effective data governance

To overcome these challenges and capitalize on emerging opportunities, Rwanda can prioritize:

- Flexibility and scalability: Adaptable and structured frameworks allow for continuous improvement and adaptation to changing contexts.
- Cross-sector and cross-border collaboration: Effective data governance requires international cooperation, especially in regions like Africa.
- Sector-specific initiatives: Tailored strategies for critical sectors like health enhance data utilization, privacy, and security.

Moving forward, Rwanda's commitment to data governance will be crucial in driving its digital transformation and achieving its social and economic goals. By addressing the existing challenges and adopting these recommendations, Rwanda can solidify its position as a leader in responsible data governance.

Conclusion

Rwanda's comprehensive approach to data governance, key to its ambition of becoming a high-income nation by 2050, is exemplified by its enactment of the Data Privacy and Protection Law and significant investments in digital infrastructure. This strategic focus acknowledges the crucial role of data in spurring innovation and economic growth. Despite the challenges of resource limitations and public awareness about data rights, Rwanda's commitment to a robust digital ecosystem, highlighted by initiatives like the Irembo platform, is commendable. Addressing these challenges through adaptable, scalable frameworks and international collaboration will be pivotal in enhancing Rwanda's data governance and ensuring the success of its digital transformation in line with its Vision 2050 goals.

How AI can inclusively transform agri-food systems in Africa

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Advances in artificial intelligence (AI) will be the most significant contributor to the transformation of agri-food systems in Africa. OpenAI's ChatGPT application exemplifies the rapid pace of advancement in AI capabilities in the last year alone. AI and other automation technologies are presenting game-changing opportunities for the continent's smallholder farmers, particularly when delivered through low-tech delivery channels, in-person intermediary networks, and through partnerships with value chain stakeholders to subsidize costs.

AI and other automation technologies are presenting game-changing opportunities for the continent's smallholder farmers, particularly when delivered through low-tech delivery channel.

A report by [Genesis Analytics](#) provides a sneak peek into this future. Data from sensors, satellites, and drones is enabling optimal use of land based on specific crop suitability.^{23,24} Automated systems, including irrigation, ensure efficient resource utilization.²⁵ AI-enabled advisory services provide farmers with timely, tailored advice to boost yields and manage pests, reducing crop failure, spoilage, and bolstering food security.²⁶ More accurate farming minimizes costs and environmental impact by using resources efficiently.²⁷ Traceability tools reduce certification costs, broadening market access. [AI-driven risk analysis](#) facilitates access to crucial financial services like credit and insurance.²⁸ The report identifies the types of solutions with existing pockets of adoption impacting smallholder farmers in Africa.

However, realizing these benefits broadly is far from automatic. Most of these solutions are concentrated in Kenya, South Africa, and Nigeria.²⁹ Even where solutions do exist, smallholder farmers without access to the networks, hardware, and capital necessary to use these solutions will not benefit. There is a threat of larger farms, enabled by technology, outpacing smaller farms in productivity and endangering rural livelihoods. Gender disparities in technology adoption can exacerbate household inequalities, and concerns about data governance and potential labor displacement due to AI-enabled automation are real.³⁰

23 Genesis Analytics. 2023. Can AI Inclusively Advance Agri-Food Systems?

24 Yang, C.. 2018. "High resolution satellite imaging sensors for precision agriculture." *Frontiers of Agricultural Science and Engineering* Vol. 5 (issue 4).

25 GSMA. 2018. "eFishery: Shaping the future of Indonesia's aquaculture industry/".

26 Springer, E. et. al.. 2023. "Inclusive Digital Design Toolkit."

27 Digital Agri Hub. 2022. "Assessment of smart farming solutions for smallholders in low and middle-income countries."

28 Apollo Agriculture. 2019. "Increasing Food Security in Africa."

29 World Bank. 2020. "Scaling Up Disruptive Agricultural Technologies in Africa."

30 Ryan, M. 2019. "Ethics of Using AI and Big Data in Agriculture: The Case of a Large Agriculture Multinational."

For AI to have a broad impact, solutions must be rooted in local contexts. This means tools in local languages, introduced through trusted human intermediaries.

