



The Mobile Economy **Sub-Saharan Africa** 2022



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Executive summary



Closing the usage gap is crucial to realising the potential of mobile connectivity

In Sub-Saharan Africa, 40% of the adult population are now connected to mobile internet services.

Mobile connectivity was at the centre of the Covid-19 response in Sub-Saharan Africa. During the pandemic, mobile acted as a critical lifeline for consumers. As the predominant form of connectivity in the region, the vast majority of services that moved online amid lockdown measures utilised mobile networks to reach end users. The mobile industry has also continued to bring connectivity to people and invest in network coverage and capacity expansion to help people interact with the communities and environment around them.

As countries in Sub-Saharan Africa, and the rest of the world, transition into a post-pandemic economic recovery phase, mobile connectivity is set to play a crucial role in defining the 'new normal'. Authorities see an opportunity to leverage digital technology and services to build economies that are more resilient to future shocks, enhance productivity and efficiency in service delivery, and ensure more inclusive socioeconomic development.

In Sub-Saharan Africa, 40% of the adult population are now connected to mobile internet services. However, another 44% live in areas covered by mobile broadband networks but do not yet use mobile internet services (the usage gap). Addressing the main barriers to mobile internet adoption for these people, including affordability and digital skills, should be a priority for stakeholders in order to realise the potential of mobile connectivity to drive economic growth and development in a post-pandemic world.



5G activities gather momentum as 3G begins to decline

5G-related activities are beginning to pick up across the region. These include 5G spectrum auctions, 5G pilots and commercial trials, and efforts to develop locally relevant 5G use cases. For example, South Africa's ICASA completed the spectrum auction for frequencies in the 700, 800, 2600 and 3500 MHz bands in May 2022; MTN Nigeria launched a commercial pilot for its 5G network in August 2022; and Vodacom launched a commercial 5G network in September 2022. Following the huge demand for connectivity in the wake of the Covid-19 pandemic, there is growing interest in the role of 5G in the connectivity landscape.

While the general consensus remains that a widespread 5G rollout is more of a long-term prospect in Sub-Saharan Africa, there is a strong case to utilise the technology in some scenarios to serve certain connectivity requirements for individuals and enterprises. Although 3G will remain the dominant connectivity technology in Sub-Saharan Africa, accounting for over half of total connections by 2025, this year marks a turning point as 3G adoption begins to decline for the first time. This reflects the growing shift towards 4G as operators take steps to migrate customers from legacy networks (2G and 3G). By 2025, 4G will account for a third of mobile connections in the region, compared to under a fifth of connections in 2021.



Subscriptions growth remains strong

By the end of 2021, 515 million people subscribed to mobile services in Sub-Saharan Africa, representing 46% of the population – an increase of almost 20 million on 2020. There will be nearly 100 million new subscribers by 2025, taking the total number of subscribers to 613 million (50% of the region's population). The two most populated countries – Nigeria and Ethiopia – will account for almost a third of new subscribers in the period to 2025.

Sub-Saharan Africa's demography, with a sizeable proportion of the population under the age of 18, means that subscriber growth will remain strong for the foreseeable future as young consumers move into adulthood and are able to subscribe to mobile services. Meanwhile, young subscribers are more likely to be tech-savvy and keen on adopting mobile internet services, particularly more advanced 4G and, where available, 5G services. This is one trend to watch, given the implications for high-speed connectivity and the creation and distribution of digital services in the region.



Mobile continues to contribute to economic growth

In 2021, mobile technologies and services generated around 8% of GDP across Sub-Saharan Africa, a contribution that amounted to almost \$140 billion of economic value added. The mobile ecosystem also supported more than 3.2 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector, with \$16 billion raised through taxes on the sector. By 2025, mobile's contribution will grow by \$65 billion (to almost \$155 billion), as the countries in the region increasingly benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services.



Policymakers can help spur inclusive development

Mobile connectivity has the potential to accelerate Sub-Saharan Africa's digital transformation and drive socioeconomic advancement in areas such as healthcare, education, digital commerce, industrial automation and smart city infrastructure. Realising this potential requires policy measures to support network investments and improve the affordability of digital services for consumers. Governments and regulators in the region should therefore adopt forward-looking spectrum management and fiscal policies, which includes:

- creating a spectrum roadmap to ensure there is enough spectrum to meet surging demand for mobile services in both the short and long term
- ensuring access to mid-band spectrum, in particular 3.5 GHz, given its importance to the future of 5G
- accelerating access to sub-1 GHz spectrum to provide widespread rural mobile broadband services
- applying best-practice principles of taxation as recommended by international organisations such as the World Bank and the IMF.

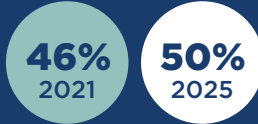
The Mobile Economy Sub-Saharan Africa



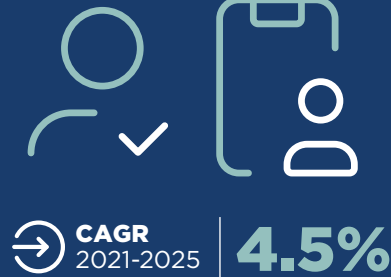
Unique mobile subscribers

2021
2025

515m
613m



Penetration rate
Percentage of population



Smartphones

Percentage of connections
(excluding licensed cellular IoT)

2021
2025

49%
61%



4G

Percentage of connections
(excluding licensed cellular IoT)

2021
17% | 2025
33%



5G

Percentage of connections
(excluding licensed cellular IoT)

41m connections
in 2025

4% of total connections



SIM connections

(excluding licensed cellular IoT)

2021
2025

917m
1.09bn

Penetration rate
Percentage of population

82% 2021 | 89% 2025



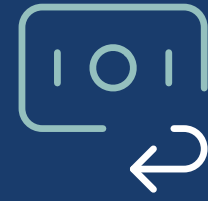
CAGR 2021-2025
4.5%



Operator revenues and investment

2021
2025

\$46.6bn
\$57.4bn



Total revenues

Operator capex

\$29.5bn

2022 —●— 2025



Mobile industry contribution to GDP

2021
2025

\$138bn **8%**
of GDP
\$154bn



Public funding



2021 **\$16bn**

Mobile ecosystem contribution to public funding (before regulatory and spectrum fees)



Employment

400,000 jobs



Formally supported by the mobile ecosystem in 2021



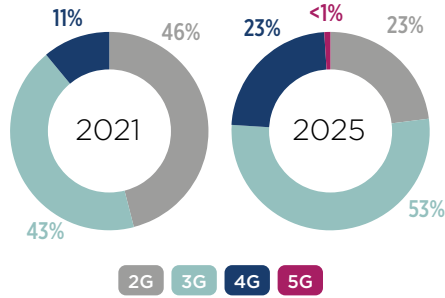
+ Plus an additional **2.8 million informal jobs and jobs in other parts of the economy**

Subscriber and technology trends in key markets

ECCAS



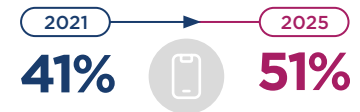
TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



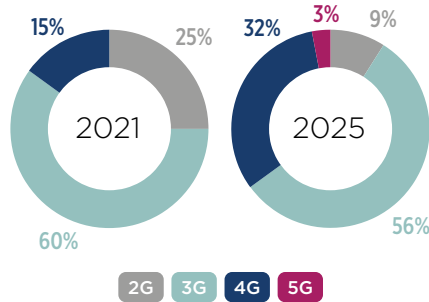
SMARTPHONE ADOPTION



ECOWAS



TECHNOLOGY MIX*



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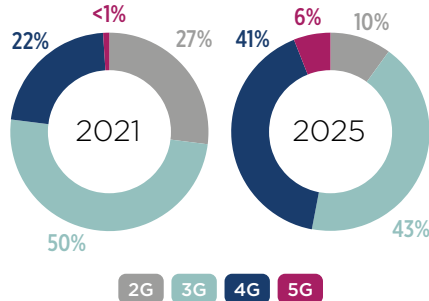
SMARTPHONE ADOPTION



