

5G in Africa 2025: market status, trends and outlook

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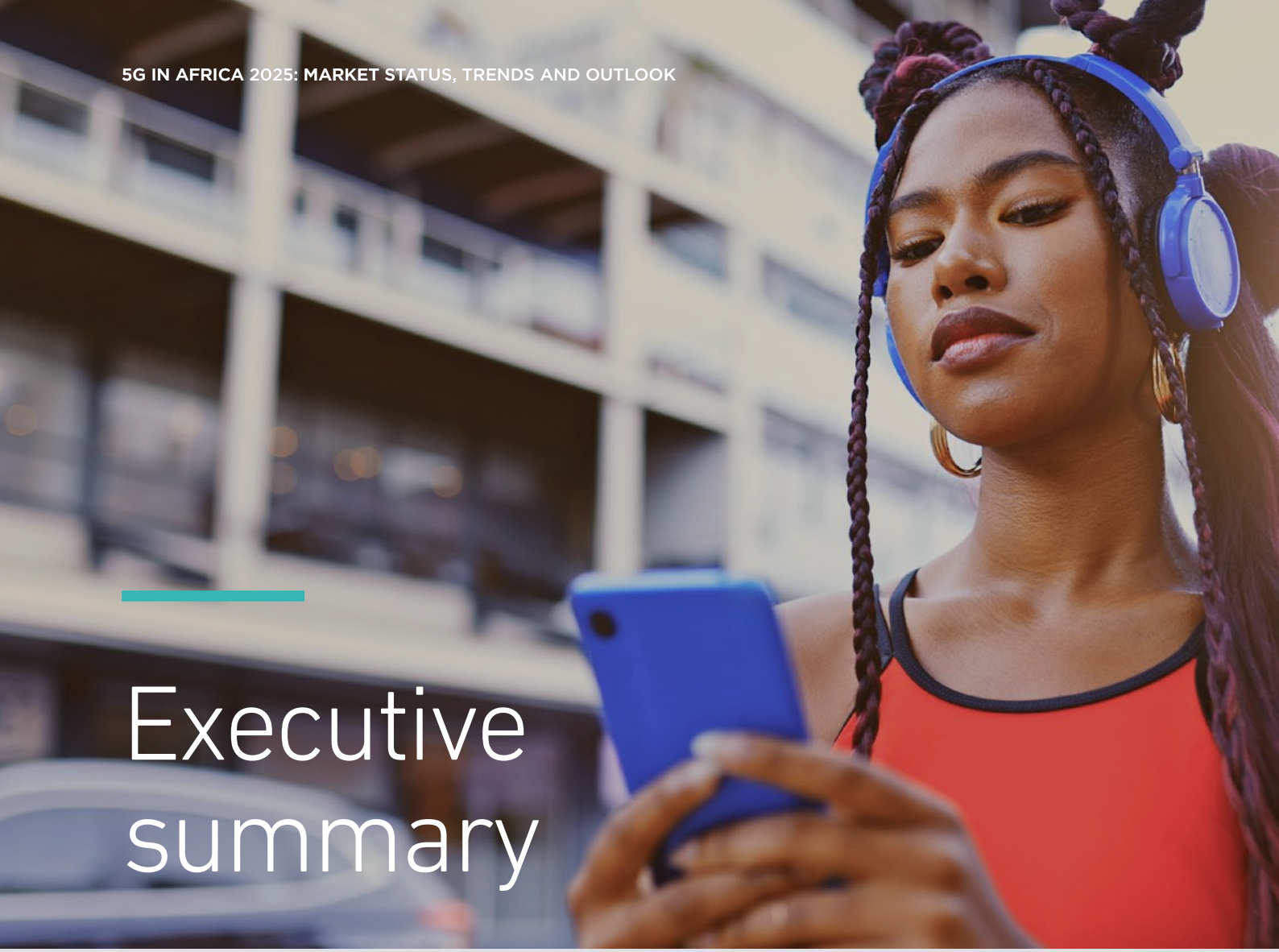
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Executive summary

5G momentum continues to build in Africa. As of September 2025, 53 operators in 29 markets across the region had launched commercial 5G mobile services. More markets are expected to follow soon, with operators in an additional 14 countries making a commitment to launch 5G in the coming years.

Although the number of commercial 5G services is growing quickly, it is still early days for 5G adoption in Africa. There will be around 54 million 5G mobile connections in the region at the end of 2025, accounting for 3.8% of total connections. 5G adoption will gather pace in the second half of the 2020s with the arrival of sub-$100 5G smartphones and new spectrum assignments in North Africa. Consequently, 5G is expected to account for more than a fifth of total mobile connections in Africa by the end of the decade, equivalent to over 380 million connections.