To navigate these challenges and harness AI's potential inclusively, four areas must be prioritized:

1. **Building strong data and technology infrastructure:** AI's power lies in data. With businesses controlling much of this asset, creating incentives to share this data is crucial. By reducing the costs of on-farm technology like sensors and drones, governments can level the playing field. Developing agri-specific opensource software infrastructure can support AI tools being tailored to local African contexts at scale.
2. **Championing farmer-centric solutions:** For AI to have a broad impact, solutions must be rooted in local contexts. This means tools in local languages, introduced through trusted human intermediaries. Empowering farmer cooperatives to participate in AI solution development and become procuring entities can boost AI adoption. Unlocking government demand for climate-smart digital extension advisory services will go a long way to addressing the financial sustainability of these solutions.
3. **Balancing innovation with demographic and environmental transitions:** With a growing youth population, empowering young people in Africa to transition into new work opportunities in the AgTech value chain is urgent. Climate change necessitates eco-friendly AI solutions, with AgTechs taking responsibility for their environmental footprint.
4. **Upholding ethical standards in AI and data use:** As with any nascent technology, ethical challenges are inevitable. Impact assessments can prevent biases, and participatory governance like data trusts ensure fair data use. Remedies for potential harms and specialized ethical assessment tools are essential. Emphasizing farmer-centric data governance, empowering organizations to support farmers, and establishing a regional AI lab can enhance AI model accuracy and accountability in African agriculture.

Should African central banks pursue digital currencies?

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A Central Bank Digital Currency (CBDC) is an electronic form of a country's official currency. They have recently become a global phenomenon with about 131 countries, representing 98% of global GDP, exploring their issuance as of November 2023.³¹

In the Central Bank of Nigeria (CBN), work on a CBDC began in 2017, with extensive studies, stakeholder consultations, use case identifications and testing in a sandbox. A critical objective of this preliminary work was to first establish compelling cases and potential benefits for a digital currency in Nigeria. This phase highlighted such benefits to include rapid financial inclusion, better monetary policy formulation, reduced cost of cash processing, and improved efficiency of payments.

Given these benefits, a multidisciplinary Working Group was inaugurated and tasked with leading the effort to create a CBDC (named the eNaira), beginning with preparing a "Design Paper". This document laid out the currency's architecture, the options for and choice of distributed ledger technology, the risks and mitigants, the roles of different stakeholders, and the implementation roadmap, amongst others.

Since the eNaira's launch in October 2021, there has been remarkable progress in reaching some of the aforementioned objectives. For example, over N20 billion (about USD 20 million) has been minted, and about 28.4 million new wallets have been created with over 2.2 million transactions valued at about N108 billion carried out on the platform.³²

Similar to Nigeria's case, these benefits appear to make compelling arguments for issuance of CBDCs by other African Central Banks. For those who might embark on this journey, there are four major **risks** to be mindful of. First is the risk of banking sector disintermediation, as customers move deposits into wallets. Second, CBDCs may be vulnerable to cyberattacks that could lead to financial losses and a loss of public confidence. Third, operational risks may arise from maintaining nonstop functionality. Fourth, privacy concerns might also make citizens view CBDC usage as risky because transactions are easily traceable.

The CBN addressed these risks with a combination of well-designed systems, limits on wallet balances, strong security protocols, robust engagement with stakeholders, and striking the right balance between transparency and privacy.

31 Atlantic Council. Central Bank Digital Currency Tracker. <https://www.atlanticcouncil.org/cbdctracker/>.

32 Data comes from the Central Bank of Nigeria's digital dashboard.

The prospects of digital currencies appear promising. The age of cash is ending. The digital revolution seems unabating. Africa cannot afford to be left behind.

These efforts have elicited six key **lessons, namely:**

- Early collaboration with commercial banks is critical to forestall disintermediation.
- A robust digital identity for consumers must precede the pursuit of a CBDC.
- A phased implementation approach is critical to contain and manage disruptions.
- Adequate internal staffing must be available to maintain the system.
- Offline capabilities are essential, given Africa's low internet penetration.
- Given that CBDCs are faster to produce, their minting, storage, issuance, and distribution must have strong governance mechanisms.

Overall, the **prospects** of digital currencies appear promising. The age of cash is ending. The digital revolution seems unabating. Africa cannot afford to be left behind. We need to be proactive in this race, and mindful that one must build the barns before the harvest.

Digital public services delivery in Ghana

“Technology is a word that describes something that doesn’t work yet.”

Douglas Adams

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As we enter 2024, the discourse on digital public services delivery (D-PSD) has garnered increased attention. Through the lens of D-PSD, I assess the dynamic interactions between the government and the market economy—its citizens, businesses, and civil society.