SADC



TECHNOLOGY MIX*



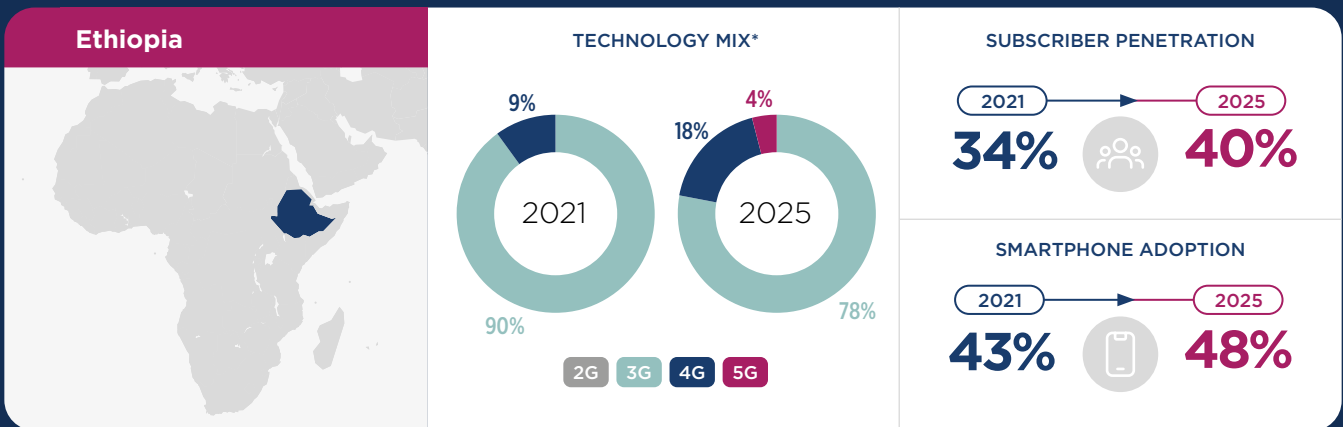
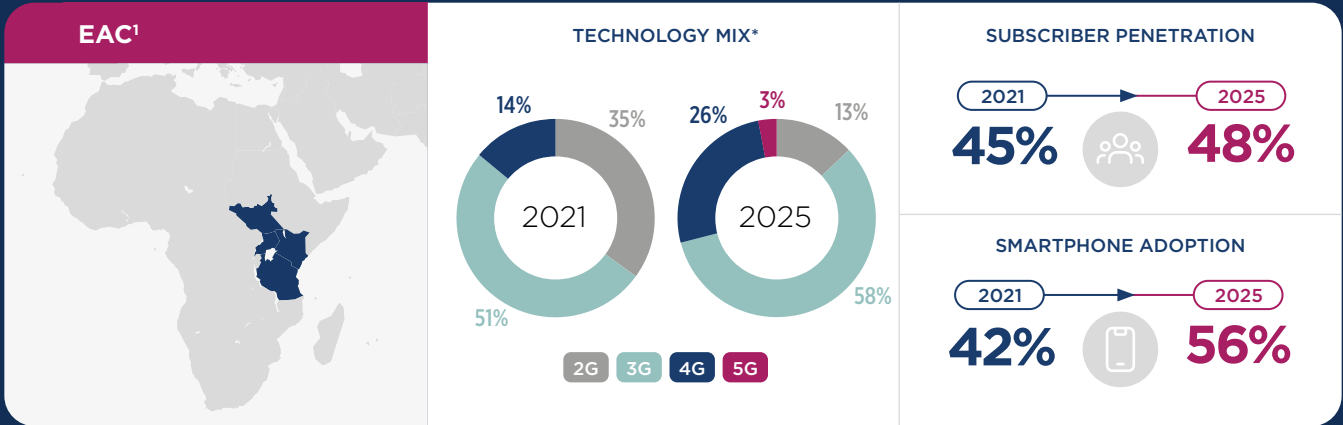
SUBSCRIBER PENETRATION



SMARTPHONE ADOPTION



* Percentage of total mobile connections (excluding licensed cellular IoT)
 Note: Totals may not add up due to rounding



1. The Democratic Republic of Congo (DRC) joined the EAC in March 2022 but has not been included in the data for the EAC in this report.

01

The mobile market in numbers

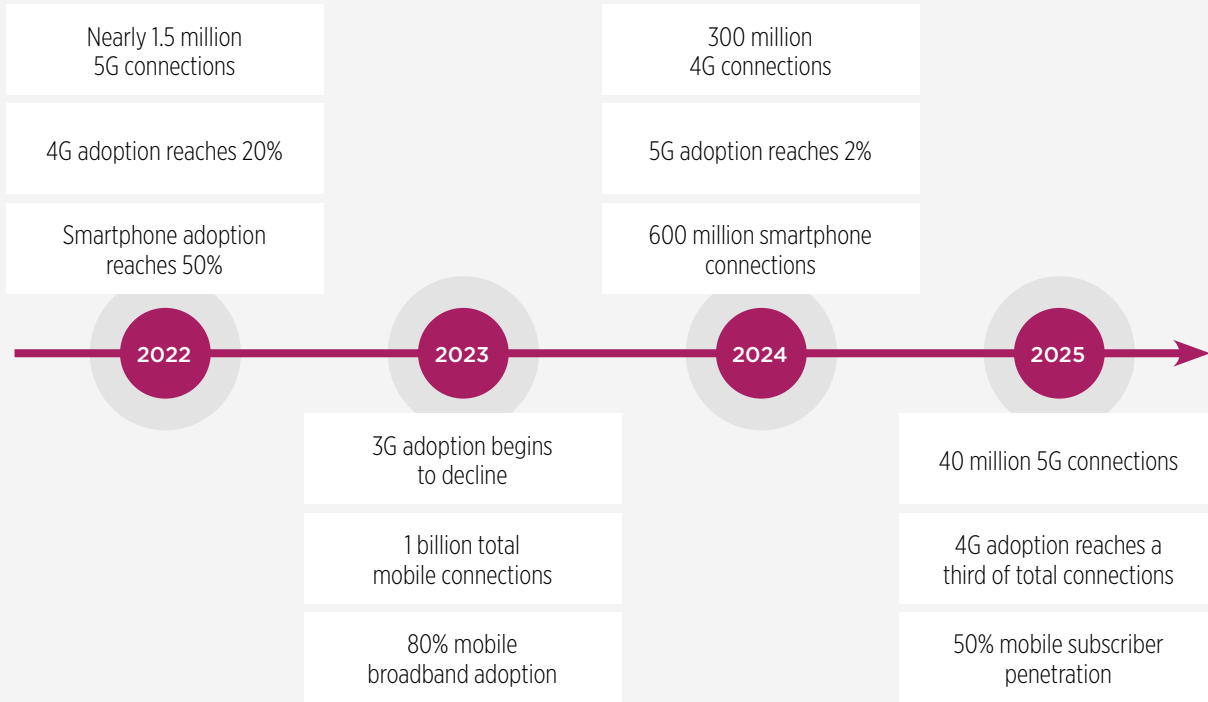




1.1 Mobile adoption continues to increase

Figure 1

Key milestones for the mobile industry in Sub-Saharan Africa to 2025

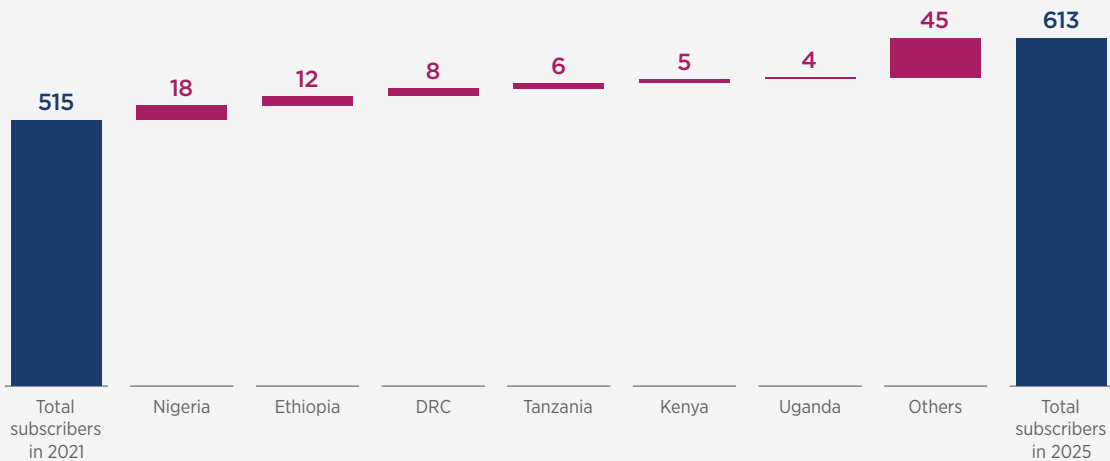


Source: GSMA Intelligence

Figure 2

There will be nearly 100 million additional mobile subscribers in Sub-Saharan Africa by 2025; Nigeria and Ethiopia will account for almost a third of these

New mobile subscribers (million)



Source: GSMA Intelligence

Competition will drive subscriptions growth in Ethiopia

Ethiopia is Sub-Saharan Africa's second-largest market, having a population of around 120 million. With a mobile penetration rate of just 34% at the end of 2021, compared to the regional average of 46%, Ethiopia has significant headroom for mobile subscriptions growth.