5G monetisation will become a growing focus for operators as the number of 5G connections increases. 5G fixed wireless access (FWA) has emerged as one of the biggest opportunities to generate new revenues from 5G investment in the near term. To date, 25 African operators have launched 5G FWA commercial services, with the majority of these offering FWA in addition to 5G mobile services. 5G FWA is being positioned as a premium service. For example, MTN targets the top 10% of households in its markets with its FWA proposition, generating a monthly ARPU of between $24 and $32.

5G also presents an opportunity for operators to initiate new monetisation levers in the consumer mobile space. The introduction of speed-based pricing, more advanced segmentation strategies and new content bundles all hold promise for capitalising on 5G's enhanced capabilities. Operators' enterprise 5G strategies are also beginning to take shape in Africa, with new opportunities emerging in private wireless networks, edge computing and cloud services.

To capitalise on the promise of 5G, operators require enabling policy environments. In this report, we highlight five key policy imperatives to drive the development of 5G in Africa.



Technology-neutral spectrum licensing

As new 5G spectrum has yet to be assigned in many markets, spectrum refarming in certain legacy bands is necessary to support 5G rollout.



Affordable 5G devices

Aligning tax policies with governments' digital transformation objectives can make devices more affordable and drive 5G adoption.



Right-of-way (RoW) regulations

RoW rules to support faster 5G rollout include the simplification of RoW application procedures and the reduction or elimination of administrative fees for cell sites.



Transition to renewable energy

There is a need for policy levers, including fiscal incentives, to accelerate the transition to alternative energy sources for telecoms networks.



Network competition

Network competition, along with voluntary passive and active network sharing, has been shown to drive innovation and investment.



1 5G state of play globally

5G adoption accelerates but monetisation remains a challenge

5G commercialisation continues to gather pace around the world. As of September 2025, 350 operators in 138 markets globally had launched commercial 5G mobile services. The number of 5G connections is expected to surpass 2.7 billion at the end of 2025, rising to 5.6 billion by 2030.

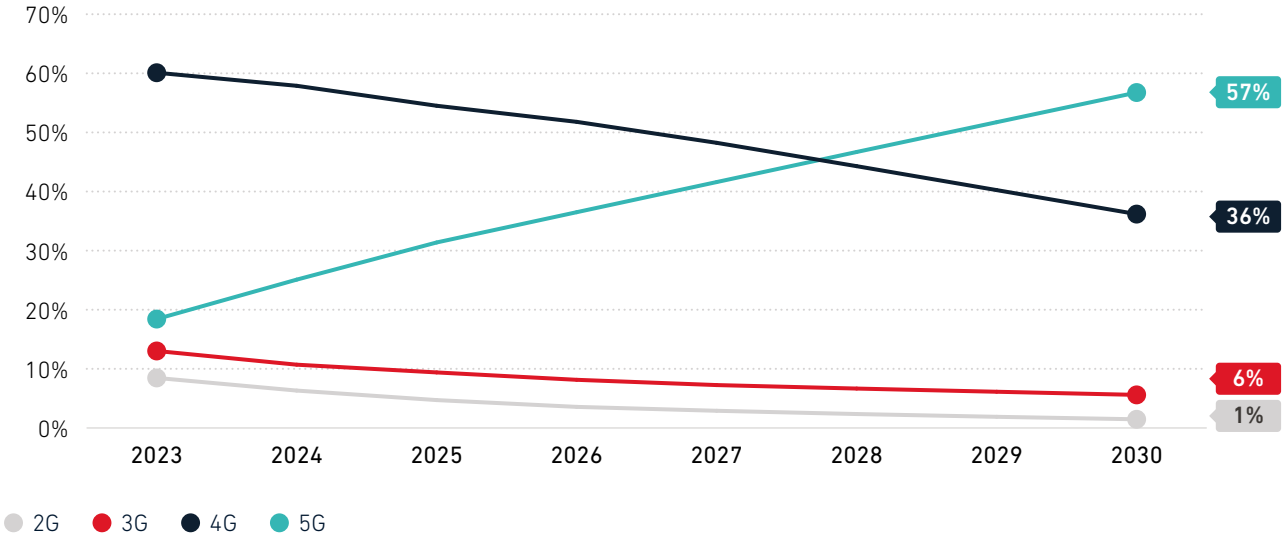
The number of connections on legacy networks (2G and 3G) will continue to decline in the coming years as users migrate to 4G and 5G, leading to an increasing number of network sunsets. Between 2010 and June 2025, a total of 183 networks had been shut down.