Public services delivery (PSD) reflects the intricate interactions between the public and private sectors. Digitalizing these interactions, aka D-PSD, means integrating digital technology to make them seamless, efficient, and transparent. Of course, D-PSD could raise other concerns regarding privacy and exclusion. Yet, it is no longer just an add-on; “digital” has become an integral fabric of our societal machinery, facilitating faster, more convenient interactions, eliminating systemic frictions, enforcing compliance, and addressing coordination failures.

In Ghana, there is a distinct vision for broader digital services, exemplified by its [Digital Agenda](#), [Digital Financial Services Policy](#), and other significant initiatives, which I will attempt to emphasize. That said, the government’s one-sided digital thrust is keen and fast on revenue collection but slow in reciprocating payments, particularly to businesses. This unwelcome feature illustrates a double standard in D-PSD and is in sharp contrast to the golden rule—“Do unto others as you would have them do unto you.”³³ As I reflect on Ghana’s digital journey thus far and gaze into the horizon of 2024, three focal areas in D-PSD demand rigorous scrutiny: government-to-persons (G2P), government-to-businesses (G2B), and conversely, persons or businesses to government (P/B2G) services.

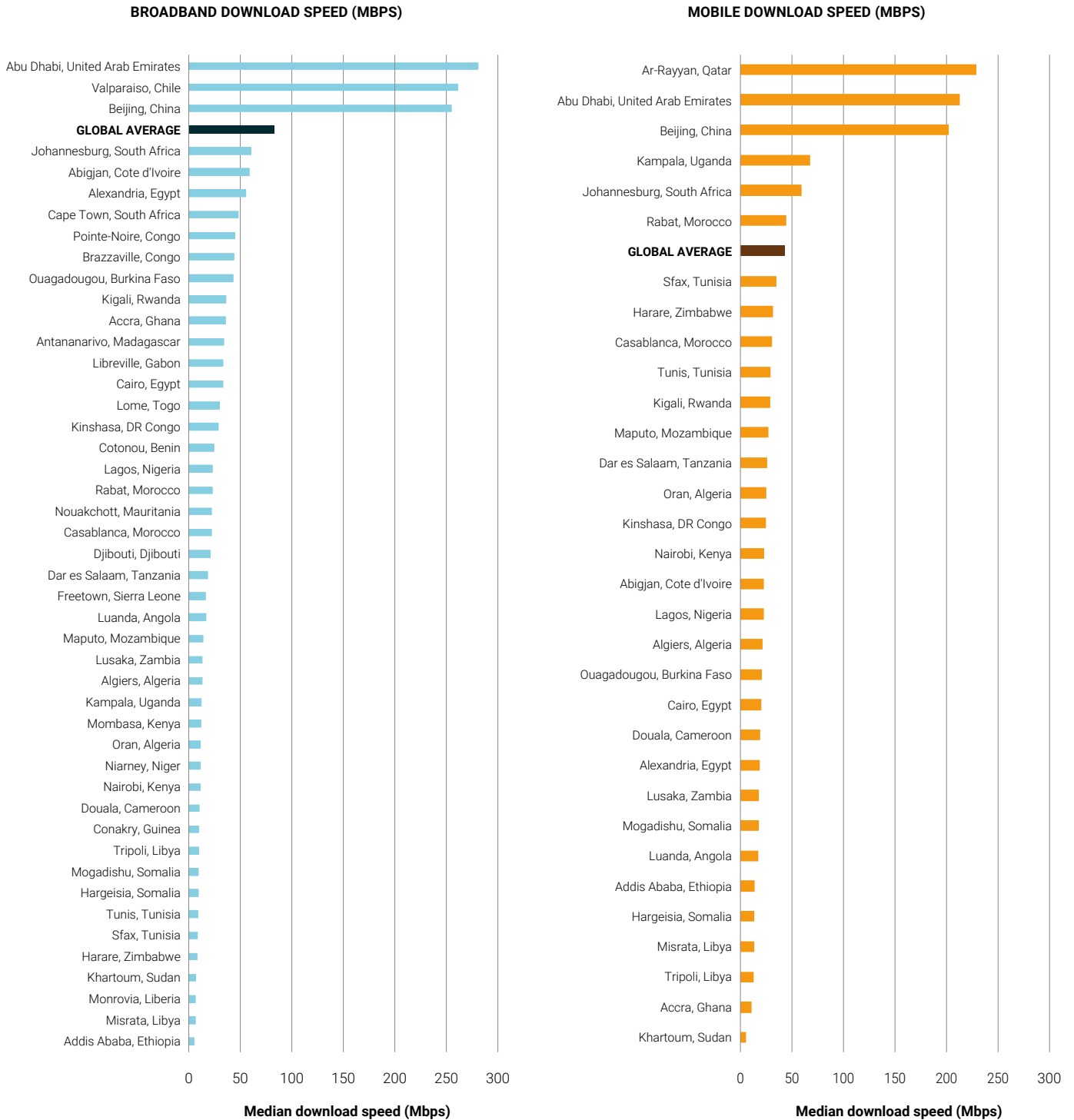
Government-to-persons (G2P): G2P interactions are pivotal for government’s engagement with citizens. Digital cash transfers, exemplified by platforms like [e-zwich](#) (2008), are hailed for potential poverty alleviation but grapple with targeting and delivery challenges. PREMIX fuel distribution (2023), a crucial lifeline for the local fishing communities, faces black-market disruptions and distribution hurdles. Digital interventions, especially [automation and biometric systems](#), could streamline this. Conversely, the government’s partnership with Zipline in 2019 to leverage [drone technology](#) for prompt delivery of medical services showcases the broader potential of digital innovation in public services. Tapping into [digital](#)