In August 2022, Safaricom Ethiopia announced a large-scale customer pilot of its network in Dire Dawa city and the Harari Region, as part of a phased city-by-city regional network rollout. Customers will be connected to 2G, 3G and 4G networks, allowing them to access voice, SMS and data services.

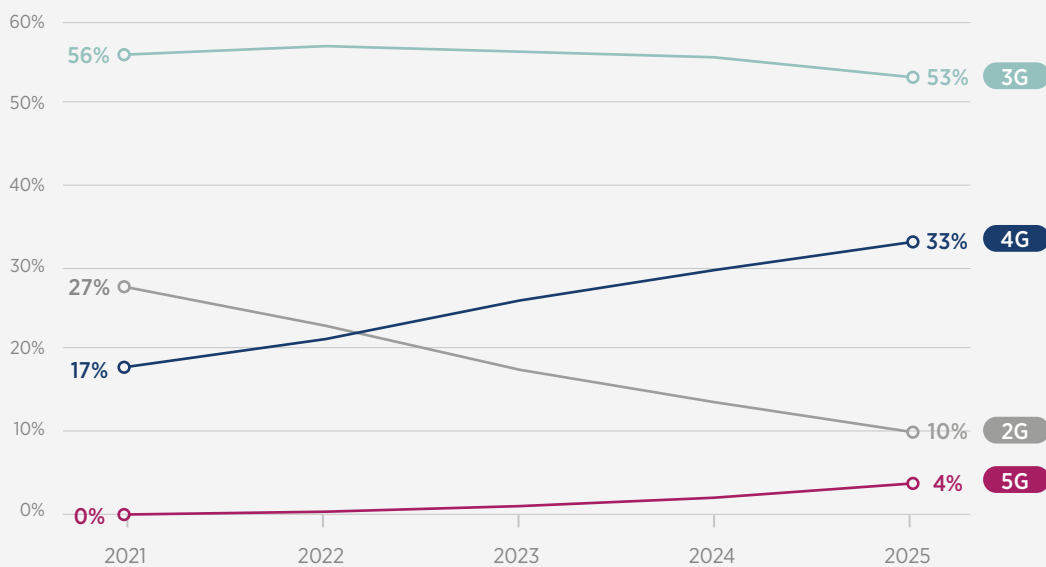
Safaricom Ethiopia's national launch will take place in October 2022, with the operator aiming to extend services to 25 cities in total by April 2023. The liberalisation of the telecoms sector is expected to drive subscriptions growth as competition between the incumbent operator Ethio Telecom and new entrant Safaricom Ethiopia brings down prices for consumers, stimulates investment in network infrastructure and inspires the development of innovative adjacent services.

1.2 4G accelerates as 3G reaches its peak

Figure 3

Adoption of 4G is picking up and will overtake 2G in 2023; 3G adoption reached its peak in 2022

Percentage of connections (excluding licensed cellular IoT)



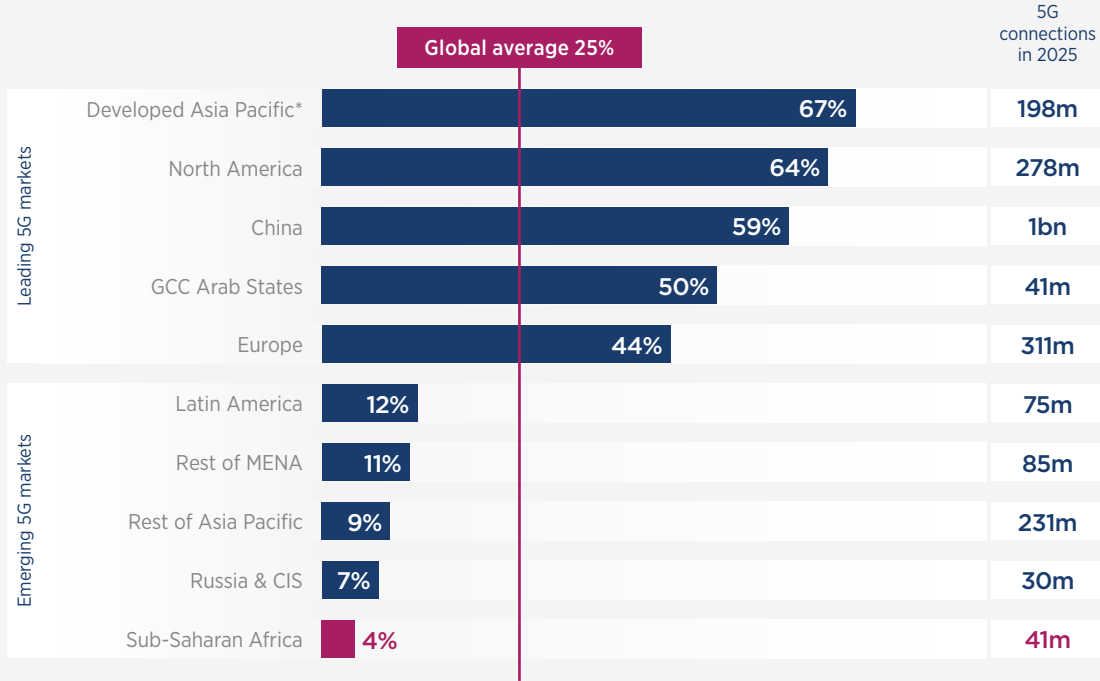
Source: GSMA Intelligence



Figure 4

By 2025, 5G will account for 4% of total connections in Sub-Saharan Africa, compared to the global average of 25%

5G adoption in 2025 (percentage of total connections)



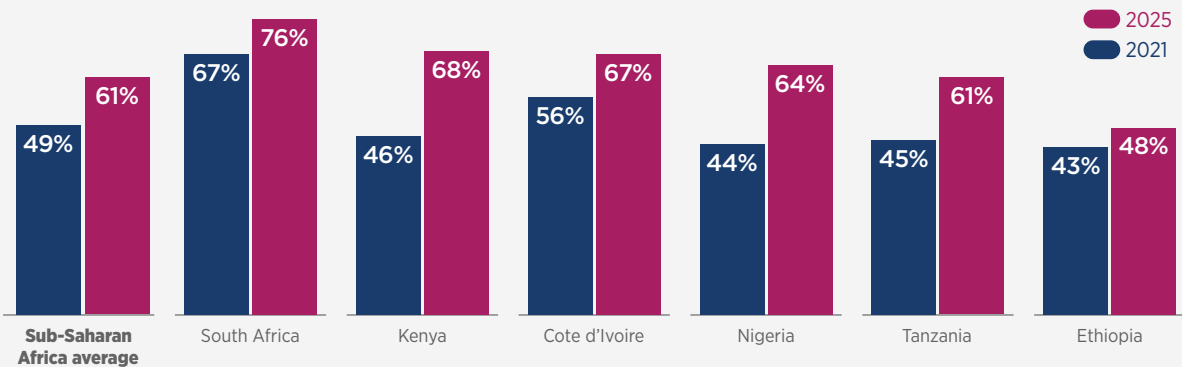
Source: GSMA Intelligence
* Australia, Japan, Singapore and South Korea

1.3 Smartphone adoption and data traffic on the rise

Figure 5

By 2025, smartphones will account for 61% of total connections, on average, in Sub-Saharan Africa

Smartphone adoption (percentage of total connections) in the top six markets in Sub-Saharan Africa