Momentum globally has accelerated in recent years, with around half of total network sunsets having been completed in the last three years. In Sub-Saharan Africa, less than 15% and 10% of countries are involved in the shutdown of 2G and 3G networks, respectively.

Figure 1

Global mobile adoption by technology

Percentage of total connections



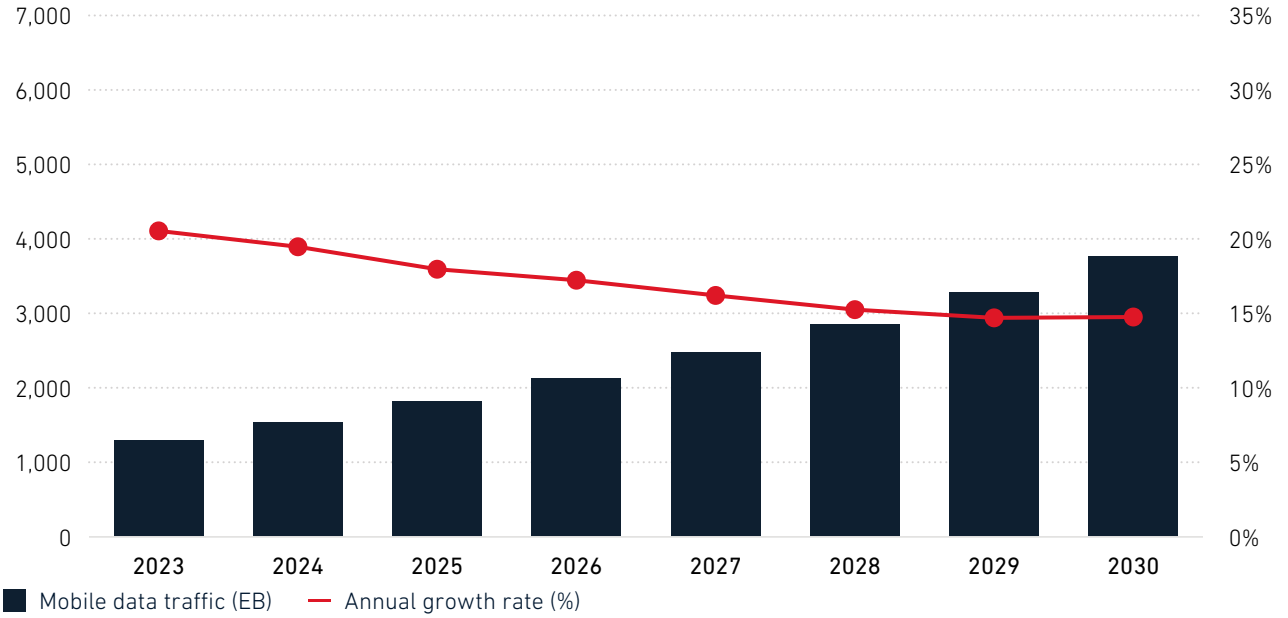
Source: GSMA Intelligence

5G's advanced radio capabilities and the additional capacity provided by new spectrum have been important in accommodating growing levels of mobile data traffic in the 5G era. In 2024, the average global monthly mobile data usage per connection reached 15.6 GB, up from 5.3 GB in 2019. This has been primarily driven by the rising consumption of short-form videos on social media applications.

The rate of mobile data traffic growth is expected to moderate over the next few years, as new applications such as AR/VR and the metaverse have yet to reach the mainstream. However, total mobile data traffic is still projected to almost double between the end of 2025 and 2030, highlighting the need for additional 5G investment.

