The rise of Africa's digital economy

The European Investment Bank's activities to support Africa's transition to a digital economy

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Acronyms and abbreviations

ACP	African, Caribbean, and Pacific
AfCFTA	African Continental Free Trade Area
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development
CEMAC	Central African Economic and Monetary Community
D4D	Digital 4 Development
DETF	Digital Economy Task Force
DG DEVCO	Directorate-General for International Cooperation and Development
DG NEAR	Directorate-General for Neighbourhood and Enlargement Negotiations
DSM	Digital Single Market for Europe
EBRD	European Bank for Reconstruction and Development
EEAS	European External Action Service
EFSD	European Fund for Sustainable Development
EGDI	E-Government Development Index
EIB	European Investment Bank
EU	European Union
G7/G20	Group of Seven/Group of Twenty
GAFAM	Google, Apple, Facebook, Amazon, Microsoft
GDP	gross domestic product
GDPR	General Data Protection Regulation
GSMA	GSM Association (Global System for Mobile Communications)
H1, H2	first/second half-year
ICT	information and communications technologies
IMF	International Monetary Fund

ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
KES	Kenyan Shilling
Mbps	megabytes per second
MSME	micro, small and medium-sized enterprises
NDICI	Neighbourhood, Development and International Cooperation Instrument
Q1, Q2, Q3, Q4	first/second/third/fourth quarter
SDGs	United Nations Sustainable Development Goals
SMEs	small and medium-sized enterprises
Tbps	terabytes per second
UN	United Nations
UNDP	United Nations Development Programme
Unesco	United Nations Educational, Scientific and Cultural Organization
Unicef	United Nation Children's Fund
US	United States
WHO	World Health Organization

Executive summary

Africa's digital transformation is underway, generating transformational changes across all economic sectors and providing much-needed social upsides. On several market growth parameters for telecommunications the continent has recorded the highest growth rates globally. However, while the growth figures are impressive, a stark digital divide remains. An estimated 900 million people are still not connected to the internet; for those who are connected, connectivity prices remain mostly high and bandwidth is severely limited in many areas.

At the time of a global pandemic that takes lives daily and calls for economic resilience, digital technologies and solutions that can substantially mitigate its effects must be made available to all. According to the World Health Organization (WHO), the COVID-19 pandemic has triggered unprecedented demand for digital health technology solutions and revealed successful solutions for population screening, tracking infections, prioritising resource use and allocation, and designing targeted responses.

The purpose of this paper is to present the EIB's support for the African continent's transition to a digital economy, particularly in response to the challenges raised by the COVID-19 crisis and with the aim of building inclusive, long-term economic resilience. This paper is composed of six main sections which individually address a fundamental theme to understanding the Bank's analysis and vision of Africa's digital economy.

Section 1 of the report reviews European and African Union policy objectives for digital transformation and the addresses how the EIB has delivered and will continue to deliver on those policy objectives.

Section 2 outlines the EIB's analysis of the development potential of Africa's digital economy looking into the sector's macroeconomic context, technology adoption and financing trends. This section also highlights the standards and best practices deemed important to support the emergence of an open, democratic and sustainable digital society within the framework of a fair and competitive digital economy. Finally, this section provides visbility on the digital economy-driven impact; in particular contributing to achieving the United Nations Sustainable Development Goals, and building sustainable economic growth.

Section 3 addresses Africa's digital economy investment requirements and their scope for furthering economic development in detail, including considerations on fostering economic resilience against shock such as a pandemic. Africa's population is young and growing fast, with rapid technology adoption making the continent a fertile ground for innovation. Africa will account for most of the world's population growth over the coming decades, and the working-age population will grow faster than other age groups, creating opportunities for accelerated economic growth. However, the confluence of urbanisation, which is fast growing across the continent, and the rapidly increasing labour force poses risks if the employment market does not grow commensurately. This scenario could generate social and political instability that could destabilise many countries in the region, creating a significant challenge to reaping the demographic dividend. At the same time, an estimated 900 million people across Africa are not connected to the internet, which is evidence of marked social and territorial inequalities in access to digital technologies and the promises of development that such access entails. Consequently, a huge proportion of Africa's population finds itself excluded from the progress expected from digital technologies in pursuit of the Sustainable Development Goals. This situation worsens in times of crisis: the COVID-19 pandemic has shown how the most vulnerable people are the most exposed to external shocks, and how the distance from innovative solutions prevents them from escaping their current isolation.

Section 4 presents EIB's Africa digital economy financing working principles and the EIB's tools for digital economy financing. It details how the Bank's advocacy, technical assistance and financial support a ensure comprehensive approach to achieving the policy objectives highlighted in section 5.

EIB Africa digital economy financing is articulated around six complementary areas of intervention highlighted in section 5:

1. In pursuit of universal access to affordable connectivity, in line with the policy recommendation of the Digital Economy Task Force (DETF), the Bank will seek to boost investment in telecom infrastructure and develop financial instruments tailored to the financing needs of each infrastructure project, as well as supporting national ownership and capacities and the inclusion of the poorest and most disadvantaged.
2. The EIB recognises the importance of investing in digital services to immediately respond to urgent needs and to build a robust digital economy in Africa. As concrete actions, the EIB seeks to support investments in broader ICT infrastructure development to enable innovative use of ICT for socioeconomic purposes such as e-health, e/m-banking, e/m-commerce, e/m-government and other ICT-enabled services.
3. Digitalisation is a powerful tool to enhance financial inclusion for the poorest. Remote financial services, delivered via banks and microfinance institutions (MFIs), enable more affordable (by reducing transaction costs) and wider (by increasing outreach) access to financial services, particularly for the most vulnerable populations such as women and rural inhabitants.
4. Innovation and entrepreneurship are generally recognised as powerful social and economic growth engines, as well as necessary conditions for a region's long-term prosperity and sustainability. The rapidly increasing youth population in sub-Saharan Africa represents both an opportunity and a challenge in this respect: while its culture of entrepreneurship is the strongest worldwide, the region lags at the global bottom in innovation. Hence, it is imperative to address not only current gaps in investment targeting entrepreneurs but also the main gaps in local capacities for innovation.
5. The rapid digital transformation of our economies generates, with the surge in data volumes, a rising need for trust and security. Investments in cybersecurity are vital to safeguarding the development potential of the digital economy. The EIB considers that most African countries require technical assistance to develop national investment frameworks that help to protect and safeguard digital infrastructure and data from cyber threats, and provide a safe and secure online environment to all users. The European Commission will implement in all its external funding, both directly and via international financial institutions (IFIs), the principles of the European Union's 5G toolbox; thereby driving the adoption of best practices in its development activities. The EIB seeks to establish closely coordinated implementation of the toolbox in financing Africa's digital economy with the European Commission.
6. Despite its substantial growth potential, Africa's mobile industry faces many infrastructural and operational challenges. Mobile operators face difficulties in powering their existing networks, both off-grid and on-grid, due to unreliable power supplies and heavy reliance on expensive and polluting diesel generator power. Adopting green power alternatives from energy service companies (ESCOs) presents a strong financial and corporate social responsibility opportunity for mobile operators.

Section 6 highlights the importance of Africa's digital economy stakeholders working together to achieve policy objectives. As the EU bank, the EIB is able to provide significant support in terms of advocacy, technical assistance and financing. However, the Bank is one development institution out of many active in this field supporting local ecosystems composed of public and private entities.

The report builds upon a vast range of literature on best practices and policy and market analyses, and draws on policy documents which establish the core elements of digital transformation as a way of delivering the Sustainable Development Goals. It builds on the EIB's participation in the Digital Economy Task force, complements the work carried out by other organisations and builds on partnerships in the area of digitalisation.

Introduction

The Bank has steadily increased its activity in Africa's digital economy sector, working under various mandates to support digital infrastructure and solutions projects that further promote European policy objectives across the continent. The digital economy is the set of economic and social activities in relation to modern information and communication technology (ICT) that redefine how people consume, learn, communicate and work.

Over the last five years and with an increasing pattern, the Bank's digital economy lending has secured the mobilisation of a cumulative €2.5 billion in terms of investment supported across the African continent. This financing has largely supported private sector companies (70% of total) operating in the domains of infrastructure and innovative digital solutions. Technical advisory services have also increasingly complemented the Bank's digital economy lending activity.

The long-term digital transformation of Africa's economies and societies is profound. Support and financing is required to ensure an inclusive transition and wide dissemination of the economic and social benefits.

Furthering the digital economy sector in Africa will improve the delivery of quality in basic services, increase the transparency and accountability of the public sector and underpin human rights. Digitalisation can upgrade the delivery of public services, including healthcare, education, finance and agriculture at a time when the COVID-19 outbreak is seriously affecting all sectors of the economy. The transition to a digital economy is changing how people interact by enhancing the effectiveness of development activities and offering new solutions across all sectors, with extensive economic benefits.

With adequate investments in digital technologies positively influencing all sectors of the economy and society, Africa may be better able to absorb economic shocks such as that caused by COVID-19, build resilience and generate significant economic growth. The growing importance of the digital sector as an immediate response to COVID-19 necessitates strengthening the Bank's strategy in this sector.

The Bank's digital economy financing in Africa seeks to address the emerging needs of the African continent in its transition to a digital economy. The initiative's scope leverages the Bank's products and capacity on the assumption that appropriate mandates are granted under the relevant windows of the forthcoming 2021–2027 Multi-Annual Financial Framework (MFF), in particular the Neighbourhood, Development and International Cooperation Instrument (NDICI).

The EIB takes a comprehensive approach to financing the digital economy, with investments ranging from telecom infrastructure to digital services and digital transformation of the economy as well as environmental sustainability. As digital transformation is a transversal phenomenon, these areas are all highly interrelated. Inclusive digital services require universally accessible, high-capacity infrastructure. Connectivity is based on fixed and mobile access networks, as well as their connection to the internet backbone through transmission networks and related infrastructure such as data centres. Technologies like electronic identification (e-ID) provide further enabling infrastructure for public services, including for establishing public safety net projects, which are much needed amid the current pandemic. The wider and better the infrastructure, the more favourable the conditions for developing inclusive applications. Most of the digital economy's value potential lies in applications.

The Bank's support for the emergence of a digital economy in Africa is consistent with its innovation and skills public policy goal and is supportive of other sector policies, such as access to finance for small and medium-sized enterprises (SMEs) and mid-caps and climate action. It also conforms with the wider operating environment and risk capacity set out in the EIB Operational Plans, based on EIB credit risk principles and approval procedures. Equally, compliance with the Bank's Guide to Procurement and Environmental and Social Standards is required for it to support projects through investment loans or framework loans. These two documents provide standalone guidelines and rules covering all relevant Bank operations, including in the field of digital economy.

Investing in digital technologies contributes to the European Union's response to COVID-19 and forms part of the Team Europe initiative. The EIB is committed to helping partner countries outside the European Union to fight the pandemic in the short term and to develop economic resilience for the future. As the international financial institution with the largest exposure to the digital economy, the EIB plays a key role in advocating and disseminating best practices through policy dialogue in line with European standards across the African continent. This document aims to enhance communication among public agencies, other members of Team Europe and the communities that could benefit from the Bank's expertise. The paper also seeks to encourage the development of new ideas and to identify investments that will improve lives across the continent.

This paper addresses important recent market evolutions and policy changes. First, while digitalisation has been an explicit objective of cooperation since 2014, the agenda of the new European Commission and the EU-Africa strategy makes digitalisation and the digital economy cornerstones of the Commission's overall geopolitical strategy. Second, the COVID-19 pandemic has drawn more attention to the world's digital divide and the disastrous consequences of not having universal access to the internet. The internet is a vital communications tool that can help communities deal with the crisis. The technology sector is helping many industries adapt to this new situation and reduce the risks induced by the pandemic. Third, a lack of access to finance remains a challenge for the development of all industrial sectors, especially regarding the needs to cover isolated areas and conduct major digital transformation projects.

This paper provides an opportunity for the EIB, as the EU bank, to set out how it can best stimulate the overall investment required in line with European standards.

On 18 December 2019, the Digital Economy Task Force (DETF) was established during the EU-Africa High-Level Forum "Taking cooperation to the digital age." This initiative reflects the European Commission's ambitions for a comprehensive, innovative partnership between Africa and the European Union, called the New Africa-Europe Alliance for Sustainable Investments and Jobs. EIB specialists worked alongside African and European digital economy experts in drafting the DETF report, which proposes a set of policy recommendations and concrete actions to address the challenges of digitalisation in Africa. The DETF report provides a clear route map to support and drive the EIB's digital economy policy.

The Bank endorses the DETF recommendations and is integrating them into its approach to financing Africa's digital economy.

Similarly, on 9 March 2020, the European Commission and the European External Action Service published their joint communication entitled Towards a Comprehensive Strategy with Africa, which stresses the EU priorities. It sets the basis for future cooperation with Africa, making digitalisation one of the six key focus areas. The joint communication also reiterates the necessity of establishing a sound regulatory environment for competition and harmonisation, mentions the potential of digitalisation to harness growth across all services, and generally reinforces the pillars and areas of focus of the European Union's digitalisation frameworks.

Chapter 1

The EIB delivering on policy objectives

Digitalisation is at the forefront of the European Union's partnership, cooperation and involvement with Africa, and has been identified by both the European Commission and the African Union as a priority for economic and social development on the continent. The EIB is playing a key role in Africa's digital transformation by providing expertise and appropriate financial support on digital projects involving the public and private sectors. This chapter illustrates the policy context as defined by the European Union and the responses from Africa along with international support frameworks.

1.1. European policy

The European Union and its Member States have demonstrated full commitment to supporting Africa's digital transformation through various past initiatives and by promoting it prominently in discussions on priorities during the next Multiannual Financial Framework (MFF).

Since the early 2000s and in the wake of the internet revolution, the European Union has striven to set specific rules for the single market in the digital area. The Digital Single Market for Europe (DSM) strategy, adopted in May 2015, recognises the significant impact of digitalisation on growth and job creation within the European economy. There is much scope for further translating the DSM's key principles to a wider EU development policy by promoting digital economies in the rest of the world, particularly in developing countries. The need to make digitalisation more mainstream in EU interventions for sustainable development and economic growth has been strongly highlighted in the European Commission's proposal for a new European Consensus on Development. The Commission's ambition is to support the emergence of an open, democratic and sustainable digital society within the framework of a fair and competitive digital economy.

The DSM rules have a wide impact even outside the European Union, demonstrating the capacity of major trade players to set rules at a global level. This is even more true for states on the periphery of the European Union and linked to it through trade and political relations under the European Neighbourhood Policy (ENP) and to further extend the comprehensive EU-Africa strategy.

The European Neighbourhood Policy, which encompasses North Africa within the Southern Neighbourhood, was established in 2004 to provide a framework for relations between the European Union and its eastern and southern neighbours. Its general purpose is to achieve the closest possible political association and the greatest possible degree of economic integration (COM(2003) 104 final). The policy has been revised several times (most recently in November 2015) to differentiate partner countries and provide adequate flexibility and enhanced sharing of responsibility. To support its partners, the European Union has funded the European Neighbourhood Instrument with €15 billion in the 2014–2020 period.

At their Brussels meeting in September 2014, ministers in charge of digital economy in member countries of the Union for the Mediterranean adopted a declaration pledging close cooperation to reap the benefits of the digital economy for the Euro-Mediterranean area. This resulted in the establishment of a Digital Economy and Internet Access Expert Working Group to reflect on how to progress towards this objective, gathering government

officials and other stakeholders from the private sector, non-governmental organisations, international organisations and development banks.

The changes brought by the DSM strategy under Jean-Claude Juncker's mandate offer a new opportunity to put the European Union's relationship with the Southern Mediterranean on a new footing. This was discussed during the high-level stakeholder Digital4Med Conference on 8 April 2019 in Brussels, which focused on areas that can have the biggest impact and in which the European Union has relevant experience and demonstrated expertise. The conference identified types of cooperation aimed at triggering political engagement at ministerial level, and the next steps will be to identify concrete actions and to seek political endorsement.

The European Union's relationship with sub-Saharan Africa is governed until year-end 2020 by the 2000 partnership agreement with African, Caribbean, and Pacific (ACP) states, known as the Cotonou Agreement, signed in June 2000 by 78 ACP countries. It is based on four main principles: partnership, participation, dialogue and mutual obligations, and differentiation and regionalisation. It notably acknowledges civil society and, especially, the private sector as essential to fostering economic development, represented in the principle of participation.

With the creation of the new Africa-Europe Alliance for Sustainable Investment and Jobs in 2018, the partnership between the two continents increased, enhancing their cooperation in many areas, including digital economy.

As a follow-up to the conclusions of the Foreign Affairs Council (development formation) of 28 November 2016 on "mainstreaming digital solutions and technologies in EU development policy," a solid, comprehensive framework for the European Commission's digital-related development policy arose in 2017, titled Digital4Development (D4D) and detailed in the Digital4Development Staff Working Document (SWD). This framework celebrates the potential of digital technologies and services as powerful enablers of sustainable inclusive development and growth.

With the creation of the new Africa-Europe Alliance for Sustainable Investment and Jobs in 2018, the partnership between the two continents increased, enhancing their cooperation in many areas, including digital economy. In his State of the Union speech in September 2018, then-Commission President Juncker proposed this alliance to drive forward intercontinental political and economic cooperation on an equal footing. The alliance's long-term aim is to create a comprehensive continent-to-continent free trade agreement between Africa and the European Union, building on the African Continental Free Trade Area (AfCFTA). Among the specific actions triggered by the Alliance was the establishment of four thematic task forces, one of which focuses on digital solutions.

To receive guidance on which cooperative actions to prioritise, the European Union and African Union consulted industry experts, which worked together in the so-called DETF. This Task Force provided a platform for partnership between the private sector, donors, international organisations, financial institutions and civil society, based on a shared understanding of how an already evolving digital transformation in Africa can achieve cross-border integration, accelerate sustainable development and bring benefits to all. Vice-President Ambroise Fayolle represented the EIB on the DETF.

The European Union-African Union DETF worked during 2019 to develop a shared vision, a set of commonly agreed principles and a list of policy recommendations and actions to achieve four main goals:

1. **Accelerating universal access to affordable broadband** by developing the right financial instruments, business models and synergies with properly designed partnerships. The regulatory environment for competitive and harmonised regional markets must also be adapted accordingly. At the same time, measures that make broadband affordable to all, particularly the underprivileged and rural inhabitants, need to be promoted.
2. **Guaranteeing essential skills for all to enable people to thrive in the digital age**. Skills must be understood in a wide and comprehensive way across lifelong education pathways, and should be addressed by all public and private institutions potentially concerned. Skills promotion must also include reviewing education curricula in accordance with evolving needs and trends in the digital economy and society. Developing partnerships through a multi-stakeholder African Alliance for Digital Skills and Jobs is key to promoting policy dialogue and raising awareness among policymakers. Efforts must be harmonised at continental, regional and national levels, based on a thorough assessment of market opportunities.
3. **Improving the business environment and facilitating access to finance and business support services to boost digitally enabled entrepreneurship**. Partnerships between Africa and Europe, and within Africa, need to be developed to harmonise policies and investments related to digital entrepreneurship at continental, regional and national levels. Adaptation needs to be considered at all levels in the value chain, so as to ensure flexibility and a better business environment for digital enterprises of all sizes, including micro, small and medium-sized enterprises (MSMEs), startups and social enterprises. Actions must also ensure ecosystem sustainability, addressing all interrelated barriers and needs and improving advisory services to stimulate digital entrepreneurship.
4. **Accelerating the adoption of e-services and the further development of the digital economy for achieving the Sustainable Development Goals (SDGs),** aiming to ensure more inclusive societies with access to basic rights and services. Governments need to deploy the essential enabling building blocks of e-governance services, such as e-ID, public registries and cashless government, while also fully respecting data protection. Likewise, integration within Africa should be supported to ensure wider market opportunities for all companies and further benefits to citizens. Whenever possible, we should build on Africa's success stories in the development and uptake of digital financial services.

The European Union-African Union DETF report was endorsed by Andrus Ansip, vice-president of the European Commission, Dr Amani Abou-Zeid, African Union Commissioner, and European Commissioners Mariya Gabriel and Neven Mimica. The EIB took this opportunity to interact with DETF members and refine its strategy to support the emergence of a robust digital economy in Africa.

In February 2020 the communication Shaping Europe's Digital Future [1] announced that a Global Digital Cooperation Strategy will by 2021 propose a European approach to digital transformation that builds on the European Union's long and successful history of technology and innovation, vested in European values, including openness, that will be projected onto the international stage as we engage with our partners.

More recently, the Political Guidelines 2019–2024 of the President of the European Commission, Ursula von der Leyen, state that Europe must lead the transition to a healthy planet and a new digital world. More specifically, the president asked the Commissioner-designate for International Partnerships, Jutta Urpilainen, to maximise the political, economic and investment opportunities

1 COM(2020) 67 final. https://ec.europa.eu/info/sites/info/files/communication-shaping-europes-digital-future-feb2020_en_3.pdf.

presented by Africa, with its growing economies, populations and digital innovations. Along these lines, on 9 March 2020, the European Commission and the European External Action Service (EEAS) published their joint communication entitled Towards a comprehensive strategy with Africa, which stresses the EU priorities. It sets the basis for future cooperation with Africa, making digitalisation one of the six key focal areas. The joint communication also reiterates the necessity of establishing a sound regulatory environment for competition and harmonisation, mentions the potential of digitalisation to harness growth across all services, and generally reinforces the pillars and focal areas of the European Union's digitalisation frameworks.

The COVID-19 crisis has served to underline the central role of digital connectivity, technologies and services in economies and societies worldwide.

The European Union has led multiple initiatives to address the challenges of creating and operating the DSM. The best-known element and a cornerstone of this process has undoubtedly been the General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679), which entered into force in May 2018. The GDPR must be adopted by any organisation located outside the European Union desiring to conduct online business with individuals inside the European Union.

The COVID-19 crisis has served to underline the central role of digital connectivity, technologies and services in economies and societies worldwide. In June 2020 the Team Europe initiative was proposed to enhance the digital economy across the continent. It identifies digital transformation as a principal area where European partners can make a substantive impact by joining forces, and as an opportunity to promote fundamental values (such as inclusiveness; rights-based, human-centric digitalisation; responsible use of technology) and to support Africa's creative potential.

The European Commission highlights the fact that fostering the green digital economy through industry and the financial sector will be essential for meeting the Green Deal objectives. Digitalisation presents new tools for improving energy efficiency, promoting the circular economy, monitoring deforestation and air/water pollution, improving efficiency for food production, and tackling other key environmental issues. Europe intends to lead the transition to a healthy planet and a human-centric digital world, so digital is a main priority, along with the response to climate change. Digital sector investment decisions made now will have effects over the coming decades on the economic development, resilience and security path of the European Union and its partners.

The EIB's digital-sector lending activities fully support the European Commission's policy priorities inside and outside the European Union.

To put the Commission's objectives into practice during the next Multiannual Financial Framework, the Directorate-General for International Cooperation and Development (DG DEVCO) and the respective EU Delegations have made supporting digital projects one of the main topics of ongoing discussions on priorities up to 2027. The digital sector is thereby considered a crosscutting theme that touches multiple other sectors.

The EIB's digital-sector lending activities fully support the European Commission's policy priorities inside and outside the European Union. Moreover, the EIB is fully involved in and contributing to discussions with EU Delegations on digital finance up to 2027, and there is ample consultation with the Commission on individual transactions. The EIB is, therefore, a partner of choice to achieve the development objectives in line with overarching EU policies.

Through the External Investment Plan (EIP), the European Union will support its partner countries in their efforts to meet the Sustainable Development Goals by 2030. This plan will also address specific socioeconomic root causes of migration, including irregular migration, and contribute to the sustainable reintegration of migrants returning to their countries of origin and to the strengthening of transit and host communities. The plan includes a specific Digital4Development investment window under the European Fund for Sustainable Development (EFSD). Moreover, the MSME financing investment window should promote instruments and facilities serving new sub-sectors in the region, including the digital economy, through support for innovation, startups and digital entrepreneurship.

Finally, the European Union's commitment to meeting the goals of the Paris Agreement requires "bending the curve" of global greenhouse gas emissions. This needs strong global policy support and increased investment in low-carbon technologies, as well as strengthening resilience to the global warming already built into the climate system. Through its Green Deal, the European Union is committed to ambitious emission reductions by 2030. The Commission highlights the fact that digital solutions are key to fighting climate change and achieving the green transition.

1.2. African policy

In 2019 the African Union introduced the Digital Transformation Strategy for Africa (2020–2030), based on previous initiatives and following consultations of multiple stakeholders in the digital ecosystem in Africa. Those stakeholders notably included the UN Economic Commission for Africa, Smart Africa (an alliance of 30 African countries aiming to accelerate development through increased use of ICT), the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD), Regional Economic Communities, African Development Bank (ADB), African Telecommunications Union, Africa Capacity Building Foundation, International Telecommunication Union (ITU) and the World Bank. In line with the Agenda 2063 for Africa and the Sustainable Development Goals, the strategy aims to transform Africa's economies and to promote their integration by stimulating inclusive growth using digital technologies and innovation. It builds on existing initiatives and frameworks to support the development of a digital single market for Africa, where services, capital and free movement of people are ensured and business and individuals can seamlessly access and engage in online activities. The Digital Transformation Strategy relies on several principles, including solidarity and cooperation between member states; adopting a new digital mindset; engaging in a comprehensive, inclusive and transformative approach through partnerships; and generating home-grown digital content and solutions.