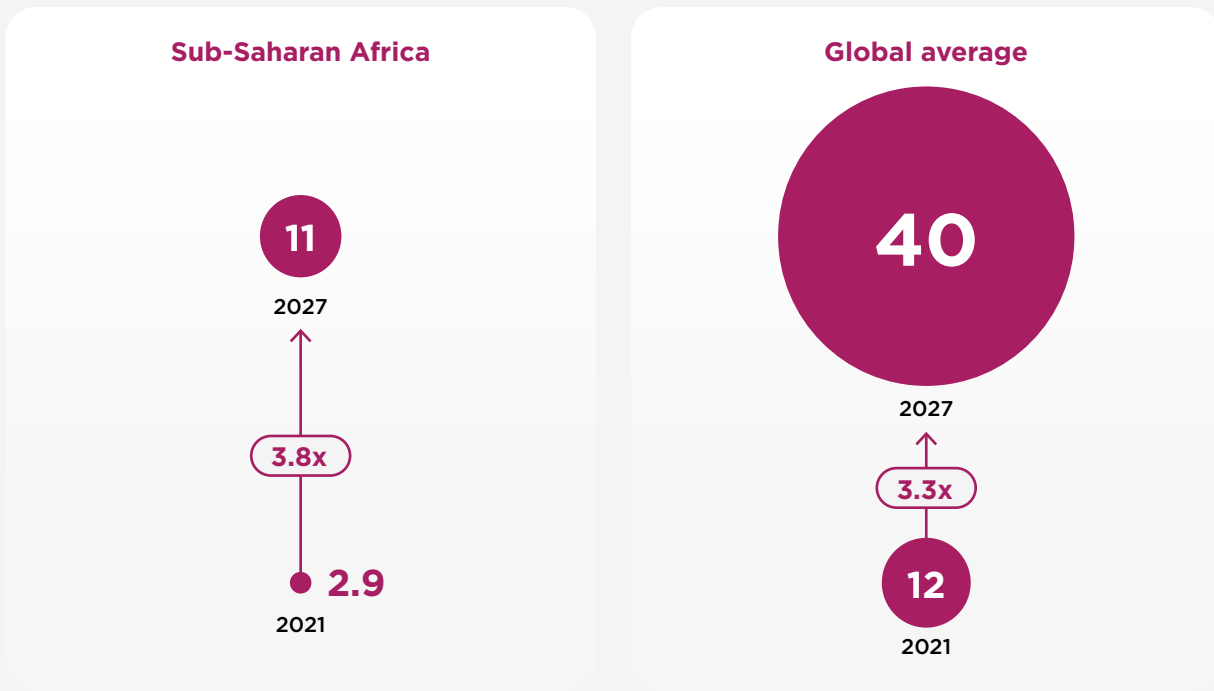


Source: GSMA Intelligence

Figure 6

Mobile data consumption in Sub-Saharan Africa will nearly quadruple by 2027, though it will continue to lag behind the global average by a wide margin

Mobile data traffic per smartphone (GB per month)



Source: Ericsson

Growing interest in online gaming will drive smartphone adoption and data traffic

Gaming is a popular pastime for people of all ages. According to GSMA Intelligence research, 58% of the adult population across 10 major countries analysed play digital games at least once a week. There are several factors driving the growth in gaming: advances in streaming technology and the proliferation of cloud/edge infrastructure; the on-demand content consumption habits of millennials; the shift in gaming consumption from consoles to mobile devices, with smartphones the most popular gaming device; and improvements in mobile and fixed networks in terms of speed, reliability, latency and coverage, all of which are key capabilities for an enhanced gaming experience.

In Sub-Saharan Africa, the number of gamers has more than doubled in the last five years to 186 million people, according to a study commissioned by game analytics company Newzoo and Carry1st, a South African gaming platform. This is largely being driven by mobile gaming – 95% of gamers across the region play on a smartphone or tablet, as opposed to consoles and computers. Within the region, South Africa has the highest number of gamers at 24 million people, representing 40% of its population, followed by Ghana (27%), Nigeria (23%), Kenya (22%) and Ethiopia (13%).²

2. <https://gamesindustryafrica.com/2021/11/29/gaming-in-sub-saharan-africa-more-than-doubles/>

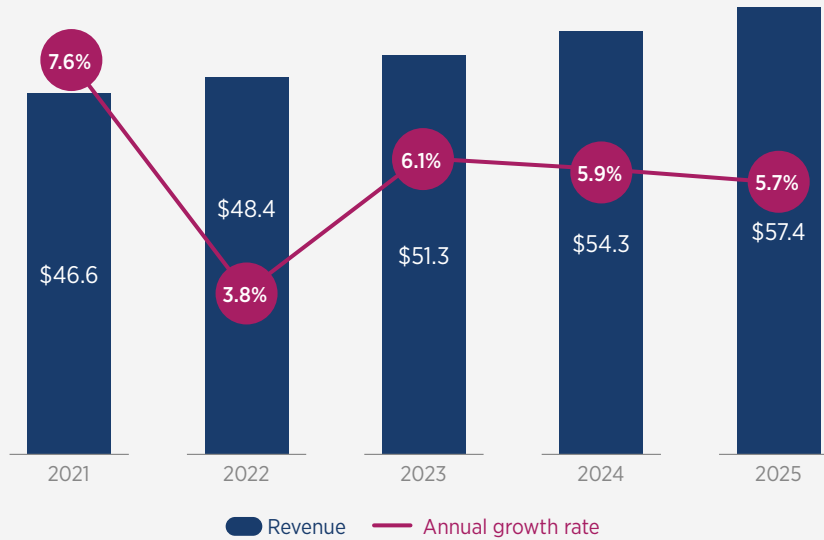


1.4 Revenue growth outlook remains strong

Figure 7

Mobile revenue will grow steadily to 2025 thanks in part to rising data usage

Mobile revenue (billion)

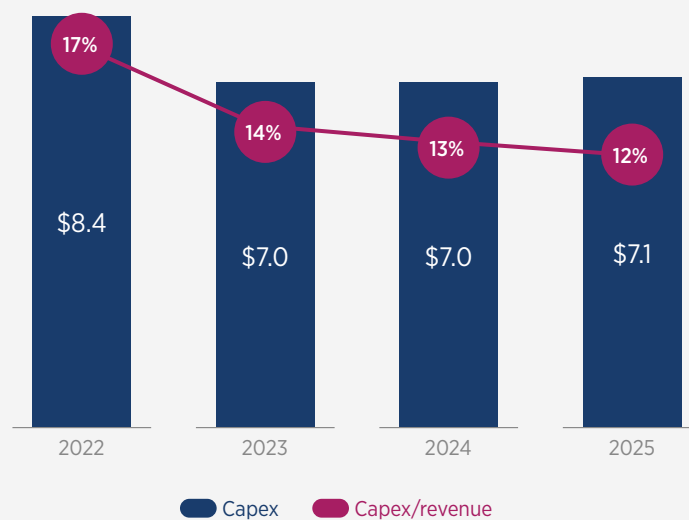


Source: GSMA Intelligence

Figure 8

Mobile operators will invest nearly \$30 billion in their networks between 2022 and 2025

Operator capex (billion)



Source: GSMA Intelligence

02

Key trends shaping the mobile industry



2.1 5G: momentum builds for 5G-related activities

At the end of September 2022, 214 mobile operators in 81 markets worldwide had launched commercial 5G services. 5G is becoming mainstream in pioneer markets. For example, the technology now accounts for nearly half of mobile connections in South Korea and more than a third in the US. Momentum has been boosted by a number of factors, including economic recovery from the pandemic, rising 5G handset sales and overall marketing efforts.

The 5G era in Sub-Saharan Africa has got off to a gradual start; at the end of September 2022, full commercial 5G services were available in fewer than five countries across the region. This is in large part due to a greater emphasis by operators and other stakeholders on migrating customers on legacy networks (2G and 3G) to 4G networks. At the end of 2021, 4G accounted for just 17% of total mobile connections in Sub-Saharan Africa, compared to the global average of 59%. This trend will continue in the short-to-medium term, given the opportunity to maximise the utilisation of existing 4G capacity and the cost implications of mass 5G rollouts.

That said, 5G-related activities are beginning to gather pace across the region. These include 5G spectrum auctions, 5G pilots and commercial trials, and efforts to develop locally relevant 5G use cases. Following the huge demand for connectivity in the wake of the Covid-19 pandemic, there is growing interest in the role of 5G in the connectivity landscape. While the general consensus remains that mass 5G rollouts are more of a long-term prospect in Sub-Saharan Africa, there is a strong case to utilise the technology in some scenarios to serve certain connectivity requirements for individuals and enterprises.



Figure 9**Examples of recent 5G activities in Sub-Saharan Africa****Botswana**

In February 2022, Mascom in Botswana launched its first 5G services in the capital, Gaborone. The operator plans to install 5G at 111 sites across the country by the end of the year.

**Cote d'Ivoire**

In December 2021, MTN began trials of 5G equipment in several sites across Abidjan. The Cote d'Ivoire government wants 5G networks to go live ahead of the Africa Cup of Nations football tournament, which it will host in 2023.

**Ethiopia**

In May 2022, Ethio Telecom launched a pre-commercial 5G network across six mobile stations in the capital city of Addis Ababa. The operator plans to deploy 150 5G sites within and outside of Addis Ababa over the next year.

**Kenya**

In August 2022, Safaricom and Nokia performed a pilot test for a 4G and 5G fixed wireless access (FWA) network slicing on the operator's live commercial network. In May 2022, the Communications Authority of Kenya allocated 60 MHz of spectrum in the 2600 MHz band to Safaricom for 5G expansion.

**Nigeria**

In August 2022, MTN announced that it had begun its pilot test of 5G in Nigeria. The operator deployed over 190 5G sites in Lagos, Abuja, Port Harcourt, Ibadan, Kano, Owerri and Maiduguri – with more expected to go live ahead of full commercial launch.