Figure 2

Global mobile data traffic



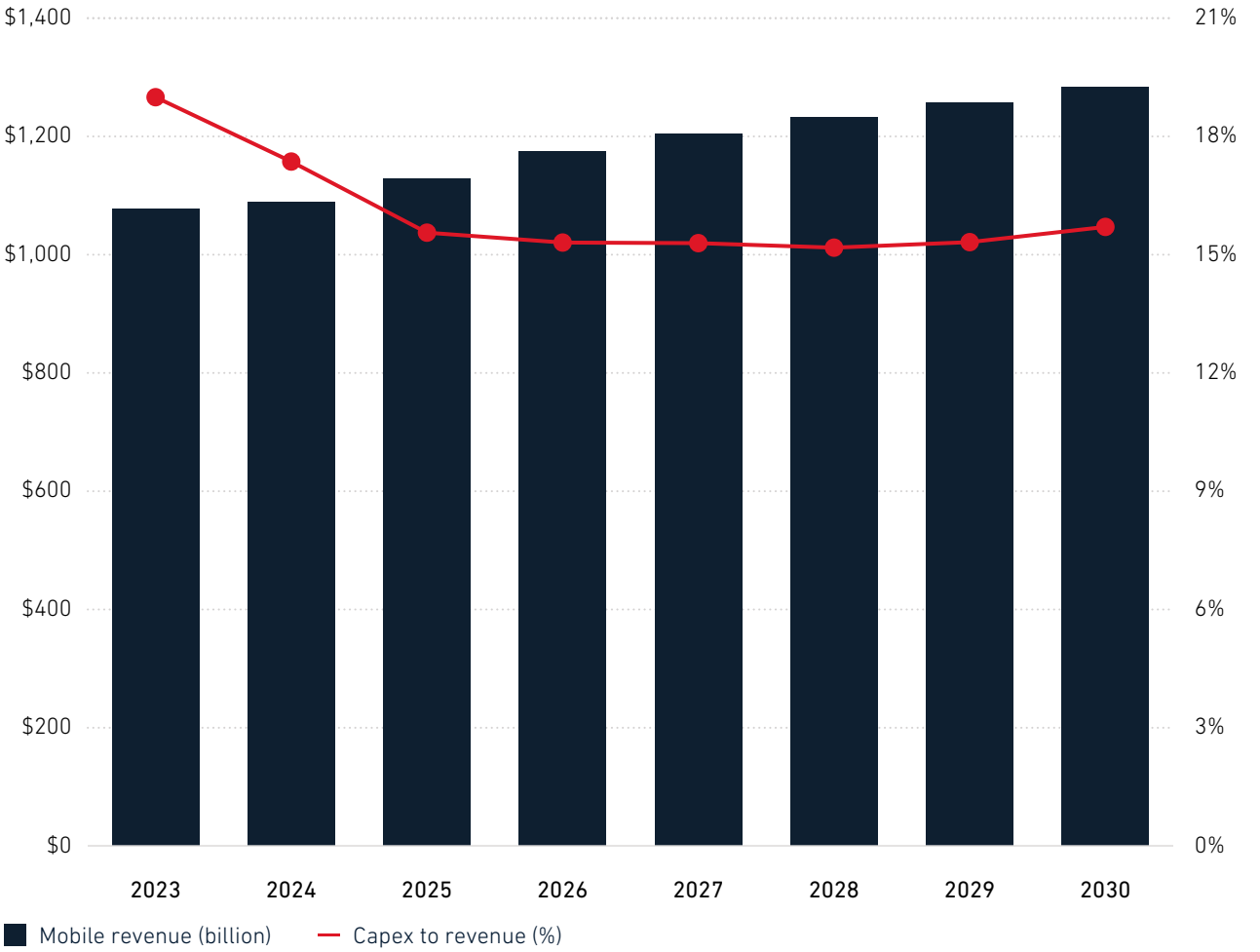
Source: GSMA Intelligence

The growth in mobile data traffic has not been matched with a surge on the revenue side of the equation. For much of the past decade, global mobile revenue growth has been in the low single digits in percentage terms. The introduction of 5G services has not altered the growth trajectory for the mobile industry, despite good traction in some countries for services such as 5G FWA and private 5G. There will therefore be increased attention on other prospective future drivers, including generative AI (genAI) and network API exposure.

On the cost side, mobile operators have invested over $1 trillion in mobile capex over the past five years, much of which has been spent on 5G networks. Global mobile capex/revenue was 20% at the end of 2022, likely marking the peak of the 5G investment cycle. However, mobile operator capex is still projected to surpass $1.1 trillion for the period 2025–2030.

Figure 3

Global mobile revenue and capex-to-revenue ratio



Source: GSMA Intelligence



2

5G state of play in Africa

5G market update

5G momentum continues to build in Africa. As of September 2025, 53 operators in 29 markets across the region had launched commercial 5G mobile services. More markets are expected to follow soon, with operators in an additional 14 countries making a commitment to launch 5G in the coming years.

The availability of new spectrum is a crucial enabler of 5G commercialisation. As of June 2024, 16 countries in Africa had assigned spectrum for 5G services to operators. However, 5G spectrum assignment in Africa remains underdeveloped compared to other regions. Nearly 30% of African countries have assigned 5G spectrum, compared with over 90% of European countries. The situation is of particular concern in North Africa, where only Egypt and Tunisia have assigned 5G spectrum at the time of writing.