Specific objectives to drive the digital transformation have been set. These include providing universal and affordable (below $0.01 per Mbps) access to a secure and stable 6 Mbps broadband connection through a smart device, possibly manufactured on the continent, with a maximum retail price of $100; offering a massive online e-skills development programme to provide basic knowledge and skills in digital environment security and privacy to 100 million Africans per year by 2021, rising to 300 million per year by 2025; and adopting a complete legal framework for cyber-security and personal data protection and providing 99.9% of Africa's population with a digital legal identity. The African Union recognises that Africa's digital transformation must be strengthened by harmonising policies, legislation and regulations, and is committed to implementing innovative financing models to digitally transform Africa. These objectives will require an estimated additional investment of $20 billion per year between 2020 and 2025, rising to $50 billion per year between 2026 and 2030.

The Digital Transformation Strategy for Africa is based on five foundation pillars (enabling environment, policy and regulation, digital infrastructure, digital skills and human capacity, digital innovation, and entrepreneurship) in six critical sectors (digital industry, digital trade and financial services, digital government, digital education, digital health, and digital agriculture), and aims to drive digital transformation through five cross-cutting themes (digital content and applications, digital ID, emerging technologies, cybersecurity, privacy and personal data protection, research and development) to support the digital ecosystem. It includes policy recommendations and actions under each foundational pillar, critical sector and cross-cutting theme. The recommendations and proposed actions strongly align with those highlighted in the European Union-African Union DETF report referenced above.

The African Continental Free Trade Area (AfCFTA), created in 2018, provides the platform for realising new industrialisation pathways by harnessing the opportunities that digitalisation offers. However, amid the COVID-19 pandemic, the implementation date of the AfCFTA Agreement has slipped from 1 July 2020 to next year. Nevertheless, there is a push to move the continent forward by implementing the agreement and thereby spurring further collaboration and intra-African trade, which could, in turn, help the continent become more integrated, leap forward technologically and be more resilient to pandemic-related economic downturns. In October 2020 the secretary general of AfCFTA announced an upcoming digital payment and settlement platform for cross-border transactions in Africa. The potential for digital trade to drive economic development and transformation in Africa remains largely unexplored.

The Smart Africa Alliance is a partnership between 30 African countries[2] adhering to the Smart Africa Manifesto. Its goal is to accelerate sustainable socioeconomic development on the African continent through ICT use and better access to broadband services. The Alliance is a framework for implementing, monitoring and evaluating the Smart Africa Manifesto.

1.3. Delivering on policy objectives

As the EU bank with a Treaty-bound mandate for development, the EIB plays a key role in supporting and implementing EU policies, both inside and outside the European Union. In Africa, under the 2014–2020 Multiannual Financial Framework the EIB was fully aligned with EU external and development policies, as well as specific objectives set out in the External Lending Mandate (ELM), the European Neighbourhood Policy for North Africa and the ACP-EU Cotonou Agreement for sub-Saharan Africa. The EIB is working to ensure continuity under the upcoming 2021–2027 Multiannual Financial Framework, with the green economy and digitalisation as overarching priorities for EU assistance to the continent and a range of financial instruments being developed under the Neighbourhood, Development and International Cooperation Instrument (NDICI).

The EIB is engaged in strategic and technical discussions with counterparts in the European External Action Service (EEA), three European Commission Directorate-Generals (for Neighbourhood and Enlargement Negotiations (DG NEAR); DG DEVCO, becoming the DG for International Partnerships from January 2021; and for Economic and Financial Affairs), and several other directorates. These discussions are focused on enhancing cooperation outside the European Union and on identifying synergies for co-financing and blending. Annual coordination meetings by region are attended by the relevant geographic departments of

2 https://www.agenceecofin.com/gouvernance-economique/0512-71815-le-maroc-est-devenu-le-30e-membre-de-l-alliance-smart-africa

DG NEAR and DG DEVCO, alongside EEAS representatives, and there are ongoing discussions on priority sectors and strategic horizontal priority issues.

Cooperation with the European Commission and EEAS is also strong at country level. Locating the EIB's local offices within EU delegations for countries outside the European Union, together with the overall expansion of the network of EIB external offices, has resulted in much closer cooperation, especially on the ground. The Bank has been involved in several elements of the Africa-Europe Alliance for Sustainable Investment and Jobs, notably the task forces on digital economy, sustainable energy and transport—sectors where the EIB has a strong track-record for investment. The idea behind the Alliance is to ultimately create a comprehensive continent-to-continent free trade agreement between Africa and the European Union.

The EIB aims to make a major contribution to Europe's leading role promoting decarbonisation and a green, resilient and socially inclusive economy. The EIB Board of Directors approved the Climate Bank Roadmap that details how the EIB Group aims to support the Green Deal objectives and sustainable development outside the European Union. In November 2019 the EIB Group set itself the target of supporting €1 trillion of investments in climate action and environmental sustainability in the critical decade from 2021 to 2030; it also committed itself to ensuring that its financing activities all align with the goals and principles of the Paris Agreement by the end of 2020. In addition, the EIB made an important commitment towards climate action and environmental sustainability, raising its target share to at least 50% of overall business volumes by 2025.

With the COVID-19 crisis seriously affecting companies across the world, there is a high risk that firms everywhere will postpone, downsize or cancel investment, with a potential negative impact on long-term growth prospects. Digital technology has the capacity to provide the jobs and economic growth that are needed to overcome the crisis, as well as a solution to support climate action.

Chapter 2

EIB digital economy financing

This chapter outlines the guiding principles and lending activity of the EIB in the digital sector in Africa. All sectors (public, private and academia) are currently undergoing digital transformation. Therefore, the transition to a digital economy should be a steered process, rather than comprising ad-hoc actions. Digital transformation of our societies influences all aspects from social to financial in any given country. The enabling of new digital solutions and private sector growth relies on access to telecom infrastructure services. This access and the applications it enables directly contribute to achieving the Sustainable Development Goals. Digital technologies have demonstrated their capacity to increase access to and improve the delivery of services, improve productivity and job creation, and promote accountability and transparency, among other benefits.

The distancing measures and travel restrictions implemented in many African countries to mitigate and manage the current health crisis have highlighted the importance of digital technologies in today's economies and, especially, societies. Amid the COVID-19 pandemic, as medical professionals are saving lives, digital technologies are saving economies and making it possible to maintain social ties. Being able to work from one's place of confinement, reach family and friends (including by video when networks allow), share experiences on social networks, and access information helps to relieve the concerns of the population and maintain social order. These positive effects will last beyond the current pandemic response and are signs of how digital technologies transform the world and everyone's lives.

In addition to these social benefits, digital technologies have had a major economic impact. The African Development Bank projected that the real gross domestic product (GDP) in Africa would contract by 3.4% in 2020, dropping by 7.3 percentage points from the pre-COVID–19 projection in January 2020.[3] Had many companies not been able to switch massively to teleworking, the impact would probably have been much greater. Without digitalisation, then, the situation would undoubtedly be much worse.

Given the current economic situation, digitalisation is at the forefront of the European Union's geopolitical strategy towards Africa. The need to make digitalisation mainstream in EU interventions for sustainable development and economic growth has been stressed in development cooperation efforts and requires the intervention of international financial institutions fully aligned with the objectives set by the European Commission and EU Member States.

2.1. Digital economy financing by the EIB

The EIB has financed telecom infrastructure projects since the early 1970s. Lending volumes notably picked up in the 1990s, in the wake of broad-based deregulation and privatisation of the sector across Europe. The ensuing increase in competition fostered technological innovation, such as the mobile standard GSM and the penetration of internet-based technologies, resulting in significant investment programmes.

Recognising the importance of modern telecom infrastructure for innovation and competitiveness, the Bank first included the financing of telecom and digital infrastructure as an innovation programme priority in 2001. Since then, investments in fixed, mobile and satellite telecom networks have been supported as "innovation-enabling infrastructure" alongside research, development and innovation (RDI) and education projects, and are reported under the "innovation" public policy goal.

3 https://www.afdb.org/en/documents/african-economic-outlook-2020-supplement

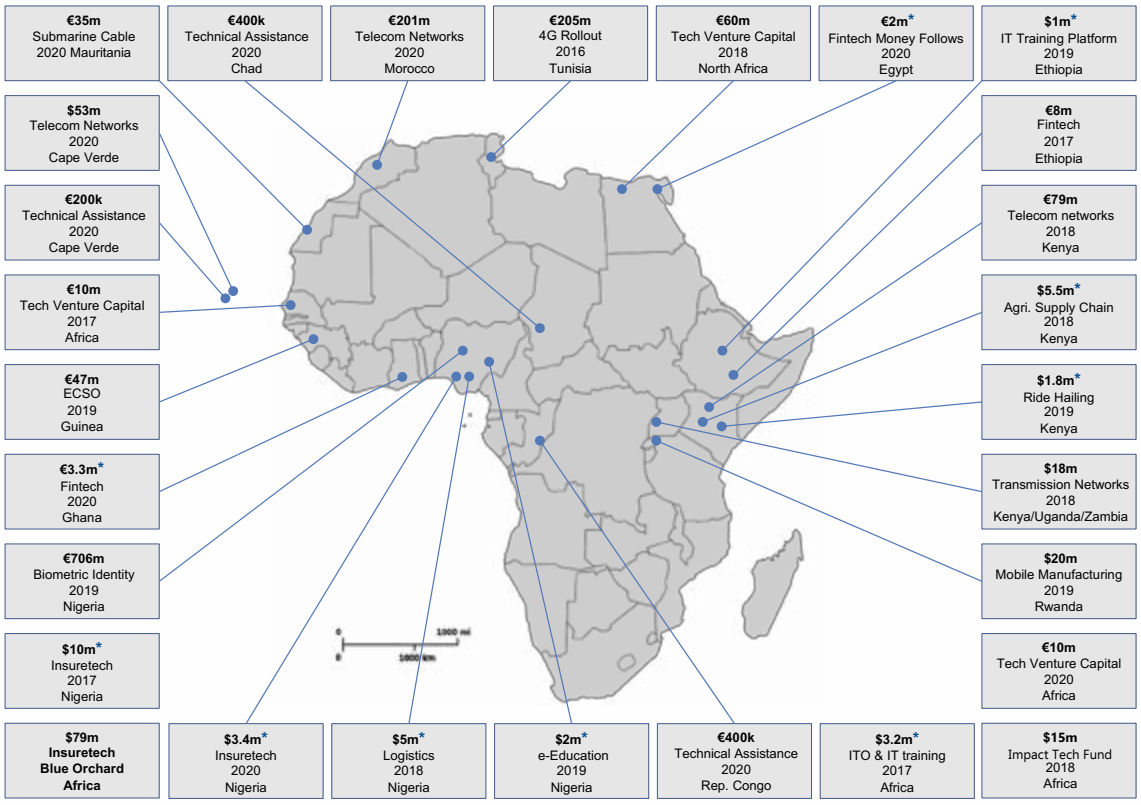
The EIB has more exposure to the digital economy sector than any other international financial institution.

Support for the digital economy is key to boosting technological innovation and services and essential for driving productivity growth. Between 2015 and Q2 2020, the Bank signed finance contracts amounting to approximately €12.3 billion in digital connectivity projects (broadband), with average annual lending volumes of around €2.4 billion. The EIB has more exposure to the digital economy sector than any other international financial institution.

The EIB's lending policy for the digital sector is aligned to EU policies in the area, such as the Digital4Development Staff Working Document and various strategies, guidance documents and reports, including the DETF report, Towards a comprehensive strategy with Africa, and the new EU internal guidelines on digitalisation for programming.

Over the last five years and with an increasing pattern, the Bank's digital economy lending has secured the mobilisation of a cumulative €2.5 billion in terms of investment supported across the African continent (as illustrated in the figure below). This financing has largely supported private sector companies (70% of total) operating in the domains of infrastructure and innovative digital solutions. The Bank's financing occurs both through direct and intermediated financing (mainly venture capital and private equity funds).

Sample EIB digital economy investments mobilised in Africa



(*) Intermediated financing.

2.2. Macroeconomic context

The economic and health crisis triggered by the COVID-19 pandemic is badly affecting sub-Saharan Africa. The International Monetary Fund (IMF) updated its growth projections in June 2020 and now expects real GDP per capita to contract by more than 4% and unemployment to continue

rising. Given the weak state of the region's health systems and other underlying vulnerabilities, the effects on health could increase. Sub-Saharan African countries may experience direct economic effects from increased morbidity and mortality, as well as from the varying levels of lockdowns imposed by most states. Other challenges facing these countries include falling prices of oil, gas, iron ore and other commodities; reduced demand for exports, particularly from the European Union, China and the United States; disruption to supply chains for intermediate inputs and for basic goods such as food and medicines; collapse of tourism revenues; and capital flight as risk aversion rises among international investors. Although the fall in oil prices and the drop in demand could dampen inflationary pressure, the potential for food shortages and the impact of currency depreciation mean that inflation is likely to rise. Several African countries depend on oil export.

Migrant workers, refugees and other vulnerable and marginalised groups are likely to suffer most. There is a significant risk that the pandemic-related economic challenges and social distancing measures could trigger social unrest and destabilisation in sub-Saharan African countries.

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Yet, based on the region's economic fundamentals, there is also strong potential for robust, sustained and inclusive economic growth. This recovery will depend on successfully suppressing the pandemic and the gradual relaxation of restrictions on the continent and in economic partner countries, but also on the implementation of appropriate supportive policy measures to maximise SSA's economic potential. Growth prospects are particularly enhanced by natural resource endowments and the availability of a young and increasingly educated workforce. The digital economy sector often demonstrates stronger resilience. For instance, oil-producing Nigeria reported that the mobile telecommunications sub-sector accounted for 10% of the country's total GDP in 2019, compared to 7% in 2018, and leapt to 14% in Q2 2020.

The African continent has the world's highest population share aged 10–24, at approximately 32% (with over 200 million aged 15 to 24). The continent's productive capacity will surge in the coming years thanks to this additional labour supply,[4] which is increasingly well educated: Unesco expects the proportion of 20 to 24 year olds who complete secondary education to increase from 42% to 59% over the next 20 years.[5]

Prior to 2020, SSA's economies were among the world's fastest growing. According to the IMF, between 2017 and 2019, annual real growth of GDP averaged 3.1%, slower than the average for emerging and developing Asia but significantly higher than other emerging and developing markets or developed countries.[6] Furthermore, excluding the region's largest economies—Nigeria and South Africa—whose performance has been relatively weak and highly volatile, the average growth rate was close to 5% and several countries experienced average growth rates exceeding 7% over this period. SSA's overall economy had been expected to expand by 3.5% in 2020.

However, even once the recovery begins, more must be done to ensure that economic growth is inclusive and sustainable, with the benefits widely shared. The number of Africans living on less than $1.25 per day is over 400 million and still growing,[7] and the growth in poverty will be exacerbated by the COVID-19 crisis. The distribution of the wealth created to date is extremely

4 International Labour Organization, World Employment Social Outlook – Trends 2015.
5 https://unesdoc.unesco.org/ark:/48223/pf0000186526
6 IMF, Regional Economic Outlook: Sub-Saharan Africa, April 2020.
7 Brookings Institute, Africa in Focus blog, 4 May 2015.

unequal, with the top 0.015% owning an estimated 28% of the African continent's individual assets.[8] Furthermore, economic growth has not created enough jobs to absorb the growing active population. Unemployment, underemployment and low-quality employment remain major concerns across sub-Saharan Africa. The rate of vulnerable employment is the world's highest, at 77%,[9] and youth unemployment is a particular concern.

Overall, Africa's economies and societies are at a critical juncture, with developments over the next few decades expected to have profound implications for the long-term future of not only Africa but also its neighbours and the larger global community. The COVID-19 crisis has particularly highlighted the risks of relying on single revenue sources, especially commodities, and the need for economic diversification. There is an urgent need to support Africa's nascent entrepreneurial ecosystem by creating new businesses, shaping innovation, providing growth capital for startups to develop, accelerating structural changes in the economy and contributing to increased productivity and competitiveness.

2.3. High performance standards, technology neutrality and network expansion

Given the persistently large gap between the ambitious EU policy targets for high-performance infrastructure and their implementation status, the EIB has traditionally focused on providing funding where it is particularly needed to support investments in the context of market failure. In the current regulatory environment, most future investments in digital infrastructure will not need significant public support, provided that efficient financing makes them commercially viable.

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However, one exception is investments in less densely populated, rural areas. They typically suffer from imbalance between high up-front investment costs and relatively limited cash flows from lower-income consumers. This lack of commercial viability often causes projects in these so-called grey and white areas[10] to be held back by private investors, resulting in rapid deepening of the digital divide. However, considering the positive externalities over a long time horizon, such projects might still be economically justified and, therefore, appropriate for public support.

A second focus area for the Bank has been supporting very-high-capacity (VHC) digital infrastructure. While adopting a neutral stance regarding the choice of transmission technology (technology neutrality), the EIB requires ambitious minimum performance standards that anticipate future demand and performance trends. These standards help ensure that users of EIB-financed projects will benefit in the long term from significantly improved network performance at affordable prices.

2.4. Security best practices in a digital world

Digital tools represent a dematerialisation opportunity for Africa's economies and allow new models to be deployed. E-government strengthens democracies across the world by increasing accountability to citizens. To derive the most benefits, the digital economy value chain must be

8 United Nations (UN), Africa Renewal online magazine, April 2015.

9 Brookings Institute, Africa in Focus blog, 30 January 2014.

10 White areas have no infrastructure, grey areas have only one piece of infrastructure in place, and black areas have more than one network operator.

protected through solid cyber-defence policies and cybersecurity best practices. Despite growing awareness of cyber threats, the use of secure networks, servers and platforms even among public administrations is still too low across the African continent, demonstrating a vulnerability of national information and administration systems and, consequently, of the states themselves.

Conversely, the misuse of digital technologies can create an environment permitting increased control and potentially manipulation or radicalisation. Cases of abusive data collection, arbitrary surveillance, manipulative interference, election interference, and mis/disinformation campaigns are increasing, as such innovative tools become more widely available and increasingly efficient. Moreover, as internet access penetration grows, cybersecurity risk awareness and digital literacy become increasingly connected.

The strengthening of the digital economy increases the need to consider and invest in security. Maintaining trust in cyberspace is a prerequisite for harnessing the digital economy's potential.

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In this context, the European Commission recognises that making cybersecurity a mainstream feature of its development cooperation is key to enabling more resilient and sustainable development. Highlighting the need to be secure and resilient, in January 2020 the Commission endorsed in the joint toolbox of mitigating measures agreed by EU Member States to address security risks related to 5G, the fifth generation of mobile networks. Closely coordinated implementation of the toolbox is indispensable to ensuring EU businesses and individuals can make full and secure use of all benefits of the new technology.

The toolbox addresses all risks identified in the EU-coordinated assessment, including those related to non-technical factors, such as the risk of interference from non-EU state or state-backed organisations through the 5G supply chain. Based on the European Union's risk assessment report published in October 2019,[11] the toolbox includes strategic and technical measures and corresponding actions to reinforce their effectiveness.

In early 2020, the European Commission announced that it will implement the European Union's 5G toolbox – which provides a model for ensuring supplier diversity and mitigating the dangers of high-risk vendors – in all its external funding, both directly and via international financial institutions.

In financing projects across the African continent, the EIB encourages its promoters to apply best practices to ensure the security of digital infrastructure and supply chains, in line with the 5G toolbox recommendations.

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2.5. Free flow and protection of data

Free flow of data between economies and across political borders should be a key element of developing an efficient digital economy in Africa, and is also vital to creating a strong link with the DSM.

Following the example of the free roaming agreement between EU Member States, some African countries have decided to reduce international roaming charges. Kenya, Uganda, South Sudan,

11 EU coordinated risk assessment of the cybersecurity of 5G networks, October 2019 https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_19_6049/IP_19_6049_EN.pdf

The EIB seeks to ensure the universal application of privacy, data protection and the data-security-by-design principle in the development of e-services, wherever relevant to the projects it finances.

Rwanda, Tanzania and Burundi signed the One Network Area agreement in 2014; similarly, the Central African Economic and Monetary Community (CEMAC) plans to abolish roaming charges by 2021 in six countries (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon).

The GDPR governs data protection and privacy within, as well as the transfer of personal data outside, the European Union and the European Economic Area. It, therefore, applies to every organisation on the African continent that processes the personal data or monitors the online activities of EU residents.

The fundamental user rights contained in the GDPR are seen as an instrument of best practice. These rights are the standard that Africa's businesses and organisations are encouraged by the Commission to adopt. In this sense, the European Union offers to share its experiences with the GDPR, frameworks on artificial intelligence, and the Expert Group on Business-to-Government Data Sharing. Using the GDPR as a model, the EIB seeks to ensure the universal application of privacy, data protection and the data-security-by-design principle in the development of e-services, wherever relevant to the projects it finances.

Similarly, African countries could draw inspiration from the European Gaia-X initiative, which aims to achieve digital sovereignty in the field of cloud infrastructure, an industry traditionally dominated by US firms.

Going further: Technical assistance for Nigeria on e-ID GDPR alignment

The Bank's Board of Directors approved in May 2019 a €250 million commitment to finance Nigeria's biometric identity project. At the time of appraisal, privacy and data protection in Nigeria were significantly lagging behind international standards. This EIB financing has sought to ensure the application of best practices in this domain, such as the enactment of comprehensive data protection legislation, consistent with internationally established privacy and data protection principles. The EIB has considered it critical that a data protection authority be established to enforce the provisions of this law once passed.

The EIB also provided technical assistance to align Nigeria's Data Protection Bill with EU best practices, mainly entailing alignment with the GDPR. Through the EIB's financing, guidance and monitoring, the European Union will be able to ensure that the system deployed is aligned with the priorities set by Nigeria.

2.6. Contribution to climate action

With the effects of the COVID-19 crisis on companies across the world, tackling climate change has just become harder. There is a high risk that firms everywhere will postpone, downsize or cancel investment, with a potential negative impact on long-term growth prospects.

Just as COVID-19 and climate change pose a dual threat, digitalisation and climate action merge to provide a joint solution. By largely ignoring fixed telephony and directly focusing on mobile phones, the continent has made a great technological leap. This development opens up possibilities in terms of sustainable and inclusive growth, as using digital technologies contributes to achieving environmental sustainability through benefits such as better use of resources, increased efficiency and reduced emissions.

Digital solutions have a profound impact on most parts of the modern economy. In particular, they arguably facilitate climate change mitigation in other sectors (such as energy, transport, buildings, and agriculture) through smart and efficient technologies or ICT-enabled services. Many industry voices consider ICT an enabling technology for services that could lead to increased energy efficiency, substitute physical with virtual products/services, or replace travel and face-to-face communication with online communication tools. All these services could reduce emissions in other sectors.

Indirectly, digital infrastructure contributes to climate change adaptation in other sectors, primarily through monitoring for improved climate risk analysis, information provision for improving resilience, and education and awareness building. For instance, climate risk analysis can be improved by distributing a high number of solar-cell-powered sensors that are connected to a mobile network and send real-time information to a server based in a data centre. Provided enough computing power is available, these data can be used to create better climate-risk models. The findings can then be distributed efficiently through fixed and mobile networks to communities living in high-risk locations (such as in an early-warning system).

In providing technical assistance and supporting local promoters of the digital economy ecosystem, the EIB seeks to support digital infrastructure and technologies that promote environmentally sustainable economic growth paths.

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2.7. Providing additionality

The EIB strives to make a difference when markets fail to address investment gaps and structural deficits. While impact represents the difference made by EIB projects in the wider economy, notably in terms of job creation and GDP growth, additionality entails using the EIB's unique status as the European Union's financing institution to facilitate and strengthen investment projects through financing, credit enhancement, technical assistance and advisory support. In practice, this means addressing market failures or gaps in social equity that lead to suboptimal investment situations, through improving the quality, scope, timing and/or scale of investments while complementing the finance available from commercial sources.

The EIB's financing of digital economy projects usually addresses the following market failures:

1. imperfect competition;
2. conducting research, development and innovation activities that bear an inherent commercial risk;
3. the economic lifetime of a project exceeding the tenor of loans that are typically available in domestic capital markets.

The EIB works with promoters facing suboptimal investment situations, as they cannot access long-term financing matching the economic lifetime of their projects.

The market failure of underinvestment in infrastructure—due to significant up-front investment costs, uncertain revenue flows as competition increases, and the difficulty of accessing finance—is clearly exacerbated by where vulnerable and marginalised populations are located, notably in rural areas. Using the Impact Finance Envelope, which focuses on high-risk private sector projects, the EIB has often been equipped to provide corporations with first-time non-shareholder senior loans, effectively flagging to the banking market the company's ability to raise long-term

funding. The Bank is able to provide financing conditions that would not be available from local or international commercial banks. In various cases, EIB financing has enabled borrowers to access further financial resources from the debt or equity markets.

For startups developing solutions based on digital technologies, a limited track-record and the high screening costs for small investments create information asymmetries that restrict access to finance. By supporting such companies, the EIB sends a positive signal to private investors and thus incentivises further financing.

One EIB objective is to mobilise third-party capital investments in Africa's venture capital and private equity markets by demonstrating successful investment to other capital providers. The availability of venture capital and private equity growth capital is a major stepping-stone for entrepreneurship. A commitment from the Bank has a strong catalytic effect, helping funds achieve a critical mass to implement their designated strategy, but also adds credibility to the manager's fundraising plans. The Bank's commitment as anchor investor in various technology funds in Africa (such as TLcom or Partech Africa) was deemed crucial to attaining the first closing. The EIB's commitment provides an important market signal to other investors, including private investors that potentially join at subsequent closings. Moreover, the Bank works closely with venture capital and private equity fund managers to structure their funds in accordance with international best practices, including environmental, social, and corporate governance. In particular, the EIB implements safeguards ensuring that a fund's investment decisions consider relevant socioeconomic and environmental effects. Finally, the EIB requires fund managers to apply best practices among portfolio companies, and has started to require portfolio investees that use digital technologies to implement a cybersecurity plan in line with best practices proportionate to their size and business activity.