**South Africa**

In March 2022, the Independent Communications Authority of South Africa completed the spectrum auction for frequencies in the 700, 800, 2600 and 3500 MHz bands. The spectrum has been allotted for a 20-year period on a technology-neutral basis, enabling operators to extend 4G and 5G rollouts.

In June 2022, MTN announced plans to ramp up 5G coverage, with a target to reach 25% of the population by the end of 2022. MTN is also rolling out 5G experiential zones in major shopping centres to showcase the capabilities of the technology and make these benefits available across 5G gaming, smart home and motion tracking.

**Tanzania**

In September 2022, Vodacom Tanzania launched a commercial 5G network. The operator plans to establish over 200 5G sites in Tanzania's regions by the end of 2022, including Dar es Salaam, Arusha, Dodoma, Mwanza, Iringa, Kagera, Njombe and Zanzibar.

**Zimbabwe**

In February 2022, Econet Wireless launched a 5G network in Harare. The operator has extended coverage to other areas, including Bulawayo, Chitungwiza, Gweru and Victoria Falls.

Source: GSMA Intelligence, company announcements

Rising 5G device shipments bode well for 5G adoption

The availability of 5G devices – and at affordable prices – will be crucial to 5G adoption in Sub-Saharan Africa. This is especially true given that the sluggish uptake of 4G across the region is, in large part, attributable to the high cost of devices relative to average income levels. That said, smartphone shipment data for the region suggests growing demand for 5G-enabled devices. For example, in the second quarter of 2022, the shipment of 5G-enabled devices increased by 26.9%, significantly outpacing the overall growth of smartphone shipments to the region.³

Growth is being driven by a number of factors, including a young and tech-savvy population with a taste for the latest technology and increasing competition among handset-makers to bring the most advanced but affordable models to market. Cheaper devices are mainly being produced by Chinese vendors, with Transsion brands – Tecno, Itel and Infinix – being the clear market leaders in terms of number of sales. In August 2022, Chinese brand Realme announced in Kenya that it will increase its research and development budget by 58% to make advanced smartphone models with designs that appeal to young customers across Africa.

2.2 Telco of the future: a new wave of tower deals

There was a flurry of tower sale-and-leasebacks in Africa between 2010 and 2016 as mobile operators hived off their tower assets to third-party tower companies (towercos). This was fuelled by a need to streamline operating costs and raise funds to offset mounting debts. This was then followed by a period of relative inactivity, as towercos focused on consolidating and optimising their existing portfolios to boost profitability.

A number of new deals in recent years, however, signify a new wave of activity in the towers market as operators explore new network infrastructure models and seek further operational efficiencies, in the context of the network densification requirements of 5G. This trend is not unique to Sub-Saharan Africa; operators in several other regions have also announced significant tower deals in the last two years. For example, Orange and Vodafone

have set up independent companies to house their mobile towers in Europe. This strategy is designed to provide investors with a clearer valuation of these assets. Elsewhere, Verizon has expanded its partnership with American Tower Company, and TPG in Australia and Zain Jordan have signed sale-and-leaseback deals with established towercos.

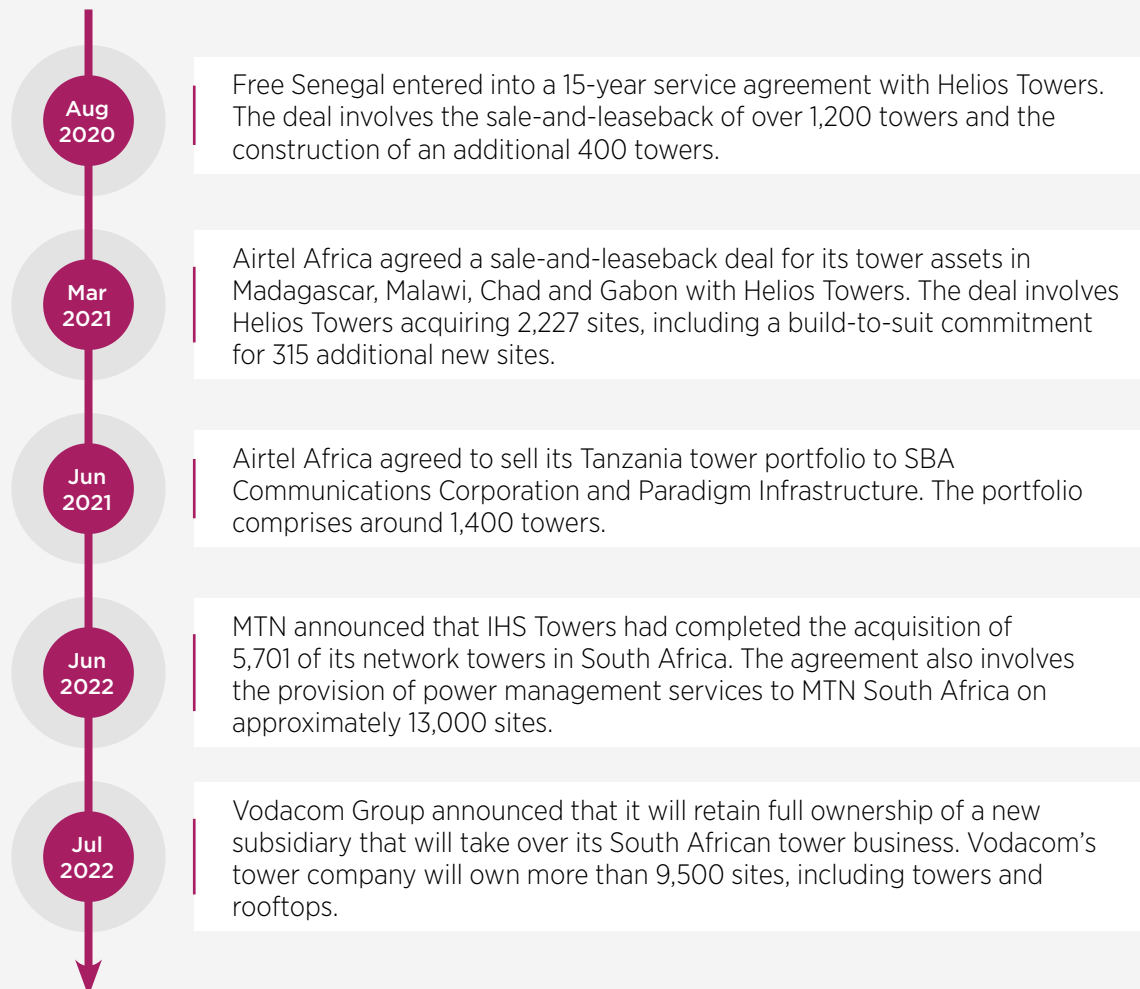
Mobile operators have taken different approaches to tower ownership, as demonstrated by recent announcements. Towercos in Sub-Saharan Africa have mostly focused on passive infrastructure assets. However, Africa Mobile Networks represents a new type of towerco in the region, with ownership of active and passive infrastructure assets in rural areas. This new model could help unlock the business case for network deployments in hard-to-reach areas.

3. Worldwide Quarterly Global Mobile Phone Tracker, IDC



Figure 10

Timeline of recent tower deals in Sub-Saharan Africa, 2020–2022



Source: GSMA Intelligence, company announcements



2.3 Sub-Saharan Africa grows presence in the metaverse

The Covid-19 pandemic has spurred new ways of working and living, accelerating the shift to digitalisation, including virtual experiences. Unsurprisingly then, the concept of the metaverse, a parallel virtual world populated with avatars, has gained significant attention. In essence, the metaverse allows individuals to consume media content, purchase items, generate tokens or participate in recreational activities without the geographical restrictions, safety concerns and other physical limitations associated with real-life experiences.

The metaverse (which continues to lack a universally agreed-upon definition) is still nascent. However, the significant levels of investment in metaverse initiatives and market-size estimates reflect the opportunities possible from the rapid advancement of the metaverse over the coming years. In the first five months of 2022, more than \$120 billion was

invested in building out metaverse technology and infrastructure, more than double the \$57 billion invested in all of 2021.⁴

The metaverse ecosystem is growing around the world, including in Sub-Saharan Africa. Indeed, the region presents significant growth prospects for the metaverse, given its young tech-savvy population and thriving tech startup ecosystem. This is beginning to attract the attention of global metaverse ecosystem players. For example, Meta has launched a two-year \$50 million 'XR Programs and Research Fund' to build the metaverse, which includes funding for the 'Future Africa: Telling Stories, Building Worlds' programme. The programme provides grants of up to \$30,000 and mentorship. It also supports VR storytellers to develop new and compelling content about Africa and showcase innovative storytelling that shifts negative stereotypes about Africa.