Table 1

Commercial 5G mobile launches in Africa by year

2020	2021	2022	2023	2024	2025
South Africa	Mauritius	Zimbabwe	Angola	Benin	Rwanda
Madagascar		Botswana	Mozambique	Congo	Egypt
Seychelles		Réunion	Gambia	Senegal	Comoros
Togo		Tanzania	Uganda	Somalia	Mayotte
		Nigeria	Ethiopia	Lesotho	Tunisia
		Kenya		Côte d'Ivoire	Namibia
		Zambia			

Note: Data correct as of September 2025
Source: GSMA Intelligence

Table 2

5G spectrum assignments in Africa, October 2023 to June 2025[1]

Country	Date	Frequency	Allocation	Final fees	Number of winners
Egypt	January 2024	3.5 GHz	Not available	$150 million	1 – We (Telecom Egypt)
Senegal	December 2023	3.5 GHz	90 MHz	Not available	1 – Free Senegal
Namibia	October 2023	700 MHz 800 MHz	60 MHz 60 MHz	$0.28 million $0.43 million	3 – TN Mobile (Telecom Namibia), MTC, Loc8 Mobile
Egypt	October 2024	3.5 GHz	Not available	$550 million	3 – Vodafone, Mobinil (Orange), Etisalat
Tunisia	December 2024	700 MHz 3.5 GHz	30 MHz 300 MHz	Not available	3 – Tunisie Telecom, Orange, Ooredoo
Comoros	May 2025	Not available	Not available	Not available	2 – Yas (Axian), Huri (Comores Telecom)

Source: GSMA Intelligence

Although 4G and 5G are the focus of operator investments in Africa, 4G and 3G are the dominant mobile technologies in the region, respectively accounting for 46% and 37% of mobile connections at the end of 2024. 4G will remain the most widely adopted mobile technology until 2030. The growth in 4G connections will be fuelled by adoption in Ethiopia and Nigeria, which will each add around 10 million 4G connections per year between 2024 and 2026.

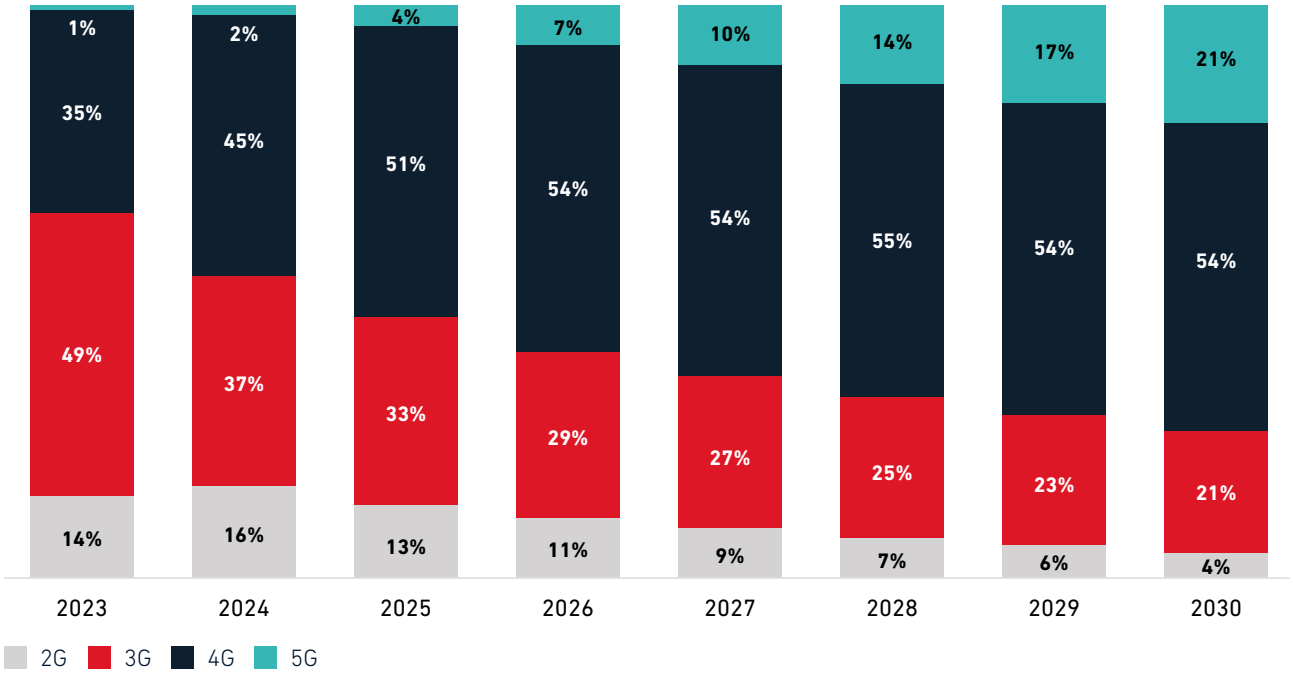
It is still early days for 5G adoption in Africa. There will be around 54 million 5G mobile connections in the region at the end of 2025, accounting for 3.8% of total connections. 5G adoption will gather pace in the second half of the 2020s with the arrival of sub-$100 5G smartphones and new spectrum assignments in North Africa. Consequently, 5G is expected to account for more than a fifth of total mobile connections in Africa by the end of the decade, equivalent to 390 million connections.