2.8. Contributing to the Sustainable Development Goals

Digital technologies and services are recognised as essential in the continuous efforts to achieve the 17 Sustainable Development Goals. They contribute most directly towards Industry, Innovation and Infrastructure (SDG 9), which targets significantly increasing access to ICT and striving to provide universal and affordable access to the internet in least developed countries by 2020. However, the digital sector's contribution in Africa is far greater. ICT can have multilateral effects on the Sustainable Development Goals through digital infrastructure (more connectivity and internet access), mobile payments (more financial inclusion), and the internet of things (IoT: more interconnection). Those technologies and solutions form enabling infrastructure on which initiatives to support the Sustainable Development Goals are built.

Digital technologies and services are recognised as essential in the continuous efforts to achieve the 17 Sustainable Development Goals.

Investing in the digital economy can place women and youth at the core of development policies and close the gap between individuals and governments, while also creating a digital bridge with the world. Building sustainable and energy-efficient infrastructure can lead to new economic opportunities and strengthened livelihoods, particularly for women, as well as improved health, safety and quality of life. Digital technologies can have a positive impact on economic growth, peace and security, the environment, marginalised communities and societal development.

The table below outlines how the digital economy can accelerate progress towards every one of the 17 Sustainable Development Goals.

SDG	Example contributions of digital solutions
1: No Poverty	One in three Africans—422 million people—live below the global poverty line. According to the United Nations, this number rises by millions as the continent's population grows. Digital payments solutions such as M-BIRR in Ethiopia allow the efficient distribution of public safety net programmes in support of the most vulnerable people.
2: Zero Hunger	The United Nations estimates that there are 180 million people living with hunger on the continent. Digital technologies can improve production capacity and distribution. Kenyan startup Twiga[12] provides a complete and efficient supply chain for agricultural products.
3: Good Health and Well-being	Digital technologies have proved useful in stopping the spread of a virus. The mHERO solution—initially developed in 2014 to combat Ebola in Uganda, Guinea, Liberia, Mali and Sierra Leone—has enabled many countries that have adopted it to continue fighting against pandemics. mHERO is a two-way mobile phone-based communication system that connects ministries of health and health workers.
4: Quality Education	In Africa, over one-fifth of children aged about six to 11 and one-third of those aged 12 to 14 are out of school. Moreover, according to the Unesco Institute for Statistics, almost 60% of young people aged about 15 to 17 are not in school. Education must be developed in different ways to educate Africa's still-growing school-age population. Education platforms ensure free and wide-ranging access to curricula for students in rural areas and in lockdown situations through feature phones.
5: Gender Equality	According to UN statistics, sub-Saharan Africa boasts the world's highest rate of women entrepreneurs, at 27%,[13] but most female-led enterprises remain small businesses with little capacity for growth. Furthermore, only 15% of women in Africa can afford to use the internet, so women's access to goods and services, information and an efficient marketing, payment and distribution platform is severely limited. Digital access is a strong empowerment tool for girls and women because it provides opportunities for education, job access, business financing and follow up, and therefore more help from governments and international organisations.
6: Clean Water and Sanitation	More than 320 million Africans still lack access to drinking water and sanitation, which is estimated to cost sub-Saharan Africa up to 5% of its GDP. Combining Earth observation data, innovative on-site instruments and modelling predictions enables comprehensive monitoring of the quality of water bodies.
7: Affordable and Clean Energy	Digital technologies such as mobile applications and the internet of things facilitate the use and democratisation of affordable and clean energy, as well as energy consumption monitoring.
8: Decent Work and Economic Growth	As a platform for innovation and increased efficiency, digital technologies offer endless growth opportunities for corporates. The emergence of a digital economy generates demand for skilled workers in jobs that offer career-building opportunities. Biometric technology offers an opportunity to reduce the rate of informality across the continent.
9: Industry, Innovation and Infrastructure	Digital technologies spread across industries, reinventing manufacturing processes, transport and logistics, information flows, business models, etc. By using the internet of things, operational processes related to production, distribution and consumption can be optimised. The use of digital solutions can be extended to various economic sectors to improve production and productivity.
10: Reduced Inequality	The extension of telecom networks across rural areas helps reduce goods and services gaps through mobile financial services, online insurance services, access to supplies and efficient logistics. The universal coverage of networks should be prioritised to prevent increased inequalities between the connected and unconnected.
11: Sustainable Cities and Communities	By harnessing the benefits of information technologies and innovation, modern cities have the opportunity to streamline their day-to-day management, become more efficient and improve many aspects of people's daily lives. The opportunities are countless. Smart lighting using motion sensors can save billions on energy costs, while using information technology (IT) and big data may prevent the spread of infectious diseases or improve traffic.
12: Responsible Consumption and Production	Digital solutions contribute in two ways. First, the dematerialisation of goods and services limits the production of physical goods. Across Africa, mobile financial services are replacing mobile phone scratch cards. Second, a number of applications focus on developing sustainable production and consumption.
13: Climate Action	Digital solutions have a profound impact on most parts of the modern economy and arguably facilitate climate change mitigation across industrial sectors (such as energy, transport, buildings, agriculture) through smart and efficient technologies or ICT-enabled services (such as weather forecasting).
14: Life Below Water	Fisheries and aquaculture currently contribute about 1.4% of Africa's GDP. Observation satellites play a significant role in monitoring oceans and marine life.
15: Life on Land	Digital solutions support the conservation of fragile ecosystems and restoration of disturbed ecosystems. Improved monitoring and reporting across the large African landmass prevents the loss of biodiversity.
16: Peace, Justice and Strong Institutions	The adoption of e-government solutions increases transparency, empowers citizens and supports economic growth. e-ID infrastructure permits fast and seamless processes when dealing with cross-border movements, and accelerates processing asylum applications and identifying asylum seekers' country of origin.
17: Partnerships for the Goals	The transition to a digital economy plays a significant role in achieving all the Sustainable Development Goals and accelerating all three pillars of sustainable development: economic growth, social inclusion and environmental sustainability. Deploying networks and interconnecting through digital services is a factor in international, regional and local integration.

12 The EIB is an investor in Twiga via its investment in the TLcom fund.

13 United Nations, Africa Renewal online magazine.

Chapter 3

Investing in Africa's digital economy

This chapter explores the need and opportunities for digital investments in Africa and their scope for furthering economic development, including considerations on fostering economic resilience against shock such as a pandemic. Africa's population is young and growing fast, with rapid technology adoption making the continent a fertile ground for innovation. Africa will account for most of the world's population growth over the coming decades, and the working-age population (25–64 years) will grow faster than any other age group,[14] creating opportunities for accelerated economic growth.

However, the confluence of urbanisation, which is fast growing across the continent, and the rapidly increasing labour force poses risks if the employment market does not grow commensurately. This scenario could generate social and political instability that could destabilise many countries in the region, creating a significant challenge to reaping the demographic dividend. According to the International Telecommunication Union, about 29% of African 18–24 year olds (about 360 million people, most living in sub-Saharan Africa) have no access to a high-speed broadband connection and are thus excluded from the emerging digital economy.

3.1. Transition to a digital economy

Through affordable technology and connectivity, the continent gets first-time access to basic services such as communication, news and information, as well as to services such as microloans and e-insurance that develop the economic and social fabric. The direct impact of digital services and products on people's lives makes digitalisation a critical enabler for achieving the 2030 Agenda and Sustainable Development Goals.

The use of digital technologies is transforming economies and societies at unprecedented speed and scale, creating immense geopolitical, commercial and socioeconomic opportunities alongside pressing challenges.

The International Telecommunication Union's 2018 study noted that a 10% increase in mobile broadband penetration in low-income economies yields a 2% increase in GDP.[15] In sub-Saharan Africa more specifically, a 10% increase in mobile broadband penetration is likely to yield a 2.5% increase in GDP. The more people and things are connected in a safe and trustworthy manner, the more the continent builds data for actionable insights—perceived to be the most valuable resource of the 21st century.

Africa's transition to a digital economy not only creates opportunities for economic growth and increased job creation but also forms the basis for recognising human rights, accelerating access to quality basic services, improving government transparency and accountability, and enhancing democracy. Altogether, the adoption of e-government solutions can improve all areas of public and basic service delivery. New technologies, such as artificial intelligence, ledger technologies and the internet of things, will creatively disrupt sectors such as agriculture, manufacturing and urban development, which have long suffered poor efficiency and competitiveness.

14 United Nations Department of Economic and Social Affairs, June 2019, https://www.un.org/en/un75/shifting-demographics#:~:text=In%20sub%2DSaharan%20Africa%2C%20where,in%20any%20other%20age%20group

15 ITU, Economic Contribution of Broadband, Digitization and ICT Regulation: Econometric Modelling for Africa, 2019, https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.BDT_AFR-2019-PDF-E.pdf

3.2. Connectivity

The physical infrastructure layer is central to transitioning to a digital economy, providing foundations for the higher layers in all value chains. Without reliable and secure high-speed networks and data centres, there can be no sustainable digital transition. Africa still needs investment in the physical infrastructure layer as many markets on the continent do not have sufficiently deep or wide coverage and the networks that are available are not at the right price and/or quality point. Access to broadband connectivity and digital infrastructure is a priority area largely shared by public institutions and private organisations in the field of digitalisation in sub-Saharan Africa.

There is a strong need across the continent to increase the capacity of transmission networks and leverage investment in infrastructure to promote last-mile connectivity to underserved areas by mobilising blended finance.

There is a strong need across the continent to increase the capacity of transmission networks and leverage investment in infrastructure to promote last-mile connectivity to underserved areas by mobilising blended finance. It is widely recognised that private sector organisations are crucial to expanding connectivity and infrastructure and, increasingly, to supporting local innovations.

Data traffic

The number of broadband connections in Africa reached 526 million[16] by year-end 2019, up from 400 million two years earlier. The continent's average broadband penetration, however, remained low at 39%.

According to the 11th annual edition of the Africa Telecom Transmission Map published by Hamilton Research,[17] Africa's operational fibre-optic network reached 1 025 000 km by June 2019 (up from 936 000 km in June 2018, +8.7%). The additional 89 000 km of network that entered into service represent investments of around €1 billion. The number of people in sub-Saharan Africa living within 25 km of an operational fibre-optic network more than doubled between June 2009 and June 2019 to 584 million (54.2% of the population).

Concerning access, mobile technology remains by far the predominant technology. At the end of 2019, 477 million people in sub-Saharan Africa subscribed to mobile services, accounting for 45% of the population.[18] Smartphone penetration had increased to 44%, but only 9% of subscribers connected through 4G. North Africa reached 77% mobile penetration.[19] Almost all mobile subscribers use a smartphone (75% of the population). In North Africa, 3G remains the main access technology (50% of subscribers), with only 17% of subscribers connected to 4G.

Africa's total inbound international internet bandwidth reached 7.939 Tbps by December 2017, representing a 34% increase compared to 5.930 Tbps in December 2016. The continent is expected to experience similar growth rates in the years to come, which will generate significant demand for increased capacity.

16 https://www.internetworldstats.com/stats1.htm
17 http://www.africabandwidthmaps.com/?p=6158
18 https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/03/GSMA_MobileEconomy2020_Global.pdf
19 *Ibidem*

Investment requirements

The World Bank, supported by the Alliance for Affordable Internet, has published an assessment of broadband connectivity in Africa. It estimates that achieving universal, affordable and good-quality broadband access in Africa by 2030 will require investments totalling $100 billion over the period 2019–2030.[20]

About $80 billion would be dedicated to capital expenditures and operating expenses related to digital infrastructure. New investments would cover network extension and densification, including use of next-generation technology such as 5G. At least $12 to 15 billion of those infrastructure investments covers connecting users in remote rural locations.

The estimate also assumes $2.4 billion of investments in policy and regulation. The remaining $18 billion would be required to finance investments in ICT skills and developing local digital solutions.

3.3. Investment models

With African states facing budget deficits and telecom operators witnessing the continuous erosion of profit margins and the contraction of average revenues per user, it appears essential to find new models to finance digital development, especially telecom infrastructure.

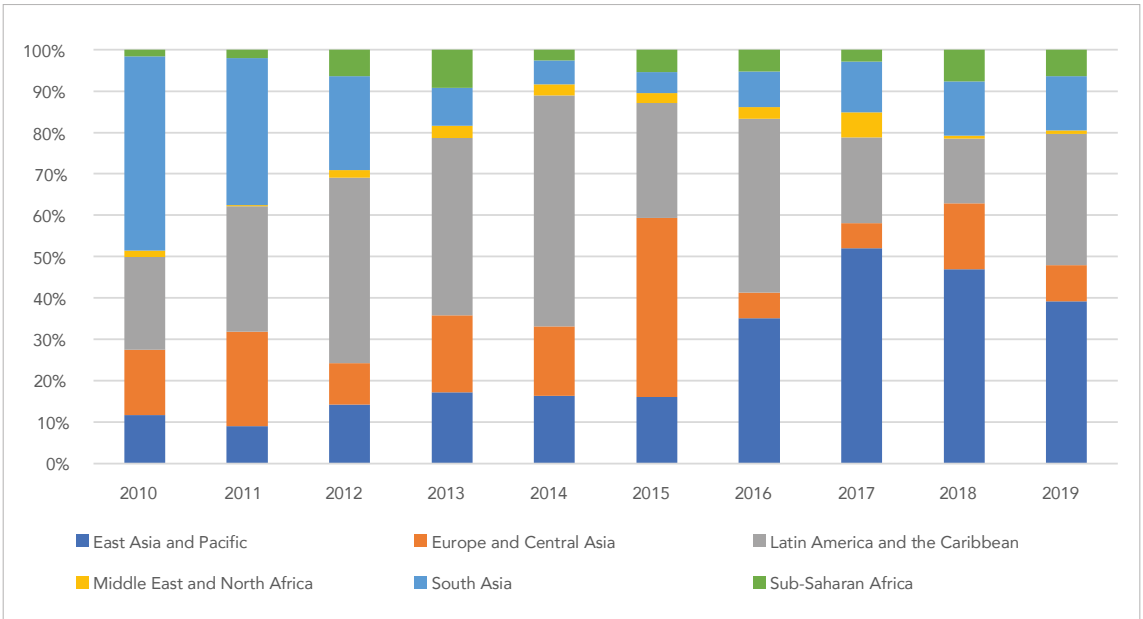
Public-private partnerships (PPPs) are promising models to fill financial gaps. They are generally structured on a design, finance, build, operate and transfer model: a private company finances a project and the government authorises the company to operate a defined asset for a specified period. This allows the company to recover its investment, after which it transfers operations to a government agency.

However, such agreements are not very widespread across the continent compared to other regions: sub-Saharan Africa represents less than 10% of global investment in private-participation infrastructure projects in emerging markets and developing economies. Moreover, Africa's public-private partnerships have been mostly focused on transport and energy infrastructure so far. The absence of a legislative framework still slows down the adoption of public-private partnerships in African countries. More positively, digital economy projects are typically governed by sectoral law and administered by the relevant ministry.

With private entities (both operators and financiers) having a strong appetite for investing in Africa's digital economy, it may be beneficial to consider structuring publicly driven projects as public-private partnerships. For example, the Singaporean government has subsidised private companies' construction of the fibre to the home/building (FTTH/B) network, while fibre infrastructure in New Zealand is deployed through a public-private partnership between the government and local operators.

20 Broadband Commission for Sustainable Development, ITU, Unesco, Connecting Africa Through Broadband: A Strategy for doubling connectivity by 2021 and reaching universal access by 2030.

Regional share of investment commitments in private-participation infrastructure projects in emerging markets and developing economies[21]



In the e-government domain, the government of Ghana signed a public-private partnership contract to re-engineer business registration processes, deploy state-of-the-art application software and hardware, and employ best-in-class solutions for the Ghana Revenue Authority and the Registrar General's Office. The government supported this project through resources from the World Bank-financed eGhana Project, contributing about one-third of the $60 million project costs; the private sector contributed the remainder (see section 8.4.1 for more details).

Other models can be used to support the development of telecom infrastructure. Joint ventures, for instance, allow operators to join forces when deploying infrastructure. In Singapore the construction of passive fibre infrastructure to improve fibre coverage across the country was delivered by a joint-venture between four companies: SingTel (mobile network operator), Singapore Press Holdings (media), Axia NetMedia (network equipment) and SP Telecommunications (network services). Following the same logic, infrastructure-sharing partnerships enable operating expenses savings of 15% to 30% and capex reduction of up to 60%. For instance, since August 2015, a partnership agreement has allowed South African operator MTN to use the network infrastructure of connectivity and cloud solutions provider Liquid Telecom to provide broadband internet access to customers in the Democratic Republic of Congo, Burundi, Tanzania and Zimbabwe, and enabled Liquid Telecom to access MTN's network infrastructure in ten countries in West and Central Africa, including Ivory Coast, Ghana, Nigeria and Cameroon.

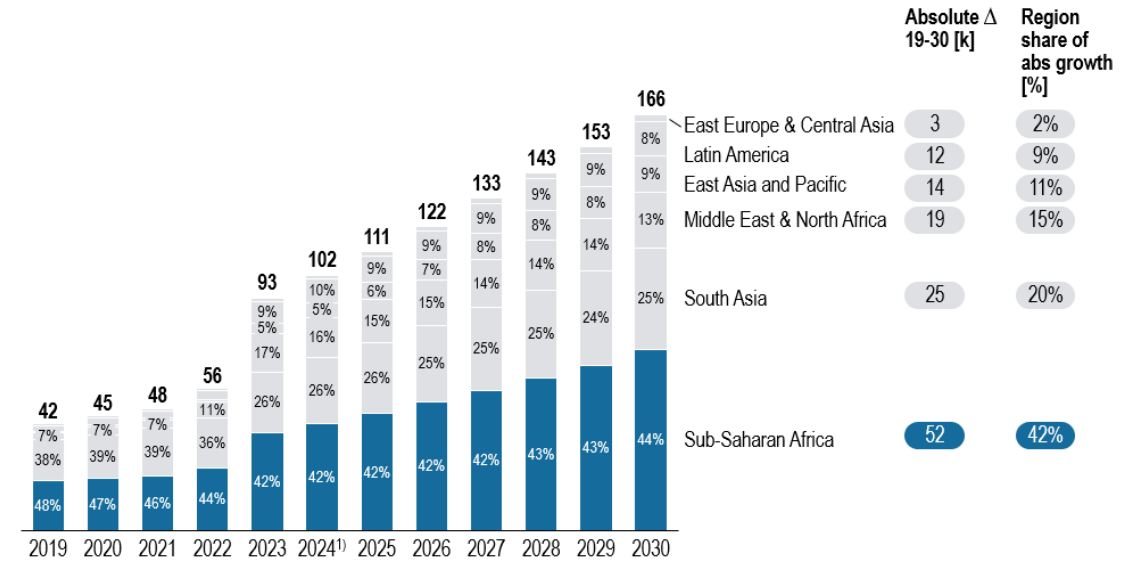
Finally, asset-lease models have emerged across the continent as operators embarked on a cost-optimisation exercise to strengthen their balance sheets. Major tower companies (TowerCos) have emerged and grown in Africa, driven by the huge opportunity to establish infrastructure enabling connectivity in the region. IHS, Helios Towers, Eaton Towers and other market players aim to fully harness the potential of telecom tower assets by selling space to multiple tenants. TowerCos provide the tower structure on which telecom companies' radio equipment and antennas are placed, as well as value-added services such as provision of power and maintenance.

21 The World Bank, Private Participation in Infrastructure 2019 Annual Report.

The use of TowerCos lowers costs per site and frees up investment capacity for mobile operators, which is particularly beneficial for expanding networks in rural areas.

Access to reliable power solutions remains a challenge for telecom operators in developing markets that lack reliable infrastructure grids. Bad-/off-grid towers are often diesel-powered, which drives up the energy cost and carbon footprint of telecom operators. This has prompted telecom operators to shift towards power solutions that are cleaner (renewables) and more cost-effective but have increased complexity, through outsourcing to dedicated telecom energy services companies. This market is still in the early growth stage, with many emerging players and varying business models. The number of towers in sub-Saharan Africa supported by telecom energy services companies is expected to grow from 20 000 in 2019 to 75 000 in 2030.

Telecom energy service companies site growth by region, 2019–2030 (k # of sites)[22]



3.4. Generating impact

Economic impact

The transition to a digital economy through greater use and adoption of digital-enabled services across economic sectors generates strong positive externalities, such as increased investments, new addressable markets, improved efficiency and cost savings.

22 Roland Berger's analysis for the International Finance Corporation.

Those benefits fully justify support from national and multilateral organisations.

Entrepreneurship	More inclusive access to entrepreneurship through lower required capital investment and new business models across several sectors.
Financial inclusion	Use of ICT to drive financial inclusion by providing access to banking and digital financial services, such as mobile money, to expand payment, insurance, savings and credit options to all. Digitisation has emerged as the main driver for improved financial inclusion, starting with retail electronic payment systems and expanding to insurance, savings and credit servicing. This evolution has had a major impact on previously unbanked medium and low-income households as well MSMEs.
Productivity increase	Use of digital solutions is a major driver of increased productivity in sectors such as agriculture, financial services, and transport as well as in public services.
Access to jobs	The emergence of Africa's digital economy, bringing new products and services, has the potential to create jobs, particularly among young people.
Access to goods and services	Digital solutions are reducing the cost of serving consumers across industries, allowing products and services that were traditionally only accessed by the privileged few to reach a wide pool of customers.

Social impact

The adoption and use of digital solutions generate social benefits through improved quality of life. Those benefits generate political support for transitioning to a digital economy and attract impact investors and entrepreneurs.

Education	Improvements to the education curriculum through access to information, interactive training materials, e-learning and distance learning.
Healthcare	Technological innovations and the increased affordability of equipment support the proliferation of e-health solutions, from the dissemination of basic prevention information to e-health record platforms and tele-surgeries.
Gender equality	Digital technologies increase women's inclusion in socioeconomic life through first-time access to legal identity, financial inclusion, information and dedicated services delivered through innovative business models.
Government services	Facilitating the online dissemination of essential public information, accountability, online citizen engagement and streamlined processes, including payment services, generates strong gains in the efficiency and transparency of governance.
Democracy	Access to information and diversified sources of communication enhances democratic participation and awareness.
Climate action	Indirect benefits in other sectors through smart and efficient technologies or ICT-enabled services. Next-generation technologies also tend to be more energy efficient. (See section 11 for more details.)
Inclusion of rural population	Network extension in rural areas provides the infrastructure to deliver first-time access to services such as finance, insurance, information and electricity to unserved populations.
Conservation	Digital technologies are used to increase operational efficiency and open market opportunities across the food security, climate technologies and domestic nature tourism sectors. In the challenging environment faced by most of the African continent, use of modern technology can greatly unlock market potential and provide solutions for better use of resources. Enhanced communication also makes it possible to raise awareness of Africa's conservation challenges.

Going further: Digital-enabled resilient and universal education system

The COVID-19 pandemic is a global crisis that threatens human lives. It affects not only public health systems but also the economic and social activities of countries across the world. Several measures including lockdowns have been taken by many governments to mitigate the pandemic. Such measures have resulted in disruptions to education, economic activities, and people's social movement.

The pandemic has exposed many significant short- and long-term challenges facing Africa's education sector. Lack of connectivity, equipment, access to electricity and online platforms are the most visible issues for many learners across the continent. However, diminished resources for institutions and the personal and academic challenges confronting institutions and students have also highlighted the need to improve education institutions across Africa.

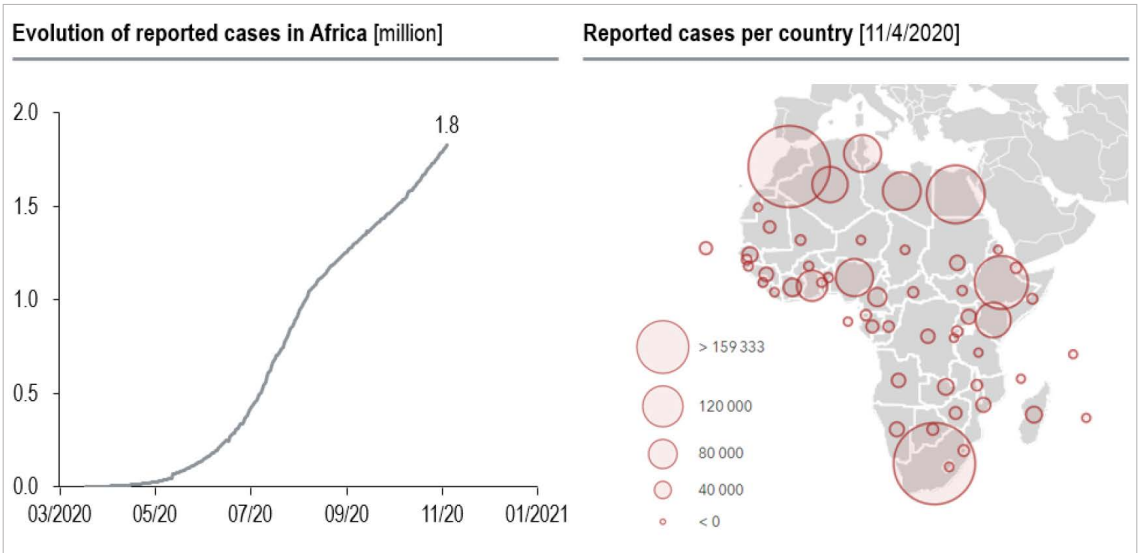
To build economic and social resilience across the continent, there is long-term need for online learning and improved digital literacy, which is required for the fourth industrial revolution.