4. "Meet the metaverse: Creating real value in a virtual world", McKinsey, June 2022



A growing number of local ecosystem players have announced various activities across the metaverse value chain, including the following:

- **Africarare**, Africa's first metaverse, has announced plans to commercialise the 3D virtual reality experience that is set in UbuntuLand, a virtual world that merges creativity, cryptocurrency and commerce. In February 2022, MTN revealed that it had purchased 144 plots of virtual land in UbuntuLand.
- **Thrill Digital** in Nigeria uses AR/VR, crypto and gaming to create a fashion metaverse. The firm won a \$40,000 grant from Epic Games (a US video game and software developer investing in metaverse development) to start Astra, a play-to-earn crypto game where players try to amass as many tokens as they can within an allotted time to win real-life luxury fashion items.

The metaverse can be applied across a wide range of use cases in Sub-Saharan Africa, notably work, gaming, education, healthcare and advertising. It could provide a platform to deliver unique virtual experiences, overcoming the physical limitations for many services in the region. That said, the underdevelopment of the metaverse ecosystem in the region – especially with respect to device availability and affordability, content and services, and access to high-speed connectivity – could limit uptake in the short term.

Mobile operators will play a central role in the future development of the metaverse in Sub-Saharan Africa. Primarily, mobile networks, particularly 5G, will provide the required connectivity for the metaverse in the region. Beyond connectivity, operators can also participate in other parts of the value chain, as has been demonstrated in other regions. For example, SK Telecom launched the Iffland platform for users to make digital interactions in a virtual environment, and AT&T has partnered with Quintar, a sports entertainment AR business, to create and deliver in-game AR experiences to sports fans in stadia and venues. These examples highlight the opportunity for operators to capture additional value elsewhere in the value chain, particularly in developing platforms, content and services in the metaverse. Leveraging new and existing relationships to create partnerships within the telecoms industry and beyond will be necessary to capitalise on the potential of the metaverse.

03

Mobile contributing to economic growth and social progress



3.1 Mobile’s contribution to economic growth

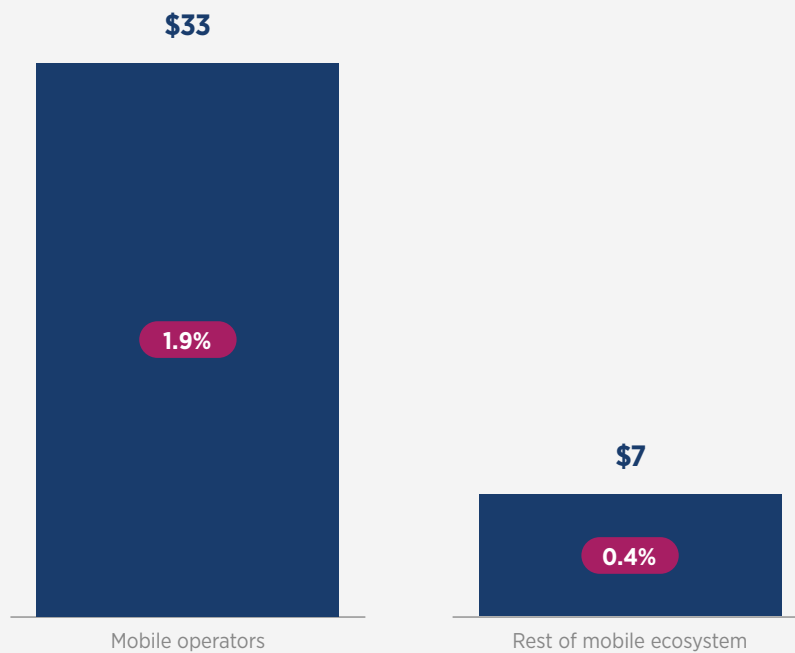
In 2021, mobile technologies and services generated around 8% of GDP across Sub-Saharan Africa, a contribution that amounted to almost \$140 billion of economic value added. The mobile ecosystem also supported more than 3.2 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector, with \$16 billion raised through taxes on the sector.

By 2025, mobile’s contribution will grow by approximately \$16 billion (to almost \$155 billion), as the countries in the region increasingly benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services.

Figure 11

The Sub-Saharan Africa mobile ecosystem directly generated \$40 billion of economic value in 2021, with mobile operators accounting for the vast majority

Billion, percentage of GDP



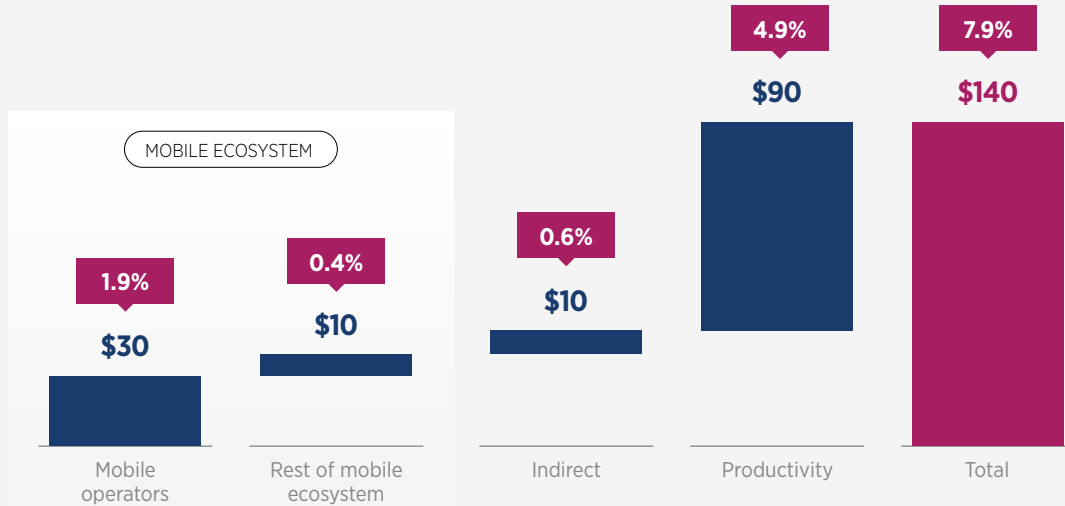
Source: GSMA Intelligence



Figure 12

Additional indirect and productivity benefits brought the total contribution of the mobile industry to the regional economy to almost \$140 billion in 2021

Billion, percentage of GDP

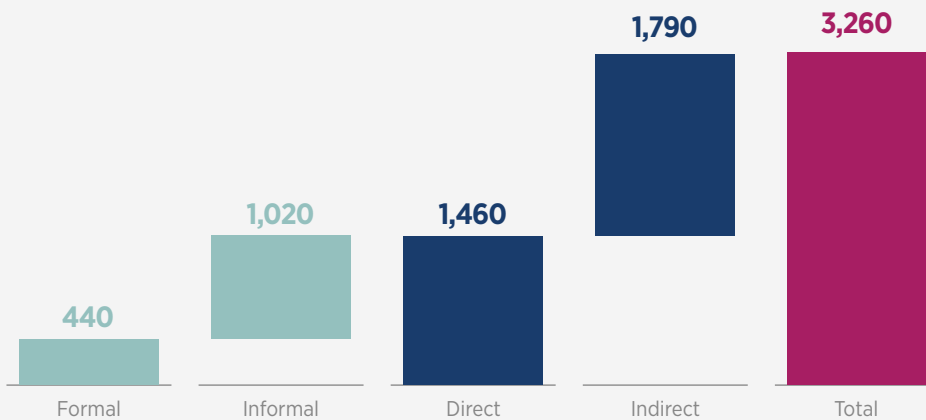


Source: GSMA Intelligence
 Note: Totals may not add up due to rounding.

Figure 13

In 2021, the mobile ecosystem formally employed more than 400,000 people in Sub-Saharan Africa and supported another 2.8 million informal jobs and jobs in other parts of the economy

Jobs (thousands)

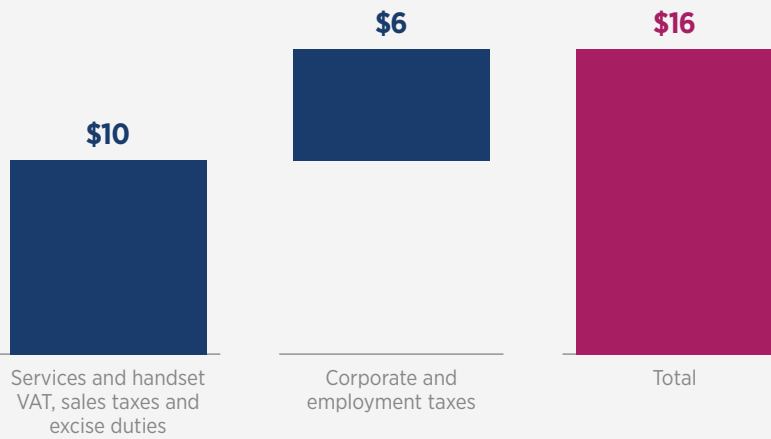


Source: GSMA Intelligence
 Note: Totals may not add up due to rounding.