1 For details on previous 5G spectrum auctions in Africa, see 5G in Africa 2023, GSMA Intelligence, October 2023

Figure 4

Mobile adoption by technology in Africa

Percentage of total connections

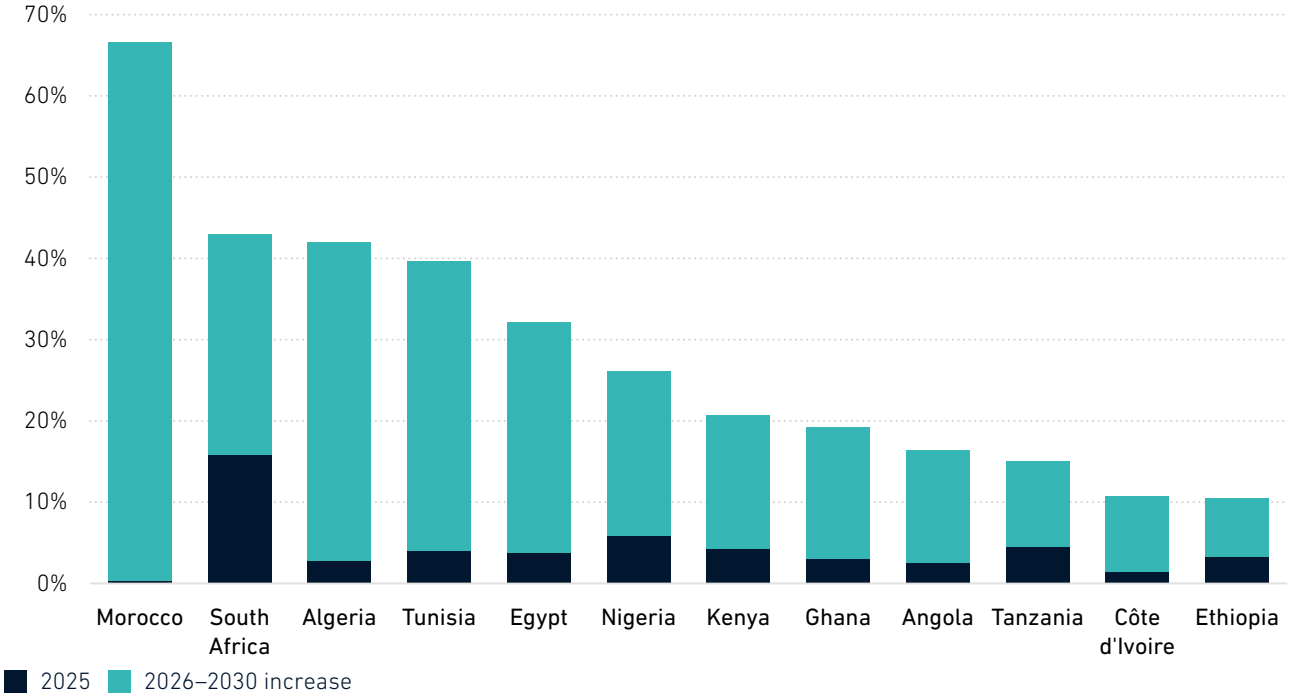


Source: GSMA Intelligence

Figure 5

5G adoption in the top 12 markets in Africa by number of 5G connections, 2030

5G as a percentage of total connections



Source: GSMA Intelligence

CASE STUDY

Qualcomm powers Africa's 5G future through local innovation

Challenge

With 5G poised to unlock unprecedented economic growth and societal transformation, realising its potential requires more than just deploying infrastructure. Local innovation tailored to the Africa's unique challenges and opportunities is critical to the success of 5G in the region.