33 (Matthew 7:12).

FIGURE 20

MOST AFRICAN COUNTRIES HAVE SLOWER THAN AVERAGE DOWNLOAD SPEEDS

Cities like Kampala, Johannesburg and Rabat have mobile download speeds above the global average. Johannesburg, Abigjan and Alexandria have broadband download speeds close to the global average.



Note: Median broadband and mobile speed (Mbps) as of August 2023.
 Source: August 2023. Speedtest Performance database.

The interactions between persons and businesses to the government, particularly in taxation, bill payments, and registrations, present a vivid illustration of our digital (r)evolution and challenges.

verification to curtail “ghost names” on government payrolls is another integration, and the list goes on and on.

Government-to-businesses (G2B): G2B digital interactions reveal an unsettling paradox. Despite G2B’s critical role, its digital footprint is surprisingly limited, a gap evident in Ghana’s vision for broader digital services. While digitization could overhaul bureaucratic snags, many (potentially high-quality) firms avoid government contracts, daunted by administrative hurdles and payment delays. Unfortunately, the government’s digital thrust seems one-sided, keen on digital revenue collection but sluggish in reciprocating. Introducing the Smart Workplace Virtual Platform (2020) emphasizes government-to-government interfaces more than G2B, and the tepid response from ministries exacerbates concerns. Conversely, the directive to use Government Integrated Financial Management Information System (GIFMIS) for Public Procurement Authority (2020) payments is a step forward but does not address the broader G2B integration issues.

Persons or businesses to government (P/B2G): The interactions between persons and businesses to the government, particularly in taxation, bill payments, and registrations, present a vivid illustration of our digital (r)evolution and challenges. At the forefront of this revolution is the historic rollout of the Unified Digital Property Tax Platform (2023). This initiative epitomizes the fervor for revenue mobilization and the expansion of the tax bracket.

We observe a troubling trend as we evaluate centralized payment platforms such as GIFMIS, GhanaPay (2022), and GHANA.GOV. There is an undeniable inertia in integrating G2B services. Many firms express reluctance to engage with government business, particularly procurement contracts, owing to the prevailing bureaucratic hurdles. The low uptake, especially concerning digital revenue mobilization platforms, suggests looming resistance from Metropolitan, Municipal, and District Assemblies (MMDAs) and bureaucrats. The scourge of corruption, infrastructural deficiencies like limited internet access, and digital literacy gaps further limit the adoption and value of D-PSD.

If the current adoption and usage patterns persist, we risk creating an uneven, exclusionary digital public services landscape. Such a trajectory could culminate in a “D-PSD divide,” sidelining certain businesses and citizens from arguably transparent and efficient public services. Central to the advancements in D-PSD is the establishment of robust identification mechanisms and business formalizations. Although there is momentum with government mandates on ID laws, concerns remain, especially around the perceived costs of formalizing businesses and the potential exclusion from digital systems. Undoubtedly, the current G2B digital landscape leans away from its potential. Therefore, a shift toward comprehensive G2B integration is crucial for productive and equitable digital service delivery.

Reforming data regulation to advance AI governance in Africa

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Approximately 36 out of 54 African countries have established formal data protection regulations, offering a potential foundation upon which robust AI legislation can be constructed.