3.5. Digital solutions to tackle COVID-19

As of 26 November 2020, 2.2 million people had been infected by COVID-19 in Africa, a steadily increasing number since March, and nearly 53 000 people had died.

Africa has been less affected than Europe—the measures taken by states to restrict the movement of populations, together with the demographic profile and lifestyle of Africans, have contributed to a different evolution of the pandemic. Nonetheless, the virus continues to spread across the continent and the socioeconomic effects could be dramatic. The African Development Bank anticipates a GDP contraction of 1.7% to 3.4% in 2020, and estimates that nearly 50 million Africans could be pushed into extreme poverty by the economic consequences of the pandemic. Poorly diversified economies are expected to be most seriously affected. In Nigeria, a country heavily dependent on the oil sector, between 8.5 and 11.5 million people are expected to fall into extreme poverty in 2020. The repercussions of the pandemic are also expected to be severe for the Democratic Republic of Congo (DRC) due to its dependence on mineral exports, whose prices have fallen on world markets. In addition to commodity-based economies, those dependent on tourism (which accounts for 8.5% of Africa's GDP) will also be severely hit: South Africa, Algeria and Morocco are all likely to experience recession. Negative social consequences of the pandemic have arisen across the continent, thereby threatening its fragile stability.

Number of reported COVID-19 cases in Africa[23]



Measures must be taken to prevent further deterioration. Many African families depend on the informal economy[24] and will have to find means of subsistence to continue to live closer to normality.

Digital technologies can provide immediate means to curb the spread of infectious diseases, assess capacity to deploy solutions to counter the pandemic from both supply and demand standpoints, and evaluate market acceptance by local stakeholders.

Restrictive containment measures have to be accompanied by economic and social solutions, such as a safety net for people in isolation who cannot work. However, the real concern is how to quickly provide assistance without exposing people to the virus. In predominantly informal economies, most families seek a new source of income every day. Lockdowns without a daily safety net and the means to relay direct aid would cause a complete economic halt and sharp increase in poverty. Distributing cash would break the lockdown, putting families at risk. Also, supply chains cannot be guaranteed under total lockdown.

Digital technologies can provide immediate means to curb the spread of infectious diseases, assess capacity to deploy solutions to counter the pandemic from both supply and demand standpoints, and evaluate market acceptance by local stakeholders.25 [25]

The World Health Organization is encouraging people to use digital payment services when possible, explaining that the use of cash could be a risk factor in the spread of the coronavirus.

Mobile financial services, which have grown across the continent, are enabling governments and startups to perform a significant volume of digital transactions. However, there are huge disparities across Africa in mobile financial services. Countries such as Kenya rely heavily on these technologies for any kind of transaction, whereas many other countries rarely use such

23 https://www.coronavirus-statistiques.com/stats-continent/coronavirus-nombre-de-cas-afrique/; https://africacdc.org/covid-19/

24 "The International Labour Organization estimates that more than 66% of total employment in Sub-Saharan African is in the informal sector": Angus Morgan Karthage, Understanding the informal economy in African cities: Recent evidence from Greater Kampala, 14 March 2018, https://blogs.worldbank.org/africacan/understanding-the-informal-economy-in-african-cities-recent-evidence-from-greater-kampala.

25 https://www.eib.org/en/publications/african-digital-best-practice-to-tackle-covid-19

services. Mobile services can be expanded rapidly across the continent provided there is access to efficient financing. Startups that are focused on financial inclusion receive the majority of venture capital funding in Africa.

Among the measures that can support Africa, some can serve fundamental needs and secure minimum services while others can help prepare the continent for the future and make countries more capable of tackling other health or social crises. When addressing digital technologies in Africa, it is important to consider challenges such as access to electricity, internet connectivity, infrastructure, policies and regulations, and the ability of people to use digital solutions.

Going further: Protection of vulnerable populations in Morocco

People operating in the informal economy are the hardest hit by the crisis and are particularly vulnerable to lockdowns. We need to ensure support for these vulnerable populations. African governments face the daunting task of finding solutions to help the poorest people. Digital technologies have facilitated implementing this assistance and ensuring that the right citizens benefit.

Morocco's setup leverages the country's large mobile phone penetration to identify and distribute financial aid to vulnerable populations using a text messaging (SMS) platform. The solution identifies vulnerable populations eligible for financial aid by efficiently sending those persons their affiliation numbers via SMS. It is also used to inform vulnerable populations of cash withdrawal points located nearby, taking social distancing obligations into consideration.

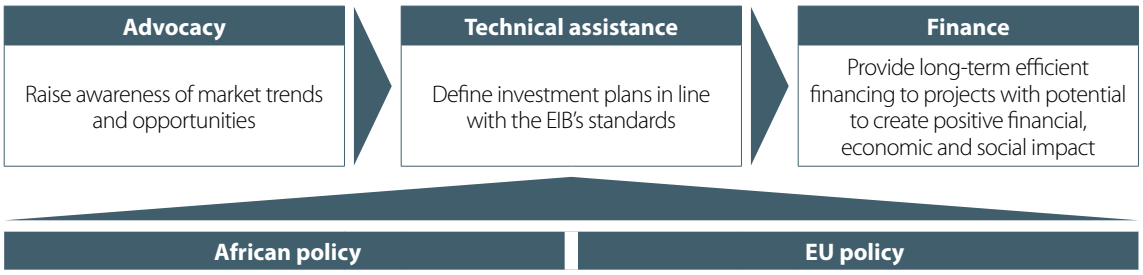
Despite these challenges, the digital economy has grown significantly in Africa, with incubators, startups and IT activities spreading across the continent. Using technology and experience, Africans have created many digital solutions to provide immediate help during the pandemic. Many countries across the continent are using digital technologies and developing highly innovative solutions. They have established laws and regulatory frameworks and continue to develop digital skills to offer new solutions. Africa has another key advantage: mobile banking.[26] The massive use of mobile banking for direct payments is an important solution. In Ethiopia, for instance, ventures such as M-BIRR allow people to send and receive money safely and instantly by phone.

26 For example, Togo has implemented a basic universal income by leveraging digital technologies: https://podcasts.apple.com/my/podcast/covid-cash-transfer-programme-in-togo-that-gives-more/id1508950038?i=1000477961786

Chapter 4

The EIB's approach to financing Africa's digital economy

This chapter describes the EIB's Africa digital economy financing working principles and tools. The EIB provides financing to the public and private sectors to support the emergence of an inclusive, open, safe and sustainable digital society within the framework of a fair and competitive digital economy—in full alignment with EU policies and the national priorities of African countries. The Bank will notably use a broad range of products to support private sector enterprises from other industries that will use those technologies for operational efficiency and productivity gains, reaching the full spectrum of firms from MSMEs and innovative startups to mid-caps and large corporates, including infrastructure operators. Investments will often have to be triggered by advocacy and complemented by technical assistance to support promoters in defining and structuring investment plans in line with their strategy.



4.1. Advocacy

The digital economy has become an important lever for the economic growth and competitiveness of African countries.

Given the continuous evolution of digital technologies and business models and their persistent importance for growth, it is highly important to foster an environment where knowledge and best practices are shared. The EIB, as the international financial institution with the largest exposure to the digital economy, plays a catalytic role in advocating and disseminating best practices in line with European standards across Africa.

For instance, to better understand which digital solutions can best help Africa cope with the COVID-19 crisis, and to estimate the investment required, the EIB hired the consulting firm BearingPoint to conduct a broad-based survey in Africa. This study was supported by the United Nations Development Programme (UNDP), which has technical expertise and a strong field presence throughout the continent.

Going further: Africa's digital solutions to tackle COVID-19

In summer 2020, the EIB published a study prepared with the support of UNDP and BearingPoint, to evaluate the investment requirements in digital infrastructure to provide an immediate response to the COVID-19 crisis across Africa. The tools presented in the study are examples of investments to save lives and increase resilience that the EIB intends to finance with its partners. The survey reviewed more than 100 digital solutions in Europe and Africa and interviewed 50 respondents from 30 African countries with responsibility for coordinating digital investments related to the COVID-19 outbreak.

The study highlights the ways in which digital technologies can provide immediate solutions to curb the spread of the pandemic; assesses the capacity to deploy solutions to counter COVID-19 from both supply and demand standpoints; evaluates market acceptance by local stakeholders; and estimates quantitatively the investment requirements across the continent over the coming year.

Link: https://www.eib.org/en/publications/african-digital-best-practice-to-tackle-covid-19

4.2. Technical assistance

The EIB can offer a wide range of advisory and technical assistance services that embrace all stages of the project cycle and beyond, to make investment projects bankable and ensure their sustainable implementation. Blending resources with technical assistance enables the Bank to bring external expertise and know-how to projects to address quality gaps, enhance standards and best practices, and provide guidance on how to bridge financing gaps.

The Bank's technical assistance services are available to enhance public and private sector projects. The scope of these activities includes support for upstream project development and the subsequent skills development of public authorities, improving access to finance and enhancing the business environment in general. The most common types of advisory services include market and sector studies to understand the needs of various industries and regions, business plan and strategy definition, risk mitigation and skills development. Our support also guides projects through the steps needed to secure financing, mobilising where necessary complex or ad-hoc financial solutions.

More specifically, at local level, the EIB's technical assistance programmes with financial intermediaries can help develop the skills of local partner banks and their clients, which can then enhance the debt-servicing capacities of small businesses and microenterprises, thereby enhancing banks' resilience. The value of technical assistance is also evident in the public sector, where our guidance helps implementers of public infrastructure projects to conduct feasibility studies, flesh out detailed designs or assess environmental impact.

Technical assistance activities provide institutional support to digital economy policy and initiatives in the form of skills development. The individual assignments, which have medium to long-term implications, span across the six intervention areas of the EIB's intervention highlighted in the Introduction. The EIB's technical assistance supports promoters, facilitates creating a quality pipeline of projects to be financed by the Bank, and supports their sustainable implementation.

Currently, the Bank is providing upstream technical assistance support to the Islamic Republic of Mauritania (submarine international connectivity), the Republic of Congo (government information systems, national data centre, transmission networks), the Republic of Chad (government information systems, transmission networks, network expansion in rural areas) and the Republic of Cabo Verde (regulatory review for access to transmission networks).

The Bank's capacity to continue providing technical advisory services is closely linked to the mandates it will be granted under the upcoming Multiannual Financial Framework.

4.3. Financial support

The EIB employs different instruments to finance its operations in Africa. Their terms are adapted to the nature of each project and to the country's economic situation. EIB loan tenors are normally commensurate to the asset life of the financed investments, and generous grace periods are traditionally linked to the time required for project construction and establishment.

Public sector financing

The EIB provides loans to the public sector to finance single large-investment projects or investment programmes. This lending supports vital infrastructure and boosts economic development. These public sector loans benefit from long financing terms that match the economic lifetime of each project, as well as backing from sovereign guarantee agreements or the European Commission. The EIB's involvement is often seen as a quality stamp, helping the project attract additional investors.

The EIB provides loans to the public sector to finance single large-investment projects or investment programmes.

Private sector financing

The EIB's products range from senior debt and hybrid debt financing to equity, project finance and, in some cases, local currency lending. Funding is provided on long terms matching the economic lifetime of each project, and it usually crowds-in additional investors (private and public). The Bank has also supported higher-risk private sector operations with potential to make a large development impact. Its capacity to continue offering a similar product range is closely linked to the mandates granted under the upcoming Multiannual Financial Framework.

Along with direct loans to corporates, the EIB also lends to financial institutions that subsequently "on-lend" to MSMEs, mid-caps and microfinance institutions. These so-called intermediated operations improve MSMEs' access to finance and financing conditions, including for long-term resources—often in local currency—that would otherwise not be available.

The EIB stimulates and catalyses private capital through investment in equity and funds. Its equity participation can be direct—by acquiring stakes in a company through common shares, preferred shares, convertible loans/notes, warrants and profit or cash-flow sharing—or indirect—by investing in private equity funds and, to a lesser extent, extending credit lines to intermediaries for equity investments. Such investments support small and medium-sized enterprises (SMEs), including in the ICT sector. The EIB can also invest in infrastructure funds, in funds that target ambitious startups, and in venture capital funds targeting innovative companies that leverage ICT-based solutions.

The Bank's value proposition goes beyond lending as it can also blend grant resources from third parties such as the European Commission or donor funds with its own loans, subject to applicable eligibility criteria. The grant resources usually take the form of:

- Interest rate subsidies: when lending to a specific country requires concessional financing sources, for example under IMF debt sustainability requirements; for fragile states recovering from conflict or disaster; or for sovereign lending targeting sectors with high economic and social returns.
- Investment grants: coupled with loan funds to target asset funding in projects that aim to deliver high economic and social impact, including for climate action.

Risk-sharing instruments make it possible to deploy the EIB's lending to projects that would not normally meet the Bank's credit risk criteria. There are three main categories: a) first-loss guarantees, to cover lending to a specific category of higher-risk borrowers, such as startups; b) subordinated debt, for example in a project finance structure or investment in a fund targeting innovation, entrepreneurship or the application of new technologies; and c) hedging the costs of swapping hard currency funding into a local currency loan, to ensure that borrowers with domestic currency sales are not exposed to foreign exchange risk. This capacity is particularly relevant for telecom operators whose hard currency revenues sharply declined due to increasing use of over-the-top services.

Chapter 5

Areas of intervention of the EIB's Africa digital economy financing

The Bank's actions focus on six inter-connected areas based on its objectives, including the recent decision to become a climate bank and in line with the EU-Africa strategy and the DETF recommendations.

5.1. Digital infrastructure

A digital divide remains in Africa, but mobile penetration is growing more quickly than anywhere else. The implications extend well beyond enabling voice and text communications. Digital platforms are creating opportunities for entrepreneurs, startups and businesses involved in many different sectors by instantly connecting them with existing and potential clients. Mobile banking is changing lives by enabling instant payment for goods and services. Reliable connections, based on infrastructure investments, are crucial to the continuing progress of these economic and social benefits.

Regarding the DETF's policy recommendation to pursue universal access to affordable connectivity, the EIB will seek to boost investments in telecom infrastructure and develop financial instruments tailored for the financing needs of various types of infrastructure projects.

The current pandemic has brought the world's digital divide into focus. As schools and workplaces close, those without reliable internet access are unable to access digital education tools and risk losing working hours. Another problem is that many people lack access to tele-consultations that mitigate the low availability of doctors. During the COVID-19 pandemic, use of these services have risen for three reasons: a) people fear becoming infected by attending crowded medical centres; b) medical staff need to prioritise for in-person consultations; and c) there are insufficient numbers of medical staff. Overall, people without broadband connections may miss critical medical advice and services.

The expansion of networks into unserved areas and the densification towards higher data rates are equally important and closely related. The digital economy is based on scale: the reach of digital services is national and their affordability increases with market uptake.

The expansion of networks into unserved areas and the densification towards higher data rates are equally important and closely related.

Looking ahead, and especially in light of current market conditions, the Bank's capacity to provide loans with attractive rates, long-term maturities and in local currencies across the continent is a prerequisite for delivering European development objectives. The EIB aims to create innovative financial instruments in collaboration with the European Commission, Member States and other partners, to drive digital infrastructure investments in Africa. For instance, blending facilities could be used to inject risk capital into special purpose vehicles to de-risk the investments and attract private sector investors backed by the EIB and others. Such instruments could also include a dedicated telecom infrastructure fund managed by the EIB and crowding-in investments from various sources, using blended grants or guarantee schemes to provide tailored solutions on a case-by-case basis.

Digital infrastructure has a range of potential vulnerabilities, which may affect software and hardware, which can arise from deficiencies in security processes, particularly if operators source sensitive assets from a high-risk supplier. Cybersecurity evaluation, including alignment with European standards and recommendations, is part of the Bank's appraisal process.

5.1.1. Performance of digital infrastructure technologies

Over the last decade, the EIB has financed latest-generation mobile as well as fixed-line backbone and access networks. While 2G, 3G and 4G LTE are the technologies dominating projects in the mobile segment, optical-fibre investments constitute the largest part of the Bank's support for fixed-line networks.

Scarcely found on the African continent, legacy copper-based, fixed-lined access networks—the "last mile" to the customer—could offer realistic peak data rates of between 50 and 100 Mbps, but only for short copper circuits of good quality that are connected to optical-fibre backhauls in street-side cabinets. There seems to be consensus that copper-based networks will not be able to meet the requirements of the gigabit society.

In comparison, current fourth-generation (4G, LTE) mobile technology can today reach realistic peak data rates of 30 to 60 Mbps if the backhaul from the mobile station is based on optical fibre. Fifth-generation (5G) technology is expected to further increase these realistic peak data rates to between 100 and 300 Mbps, creating an opportunity for new applications and business models. However, 5G mobile broadband networks and their future developments will require a significantly higher number of antennas covering ever-smaller cells that need to be connected through ubiquitous fibre networks.

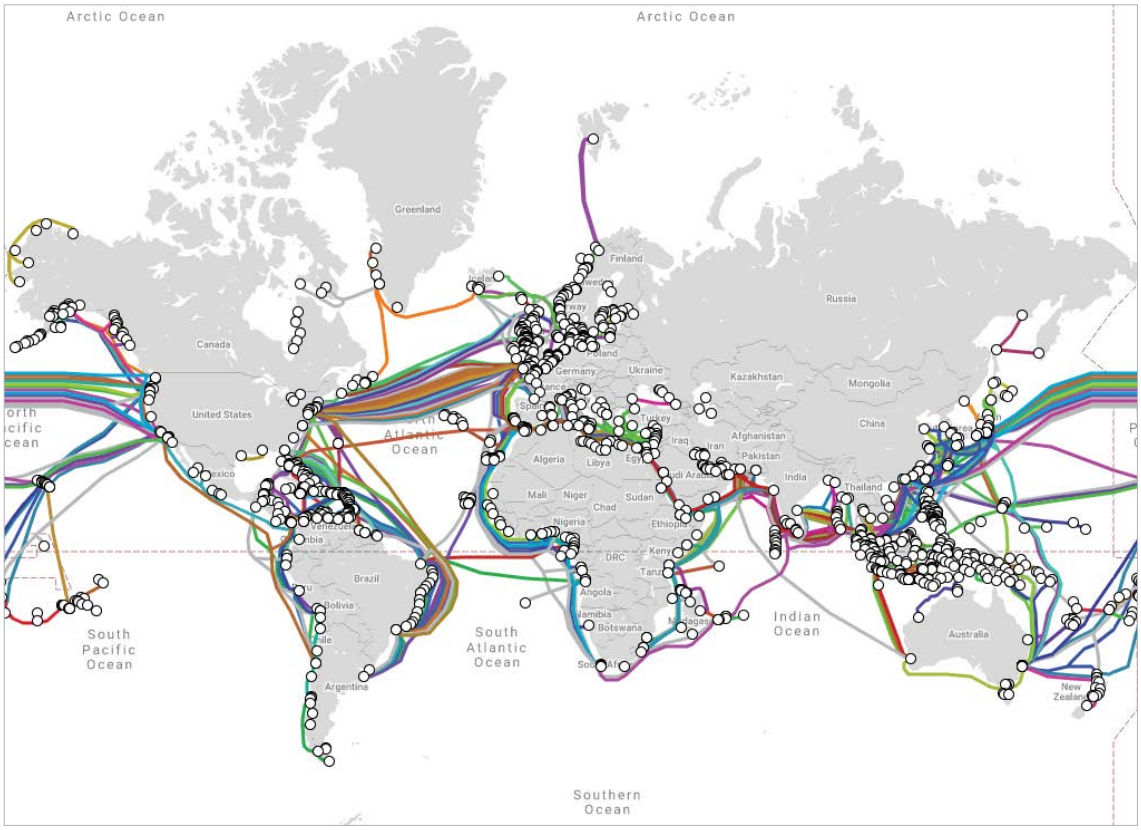
Fibre-based digital infrastructure can already provide data speeds of 100 to 300 Mbps in the access network to the final customer. This performance could be further upgraded in the future with more powerful transmission/routing equipment, without touching the (passive) fibre-optic cables in the ground. It is, therefore, safe to assume that fibre-based access and backbone networks will remain the workhorses of future digital infrastructure, and that future-proof optical-fibre technology for fixed-line access and backbone networks will be able to cope with the projected increase in data volumes.

5.1.2. Submarine cables

The growth in data traffic and its importance is driving investments in the infrastructure for data transmission, notably an exponential increase in fibre-optic submarine cables. An estimated 99% of total international traffic runs through these cables. The major submarine cable routes connect North America with Europe and Asia.

Although the African continent still remains underserved, operators and investors have recently led some projects, especially on its eastern coast. Prominent examples include the Eastern Africa Submarine System, a cable network nearly 10 000 kilometre long initiated by AUDA-NEPAD to promote the role of ICT in Africa's renaissance, and the Africa Coast to Europe cable connecting Gibraltar to South Africa and landing in countries of the Gulf of Guinea.

Submarine cable routes[27]



The GAFAM[28] have an increasing role in the development of such transmission networks. The Silicon Valley giants are investing so much in this infrastructure because they generate huge amounts of data that they intend to send around the world, rather than delegating this task to telecom operators. For instance, Facebook is leading a private consortium with seven telecom operators (China Mobile International, MTN GlobalConnect, Orange, Saudi Telecom Company, Telecom Egypt, Vodafone and WIOCC) to finance a 37 000-kilometre fibre-optic cable, called 2Africa, which will circle the continent and connect 16 African countries to the rest of the world. The cost of this infrastructure, which is due to become operational in 2023 or 2024, is forecast to be between €500 million and €1 billion. Similarly, Google is building its own private cable linking Europe (Portugal) to South Africa and with a branch landing in Nigeria. The first phase of this project, called Equiano, is due for completion in 2021.

27 https://www.submarinecablemap.com/#/

28 Acronym for five popular US tech stocks: Google (Alphabet), Apple, Facebook, Amazon, and Microsoft.

Going further: Egypt's lead in international transmission and hosting services

In November 2011 the Egyptian government placed broadband at the top of its agenda by unveiling the eMisr National Broadband Plan, which set a number of strategic directives aimed at meeting the country's high-speed internet needs. The first key objective of eMisr is to establish Egypt as a frontrunner in digital communications, notably capitalising on the country's exceptional connectivity to the world through dense submarine cable connectivity.

Recognising the advantage of its geographical position to establish a transit corridor between the Red Sea and the Mediterranean Sea, Egypt became a route of choice for crossing submarine cables in the region.

Today, Egypt is connected via 13 cable systems to the West, Asia and, to a lesser extent, Africa. The country aims to capitalise on this strong international connectivity to export hosting services throughout Africa.

5.1.3. Mobile services and smartphone adoption

Operators in Africa focus their investments on mobile technology, making it the continent's main infrastructure for telecom services. In some markets up to 99% of voice and data connections are made via mobile networks. This technology choice is driven by faster network deployments, affordability, shorter pay-back and the very poor condition of fixed-line infrastructure.

According to the GSM Association (GSMA), a global industry group, 477 million people in sub-Saharan Africa were subscribed to mobile services at the end of 2019, accounting for 45% of the population (vs. 67% world average). By 2025, sub-Saharan Africa will reach 50% subscriber penetration with more than 130 million new subscribers, half of which will come from just five markets: Nigeria, Ethiopia, Democratic Republic of the Congo, Tanzania and Kenya.

This sharp increase will be underpinned by several drivers: though Africa's operators will invest $52 billion in infrastructure rollout over 2019–2025, their contrasting financial situations mean that support will be needed to ensure mobile network rollout. Smartphone adoption will rise due to cheaper devices and new financing models, as illustrated by the recent partnership between Safaricom and Google allowing low-income consumers to pay for 4G devices in daily instalments. Finally, regional agreements will aim to reduce international roaming charges: for instance, the CEMAC project will abolish roaming charges by 2021 in six countries (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon).

Going further: Contrasting financial situations among Africa's operators

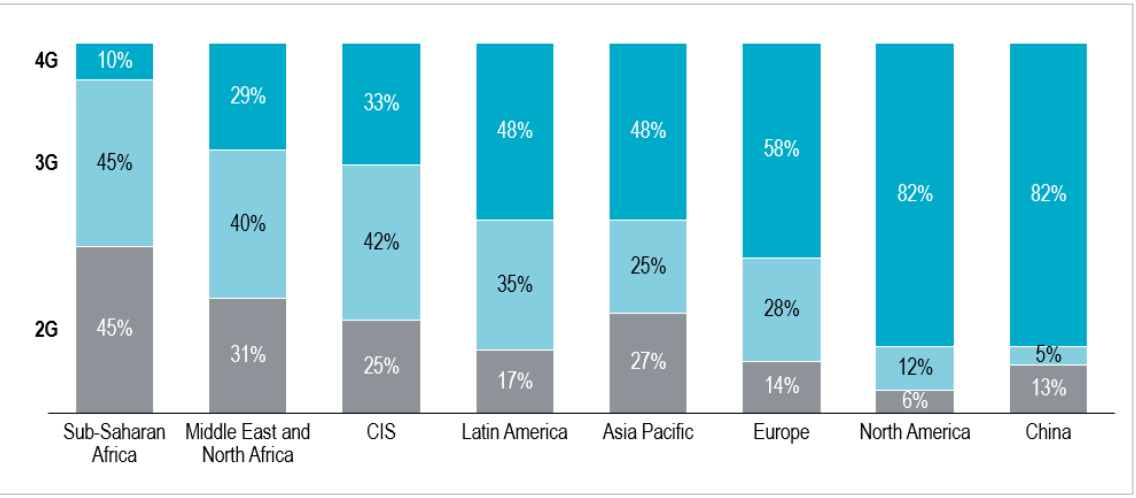
The financial difficulties faced by many operators in Africa, including notable historic players, threaten to slow the deployment of network infrastructure, leaving isolated populations underserved and endangering millions of jobs.