Solution

Recognising this need, Qualcomm is actively fostering local innovation through key initiatives:

- **Make in Africa startup mentorship programme:** Now in its second edition, each year the programme empowers 10 early-stage startups from across Africa leveraging 5G, AI, compute and IoT to create impactful solutions. AI is being used by almost all the startups, across sectors such as healthcare, agriculture, manufacturing and aerospace. Startups receive mentorship, technical expertise and visibility, nurturing a new generation of African tech innovators.
- **L2Pro Africa e-learning platform:** The free online platform equips African entrepreneurs and developers with the knowledge and tools to protect their intellectual property, a crucial element for building a sustainable tech ecosystem.
- **AI Hub:** Qualcomm's AI Hub empowers African developers to create powerful AI applications running directly on devices, offering cost savings, enhanced performance and wider accessibility. Combined with 5G, developers harness real-time data to drive innovation in sectors such as agriculture and healthcare, providing scalable and impactful AI solutions to address local needs.
- **Qualcomm Wireless Reach:** Providing grants to organisations leveraging advanced technology to drive sustainable development, the Qualcomm Wireless Reach initiative works with partners across Africa, focusing on training digital skills, improving health and empowering entrepreneurs.

Impact

By fostering local innovation and empowering African entrepreneurs, Qualcomm is helping to enable a thriving 5G ecosystem in Africa. The above initiatives are nurturing a new generation of tech innovators, while on-device AI and the AI Hub are driving the development of transformative solutions tailored to the continent's needs. This approach is key to unlocking the full potential of 5G and driving sustainable economic growth across Africa.

CASE STUDY

Detecon explores technologies to boost 5G energy efficiency

Challenge

As the demand for 5G networks grows across Africa, operators face the dual challenge of rolling out new infrastructure while managing energy consumption in a cost-effective and sustainable manner.

Solution

Detecon, a company specialising in management and technology consulting, has conducted an in-depth study on the energy efficiency of 5G networks. The study identifies several key technologies crucial for reducing the energy consumption of mobile networks:

- **Massive MIMO:** By adopting advanced antenna solutions such as massive MIMO systems, operators can improve spectral efficiency by serving more users simultaneously without increasing power consumption. This reduces the overall energy footprint of 5G networks while enhancing network performance.
- **Sleep-mode technology:** Sleep-mode technology allows specific network components to be automatically deactivated during periods of low traffic, reducing energy consumption. This is particularly effective when traffic patterns are predictable, such as during nighttime. By managing network resources more efficiently, operators can save significant amounts of energy during off-peak times.
- **AI-driven systems:** AI-driven systems enable operators to dynamically adjust energy consumption based on real-time traffic demand. According to Detecon's analysis, AI systems can reduce the power output of network components, allowing energy savings of up to 30% during off-peak hours without compromising service quality.

Impact

Detecon's study highlights several technologies that African mobile operators can adopt when deploying 5G infrastructure. By embracing these technologies, operators can not only reduce energy consumption and operational costs but also enhance network performance and contribute to global sustainability efforts. This can help operators strengthen the business case for 5G rollouts across Africa.



3

5G monetisation in Africa

Mobile revenues in Africa have been experiencing a steady increase in recent years, driven by the rapid growth of smartphone adoption and mobile data usage. However, monthly mobile ARPU in the region remains at $3, creating challenging conditions for 5G investment. Initial 5G rollouts have therefore focused on major cities, with operators targeting specific opportunities across the home broadband, consumer and enterprise segments.

5G FWA

FWA networks have been around for many years, with the majority of FWA commercial services in the past leveraging 4G. Although 4G-based FWA adoption has so far been modest, FWA is becoming a more competitive solution thanks to the enhanced capacity and higher speeds offered by 5G FWA. These advancements enable FWA to target a broader opportunity. Consequently, GSMA Intelligence expects household penetration of 5G FWA to exceed 15% by 2030 in several countries, including Australia, Austria, Germany, New Zealand, Saudi Arabia and the US.

In Africa, the low level of fixed broadband development means that operators in the region have the opportunity to deploy 5G FWA as a primary broadband connectivity option for households without access to fixed alternatives. It also gives operators a chance to capture the enterprise opportunity, particularly in the micro-, small and medium-sized enterprises (MSME) segment. To date, 25 African operators have launched 5G FWA commercial services, with the majority of these offering FWA in addition to 5G mobile services.