As artificial intelligence (AI) development accelerates globally and concerns regarding its use grow, the need for AI governance has reached an unprecedented level of urgency. With only seven African nations ([Benin](#), [Egypt](#), [Ghana](#), [Mauritius](#), [Rwanda](#), [Senegal](#), and [Tunisia](#)) having drafted national AI strategies and none implementing formal AI regulation, substantial efforts are required to advance AI regulatory frameworks on the African continent.³⁴ It is also crucial to recognize that data plays a fundamental role in AI development and warrants regulation. Approximately [36 out of 54 African countries](#) have established formal data protection regulations, offering a potential foundation upon which robust AI legislation can be constructed.³⁵ To bolster AI governance initiatives, African nations should consider data governance as a viable pathway toward regulating AI, facilitating its responsible utilization and development as this transformative technology continues to evolve.

Data protection regulation, such as the European Union's General Data Protection Regulation (GDPR), has laid a strong foundation for the EU to develop and draft the EU AI Act, which is expected to be fully implemented by 2026.³⁶ However, the advent of large language models and the increasing utilization of data workers have changed prevalent narratives around the production and use of data. Given these new complexities, existing data governance initiatives within Africa must be revamped to comprehensively cover aspects such as data quality, privacy, responsible data sharing, compliance, transparency, and labor protections for data workers. Additionally, African countries have context-specific challenges that differ significantly from those within the West, highlighting a need to understand how to develop culturally aligned and feasible governance solutions.³⁷ By balancing [lessons from the recent ratification of the African Union Convention on Cyber Security and Personal Data Protection \(Malabo Convention\)](#) and advancing research on regional and country-specific needs, African nations can work toward data policies that serve the needs of African governments, companies, and consumers.³⁸

34 Wakunuma, Kutoma, et al. 2022. "Responsible AI, SDGs, and AI Governance in Africa." 2022 IST-Africa Conference (IST-Africa). IEEE.

35 Hogan Lovells. 2023. "Recent developments in African data protection laws - Outlook for 2023." Lexology. <https://www.lexology.com/library/detail.aspx?g=baef72ee-10bd-4eb9-a614-a990c236bb45>.

36 European Parliament. 2023. "EU AI Act: first regulation on artificial intelligence." <https://www.europarl.europa.eu/news/en/headlines/society/20230601ST093804/eu-ai-act-first-regulation-on-artificial-intelligence>.

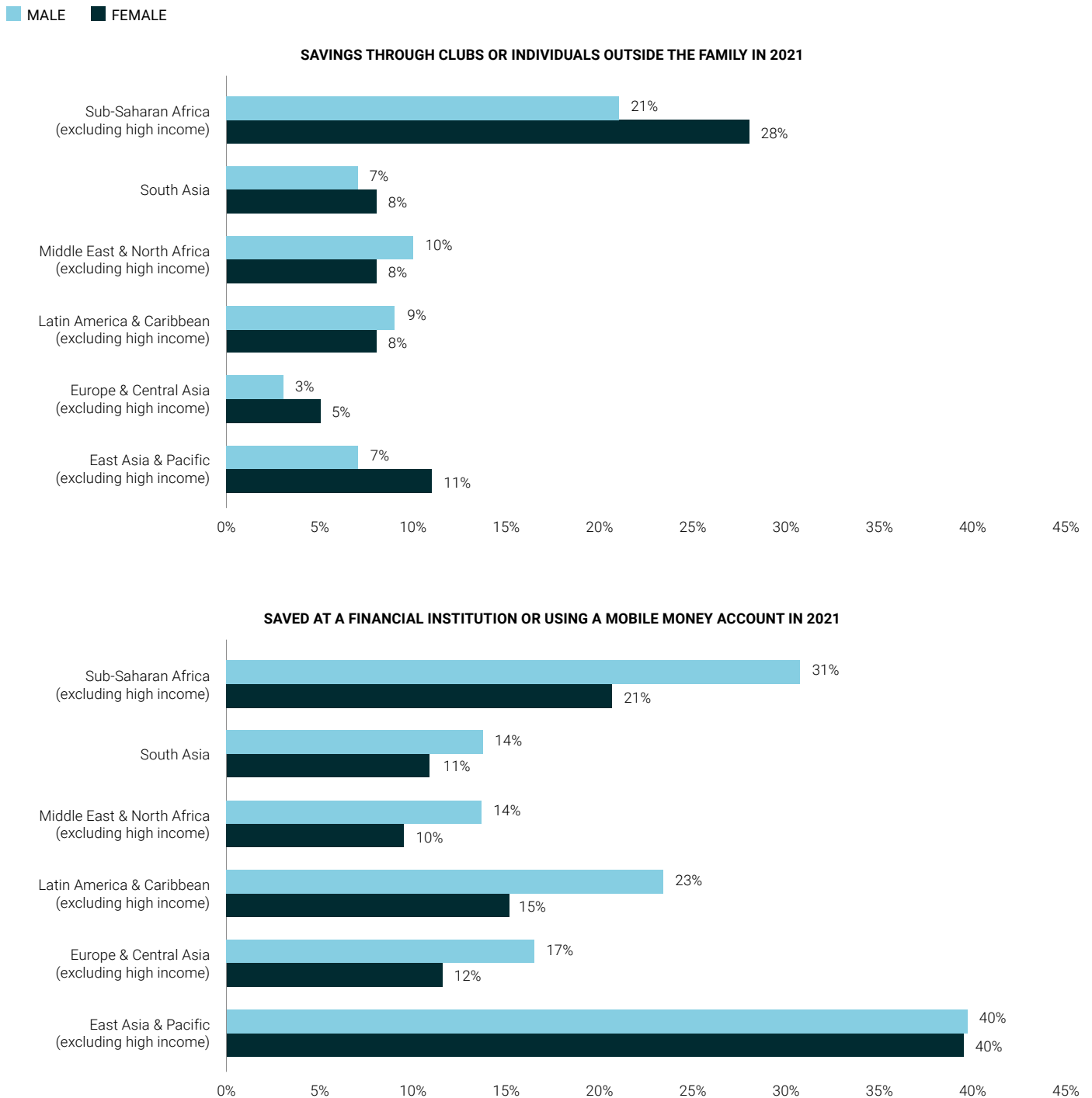
37 Png, Marie-Therese. 2022. "At the tensions of south and north: Critical roles of global south stakeholders in AI governance." Proceedings of the 2022 ACM Conference on Fairness, Accountability, and Transparency. <https://dl.acm.org/doi/10.1145/3531146.3533200>.