Figure 14

In 2021, the mobile ecosystem in Sub-Saharan Africa contributed \$16 billion to the funding of the public sector through consumer and operator taxes

Billion

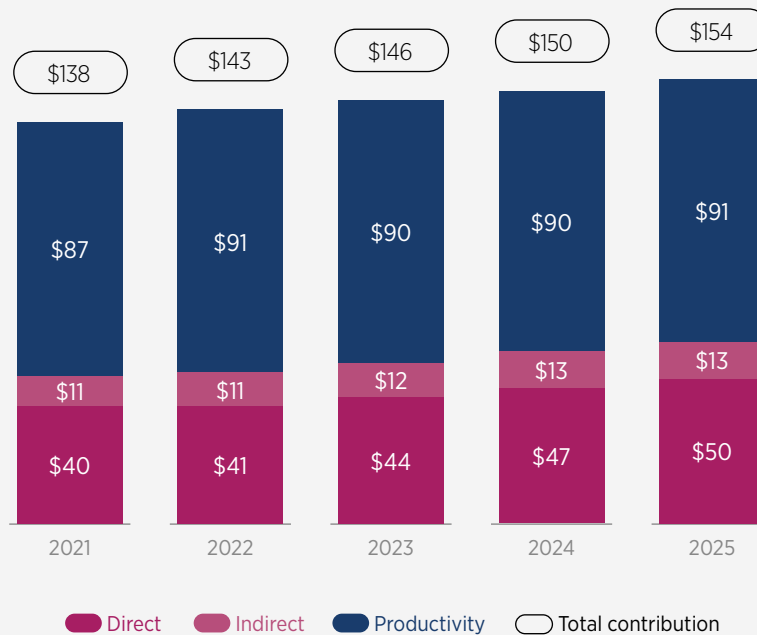


Source: GSMA Intelligence

Figure 15

Driven mostly by continued expansion of the mobile ecosystem, the economic contribution of mobile in Sub-Saharan Africa will increase by around \$16 billion by 2025

Billion



Source: GSMA Intelligence

Note: Totals may not add up due to rounding.



3.2 Mobile enabling a more inclusive society

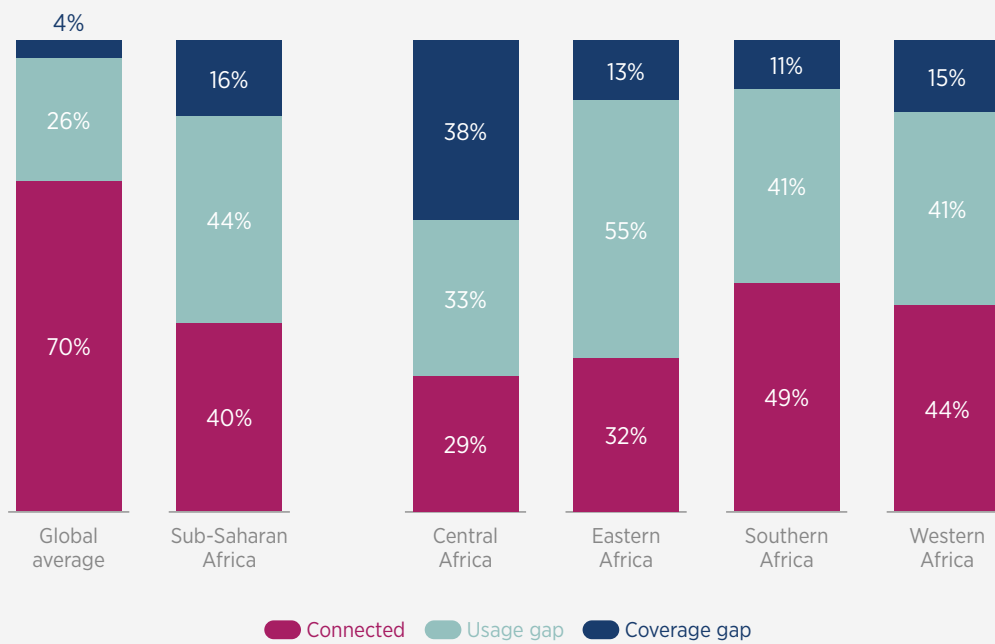
As the primary way most people access the internet in Sub-Saharan Africa, mobile is driving digital inclusion. This delivers significant economic benefits, reduces poverty and transforms lives by providing people with access to a range of life-enhancing services.

By the end of 2021, around 40% of the adult population in Sub-Saharan Africa subscribed to mobile internet services. Although this figure is a marked increase from the 35% at the start of the pandemic, it still lags behind the global average of 70% by a considerable margin.

Figure 16

The coverage gap is narrowing across Sub-Saharan Africa, but the usage gap remains a challenge

Percentage of adult population, 2021



Source: GSMA Intelligence

Mobile operators remain at the forefront of efforts to close both the coverage⁵ and usage gaps⁶ in Sub-Saharan Africa. A number of new and innovative solutions have been proposed and, in some cases, implemented to improve the economics of rural deployment. Notable examples include network sharing, community networks and open RAN.

Satellite connectivity has long been touted as a possible solution to the challenge of providing connectivity in hard-to-reach locations. Momentum behind the technology has built over the last two years, driven by the emergence of the low Earth orbit (LEO) constellation model, which promises a reduced cost structure and higher-performance capability relative to legacy geostationary satellites that operate at much higher altitudes. Also, the basic model for LEO constellations is to integrate with mobile networks – 3G, LTE and eventually 5G – creating opportunities for partnerships with operators, which is often important for the delivery of services to users on the ground. This is evidenced by some recent partnerships between mobile and satellite operators:

- **Orange Senegal** is working with SES to create a gateway for the O3b mPOWER constellation. The installation will help deliver low-latency and cloud-optimised connectivity services.
- **Vodacom DRC** has selected Intelsat to provide its Ku-band satellite services. The backhaul service and Intelsat's Ku-band capacity will enable Vodacom to extend mobile connectivity to areas where fibre or microwave backhaul networks are not yet available or where they are unfeasible to deploy.
- **Free Senegal** has signed a deal with Avanti Communications to build a satellite gateway for the latter's Hylas 4 Ka-band satellite. The new gateway will go live by December 2022, subject to regulatory approval, and will serve neighbouring countries, including Guinea, Sierra Leone, Guinea Bissau, Gambia and Liberia.

- **Orange Mali** has partnered with Intelsat to extend mobile broadband services to rural areas. The deployment of 4G over satellite is viewed as an optimal solution given Mali's land mass.

Mobile operators are also supporting efforts to close the usage gap through various initiatives to remove the non-infrastructure barriers to mobile internet adoption. For example, MTN launched its flagship digital literacy programme, MTN Data Smart, in 2019, which is based on the GSMA's Mobile Internet Skills Training Toolkit (MISTT)⁷ and uses a hybrid approach that includes remote delivery methods alongside traditional face-to-face training.⁸ In 2021, the operator trained 24 million people across 12 countries through this initiative.⁹

The barriers to mobile internet adoption are particularly acute among certain segments of the population, including the poorest, those in rural areas, women, persons with disabilities and the elderly – or a combination thereof. The mobile internet gender gap in Sub-Saharan Africa remains at 37% and women in the region are now 30% less likely than men to own a smartphone. This has grown steadily from 22% in 2017 because of smartphone ownership by men far outpacing that of women. The top barriers for women using the mobile internet or owning a smartphone in Africa include literacy and digital skills and affordability.

Driving mobile internet adoption among these user segments remains a focus for operators in Sub-Saharan Africa, as highlighted by industry efforts to improve connectivity among low-income and rural users. Meanwhile, the GSMA's Mobile Disability Gap Report¹⁰ also shows a gap in mobile ownership and smartphone usage among persons with disabilities. For operators, developing inclusive products and services that meet the diverse needs of persons with disabilities is an important step.

5. People without access to mobile internet services

6. People who live in areas covered by mobile broadband networks but do not yet use mobile internet services

7. MISTT is a set of resources for mobile operators, NGOs, development organisations and governments that want to provide training to improve people's basic knowledge and understanding of mobile internet.