The operators' difficulties are illustrated by recent forced capital movements in the sector: in 2017 the Nigerian subsidiary of Etisalat was forced to sell 45% of its capital, while Bharti Airtel decided to sell its local subsidiaries in Rwanda, Niger, Chad, Congo, Kenya and Tanzania; Orange sold its Niger subsidiary in 2019, while SotelTchad aims to open up to 60% of its capital to new investors in 2021; in Morocco, fierce competition caused the total market value to decline until the regulator imposed more stringent pricing regulations.

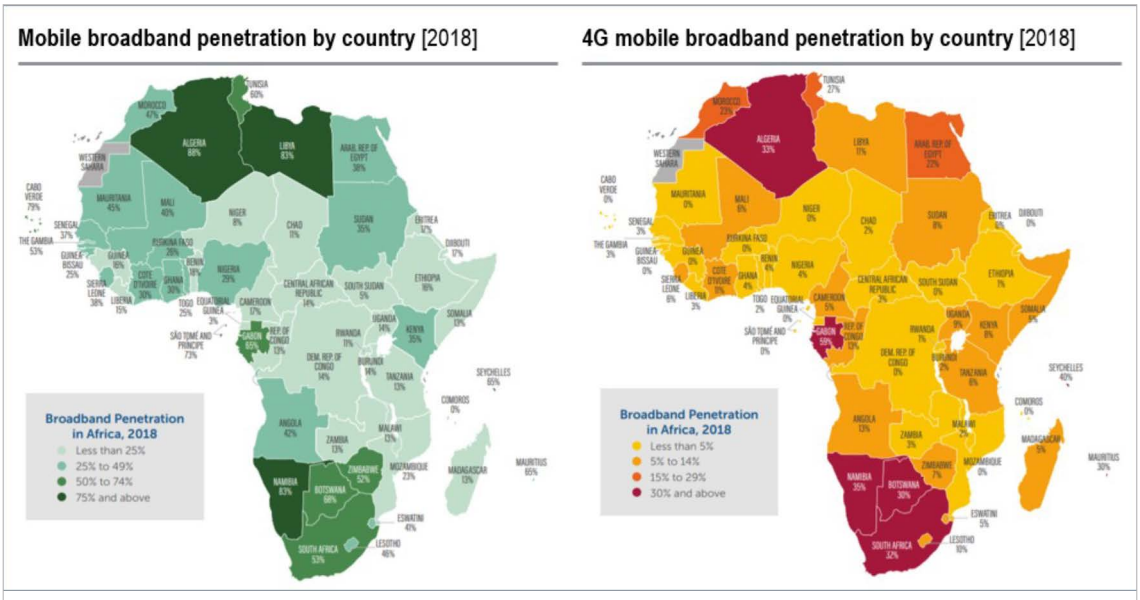
These difficulties derive from several factors: average operator revenue per user is low on the continent, notably impacted by competition from internet-based communication services such as WhatsApp. Operators encounter difficulties in operating base stations, often driven by generators with high operating expenses and located in insecure areas. Finally, high fines and taxes from governments and regulators have risen: there were 19 sanctions procedures in the 20 largest sub-Saharan markets in 2017, compared to two in 2013.

Beyond operators' contribution to accelerating digitalisation across the continent, notably through the development of 4G infrastructure, these companies also play an important social role as they are major employers in many countries. The continent still has a high number of incumbent operators that have not yet managed to transform into a business model. According to GSMA, in 2018 the industry employed 1.9 million people directly and over 2.4 million in the broader mobile ecosystem; total direct employment in the sector is expected to grow by 26% to 2.4 million jobs by 2025. Consequently, providing operators with financial support is key to securing mobile network rollout and ensuring social stability.

Mobile technology mix per region (2019; % of mobile connections)[29]



Mobile broadband penetration in Africa[30]

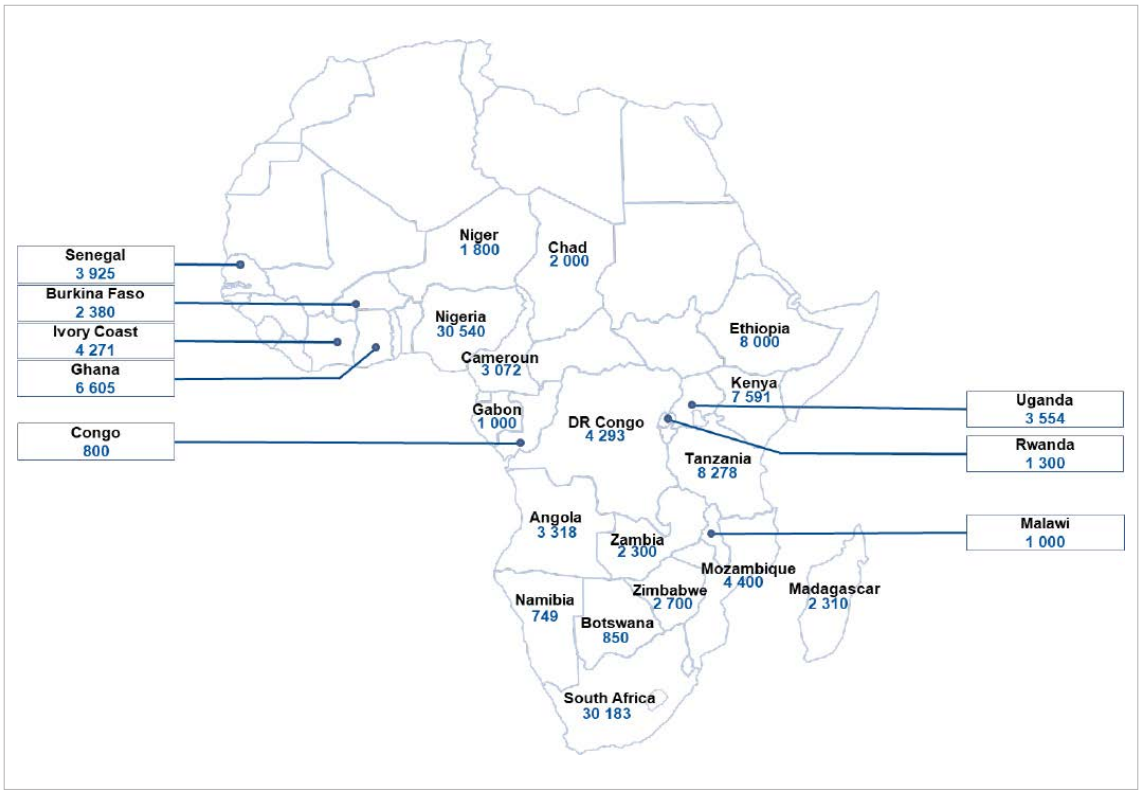


The introduction of 5G technology has begun. Some African countries, such as South Africa, are rolling out or testing the technology. However, the 5G investment wave seen across other continents is still a few years away in Africa. The 4G networks remained largely underused, at about 10% of available capacity in 2020. GSMA predicts that by 2025 about 28 million devices will be connected to a 5G network in Africa, which would only represent about 2.7% of total connections.

29 GSMA, The Mobile Economy Report 2020.

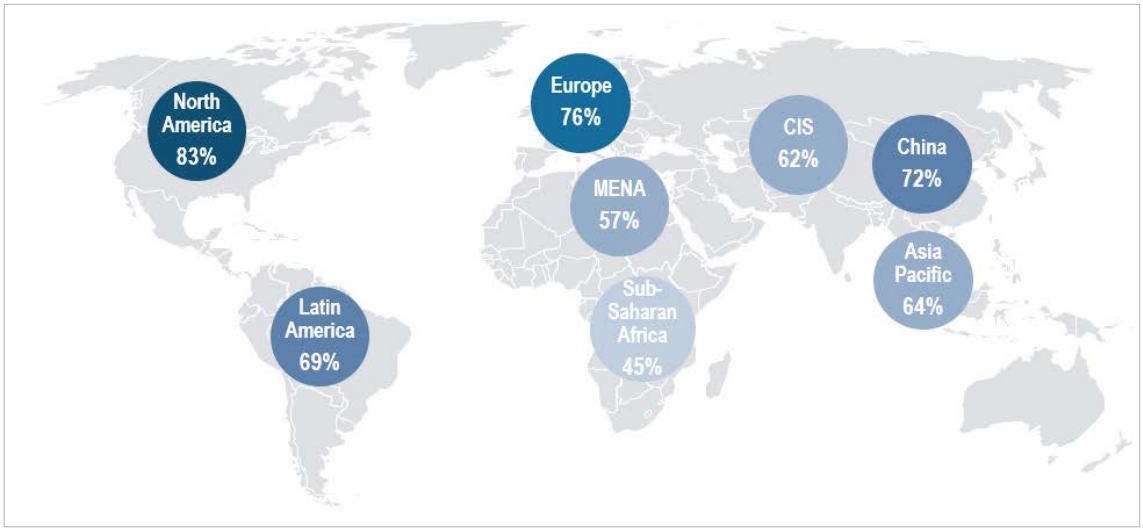
30 UN Broadband Commission, Connecting Africa Through Broadband, 2019.

Number of 4G mobile cellular sites per country (non-exhaustive)



Smartphone adoption in sub-Saharan Africa is rising but still lagging behind the global average (45% vs. 65% at the end of 2019). Affordability, notably for 4G-enabled devices, remains a key barrier to smartphone adoption.

Smartphone adoption rate per region (2019; % of connections)[31]



31 GSMA, The Mobile Economy Report 2020.

However, the smartphone entry-level selling price has decreased in recent years, notably due to global standardisation under the 3rd Generation Partnership Project[32] allowing significant economies of scale, as well as manufacturer-led innovation and competition, especially with Chinese brands such as Tecno and Infinix now selling devices for significantly less than $100.

Local manufacturing is another important driver of reducing smartphone costs. One example is the $130 Mara X smartphone developed and manufactured by Rwanda's Mara Group[33] and claimed to be the first high-tech smartphone manufactured in Africa. The continent's low cost of labour could be a driver for increased handset manufacturing capacity in the coming years.

Moreover, smartphone financing schemes are also driving the accelerating adoption rate. These financing models are beginning to gain traction in the region. In July 2020 Safaricom partnered with Google to introduce the Lipa Mdogo Mdogo payment plan, allowing customers with 2G and a daily wage to upgrade to 4G devices for a deposit of KES 1 000 ($10) and daily instalments of KES 20. The daily, rather than monthly, payment option reflects the financial constraints of low-income users, many of whom earn a daily wage and can only afford smaller payments on a regular basis.

Further supporting local manufacturing of smartphones and daily financing schemes is key to boosting the smartphone adoption rate.

Going further: the 5G era has begun in sub-Saharan Africa with promising applications, but operators will focus on increasing 4G uptake in the mid-term

5G rollout has begun in sub-Saharan Africa: Vodacom and MTN rolled out the first major 5G networks in the region in 2020 with deployments in several locations across South Africa, while 5G trials have been conducted in other countries such as Gabon, Kenya, Nigeria and Uganda.

The immediate opportunity for deploying 5G in Africa is to use fixed wireless access to fill the gap in fixed-broadband connectivity for households and businesses.

Moreover, in the internet of things sector there are many commercial applications particularly relevant for the continent: a mining company will be able to remotely track its trucks and mineral shipments; an agricultural cooperative will be able to deploy irrigation systems based on weather or soil characteristics; and water and electricity operators will be able to better track losses and manage resource allocation. With such use cases already possible using 4G—as illustrated by Safaricom's internet of things-based monitoring solution for Kenyan

32 Commonly abbreviated to 3GPP.

33 The EIB loaned $20 million to Mara through an intermediated facility.

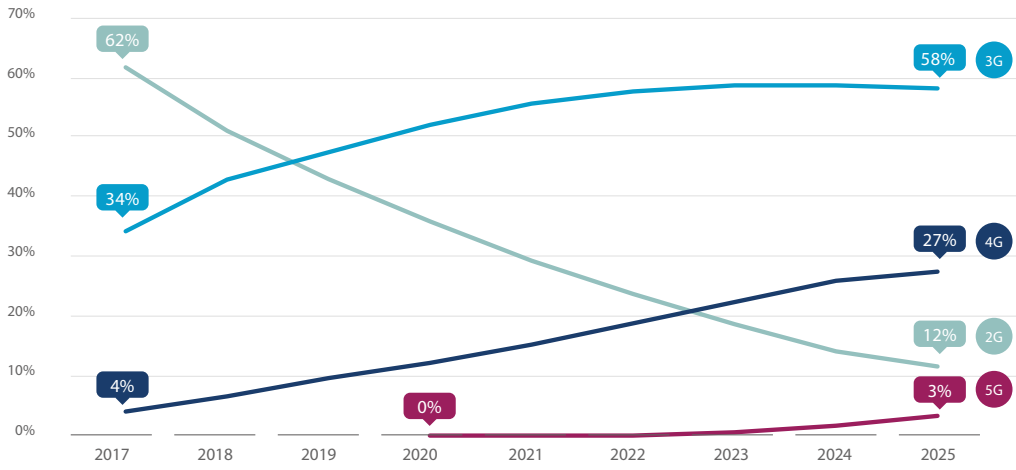
water utility EWASCO, enabling identification of optimal water flow and matching supply with demand—5G will increase the impact of such technologies by improving connection speed.

However, mass rollout of mobile 5G is not imminent in the region. The 4G networks remained largely underused, at about 10% capacity as of 2020. With 4G adoption still low, operators will focus in the mid-term on increasing 4G uptake. GSMA predicts that by 2025 about 28 million devices will be connected to a 5G network in Africa, which would only represent about 2.7% of total connections.

Moreover, the high frequencies used by 5G technology require additional investment compared to 4G networks. As the short wavelengths are less able to penetrate solid objects like walls, windows, and even trees, equipment must be mounted at customer sites and more base stations must be placed closer to customers, which need to be acquired and connected to fibre. Besides, while 5G high frequencies offer a high throughput, they have a much weaker range than 4G low frequencies, such that more sites are needed to offer a high-speed service reaching similar geographic coverage. Though most of this additional infrastructure will likely be built with small cells that use lamp posts, public phone boxes or other similarly sized structures that can host small 5G base stations, this densification will require massive investment by the operators.

According to GSMA, 5G capital expenditure will total $15 billion over 2019–2025 across sub-Saharan Africa, representing 52% of total mobile infrastructure investments in 2025.[34]

Mobile technology mix forecasts (% of total connections)[35]



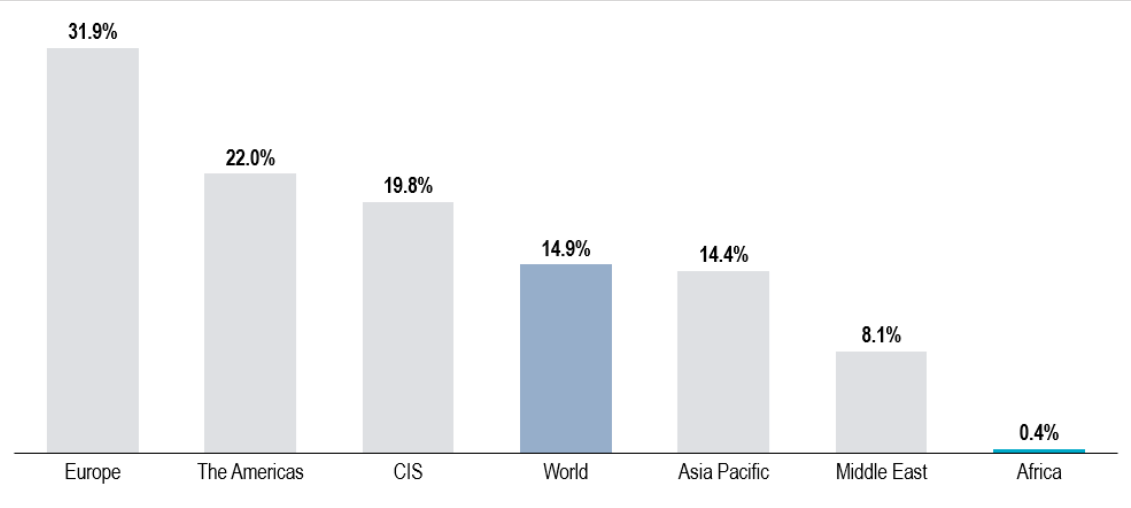
34 GSMA, The Mobile Economy Sub-Saharan Africa 2020 report.
35 GSMA, The Mobile Economy Sub-Saharan Africa 2020 report.

5.1.4. Fixed broadband

The development of the fixed-line broadband market in Africa has long been restricted by the lack of fixed-line infrastructure and the poor quality of networks in those urban areas where they are concentrated. Only 0.4% of the African population has a fixed-broadband subscription. However, investments are geared towards increasing transmission capacity at both international and national levels. These investments are being used to improve fixed-line telecoms and support growing mobile data traffic. Over recent decades, a large share of terrestrial transmission networks have relied on microwave technologies. Increasing bandwidth requirements drive today's investments towards fibre assets.

These projects are supported by favourable regulatory regimes and by public policies that highlight the key functions of broadband connectivity for economic growth. A growing number of countries are placing greater focus on national fibre rollout plans.

Fixed-broadband subscriptions per 100 inhabitants (2019)[36]



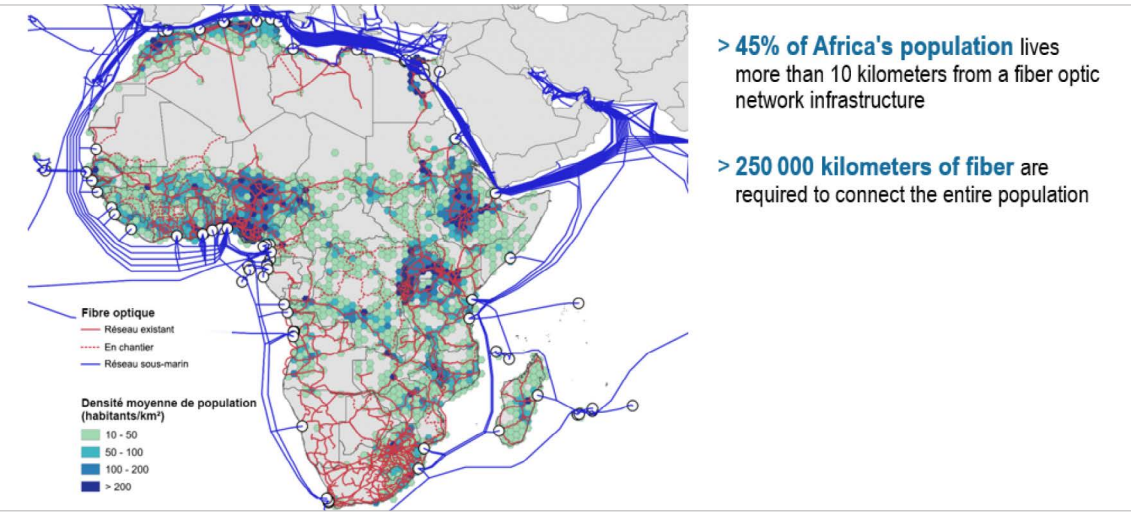
The deployment of fibre networks is currently focused on large urban areas (for example, GVA has introduced a fibre offering in the capital cities of Gabon, Togo and Congo) and on major axes (Orange is deploying an international network linking eight West African countries, while Liquid Telecom has established the One Africa network connecting Cape Town to Cairo over 7 000 km). These efforts are complemented by small-scale fibre operators, which are expanding their investments beyond the wealthy suburbs and business districts. In these remote areas, aerial fibre is a cost-effective alternative to underground networks requiring significant civil-engineering expenses.

Yet 45% of Africa's population still lives more than 10 km from a fibre-optic network. The rollout of optical fibre is quite complementary to the installation of electrical networks, and because most electricity distributors in Africa have small networks, the extension of optical fibre is considerably limited for now. Utilities companies thus have a key role to play in the telecom infrastructure rollout and must be supported.

36 ITU World Telecommunication /ICT Indicators database.

Finally, the poor quality of copper networks often results in the selection of fibre technology to deploy fixed-broadband access, as compared to the more gradual evolution through VDSL[37] in markets such as Europe.

Fibre-optic network in Africa and population density (2019)[38]



5.1.5. Satellites

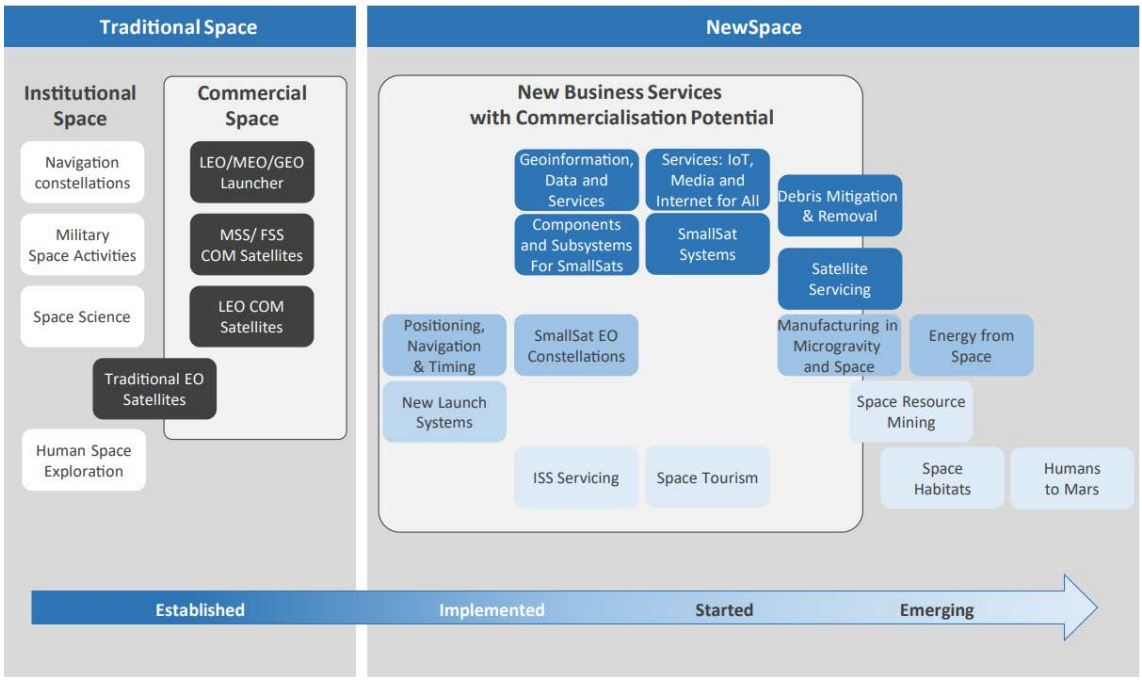
Satellite telecom technology, notably prized for high-speed internet access on the continent, has not achieved the expected development pace due to the high cost of ground equipment and bandwidth for geosynchronous equatorial orbit (GEO) satellite connectivity.

This technology is now progressing in Africa as a means to bring connectivity to rural areas where nearly 60% of the African population currently lives. For instance, projects such as the Unicef Giga project, which aims to provide connectivity to every school in the world by 2030, could take advantage of satellite communication systems. The development of high throughput satellites (HTS) over the past decade has been promising and is partially leveraged. These satellites are primarily deployed to provide broadband internet access services (point-to-point) to regions underserved by terrestrial technologies, where they can deliver connectivity comparable to terrestrial services in terms of pricing and bandwidth but with a higher latency due to their orbital position.

The commercialisation of space services is set to intensify as the wave of new technologies and business models termed "NewSpace" gains momentum. The provision of new products seeks to address a wider customer base.[39]

37 VDSL: Very high bit rate digital subscriber line.
38 https://blogs.worldbank.org/digital-development/africas-connectivity-gap-can-map-tell-story
39 https://www.eib.org/attachments/thematic/future_of_european_space_sector_en.pdf

Current and future NewSpace fields[40]



MSS: mobile satellite services; FSS: fixed satellite services; Com: communication.

In the coming years, medium and low Earth orbit (MEO/ LEO) satellites appear to be promising solutions for Africa's connectivity. Medium Earth orbit satellites orbit 5 000 to 12 000 km from Earth; their relative proximity to the planet means they achieve lower latency than geosynchronous equatorial orbit units. Low Earth orbit satellites orbit 500 to 2 000 km from Earth; this proximity makes them ideal for very-high-speed, low-latency communications, offering higher bandwidth per user. Moreover, low Earth orbit satellites tend to be very small, and so can be produced far more quickly and cheaply compared to medium Earth orbit or geosynchronous equatorial orbit satellites. However, ensuring global coverage requires more spacecraft (called a constellation) than are needed by medium Earth orbit and geosynchronous equatorial orbit technologies.

Medium Earth orbit satellites are already in use: one example is SES Networks' O3b constellation, which began offering services in March 2014. A new generation of O3b satellites, called O3b mPOWER, is expected to be introduced in 2021, and Orange's subsidiary in Africa will be the first telecom company to adopt this new communication system.