38 Carnegie Endowment for International Peace. 2023. "Continental Cyber Security Policymaking: Implications of the Entry Into Force of the Malabo Convention for Digital Financial Systems in Africa." <https://carnegieendowment.org/2023/07/10/continental-cyber-security-policymaking-implications-of-entry-into-force-of-malabo-convention-for-digital-financial-systems-in-africa-event-8146>.

FIGURE 21

SUB-SAHARAN AFRICANS TEND TO RELY ON BOTH INFORMAL AND FORMAL SAVINGS INSTITUTIONS MORE THAN THEIR LOW-INCOME COUNTERPARTS

Sub-Saharan Africa has not yet advanced in formalizing its individual saving behavior, particularly for females. This raises economic risks associated with financial security, access to credit, or entrepreneurial activities. Significantly addressing the gender gap in financial inclusion will play a pivotal role in enhancing the region's economic development and stability.



Source: World Bank. 2021. Global Findex database. World Bank Group.

Current development priorities such as refining social services, tackling insecurity, planning for climate change, building infrastructure, and fighting corruption understandably take greater precedence over regulating AI. Nevertheless, African governments must first work toward reinforcing data regulation along with building the human capital necessary to sustain AI ecosystems.³⁹ African governments must also harness the capabilities of their digital ministries to support the development of data and AI legislation. As of 2023, nearly every African country has a digital ministry, which provides a sufficient base to refine existing data protections and eventually implement AI legislation. However, governments should not be the only actors shaping data and AI regulation. As demonstrated by the United States' recently issued Executive Order on AI and the United Kingdom's AI Safety Summit, cross-sector collaboration efforts from advocacy groups, academia, policymakers, and tech companies have been influential in advancing these countries' progress toward AI legislation.⁴⁰ Within African countries, local stakeholders should be offered opportunities to shape data and AI regulation by serving on advisory bodies and expert groups like those initiated by the United Nations and OECD. Such participation will help open realizable pathways for enhanced data stewardship and oversight of AI systems—dual priorities amid the rise of emerging technologies within Africa.

39 Okolo, Chinasa T., Kehinde Aruleba, and George Obaido. "Responsible AI in Africa—Challenges and Opportunities." *Responsible AI in Africa: Challenges and Opportunities* (2023): 35-64. <https://library.oapen.org/bitstream/handle/20.500.12657/60787/1/978-3-031-08215-3.pdf#page=55>.

40 The White House. 2023. "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence." <https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/>.