8. For more information, see [MTN Data Smart: Increasing mobile internet access and use through digital skills training](#), GSMA, 2021

9. Sustainability Report for the year ended 31 December 2021, MTN

10. [The Mobile Disability Gap Report 2021](#), GSMA, 2021



Orange partners with UN Women to close the digital gender gap

In March 2022, Orange and UN Women announced a partnership to support digital inclusion and economic empowerment for women in rural West Africa. They are collaborating on UN Women's Buy from Women initiative, which gives women living in rural areas access to digital technology and new market opportunities and also provides information, weather warnings and digital financial services. In addition to providing financial assistance, Orange and the Orange Foundation offer unique technical expertise, network resources and existing infrastructure in digital skills, technologies and digital inclusion. The initiative has been implemented in several countries, including Côte d'Ivoire, Mali, Rwanda, South Africa and Senegal.

Safaricom drives the digital inclusion of visually impaired customers in Kenya

Challenge: Following an audit of its products and services to understand usage by persons with disabilities, Safaricom found that individuals with visual impairment were the most excluded category of users. For example, some customers with vision impairment had to ask third parties to make transactions for them, which left them vulnerable to fraud and security risks.

Solution: To support users with visual impairments, Safaricom built an interactive voice response platform to help them query the balance of their M-Pesa account. Safaricom also introduced Jitambulisho, a voice biometrics service that allows a customer to create a vocal password for easier access to services such as resetting their M-Pesa PIN and for PUK requests. Further, the operator worked in partnership with Dot Incorporation to launch the Dot Watch, which enables users to read all SMS notifications in Braille.¹¹

Impact: Initiatives such as these give persons with visual impairments greater confidence when using mobile devices, which can unlock the life-enhancing potential of smartphones as an assistive technology and gateway to digital inclusion.

Orange helps young people to build skills that employers demand

Challenge: In Sub-Saharan Africa, the supply of labour outweighs demand. Since most young people cannot find formal jobs, they take up informal income-generating opportunities instead. Part of the reason for the lack of formal jobs for young people is that they lack the skills employers demand.¹²

Solution: The Orange Foundation leads a range of initiatives to boost digital skills, such as the Orange Digital Centers (ODCs),¹³ which bring together three complementary programmes aimed at providing free and inclusive resources to support local tech startups and entrepreneurs:

- **Coding School:** A freely accessible technological centre that offers training and events for the community of young developers.
- **Solidarity FabLab:** A digital production workshop for creating and prototyping with digital equipment, such as 3D printers, milling machines and laser cutters.
- **Orange Fab:** A startup accelerator with an aim to build national and international business partnerships with the Orange Group and the international Orange Fab network.

Impact: Orange has opened ODCs in nine countries and intends to set up an ODC in each of its 26 operating countries by 2025. This will help people acquire new digital skills, in addition to promoting entrepreneurship and enhancing job prospects.

11. [Driving the Digital Inclusion of Persons with Disabilities: Policy considerations for low- and middle-income countries](#), GSMA, 2022

12. [Informal Youth Employment in the Mobile Industry in Sub-Saharan Africa](#), GSMA, 2021

13. For more information, see <https://www.orangedigitalcenters.com/>.

04 Policies for inclusive digital development



The Covid-19 pandemic has highlighted the increasing importance of digital technology to responding effectively to crises and planning for recovery. At the same time, the crisis has created the potential to accelerate Sub-Saharan Africa's digital transformation and to develop resilient digital jobs in the region. The continued rollout of 4G and the first stages of the 5G era enable opportunities in areas such as healthcare, digital commerce, industrial automation and smart city infrastructure.

Realising this potential requires policy measures to support network investments and improve the affordability of digital services for consumers. Governments and regulators in the region should therefore adopt forward-looking spectrum management and fiscal policies, which includes:

- **creating a spectrum roadmap** to ensure there is enough spectrum to meet surging demand for mobile services in both the short and long term

- **ensuring access to mid-band spectrum**, in particular 3.5 GHz, given its importance to the future of 5G
- **accelerating access to sub-1 GHz spectrum** to provide widespread rural mobile broadband services
- **applying best-practice principles of taxation** as recommended by international organisations such as the World Bank and the IMF.

Spectrum management

Effective spectrum licensing, from roadmap to assignment, is critical to encourage the investment required to expand mobile access, meet the increase in demand for data services and enhance the quality and range of services offered.

At its core, a spectrum licensing framework should:

- **ensure access to sufficient spectrum** for operators
- **provide predictability** to support the new network investment needed
- **avoid costly restrictions on the use of spectrum** beyond those needed to manage interference.

Spectrum roadmaps

A spectrum roadmap is essential to ensure there is enough spectrum to meet surging demand for mobile services in both the short and long term. Roadmaps help governments forecast future trends and manage their work. For mobile operators, roadmaps mean increased certainty to invest based on the government's future allocation, renewal plans and management of radio spectrum.

Key themes for a spectrum roadmap should include:

- **identifying emerging opportunities and challenges** to a radio spectrum framework at least three to five years in advance
- **determining future technological trends and drivers**, and assessing their impact on spectrum policy and planning
- **planning spectrum management programmes** to address challenges and maximise opportunities
- **creating a plan to review and update the roadmap regularly**, with an annual review being recommended.

Spectrum pricing

High spectrum prices continue to hinder the rollout of mobile services in both cities and rural areas. However, for countries willing to take a different approach, larger amounts of spectrum and lower spectrum prices are strongly linked to greater population coverage, as well as better download

speeds and increased service adoption. The main goal of governments around the world should be to get the most out of mobile spectrum resources. The GSMA has developed 10 positions on the importance of fair spectrum pricing to support the effective management of spectrum resources.¹⁴

Access to mid-band spectrum

Mid-band spectrum, in particular 3.5 GHz, is important for the future of 5G because it offers a good mix of coverage and capacity. In the short term, operators should have access to 80–100 MHz of contiguous spectrum in this band. Meeting long-term demand requires forward planning from policymakers. GSMA analysis shows that a total of 2 GHz of mid-band spectrum, on average, will be required to support the growth of 5G during the 2025–2030 time frame. Importantly, the reward for reaching the 2 GHz goal is substantial. 5G growth in Sub-Saharan Africa is expected to develop rapidly in the second half of the decade and continue into the 2030s. The economic impact of mid-band 5G in the region will be around 0.4% of GDP in 2030; for comparison, mid-band 5G already accounts for more than 0.4% of GDP in Europe and North America. The overall GDP impact of mid-band 5G in Sub-Saharan Africa in 2030 will be \$13 billion.

As policymakers look to the future, the 6 GHz band¹⁵ offers significant potential. The band is already used for backhaul, and mobile operators are making a case for its use in 5G networks. Part of the band is also up for debate at the World Radiocommunication Conference 2023 (WRC-23). Discussions regarding the band's future need to focus on maximising its

value and balancing different uses. To ensure access to sufficient spectrum, governments and regulators should carefully consider the following:

- Mobile networks will need, on average, 2 GHz of mid-band spectrum per country by 2030. This is challenging to achieve without 6 GHz.
- 6 GHz capacity will be required to meet increasing customer demand at the required speeds of ITU IMT-2020.
- Mobile networks are already highly densified, but 6 GHz can enable the growth of sustainable 5G capacity on existing sites.
- Timely availability of 6 GHz, at reasonable conditions and price, will drive cost-efficient network deployment, help lower the broadband usage gap and support digital inclusion.

Therefore, according to market demand, the GSMA recommends that:

- at least 6425–7125 MHz is made available for licensed 5G by 2030
- 5925–6425 MHz should be considered for licensed 5G or licence-exempt on a technology-neutral basis.

14. [Spectrum Pricing: GSMA Public Policy Position](#), GSMA, 2021

15. [6 GHz in the 5G Era: Global Insights on 5925–7125 MHz](#), GSMA, 2022

Low-band spectrum and the digital switchover

The characteristics of low-band spectrum allow it to propagate deeper into buildings and give a consistent user experience across urban and rural areas at lower cost. But low-band spectrum is a scarce resource and making sufficient bandwidth available is a complex balancing act for regulators. Finding solutions to increase the amount of available spectrum is key to the future of 5G expansion, enabling affordable services for all.

So far, a lack of access to sub-1 GHz spectrum due to slow digital switchover (DSO) is negatively affecting coverage expansion. Without this range, it can be very expensive – and thus impractical – to provide widespread rural mobile broadband services. Experiences from around the world show that DSO-related challenges can be resolved and that consumers benefit from the improved coverage enabled by this range.

Technology neutrality

Technology neutrality is an important capability that must be made available in any current or future band. This gives operators the flexibility to upgrade technologies as soon as the market requires.

Refarming 2G, 3G and 4G bands can, in time, sustain the growth of 4G and contribute to meeting some of the future spectrum requirements for 5G, which will ultimately require new bands.

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