Low Earth orbit-based communication systems suffer from high costs and limited demand, but are regaining traction due to recent technological advances and reduced launch cost. Several players are investing to deploy such satellites: SpaceX already operates 895 LEO Starlink satellites and aims to be operating 12 000 spacecraft by 2025, focusing on remote areas. Telesat will begin to deploy its low Earth orbit constellation in 2022 with the launch of 78 spacecraft; the remaining 220 satellites will be launched into inclined orbits by the end of 2023. In July 2020 Amazon received authorisation from the Federal Communications Commission to launch and operate its Kuiper constellation of 3 236 spacecraft to provide internet to "tens of millions of people" located in underserved areas. This constellation represents an investment exceeding $10 billion. The low Earth orbit space race has begun, but the financials of these projects pose significant

40 SpaceTec Partners, NewSpace Study, 2016.

challenges. Some endeavours in this field have faced severe setbacks: LeoSat recently ceased operations after being unable to secure additional investment, while OneWeb recently filed for Chapter 11 bankruptcy after failing to secure additional financing in March 2020, before being acquired by the UK government with funding from India's Bharti Global.

Development institutions such as the EIB have capacity to finance the acquisition of space assets and research, development and innovation activities linked to developing applications. The lease of satellite capacity, which is an operational cost, should not be financed by long-term facilities. African countries have already placed into orbit some observation and radio satellites, but these require limited investments. In the space sector, larger investments are required for low and medium Earth orbit constellations (still lacking in Africa) or geostationary satellites. A few space assets are owned and operated in Africa—namely the NileSat constellation and NigComSat satellite. Largely dependent on non-African operators and competing for capacity with other world regions, the African continent suffers from the limited affordability of satellite capacity. Long-term financing for African-owned space assets is an option for accessing the benefits of geostationary satellites. The EIB has capacity to finance space systems with maturities matching their lifetime, usually up to 15 years for geosynchronous equatorial orbit satellites.

5.1.6. Data centres

Increased data traffic in Africa is driven by the continent's transition to a digital economy and puts pressure on existing ICT infrastructure. The digital supply chain comprises data transport, storage and processing. A data centre is the physical facility used to store and process applications and data. Data centres also provide security for physical servers and data. With slightly over 100 data centres across the continent, Africa has less than 1% of the world's data centres,[41] despite being home to about 17% of the world's population. However, its capacity has doubled in the past three years. The leading data centre markets on the continent are South Africa (around 27 data centres), Nigeria (around 14), Mauritius (around 10) and Kenya (around 7). According to market research firm Arizton,[42] Africa's data centre market is expected to exceed $3 billion by 2025, growing at a composed annual growth rate of over 12% during the forecast period. It is also expected that over 70% of organisations operating in the region will shift to the cloud by 2025.

Over the last five years, Africa's data centre industry has witnessed steady interest from major global cloud service providers such as AWS and Microsoft, along with Huawei. In 2019 Microsoft Azure became the first Tier 1 data centre operator to enter the African continent by opening two data centres in South Africa. In October 2020 Liquid Telecom announced that it had closed $307 million in financing for building an additional five data centres in five fast-growing African countries, including Egypt, Ghana and Nigeria, on top of the five data centres it already operates.

41 Xalam Analytics, 2020, https://xalamanalytics.com/research/investor-reports/the-african-data-center-boom-2018/

42 https://www.reportlinker.com/p05822887/Data-Center-Market-in-Africa-Industry-Outlook-and-Forecast.html?utm_source=GNW

Sample data centre locations in Africa[43]

Demand for data centre services will mainly be driven by corporate usages, increased broadband penetration and use of internet applications. The localisation of data centre capacity on the continent improves the speed of connection to applications, as distances are much shorter compared to using capacity in other continents. Corporates, particularly in the financial and extraction industries, turn to third-party suppliers for increased security and lower cost, relative to managing their own data on expensive internal servers. The availability of renewable energy may also be a main element of ensuring projects' financial sustainability. Moreover, governments are increasingly conscious that local data must be hosted domestically. Finally, as Africa's governments seek to grow their digital economy, new and innovative digital projects requiring hosting services will emerge on the continent, such as smart cities (using analytics and sensors for better city management) or edge computing (for better management of the increasing use of connected devices by businesses and consumers).

43 Source: EIB analysis. For detailed locations: https://www.google.com/maps/d/u/0/edit?mid=1oJml-H7Ljxp8MnVM5VFh76v9hfBHAji3&ll=0.56425504530475 12%2C17.01488815000002&z=3

5.2. Financial inclusion

5.2.1. Digital transformation of established banks

Evolving towards digital banking is a major stepping-stone for the banking industry to enhance product delivery, save costs and compete internationally. Digital transformation in the banking industry is a multi-year process that requires banks to invest heavily to adapt to a constantly evolving external environment: customers' expectations and touchpoints shift, regulations impose new processes and IT service providers develop platforms ever more capable of supporting innovation.

The global banking industry is driven by personal, secure and high-quality services. Digital transformation in the banking industry offers new means to engage with customers and deliver a highly personalised, efficient and integrated experience. Using modern communication channels, new technologies can reduce banks' response time, facilitate on-demand services and deliver real-time information in a user-friendly format to customers through online consumption models developed by digital technologies across sectors.

Most banks still rely on legacy infrastructure that does not fully support new web services and is, therefore, often incompatible with modern digital solutions. Legacy systems and hardware are likely to present high barriers to the effective implementation of new digital solutions. In addition, bank services operations have a range of hardware and software systems of different ages and technologies.

The EIB pursues a comprehensive strategy in financing the ICT sector, so as to cover all segments of the value chain from suppliers to customers. As such, the Bank finances research, development and innovation investments conducted by software developers and IT solutions companies. The Bank also finances digitalisation investments: financing the digitalisation of European corporates and public sector bodies unlocks a local market for software and software-based service providers and ensures that the economic benefits of those solutions spread across various industries.

There is strong economic interest in investing in the digital transformation of Africa's banking industry due to its positive externalities: digital technology is transforming the banking industry, and banks face the challenge of fully digitising their operations to remain competitive and comply with regulations. Banks across the globe are positioning themselves to leverage the benefits of technology and focus on innovation. The IT spending of the banking industry is also driven by the costs of meeting regulatory obligations, which do not contribute to banks' earnings, and the heavy reliance of banks on IT for their back offices and distribution channels.

5.2.2. FinTech

Mobile and digital technologies have helped to significantly boost financial inclusion in sub-Saharan Africa in recent years. The percentage of adults with an account rose from 24% in 2011 to 43% in 2017. Mobile money services provided by FinTechs and telecom operators are increasingly filling the gaps that traditional banks have never been able to address.

Compared to traditional banks, mobile money services do not require the same investment in branch infrastructure, and agent banking serves areas with low population density at a significantly lower cost. Digital finance still has untapped potential in sub-Saharan Africa, in terms of tailoring financial services to local context and end-user characteristics.

Going further: M-BIRR – realising the potential of mobile payments in Ethiopia

In Ethiopia, only one in five people have a bank account but half of all adults own a mobile phone. Accordingly, mobile banking has transformative potential for financial inclusion.

In 2015 M-BIRR began a service enabling five local microfinance institutions to offer mobile banking services. Their clients became able to transfer funds between accounts and to withdraw and deposit funds at M-BIRR agents, usually small retail outlets such as pharmacies, supermarkets and petrol stations. Banking services penetration in Ethiopia is extremely low; for many users, M-BIRR is their first experience of banking services.

The company also processes the Ethiopian government's social welfare payments for over 750 000 households, benefiting around 3 million people. The opportunity to receive social security payments by phone is making a huge difference.

The EIB has backed M-BIRR's expansion with a €4 million equity investment under the Impact Financing Envelope, a co-investment with DEG (German Investment Corporation). M-BIRR used the EIB investment to expand into other sectors of the Ethiopian economy, serving small businesses for which it can be costly or dangerous just to move daily revenues from one place to another in cash, as well as supporting the microfinance institutions that deliver the M-BIRR service to open more agencies and branches.

To reap the full impact potential of digital financial inclusion, it is necessary to strike the right balance between leveraging opportunities and managing risks. Issues of trust, financial capability, regulation, compliance and interoperability loom large. The role of FinTechs and banks in inclusive finance crucially depends on the features of the market in which they operate. Reaching the bottom of the pyramid requires client-centred innovation, designing products to target minorities and vulnerable segments of society, including older people and people with disabilities, and recognising gender as an additional layer of inequality. Innovative uses of transactional and alternative data can cater digitally to entrepreneurs, and new forms of collaboration between banks, supply chains and FinTechs will continue to emerge.

5.2.3. InsureTech

According to market research company IMARC,[44] Africa's insurance[45] market reached a value of $61.1 billion in 2019, which represents about 1% of the global market. Insurers see emerging economies as presenting significant potential for growth and profitability.

Digital solutions offer ways for insurance companies across Africa to develop such innovative solutions and to reimagine how they connect and engage with customers. While distribution is changing for the industry, the rise of digital platforms will help insurers maintain the pace of distribution, speed up processes, further reduce costs and achieve business goals. In markets like South Africa, telematics is being used to assess driver behaviour in underwriting automobile insurance. Meanwhile, 64% of life insurance coverage and 13% of non-life coverage in Brazil is now sold through banking institutions, according to Oxford Economics.

44 https://www.imarcgroup.com/africa-insurance-market

45 Insurance refers to a contract or a policy that protects the insured party from financial losses.

In the insurance sector, innovation happens at two levels. The market has experienced strong disruption by InsureTech and FinTech startups that may address underserved markets or serve other markets more efficiently. Consequently, insurers have increased their investments in digital transformation, and are also increasingly acquiring promising or threatening startups.

According to a 2019 industry survey published by the Joint Risk Management Section,[46] actuaries ranked climate change as the top risk for that year, ahead of cyber damage, financial instability, and terrorism. There were 710 natural catastrophe events in 2017, marking only the fifth time this annual count had exceeded 600, with all of those counts occurring over the last six years. This growing impact of climate change is also showcased by the increase in average insured loss per year to $49 billion in the ten years ending in 2016, compared to about $28 billion over the preceding two decades, and this situation is expected to deteriorate further. Insurance companies' ability to cover climate change risk is affected by absence of reliable precedents. The emergence of digital insurance market in Africa will provide tools to mitigate the adverse effect of climate change and encourage preventive measures.

Going further: Investing in climate change adaptation and resilience InsureTech

In light of climate change, insurers have identified a business imperative to invest in digital technologies to not only preserve their existing markets, policies and investments but also create new markets and green investments. Insurers operating in developing markets, which face greater exposure to climate-related risks, need to better understand, quantify and combat the impact of climate change. Much innovation in the insurance industry is driven by emerging startups, which redesign business models and develop innovative products and solutions. These companies require growth capital to emerge and scale towards sustainability.

The EIB committed $20 million to equity participation in the $80 million Blue Orchard InsuResilience Investment Equity Sub-Fund, which targets high-growth innovative companies operating in the insurance industry to provide solutions for climate change adaptation and resilience. Pursuant to this objective, the fund will invest in insurers that invest in and use technology and in digital technology companies developing solutions for the insurance industry.

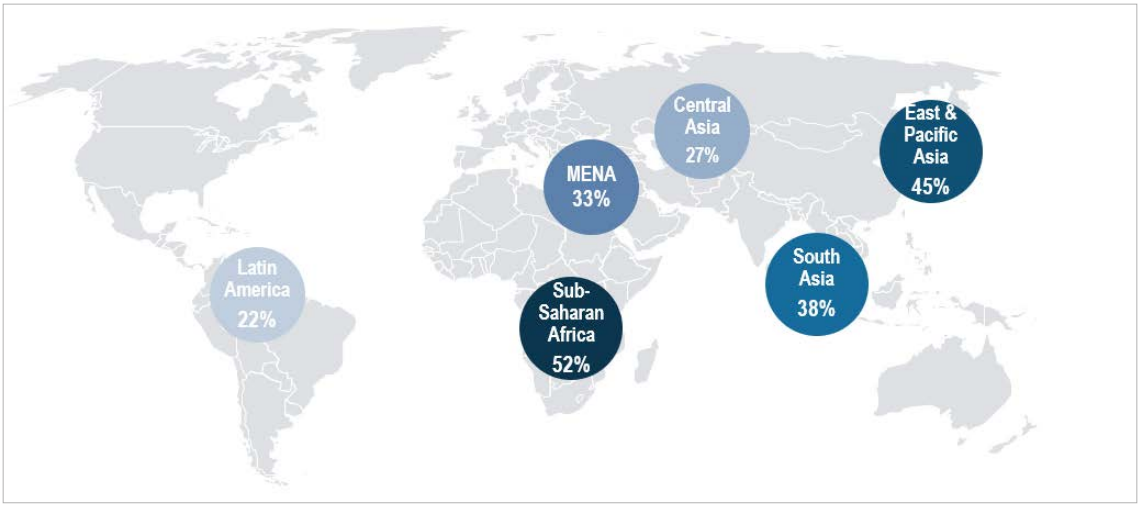
For instance, the fund invested in Inclusive Guarantee, a leading microinsurance broker in West Africa and a pioneer in climate insurance products. The company was established in 2007 to promote socially inclusive insurance products, and currently focuses on West African farmers and index-based crop insurance.

46 https://www.soa.org/globalassets/assets/files/resources/research-report/2019/12th-emerging-risk-survey.pdf

5.3. Entrepreneurship

Small and medium-sized enterprises (SMEs) form the backbone of economies across the globe: they account for the majority of businesses worldwide (about 90%), more than 50% of employment, and are important contributors to job creation and global economic development. However, one of the biggest constraints on their growth is the lack of access to finance: 52% of sub-Saharan Africa's SMEs experienced a funding shortfall in 2018, which is the highest rate among developing economies.

Share of small and medium-sized enterprises experiencing a funding shortfall in developing economies (2018)[47]



Africa's entrepreneurs have unprecedented opportunities to produce innovative web-based applications and dynamic new business models.

Entrepreneurship plays a crucial role in net job creation, inclusive economic growth and poverty reduction. Increased use of new technologies, particularly digital, will also be key, as sub-Saharan Africa grows more connected with increased access to mobile broadband, fibre-optic cable connections and power-supply expansion, combined with the rapid spread of low-cost smartphones and tablets. Africa's entrepreneurs have unprecedented opportunities to produce innovative web-based applications and dynamic new business models. Many are seizing these opportunities: startups are being established all over the continent (even in rural areas to address rural population needs), and sub-Saharan African countries have among the highest entrepreneurship rates in the world (22% of Africa's working-age population are starting businesses[48]), with women participating at the same level in most countries. According to the Global Entrepreneurship Monitor 2014 Report, individuals in African economies tend to have the highest perception of opportunities and entrepreneurial intentions, accompanied by the lowest fear of failure.

Mobile technology, in particular, provides a versatile, low-cost platform of opportunities for entrepreneurs. The GSMA estimates that over 4 million jobs in sub-Saharan Africa are directly and indirectly related to mobile technologies. Over the long run, mobile technology is having a transformative effect on economies and societies in the region, introducing connectivity and services as well as driving new business models and innovations.

47 PROPARCO, Financement des PME en Afrique: quoi de neuf?, 2019.

48 https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AEO_2017_Report_Full_English.pdf

The EIB primarily targets the continent's increased investment requirements through diversified financing instruments, while also supporting business innovation, especially in digitalisation, energy efficiency and climate action. To address the needs of SMEs, the EIB supports businesses through a wide range of intermediated products, including loans, guarantees and securitisation, equity and quasi-equity financing. The Bank cooperates with a wide range of financial intermediaries that offer financial products targeting MSMEs. It benefits from these intermediaries' presence across the continent, expertise and local knowledge.

The EIB primarily targets the continent's increased investment requirements through diversified financing instruments, while also supporting business innovation, especially in digitalisation, energy efficiency and climate action.

Two key factors are providing considerable opportunities for private enterprise growth: a) the availability of new forms of financing, such as venture capital, private equity, subordinated debt, long-term senior debt and other forms of patient capital provided by the Bank and partner financial institutions; and b) stronger support for the local entrepreneurship ecosystem.

The intrinsic nature of digital transformation investments exacerbates the access-to-finance issue already confronting SMEs across the continent. Local financial institutions often lack the expertise to assess digital projects and their lending products are not always suitable for these projects, especially given the high risk and complex business models of digital natives.

The EIB seeks to develop this portfolio to increase investments in funds with high risk inherent to the industry profiles providing adequate financing products, which could include junior financing by third parties. In sectors where the services would identify market failures, the option to develop innovative financing tools such as a dedicated fund catalysing investments from third parties would be considered.

5.3.1. Intermediated lending

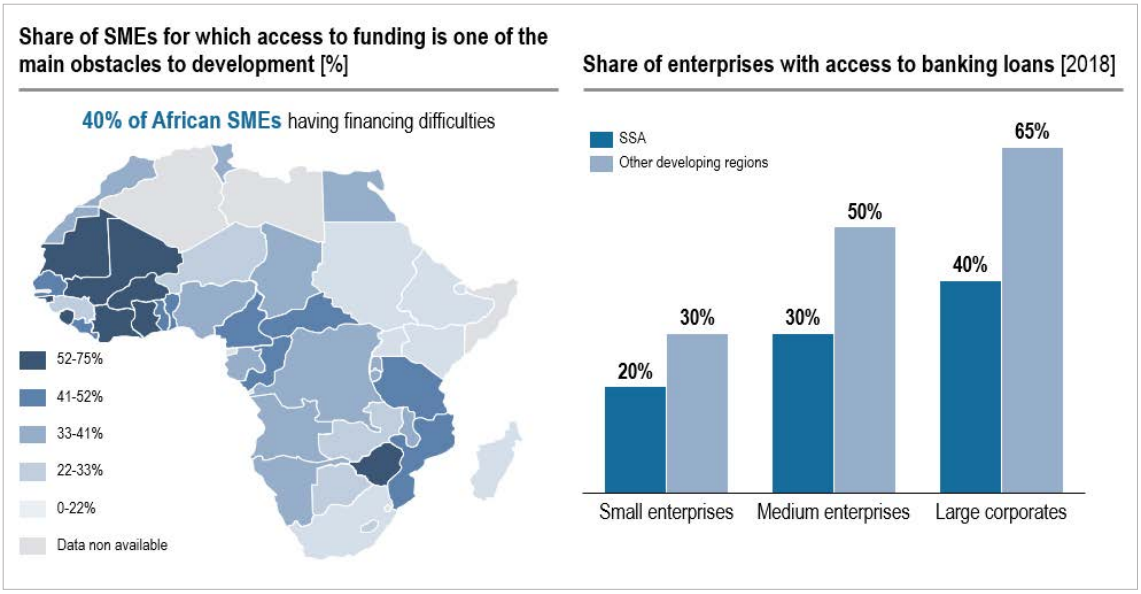
Africa's banks often limit long-term financing, being cautious in the structural management of asset-liability maturities: lacking dynamic local bond markets and long-term interbank loans, their financing is primarily ensured by their customers' deposits.

While long-term loan solutions exist, they are often reserved for large corporates or subsidiaries of large groups, at high rates and mainly in hard currency, enabling the lender to avoid the exchange rate risk in local currency.

Corporates, especially SMEs and mid-caps, can rarely find loans in local currencies and with maturities corresponding to the economic lifetime of the investment. The alternative is resorting to short-term financing, whose much higher (often unsustainable) monthly payments often generate cash flow issues. For SMEs, the major obstacle to getting a bank loan is perception of the risk they represent. Some banks across the continent require an 80% guarantee for loans to SMEs. This obviously limits the number of companies that can obtain financing. This perception of high risk may derive from a lack of reliable data, which complicates analysis of future cash flows. Innovative solutions allow the collection of alternative input data for credit-scoring algorithms. Some FinTechs, such as Tiaxa and Jumo, collect thousands of data points related to SMEs' mobile payments or use of social networks to feed their algorithms and enable credit analysis in the absence of traditional information. These initiatives remain rare and need further support.

Due to the abovementioned difficulties, only 20% of small enterprises and 30% of medium-sized enterprises have access to banking loans in sub-Saharan Africa, against 30% and 50%, respectively, in other developing regions.

Deep dive on Africa's small and medium-sized enterprises with financing difficulties[49]



Access to affordable loans with long maturities in local currencies, or coverage for the exchange rate risk, is a necessity for corporates to invest in growth. The EIB has a long history supporting Africa's telecom corporates.

The EIB Group (comprising the EIB and the European Investment Fund) supports companies throughout their development. EIB-intermediated lending has typically helped established small businesses and mid-caps but also MSMEs. The EIB supports the microfinance sector by directly financing larger microfinance institutions and indirectly financing smaller ones (more rural and risky) via microfinance equity funds and vehicles. These institutions are developing numerous digital solutions to increase their effectiveness and outreach, in line with their mission to support financially excluded populations. Investments to help achieve the digital agenda of microfinance institutions remain important.

The EIB is able to reach a wide range of small entrepreneurs and self-employed people, in addition to more traditional banking clients (SMEs and mid-caps).

For SMEs, accessing finance for investments in digitalisation proves even more difficult than finding finance for traditional investments; this challenge applies especially to intangible investments, such as in software, skills development and innovative solutions. Therefore, SMEs will need support through financial instruments that are able to cover these specific risks.

49 PROPARCO, Financement des PME en Afrique: quoi de neuf?, 2019.

Going further: SME Access to Finance Initiative

Supported by the European Fund for Sustainable Development, the SME Access to Finance Initiative is a joint programme of the European Union and the EIB. The initiative offers medium- to long-term funding and a risk-sharing instrument. It facilitates access to finance for SMEs and underserved groups such as startups or women- and youth-led businesses in EU Neighbouring Countries and sub-Saharan Africa. Eligible financial institutions include commercial banks, national promotional banks, guarantee institutions and any public or private institutions that provide loans and/or other debt instruments for these purposes.

Link: https://www.eib.org/attachments/thematic/sme_access_to_finance_initiative_en.pdf

EU Neighbouring Countries: Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Kyrgyz Republic, Lebanon, Libya, Moldova, Morocco, Palestine, Syria, Tunisia and Ukraine.

5.3.2. Microfinance

In recent years, microfinance (and more specifically microcredit) has made significant progress on the continent, particularly in West Africa. According to the Central Bank of West African States, the utilisation rate of microfinance services[50] in the West African Economic and Monetary Union rose to 21% in 2018, compared to 19% in 2017.

Many initiatives are started to improve microfinance performance across the region, including initiatives supported by the EIB. For instance, Kafo Jiginew, one of Mali's leading microfinance institutions, received CFA 6.5 billion[51] ($11.03 million) from the EIB in February 2020 to provide around 60 000 microcredits to small farmers, as well as financing for nearly 15 000 people. In 2019, $13 million in financing was announced by the EIB for two microfinance institutions operating in Senegal and Burkina Faso, respectively.

Access to microfinance will be further improved through developing mobile banking platforms such as M-Pesa in East Africa (with 21% of credit granted via mobile phone in sub-Saharan Africa in 2017), growing numbers of microfinance institutions in rural areas, and better access to microcredit for women (in 2019 only 28% of microcredits granted in the West African Economic and Monetary Union went to women).

50 This measures the number of individuals holding deposit or credit accounts in microfinance institutions as a proportion of the adult population.

51 CFA: the West African CFA franc.

Going further: The Centenary Rural Development Bank supports financial inclusion in Uganda

According to the World Bank, every year about 700 000 people in Uganda reach working age, but only 75 000 new jobs are created. Uganda also hosts over 1.3 million refugees and asylum seekers who have survived local conflicts. This is the third-largest refugee population in the world.

To provide financial literacy to farmers living in distant, rural areas and refugee communities, Centenary Bank and the EIB, in coordination with the Ugandan Office of the Prime Minister, United Nations High Commission for Refugees and the European Union, have organised intensive training sessions targeting business development, digital services and mobile banking.

This is particularly significant considering that 89% of Ugandans (about 18.6 million people) have no bank account or access to legal or financial services.

In May 2019 local entrepreneurs and more than 1 000 refugees attended the first nationwide financial inclusion initiative. This included training workshops across Uganda, both in the capital Kampala and in areas hosting refugees.

The EIB financed Centenary Bank with a €15 million loan under the ACP Smallholder Financing Facility to support micro, small and medium-sized entrepreneurs.

5.3.3. Venture capital

According to a report published by Partech Africa,[52] in 2019, 243 African tech startups raised a total of $2.02 billion in equity through 250 rounds, representing 74% growth in the amount raised year-over-year. The yearly funding amount continues its exponential growth with 206 transactions (+57% year-over-year) in Seed and Series A investments. This appetite for early-stage companies demonstrates investors' willingness and capacity to take risks on promising ventures in Africa.

The pool of investors operating on the continent is diversifying. Partech Africa's report identified that 70 of them made two or more transactions in 2019, compared with only 20 investors in 2017. The top five most active investors each closed more than seven transactions in 2019.

Nigeria attracted $747 million in tech venture capital investment (37% of all funding) but ranked fourth in deal count (38). Kenya ranked second in transactions (52) and volume ($564 million). Egypt ranked third in transaction count (47, +147% year-over-year) and volume ($211 million, +215% year-over-year). South African startups ranked first in transactions (66) but only fourth in volume ($205 million), representing an average per transaction lower than its peers. Significant disparities remain across the continent: the top four countries highlighted (Nigeria, Kenya, Egypt and South Africa) represented 85% of total funding ($1.7 billion).

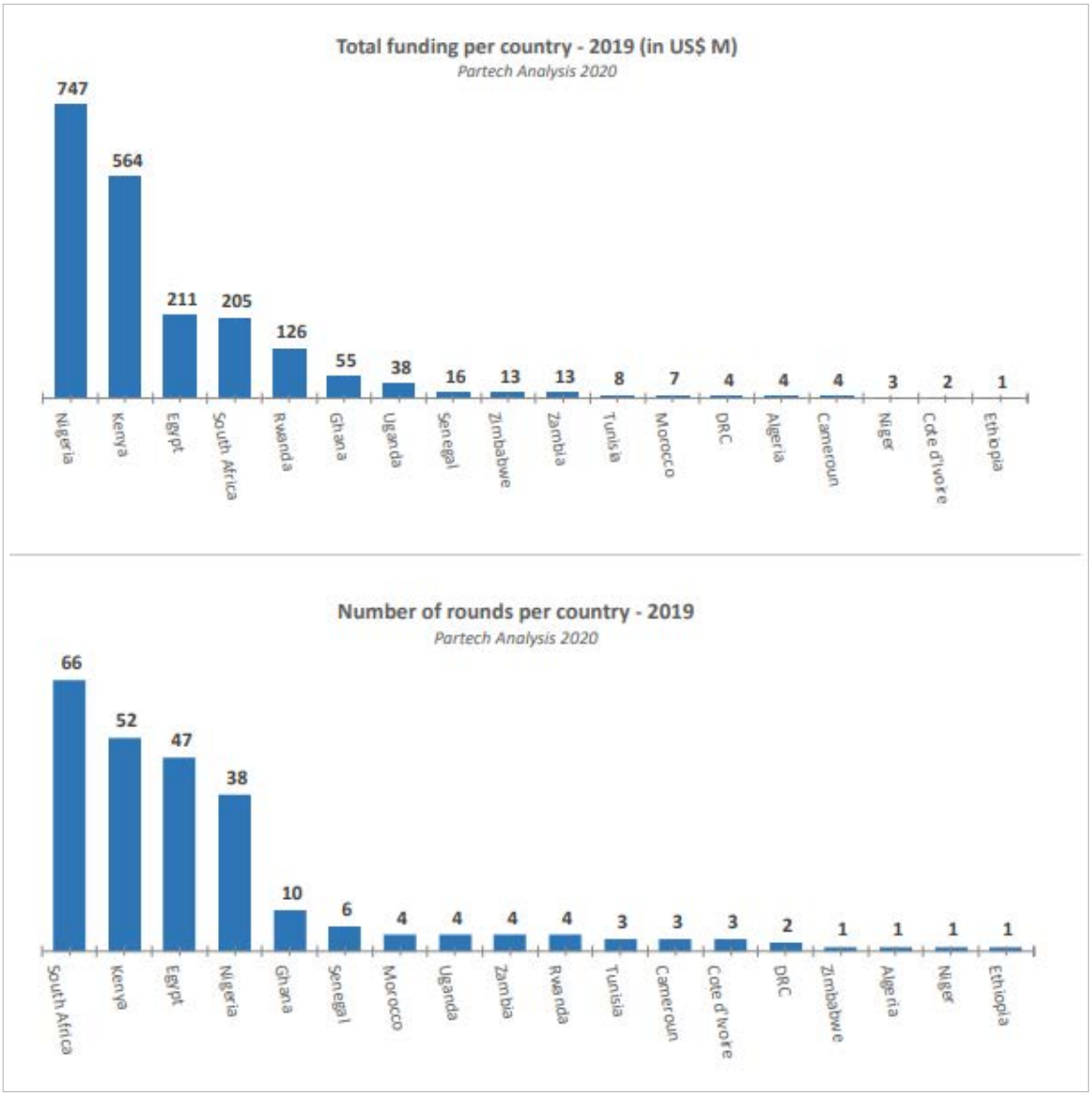
The rest of the continent remains largely unserved. In 2019 there were only 18 countries with at least one equity tech deal above $200 000 (compared to 19 countries in 2018), with total funding of $294 million (+53%) raised over 47 transactions (+24% year-over-year).

52 https://partechpartners.com/news/2019-partech-africa-report-here-and-its-best-yet-us-2-02-b-raised/

Financial inclusion remains the main investment sector on the continent, attracting 54.5% of total funding. This segment is driven by investments in FinTech startups ($836 million, +120% year-over-year), off-grid technology ($247 million, +27% year-over-year) and InsureTech ($19 million, +111% year-over-year).

The online and mobile consumer services sector has witnessed a steep increase to 29.3% of total funding (vs. 19.6% in 2018). This segment spreads across various verticals, of which health tech raised $189 million (+969% year-over-year), e-commerce $134 (+2% year-over-year), EdTech $124 million (+290%), and shared economy and personal services $124 million (+162% year-over-year).

Business-to-business and tech adoption represented 16.1% of total transactions (vs. 30.4% in 2018). This segment was largely driven by investments in the enterprise vertical ($247 million), which declined by 26% after exceptional transactions in 2018. The connectivity and hardware vertical experienced 344% growth year-over-year, raising $52 million.



Venture capital funds' ability to associate social return with financial return has been demonstrated by a growing number of exits. For example, A15 made the first dragon[53] on the African continent with the sale of TPAY Mobile to Helios Investments in 2018. In 2017 Diga-me achieved the highest exit with the sale of Edtech Getsmarter to 2U.

The EIB has been at the forefront of Africa's technology venture capital market in recent years. It has been the anchor investor in funds such as TLcom Tide Africa, Partech Africa, and AfricInvest Venture Capital, which managed to attract both public-development and private investors. The Bank has been among the first investors supporting venture capital funds in Africa, leveraging its long experience in impact investing on the continent. A commitment from the EIB is often deemed crucial to attaining the first closing or achieving the target size, so that the team can pursue the intended strategy. The backing of a facility such as Boost Africa (see below) provides further capacity for de-risking the investment in technology venture capital funds.

Going further: Boost Africa

In September 2020 the European Union signed a contribution agreement with respect to the EIB's Boost Africa initiative, which aims to enable and enhance entrepreneurship and innovation across Africa in a commercially viable way, through a blending mechanism with the European Commission under the Thematic Blending Initiative. Boost Africa targets a gap in the sub-Saharan market by pairing early-stage venture capital with skills development. Boost Africa allows the EIB to carry out junior investments in selected financial intermediaries (funds).

Boost Africa will focus on financial intermediaries investing in ICT, healthcare, climate mitigation and adaptation, education, financial services, manufacturing and other sectors. There will be particular emphasis on intermediaries focusing on youth and women.

Beyond access to finance, the initiative will also contribute to addressing other important market gaps, such as limited access to business development services, talent pools, mentorship, links to networks, technology and knowledge transfer mechanisms, and limited internal managerial capacity and financial literacy. Providing this combination of access to needed financing with access to local technical support mechanisms and networks makes Boost Africa a unique proposition that will effectively support local young entrepreneurs.

Based on the EIB's current pipeline for Boost Africa, the facility should be deployed within 2021. It will be necessary to extend this facility to support new funds emerging from the continent, so as to ensure long-term support to the local entrepreneurial market.

53 A "dragon" is a venture capital fund that manages to return 100%+ of the fund's value in a single exit.

5.3.4. Tech private equity

Private equity is a valid alternative to stock exchanges but remains in its infancy in most sub-Saharan African countries. The African Private Equity and Venture Capital Association (AVCA) recorded 863 private equity deals in sub-Saharan Africa between 2014 and 2019, with a mean size of $24 million. The number of deals has steadily risen, from 158 in 2014 to 198 in 2019, but this expansion is relatively slow considering the large gap in the market that could potentially be served by private equity.

North Africa attracted the largest number and total value of private equity transactions in Africa. In sub-Saharan Africa, Southern Africa accounted for the largest number of deals (311), the vast majority in South Africa. West Africa accounted for 274 deals, the vast majority in Nigeria and Ghana. East Africa accounted for 184 deals, more than half of which were in Kenya, while only around 4% of deals concerned Central African markets (the remaining deals were multiregional). Even in the relatively developed markets, such as South Africa, Ghana, Nigeria and Kenya, funds tend to be focused on a few large corporates.

In addition to much-needed capital, fund managers bring organisational expertise and know-how. This is particularly important for seed-stage companies, making their growth more resilient. In the short term, the threat of a recession longer and deeper than expected due to the COVID-19 crisis is the major risk posed to the continent's PE market.

According to AVCA's recent survey of general partners' views on the crisis, relatively few funds (12%) are currently concerned that investment opportunities are decreasing. However, 86% see pandemic's financial impact on their operations, including liquidity, as one of the top three risks, and 65% expect to see delays of over six months in deploying capital. Almost 30% had terminated deals as a result of the crisis.

In 2020 private equity activity slowed down across Africa in comparison to recent years, with the continent's largest economies on the brink of recession and investors seeking to improve capital efficiency, despite the effects of the ongoing pandemic. The main cause of this slump is restrictions on travel and population movement, which have stopped the smooth functioning of Africa's market economy. The total values of Africa's private equity fundraising and private equity deals decreased to $0.5 billion and $0.7 billion, respectively, in H1 2020. Likewise, the total volume of Africa's private equity exits dropped from 45 in 2019 to 13 in H1 2020. Selling to private equity and other financial buyers was the most common exit route, representing 54% of the total exit volume, followed by selling to trade buyers at 31%. In H1 2020, 39% of the total amount closed was from sub-Saharan African funds; country-focused funds were second, representing 30% of the total funding raised, while pan-African and regional funds represented the remaining 31%.

5.3.5. Telecom infrastructure funds

There is a lack of financing for telecom infrastructure projects in Africa. International financial institutions such as the EIB can mainly finance larger projects with senior debt or venture debt. Although some development institutions have capacity for equity participation, they are often not fully equipped to deliver the support usually required of equity investors. There are limited options for financing smaller projects or large projects with a high-risk profile. The continent has some infrastructure funds, such as Meridiam, and private equity funds investing in corporates and digital infrastructure, such as Convergence, both of which have benefited from EIB investments. However, the market remains underserved and so the Bank seeks to further its investments in this domain.

Should the market continue to fail to provide risk capital to infrastructure ventures, the Bank could envisage creating a dedicated fund in partnership with development institutions and the private sector. The EIB has experience setting up funds, including financing telecom networks (such as the Connecting Europe Broadband Fund). Through a mix of equity and debt instruments, such a fund could support access and transmission telecom projects that present weak financial robustness, are located in less densely populated areas and/or have a high risk.

5.4. Adoption of e-services

The EIB recognises the importance of investing in digital services to provide immediate responses to urgent needs and to build a robust digital economy in Africa. As concrete actions, the EIB seeks to support investments in broader ICT infrastructure development that enables innovative use of ICT for socioeconomic purposes such as e-health, e/m-banking, e/m-commerce, e/m-government and other ICT-enabled services.

In a pandemic situation, a digitalised healthcare ecosystem may facilitate the pandemic response by enhancing surveillance and control activities (such as rapid case reporting) and by supporting the exchange of information (for example, efficient documentation, sharing of patient records). The spread of COVID-19 has raised the importance of health data exchange and interoperability, and also exposed their limited penetration across health organisations.

The EIB gives special attention to the development of inclusive private and public sector ICT services that run on multiple platforms, with the objective of ensuring greater efficiency in the business environment (e-business), healthcare system (e-health), government services (e-government) and other services that impact on reducing poverty. This is in line with the EIB's impact priorities of private sector and entrepreneurship development.

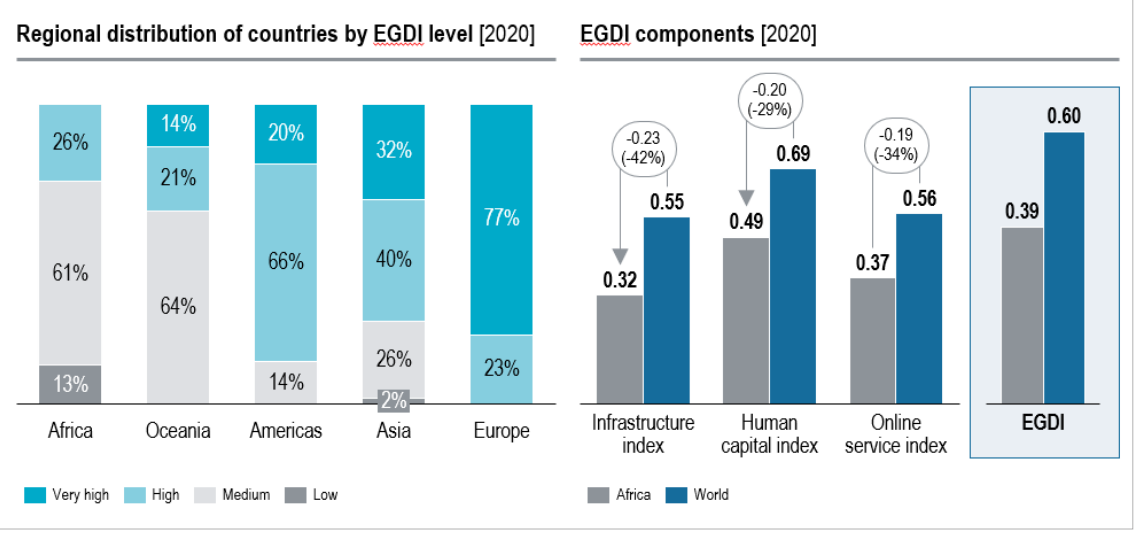
5.4.1. e-government

Developing e-government should be a priority for many African states as it provides both social and economic benefits. The social benefits include a rise in education levels, easier access to employment, better access to healthcare and greater transparency in public affairs. Benefits to the economy include increased productivity from mastery of digital skills and increased efficiency and time saving from developing online services (such as online tax collection).

Africa is lagging behind other regions in terms of e-government development: the continent's average score in the 2020 UN E-Government Development Index (EGDI) is 0.39, against the world average of 0.60, and only 26% of African countries have a high EGDI score.

The EGDI is computed from three underlying components: telecom infrastructure (such as 3G/4G coverage, access to internet, networks quality), human capital (including the population's level of education, mastery of digital media) and online service provision (such as number of online public services, ergonomics of online public websites, quality and use of public data). Africa lags furthest behind on infrastructure, but human capital and online services also need to be strengthened.

Africa's relative EGDI performance (2020)[54]



54 UN E-Government Survey 2020.

Going further: some recent improvements in online service provision

Online service provision has improved in many countries: Namibia has set up a platform that gives centralised access to all public services; Gabon recently introduced eGabon 2025, a development plan that includes a government internet portal, an electronic payment system and e-government services; Kenya continues its efforts to integrate digital technologies into public services (such as the iTax portal introduced in 2017); in 2019 Tanzania established the e-Government Authority with a mandate to facilitate public access to digital services, and introduced the requirement for online services provision to be tracked and measured so that the progress and impact of e-government development can be assessed.

The success of these countries partly results from their comprehensive digital government strategies and implementation plans.

In January 2019 the European Commission published the Guidelines and Roadmap for full deployment of e-governance systems in Africa,[55] which highlights that governments should ensure the best possible use of digital technologies to benefit the people, by acting as facilitators, enablers and regulators, and involving all stakeholders through transparent cooperation. The report proposes a matrix for measuring the level of e-government and determining the key elements that should be addressed, with work on different issues proceeding in parallel and different activities suggested. The EIB's support in terms of technical assistance and financing will serve to enable the proposed roadmap and support alignment with EU best practices, especially for cybersecurity and data protection.

Beyond developing infrastructure, human capital and online services, providing people with verifiable identities is vital to the successful rollout of digital services. Almost half of the sub-Saharan African population still has no legal identity. Providing digital identities is a prerequisite for unleashing a new wave of innovation, expanding financial inclusion and preventing fraud, while also increasing efficiency, transparency and accountability in the delivery of social services. To this end, the Smart Africa Alliance has proposed a blueprint to assist public and private sector players with the design and implementation of digital identification schemes for individuals, which are trusted by all stakeholders based on shared rules and minimum requirements, thus facilitating mutual recognition. The EIB has also been active in this field in Nigeria, where it supported the successful development of e-ID.

55 https://ega.ee/wp-content/uploads/2019/04/eGA_Final-Report-Research-analysis-guidelines-and-roadmap-for-full-deployment-of-e-governance-systems-in-Af.pdf

Going further: human capital development – a gap to fill for African countries

Limitations in human capital development have prevented many countries from moving to the highest EGDI levels. Africa's education systems are in crisis, with an estimated 50 million children out of school, low completion rates, and poor learning achievement, while the inadequacy and insufficiency of available training offers in digital skills is also concerning. For instance, the World Bank reports that only 50% of African countries include computer skills in their curriculum, compared to 85% elsewhere. The World Economic Forum estimates that young Africans pursuing a science, technology, engineering or mathematics degree account for only 2% of the continent's total university-age student population.

By creating a gap between the demand for and supply of digital skills in the labour market, this situation pushes companies operating in sub-Saharan Africa to import these skills from abroad. In Ghana, for example, nearly 20% of companies prefer to recruit only internationally for e-skills. Beyond undermining the continent's prospects for reducing unemployment, inadequate training in digital skills could reduce growth in African countries. More than 40% of Tanzanian firms and 30% of Kenyan firms indicate that the lack of skills in their workforce inhibits their growth and productivity.

Some public-led initiatives are trying to fill the gap (such as Rwanda's Smart Classroom, an initiative aiming to digitise the currently paper-based education system) but they remain limited due to budget constraints. However, many private initiatives have been established. Some are led by local players, such as Tanzania's Ubongo, which provides multiplatform educational content for children via accessible technologies like TV, radio and mobile phones; Eneza Education, which delivers tailored educational content either online, via applications, or through basic feature phones to over 800 000 users across the continent; and Andela, which specialises in training software developers through hubs in Nigeria, Kenya, Rwanda, Egypt, Ghana and Uganda (the EIB invested in Andela through the TLcom fund). There are also some initiatives led by foreign companies: for instance, IBM has invested $70 million in its training programme called IBM Digital - Nation Africa, which offers future learners an IBM Cloud-based learning platform that will host free educational programmes for five years.

Although these private initiatives are encouraging and need further support, they cannot reduce the gap on their own; Africa's education systems, which are increasingly obsolete for the professions of the future, must be completely overhauled in terms of trainers, teaching methods and subjects taught.

The adoption of e-government provides solutions to the complex challenges that African governments face, including how to improve efficiency and transparency, reduce the high costs of delivering public services, and extend the government's reach to the underserved segments of society. These benefits are driving public investments in this sector. However, while investments in e-government projects are increasing, concerns also growing over the large number of project failures, resulting in significant losses on major investments by cash-constrained nations. E-government transformation projects present inherent implementation and financial risks.

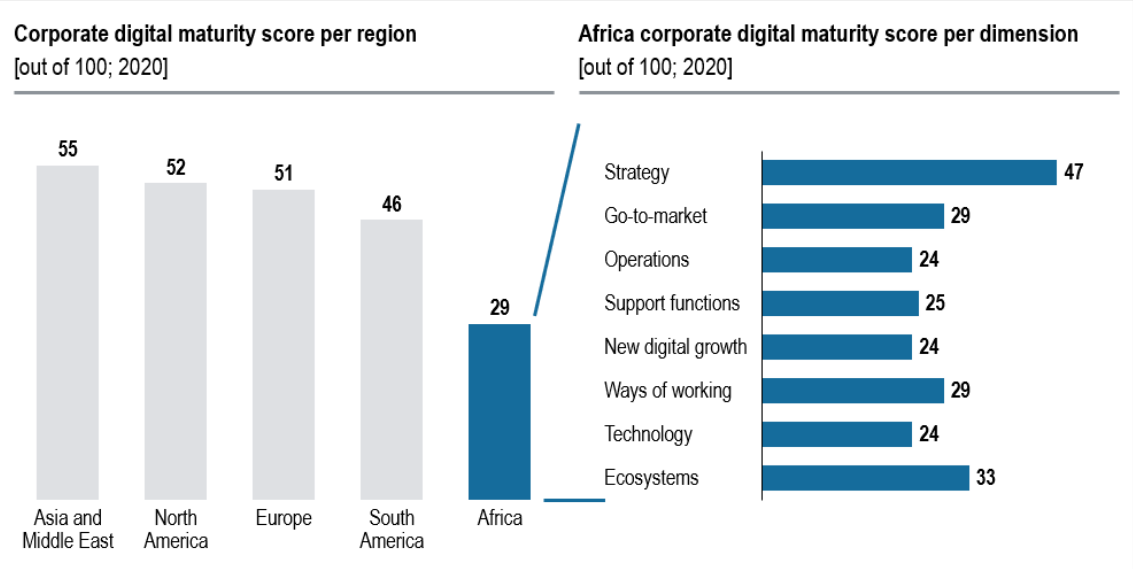
Most e-government projects are financed through government budgetary resources and operated by the government. The financing for these projects may be provided by a development institution, such as the EIB. However, due to high public debt levels across the continent and public financial resources becoming scarce, other options may be considered.

Two options leverage private investments. The first option is the full privatisation or outsourcing of public services to the private sector. The main benefit is that the project is fully financed by the service provider; on the downside, the public loses control over the services provided. The second option is the public-private partnership model, whereby the private party bears significant risk and management responsibility, and remuneration is linked to performance. This option provides the flexibility of innovative financing options during the investment and operation phases.

5.4.2. Corporates

Corporates in Africa are lagging behind in digital maturity. More precisely, although quite mature in crafting digital strategies, they struggle with execution: Africa's businesses have difficulties in identifying what and how to digitise in their go-to-market approach and their operations and support functions; identifying new digital growth opportunities; implementing new ways of working, leveraging data and new technology tools; and identifying the right partners and ecosystems to accelerate capability building.

Digital maturity of Africa's corporates[56]

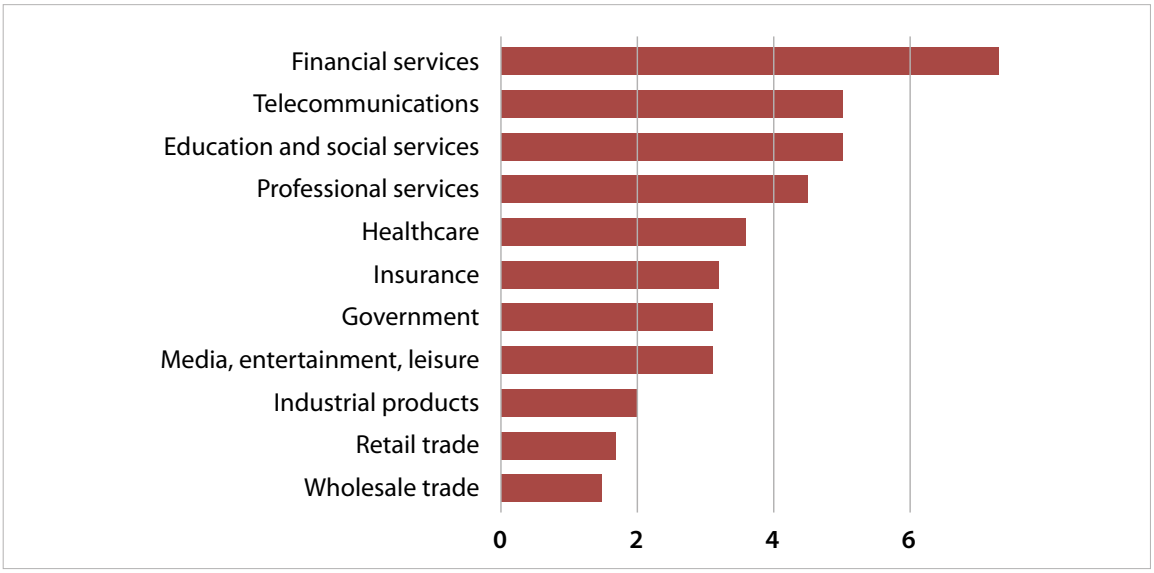


56 BCG Digital Acceleration Index global database.

This underperformance derives from three main challenges: management's inability to narrow digital priorities; employees' cultural resistance hindering companies' ability to scale up change; and the lack of technical and human capabilities.[57]

It is important to keep in mind, however, that digital maturity varies widely across companies. Unsurprisingly, the banking and telecom industries are much more mature than insurance and energy (both held back by relatively few customer interactions and low digital adoption and trust among customers) and retail and consumer goods (both held back by the logistical difficulties of doing business in Africa). This statement is corroborated by the average IT spend as a percentage of revenues or gross output per industry.

Total IT spend as% of revenues or gross output[58]



In every sector, the digital transformation of Africa's corporates is closely related to the improvement of digital skills on the continent. A Deloitte survey[59] reports that only 20% of companies feel they have the required skills to successfully complete a major digital transformation programme. Providing financial support is also a priority, as nearly 60% of companies report allocating less than 1% of their overall budget to digital initiatives.

57 BCG, The Race for Digital Advantage in Africa, 2020.
58 Forrester Research Inc., DB Research, IT Spending Forecasts.
59 Deloitte, Digital Future Readiness.

However, finding the necessary funding might be challenging. The lack of knowledge and expertise within banking sector financing corporates means that digital projects are often disadvantaged compared to other kinds of projects. Banks tend to perceive digital projects as riskier propositions, given some of their unique characteristics and, in particular, the fact that intellectual property and intangible assets are not widely recognised as collateral. The novelty of digital projects often means that historical evidence to support their business case is lacking, which may raise doubts about a company's capacity for debt repayment and future cash flow generation. Moreover, the loan ticket size and funding requirements for digital projects are relatively small, resulting in higher transaction costs and administrative burdens. In other words, these projects may be less attractive and less profitable for banks than larger loan tickets. SMEs often require a small loan ticket size to initiate a digital project.

All sectors need to seriously consider their digital transformation. The financial services industry has historically invested heavily in its IT systems and is increasingly under pressure to modernise (see below: Going further: Digital transformation in the financial services sector).

Modernisation of the agriculture sector holds significant economic benefits. Around two-thirds of the African population is employed in agriculture, the vast majority working on small-scale farms that currently produce around 90% of all output. Therefore, agriculture is key for most economies in Africa. The sector also accounts for at least 15% of the region's GDP (23% for SSA[60]). Despite the challenges faced (such as low productivity, long-term underinvestment and poor governance), prospects for Africa's agricultural sector are relatively positive. UN institutions expect cultivated areas to expand and farmers to increase productivity, through greater use of technology and improved inputs. Digital technologies such as artificial intelligence, robotics, blockchain, high-performance computing, internet of things and very-high-capacity networks such as 4G and 5G have the potential to increase farm efficiency and improve economic and environmental sustainability. Increased use of digital technologies can positively influence the quality of life in rural areas, and may attract a younger generation to farming and rural business startups.

60 https://www.mckinsey.com/industries/agriculture/our-insights/winning-in-africas-agricultural-market

Going further: Digital transformation in the financial services sector

The implementation of IT systems in financial institutions usually has implications across most departments and various locations of the organisation. Failure to establish an IT system can have a significant reputational and commercial impact on a banking institution. In addition, and due to its complexity, successfully implementing an IT solution requires a high level of internal support.

The banking industry is driven by personal, secure and high-quality services. Digital transformation in the banking industry offers new means to engage with customers and deliver a highly personalised, efficient and integrated experience. Using modern communication channels, new technologies can reduce banks' response time, facilitate on-demand services, and deliver real-time information in a user-friendly format to customers through online consumption models developed by digital technologies across sectors. IT investments in the banking sector can be divided into the following main categories: core systems, risk management systems, data analytics, distribution channels, and data/cyber security.

- Core systems are the basic IT infrastructure of the banking system and include all core banking functions, such as transactions and accounting. While still very often based on legacy, home-made developments, this basic infrastructure will increasingly be replaced in the near future by modern technology, including cloud-based or software-as-a-service systems, allowing the development of state-of-the-art distribution channels. Banks' investments in their own data centres will be another important component of this category.
- Risk management systems are the tools that allow banks to implement enterprise-wide governance policies, ensure regulatory compliance, and increase revenue through improved decision making.
- Data analytics refers to the analysis of large amounts of data managed by banks. Cost-reduction opportunities stemming from use of data analytics (also called big data) lie in fraud and sanctions management, while account management can also be improved by efficient use of enhanced customer insights. Taking a longer-term view on big data offers banks the potential for significant new revenue streams from up-selling and cross-selling.
- The investments in IT linked to distribution channels are driven largely by the development of internet- and mobile-based customer interfacing solutions. With the increasing penetration of smartphones and internet connectivity, and the advent of technology-based banking enterprises (FinTechs), conventional banks need to adapt their traditional points of sale and implement app- and internet-based delivery channels for their services. A large driver for the rollout of such solutions is the potential efficiency gains that banks can achieve through use of IT.
- With the increasing use of IT-based banking, the robustness of banks' data and IT security systems becomes crucial for customers to accept such technologically advanced solutions and for banks to meet their regulatory obligations and ensure efficient operations.

5.5. Cybersecurity

The rapid digital transformation of our economies generates, with the surge in data volumes, an increasing need for trust and security. A lack of existing cybersecurity infrastructure and technologies risks undermining digitalisation. Successful cyberattacks across countries and sectors demonstrate the vulnerability of digital assets and undoubtedly justifies the trend for more investment in cybersecurity.

To facilitate achieving Africa's development aspirations, improving cybersecurity should be considered as important as building a digital economy.

Africa is particularly vulnerable to cybercrime due to its weak security infrastructure, shortage of qualified personnel, limited awareness and lack of regulatory coordination. According to Kenya-based IT and business advisory firm Serianu, cybercrimes cost Africa's economies $3.5 billion in 2017, up 75% from 2016. Also in 2017, more than 95% of public and private organisations across the continent invested less than $1 500 per year on cybersecurity measures. Due to limited resources and knowledge of the issue, SMEs usually fail to make any investment in this domain. Cyberattacks can take very diverse forms, ranging from simple email or text message scams to the dissemination of fake news, ransom attacks or large-scale theft of customer data using malware. The wide-ranging consequences include financial losses, reputational damage, and disruption of business and government operations. According to some experts, the lack of sound government policies and regulations on cybersecurity also highly limits the continent's capacity to deal with the high and growing rate of cyberthreats. To facilitate achieving Africa's development aspirations, improving cybersecurity should be considered as important as building a digital economy.

Going further: Cyber-criminality in COVID-19 times

Hackers are leveraging the panic and confusion of the pandemic to conduct malware attacks against computer networks. Phishing messages purportedly from health agencies and offering information on the disease have a high probability of being opened. There is also evidence that fake social media accounts are spreading disinformation about COVID-19 to advance the interests of particular nations. Some campaigns praise the handling of the outbreak by government agencies and medical workers, while others disseminate rumours on the origins of the virus.

While teleworking arrangements may be effective to slow the virus's community spread, they present cybersecurity challenges that should not be underestimated. These risks can differ from those posed to on-premises operations. The increased use of teleworking among large corporates across the continent, using remote VPN connections, increases the risk of cyberattacks. Abnormal patterns are more difficult to identify when IT personnel are mobilised for business continuity and when the numbers of connections are much greater than normal.

According to the 2018 Cybersecurity Index,[61] only three of 54 African nations (Mauritius, Kenya and Rwanda) would be able to respond to cyber threats, due to insufficient human capital. Some countries are, nevertheless, organising themselves faster than others to protect against cyberattacks. For example, Senegal inaugurated its regional cybersecurity school in Dakar in November 2018, while Benin created the Agence Nationale de Sécurité des Systèmes d'Information (National Information Systems Security Agency) in 2018, and established both the Office Central de Répression de la Cybercriminalité (Central Cybercrime Repression Office), attached to the judicial police, and Epitech (a school of innovation and IT expertise) in 2019. According to the International Telecommunication Union, Benin was thereby transformed from a hub of cybercrime in Africa to one of the ten countries best-equipped to defend against cyberattacks on the continent.

Africa's transition to a digital economy requires investments in cybersecurity as a vital response to increased threats of illegal access to and malign use of data. New and advanced technologies that progressively spread through the continent, such as the internet of things, and the increase in connected devices and applications are likely to magnify the threat potential.

Practically, African countries should each develop a national computer security incident response team (CSIRT), which nationally handles cyberattacks and computer-security incidents. In addition, major private and public companies need to develop their own security operations centre (SOC). This centre entails people, processes and technologies that provide situational awareness through the detection, containment, and remediation of IT threats. It handles, on behalf of an institution or company, any threatening IT incident, ensuring that each incident is properly identified, analysed, communicated, investigated and reported. It also monitors applications to identify possible cyberattacks or intrusions, and determines whether they are genuine malicious threats that could affect the business.

To enable such changes, a full ecosystem of companies is required, ranging from software companies—providing antivirus solutions, security information and event management (systems that aggregate and correlate data from security feeds), and anti-DDoS systems[62]—and providers of hardware capabilities, such as firewalls, to system integration and operations companies able to implement and operate such systems.

The EIB is a key player in supporting the emergence of and building capacity in emerging innovative sectors, capitalising on its experience from Europe. Given the risks and the emergence of new threats across all areas of the economy, it is the EIB's mission to provide financing for innovative solutions to tackle cybersecurity challenges. Cybersecurity-related investments range from hardware to training. The EIB understands the importance of financing such investments to safeguard the development potential of the digital economy.

The EIB mobilises technical assistance to develop national investment frameworks that help to protect and safeguard digital infrastructure and data from cyberthreats, and provide a safe and secure online experience to all users. This involves conducting extensive analysis of current national cybersecurity strategies in reference countries, focusing on their risk assessment approach, regulatory landscape, governance structure, stakeholder engagement, international cooperation, incident response mechanisms, awareness, cybercrime, and privacy approach.

61 ITU, Cybersecurity Index 2019.

62 DDoS: distributed denial of service.

5.6. Energy efficiency

The Bank seeks to support the development of energy systems that are low-carbon, efficient and reliable, and which improve access to modern and affordable energy.

Demand for reliable energy services to run digital infrastructure is growing rapidly, as economies become increasingly dependent on the high availability of systems, particularly for mobile finance, e-health and e-government applications. The Bank will focus its support on reliable energy technologies, consistent with decarbonisation and the energy transformation. By applying its environmental and social standards and procurement processes, the EIB will continue to ensure the support of sustainable, high-quality infrastructure that delivers long-term economic benefits.

Despite its major growth potential, the mobile industry in Africa faces many infrastructural and operational challenges. First, mobile operators face difficulties in powering existing networks, both off-grid and on-grid, due to unreliable power supply and heavy reliance on expensive diesel power. For a typical tower site in Africa, energy costs represent as much as 40% of the overall network operating expenses. Second, mobile operators face infrastructure challenges in their efforts to expand mobile coverage to populations without coverage (located mostly in rural and remote areas without access to grid electricity and road infrastructure), owing to higher operational costs and poor return on investment.

The EIB seeks to support the development of energy systems that are low-carbon, efficient and reliable, and which improve access to modern and affordable energy.

Telecom operators are shifting towards power solutions that are cleaner (renewables), more efficient and more cost-effective but have increased complexity, through outsourcing to telecom energy services companies. This market is still in the early growth stage, with many emerging players and varying business models. Renewable solutions, such as solar, provide a tremendous opportunity to reduce carbon footprint and costs, due to the rapidly declining cost of renewables and storage technologies. Adopting green power alternatives from a telecom energy services company presents a strong financial and corporate social responsibility opportunity for mobile operators.

The EIB seeks to provide more efficient financing to energy service companies to extend the reach of telecom networks to rural areas and limit emissions from operating telecom networks.

Case study: Green innovation for Guinea's mobile networks

Digitalisation is proving to be a cornerstone for development in sub-Saharan Africa, and underpins all the Sustainable Development Goals. Extending networks across the continent connects more people and creates opportunities for underserved groups.

The EIB is lending $30 million to help extend mobile coverage across Guinea. Like many countries in sub-Saharan Africa, Guinea has good mobile network coverage, which is essential for economic development and for connecting people with life-improving digital services. However, Guinea's energy grid is strained by the rapidly growing demand for electricity, which leads to frequent power cuts as current capacity is exceeded. Mobile phone masts need a power source to function, so during power cuts the mobile signal cuts out too, unless there is a backup generator (usually diesel-powered). To deal with this, Orange Guinée is changing the technology that drives its business, ensuring more reliable power supplies, consistent network access, and lower emissions.

At the time of project appraisal, Orange had 1 500 sites across Guinea, and covering the whole country and reaching all 12.4 million residents was a significant challenge. IPT Powertech Guinea is responsible for handling upgrades to the network, one site at a time: "We are covering the whole of the country with all of its landscapes, ranging between mountains, forests and tough terrains through to rivers, lakes and oceans." The company's infrastructure focus is on two key elements: renewable energy and energy efficiency. The new system for continuously powering mobile phone towers will significantly reduce the need for generators, therefore cutting emissions drastically.

The financed energy service company (IPT Powertech Guinea) installs photovoltaic panels on the sites, which allows the network's diesel consumption to be cut by over 80%. These panels keep the sites active when the electricity grid is overburdened. In the most badly affected areas, power availability ranges from six to 12 hours per day. All of these sites require stable power backup, and that is what the solar panels provide, by powering batteries to keep the sites functioning. The equipment used is efficient and designed to last a long time, thereby minimising the energy wasted and the need for replacement parts.

Orange Guinée will save money by no longer having to invest in diesel and generators. Those savings can be directed into extending the network with new, green equipment. In 2019 Orange built over 200 new sites, and another 220 were planned for 2020. The EIB is co-financing this project with DEG (German Investment Corporation), a development finance institution and subsidiary of KfW. The infrastructure will create opportunities, potentially for thousands of people, and reduce environmental impact. It is also sustainable. The sites are scalable for 3G, 4G and even 5G technologies without requiring extra investment in energy. Orange Guinée rolled out 4G during 2019 and has continued to do so in 2020.

Chapter 6

Working together

The EIB is the EU bank; as its shareholders, the EU Member States shape the Bank's approach to the projects it finances, while also helping to steer policy. It would be impossible for the EIB to deploy support for the emergence of Africa's digital economy without the backing of Member States and the European Commission. This applies to both investment facility operations and those using our own resources. The EIB seeks to partner with other development institutions to increase the impact of its investments in digital technologies and solutions.

The EIB seeks to partner with other development institutions to increase the impact of its investments in digital technologies and solutions.

6.1. European institutions

The European Commission works together with the European Union's partner countries across the world to achieve sustainable development, designing EU partnership and development policies. The different Commission services, Member States and EU Delegations all have a role to play for effective and coherent cooperation. Priorities for development cooperation arise from the Council of the European Union and the European Parliament, which approves budget and programming proposals.

Adopted in 2017, the External Investment Plan is the European Union's €50 billion public and private investment plan for development (€5.1 billion from EU public funds to share the risk of investing in target sectors), centred on countries neighbouring the European Union and on Africa. Its concept is to provide financial risk-sharing guarantees for projects "where viable business proposals meet social needs." With these instruments, the plan generates more investment to help target countries create more jobs, grow faster, and become more stable and prosperous. The plan prioritises sustainable energy and connectivity, financing for MSMEs, sustainable agriculture, sustainable cities, and digitalisation for sustainable development.

Emphasising its public–private character, the External Investment Plan combines EU grants with loans from other investors to fund development projects, and provides for partnering with governments to facilitate doing business and attracting investment. Such financing will be provided through the European Fund for Sustainable Development.

Thanks to its delegation presence, the European Union has a particular comparative advantage in engaging with different local governments and ministries. The EIB aims to work closely with Africa's EU Delegations to develop a country-oriented approach to financing the digital sector. This involves conducting detailed country diagnostics and providing technical assistance to take the lead in appropriate actions, based on the context.

The European Commission has been at the forefront of implementing forward-looking policies to ensure the development of a sustainable global digital economy which the EIB seeks to support through its financing.

The European Commission has been at the forefront of implementing forward-looking policies to ensure the development of a sustainable global digital economy which the EIB seeks to support through its financing. The Commission seeks to support the implementation of a fair and competitive market, creating an environment in which people are empowered and can trust in the security of the data they provide both online and offline. In this respect, the European free-roaming agreement has inspired a number of African countries and the GDPR is becoming a global standard. More recently, the European Union's 5G toolbox has been providing a model for ensuring supplier diversity and mitigating the dangers of high-risk vendors. The EIB is fully aligned with the policy objectives set by Member States and the Commission, and applies their principles to its financing.

6.2. Team Europe

The European Union, as a major provider of development aid and finance, is keen to promote multilateral responses to increase coordination and enhance the visibility of European support for external partner countries, in partnership with international financial institutions, the United Nations, and the G7 & G20. During the COVID-19 pandemic, the European Commission has orchestrated a common European response, with the objective of taking resolute actions to reinforce public health sectors in EU partner countries and to mitigate the socioeconomic impact of the health crisis.

The Team Europe initiative aims to provide a single framework for action between the European Commission and its implementation partners, and to combine resources from the European Union, its Member States development agencies, technical assistance providers and financial institutions, particularly the EIB, the European Bank for Reconstruction and Development (EBRD) and European development finance institutions. This entails stepping up "reciprocal syndication" in co-financing coronavirus responses and increasing mutual reliance on one another's appraisals.

This response mainly addresses the immediate health crisis and its socioeconomic consequences. To this end, the European Union has secured more than €18.8 billion of financial support for external partner countries from existing external action resources. The bulk of the funding (€10.6 billion) comes from reorienting existing funds and programmes to specifically tackle the coronavirus, and includes the accelerated provision of €5.2 billion in loans from the EIB.[63] A coherent financial package will be built for each partner country needing EU support, based on existing instruments and facilities that can efficiently deliver fast and tangible results. This is particularly the case for the External Lending Mandate.

To address the COVID-19 crisis, the Team Europe's joined-up response strategy focuses on three priorities:

- emergency response to the immediate health crisis;
- strengthening health, water and sanitation systems; and
- addressing the immediate social and economic consequences.

ICT solutions presented in the EIB report titled Africa's digital solutions to tackle COVID-19 (a Team Europe contribution) feed these three priorities. The report notably identifies pioneering and innovative solutions for helping medical personnel, enabling the anticipation and control of the virus's spread, supporting poor communities and assisting governments to better communicate.

Once the world emerges from the current crisis, the Team Europe approach will offer the benefit of systematising the financing of digital projects in Africa and building resilience across the continent. Collaboration between financial players is particularly relevant in the digital field, which is inherently cross-cutting and often fits into a broader framework of transformations requiring inputs from a variety of sources of expertise. Whatever the nature of the project to be financed (infrastructure or services, public or private sector, disruptive innovations or transformations), collaboration is essential.

63 https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_606

In this configuration, the EIB is the financial institution with the largest capacity to intervene in financing digital projects. The Bank's financial engineering capabilities and proven knowledge of the digital sector could, therefore, be amplified in full alignment with the European Union's geostrategic choices, policies and sustainable economic development priorities in African countries.

As part of its portfolio of products and services, the EIB can provide direct lending to clients of all sizes by borrowing money on capital markets. This type of support can help leverage investment attractiveness to other investors, as shown in past and current projects funded by the Bank, especially for financing larger infrastructure projects and businesses in the private sector, thus increasing the global impact of investments.

The Bank can also deliver advice and technical assistance, and open credit lines for financial institutions lending funds to creditors, especially for smaller projects below €25 million.

In all cases, the EIB seeks to be the guarantor of European values, principles and standards. In the digital sector, this translates, for example, into special attention to respect for natural sovereignty, high privacy compliance standards for protecting users' data, and IT security.

6.3. EIB trust funds

Because financing for development is limited, the EIB works with donors to create trust funds and provide in-depth support for projects across the world through technical assistance, grants and loan guarantees. EIB trust funds are agreements in which a donor transfers money to the EIB to help a third party. The EIB manages nine trust funds financed by Member States, the European Commission and the United Kingdom.

The Partnership Platform for Funds is the Bank's framework for managing donor funds. Launched in 2017, it streamlines and standardises our procedures on issues such as governance arrangements, fee calculations and reporting standards, and acts as an umbrella for the different individual trust funds it encompasses. The Bank seeks to expand these partnerships to include other governments, philanthropists and foundations.

Given the wide acceptance of the key role of digital technologies for development, together with increasing donor interest in supporting the sector, digital economy financing is an area that could be further supported by the Bank with the backing of dedicated or generalist trust funds.

6.4. Partner financing community

Multilateral development banks are committed to boosting financing for the Sustainable Development Goals and the global fight against the climate crisis by crowding-in the private sector. Besides seeking to mobilise finance from public and private financiers, multilateral development banks care about standards, investment quality and impact, including environmental, social, and governance effects; the best strategic use of scarce concessional finance resources; and helping the poorest and most vulnerable.

Infrastructure remains a top global priority. Japan's presidency of the G20 in 2019 focused on quality infrastructure. Saudi Arabia's presidency will build on this focus by developing a framework for InfraTech, which targets improvements to the combination of physical infrastructure and digital technologies to deliver increased impact and value. Within the G20 Infrastructure Working Group, multilateral development banks will exchange knowledge through the infrastructure collaboration platform.

Most development agencies have digital economy as a key sector of their agenda for the coming years. This support is essential given the market's failure to provide enough financing to achieve ambitious goals and deliver significant impact. The commercial organisations (both international and regional) that finance Africa's digital economy focus on the projects that are most financially sound. Commercial financing conditions often cannot accommodate high-risk investments. When there is a financing market failure, development agencies are usually the only solution. The EIB works with various national and multilateral development agencies supporting Africa's digital economy, examples of which are described below (non-exhaustive).

	Examples of collaboration in the digital field
Multilateral development agencies	
The African Development Bank Group	The EIB co-invested with the African Development Bank Group in several venture capital funds, including TLcom and Partech. The two institutions also jointly set up the Boost Africa initiative (see section 9.3.3).
European Bank for Reconstruction and Development (EBRD)	The EIB and EBRD Digital Transformation Platform and Broadband Investment Programme was selected under the European Fund for Sustainable Development. The programme aims to increase the use of digital technologies, and widening rural access to broadband in the neighbourhood.
World Bank Group	The World Bank provided technical assistance for and committed $300 million to the development of digital identity (e-ID) infrastructure in Nigeria and the supply of biometric identities to Nigerians living in their home country or abroad. The EIB approved a €250 million loan to co-finance this project.
National development agencies	
Agence Française de Développment (AFD, French Development Agency)	Agence Française de Développment is a co-financier of the digital identity (e-ID) infrastructure in Nigeria alongside the EIB and the World Bank.
FINNFUND	The EIB co-invested with FINNFUND in M-BIRR, a mobile banking services platform operating in Ethiopia, via M-BIRR-affiliated microfinance institutions and banks.
KfW (German Development Agency)	The EIB co-invested with GIZ in M-BIRR via microfinance institutions and banks affiliated with the Ethiopian platform.
Intergovernmental agencies	
UN agencies	The EIB works with various UN agencies for the development of Africa's digital economy. Examples of collaborations include: • The EIB initiated a study by BearingPoint, in partnership with the UNDP, to evaluate the investment requirements in digital infrastructure to provide an immediate response to the COVID-19 crisis across Africa. • With Unicef, the EIB provides its expert support to the GIGA initiative. • With ITU, the EIB evaluates opportunities to support the Connect2Recover initiative.

6.5. Private investors

Private sector participation in developing Africa's digital economy has become more pronounced over recent years. The liberalisation of most markets over the last 20 years has played a major role in attracting private investors; in particular, the lack of major infrastructure investments and strong telecom potential drove investors with available liquidities to the sector. However, with major currency fluctuations and diminishing revenues in hard currencies due to a strong decline in roaming revenues, the risk profiles of many telecom operators have worsened.

More recently, the private sector ramped up its participation in the applicative markets, encouraged by low interest rates. Private sector industry players and investors are crucial to expanding connectivity and infrastructure, increasing the adoption of digital solutions and encouraging local innovations.

Investment firms are showing a strong appetite for the technology, media and telecommunications market in Africa. By the end of 2019, the Partech Africa[64] fund had made a total of 11 investments in nine tech companies based in six countries, focusing mainly on Series A and B tickets. Convergence Partners[65] is focusing on this sector in Africa, with about 30 investments achieved since its inception in 2006. In March 2019 Meridiam announced the closing of the Meridiam Infrastructure Africa Fund[66] for a total amount of €546 million, 2.5 times its initial size.

Private sector industry players and investors are crucial to expanding connectivity and infrastructure, increasing the adoption of digital solutions and encouraging local innovations.

Operators are also willing to invest, as illustrated by the ongoing battle between 11 companies to obtain one of two new telecom licences being issued by Ethiopia. Among them are renowned groups such as Global Partnership for Ethiopia (a consortium including Vodafone, Vodacom and Safaricom), Etisalat, MTN, Orange, Telkom SA, Saudi Telecom Company and Liquid Telecom.

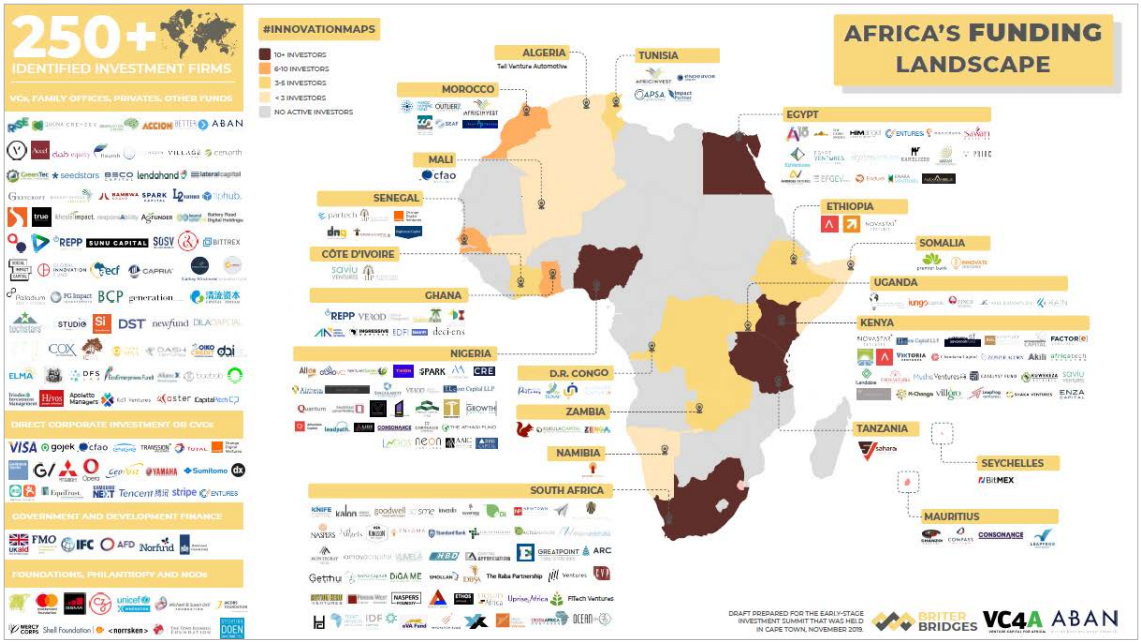
The GAFAM also have an increasing role in the development of telecom infrastructure, especially for transmission networks (backbone and submarine cables). Both Google and Facebook are leading significant submarine cable projects and financing emerging telecom operators.

Finally, the European Commission is setting initiatives to foster private investment, for instance through the Africa-Europe D4D Hub, a project aiming to facilitate and build inter-Africa and Africa-EU multistakeholder partnerships between key stakeholder groups (private sector, civil society, government and academia).

64 EIB-supported.
65 EIB-supported.
66 EIB-supported.

Elsewhere, China's major state-owned companies are investing heavily in Africa, supported by the Export–Import Bank of China.

Africa's funding landscape (all sectors included)[67]



67 Briter Bridges, Africa's funding landscape 2019.

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The rise of Africa's digital economy

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