Figure 6

Commercial launches of 5G mobile versus 5G FWA in Africa

Number of operators



Source: GSMA Intelligence

To maximise the 5G FWA opportunity, a number of potentially limiting issues need to be addressed, including access to spectrum and the affordability of customer-premises equipment (CPE). Operators will also be required to make additional investments in backhaul infrastructure to support the significant increase in data traffic levels arising from FWA adoption. However, these obstacles are not insurmountable, with MTN among the operators in Africa putting FWA at the core of their strategy to boost home broadband adoption.[2]

MTN steps up FWA efforts to target home broadband opportunity

MTN is aiming to increase its number of home broadband subscribers from 20.6 million in 2021 to 37.3 million in 2025.[3] In achieving this outcome, it hopes to generate revenues of R120 billion ($8 billion) from home broadband in 2025. It is targeting growth from three main segments:

- **Mobile broadband:** MTN sells a range of mobile hotspots that can be used to provide connectivity to multiple devices inside of the home. MTN's monthly ARPU for mobile hotspot devices typically ranges from $8 to $12. The operator believes this makes it affordable for the top 30% of households in its target markets.
- **FWA:** MTN targets the top 10% of households in its markets with its FWA services, generating a monthly ARPU of between $24 and $32. The higher price of FWA plans compared to mobile broadband plans reflects the increased data usage of FWA subscribers. MTN reports that the average FWA subscriber uses over 200 GB per month, in contrast to 50 GB per month for mobile broadband subscribers.
- **Fibre:** MTN's FTTH proposition is targeted at the top 1% of households in its target markets. Monthly ARPUs for MTN's fibre subscribers generally range between $40 and $50, depending on the market.

MTN recorded strong growth for FWA and fibre in 2023, driven by rising demand for entertainment and remote-learning services alongside an increase in home working. For example, MTN South Africa saw a 70% increase in postpaid FWA subscribers in 2023, following the launch of its new product portfolio focused on the residential segment. MTN Nigeria also experienced strong fixed broadband growth in 2023, with demand for FWA and FTTH peaking in Q4 2023 at 87,000 gross connections.

2 For more information on the FWA opportunity in Africa, see 5G FWA in Africa: emerging trends and opportunities, GSMA Intelligence, 2023
3 MTN's home broadband targets cover six key markets: Nigeria, South Africa, Ghana, Uganda, Camerron and Côte d'Ivoire.

Consumer 5G

The arrival of 5G presents an opportunity for operators to initiate new monetisation levers.[4] Three routes to consumer 5G success are assessed below.

Speed-based pricing

Speed-based pricing for mobile has the potential to improve ARPU and, by extension, mobile operator revenue growth. While it is well established in many fixed broadband markets (with home broadband offered on an unlimited basis at different download speeds), its use in mobile is relatively recent. Nonetheless, early signs from Finland and other early adopter 5G markets look promising.[5]

For operators, speed-based tariffs enable better targeting of specific customer needs – both at the low end (customers on a budget who are happy with lower speeds) and the high end (customers looking for, and prepared to pay more for, higher speeds). Speed-based mobile tariffs are not yet offered by African operators. However, as 5G networks become ubiquitous (at least in urban areas), offering a range of maximum speed options to customers will become more of a possibility.

Customer segmentation

Segmenting customers into specific groups to offer a range of tariffs targeting different parts of the population is another option for operators. Vodacom has achieved some success with this strategy. Its NXT LVL proposition, targeted at customers under the age of 25, reached 2.6 million subscribers in March 2024. A further type of customisation in some markets is time-of-use tariffs, with data allowances restricted to certain times of the day, typically weekends or at night. These are relatively common in Nigeria and South Africa.

Some of the new features of 5G networks open the door for operators to develop more advanced segmentation strategies. These include speed boosts for gaming or streaming, and offering time-limited data bundles for specific locations or points in time (e.g. a live concert or sports event).

Bundling and zero-rating

GSMA Intelligence research indicates that 5G users are more likely than 4G users to add content and services to their subscriptions plans.[6] This is something for operators to build on as they design their 5G commercial strategies and offerings, particularly in Africa's mobile-centric markets where fixed lines and, in many cases, TVs are not an option for content consumption. In some cases, content bundling is combined with zero-rated data, whereby certain applications can be used without subtracting from a subscriber's data allowance.

Video streaming and music streaming remain the most desired bundling options, while there are also opportunities to monetise digital gaming, with cloud-based services requiring 5G's high speeds and low latencies. Many African operators report growing revenues from offering such content with their subscriptions plans. For example, Safaricom's annual content revenues stood at KES0.7 billion ($5.4 million) as of March 2023 (+50% year on year), underpinned by growth in video streaming services, gaming subscriptions and educational content. The operator reported that it had over 2 million mobile customers across these services.

4 Revisiting 5G monetisation: upping the experience, GSMA Intelligence, 2024
5 Elisa Finland: Utilising 5G speeds for a mobile ARPU uplift, GSMA Intelligence, 2023
6 Five years of 5G for consumers: how user behaviour and experience are changing, GSMA Intelligence, 2024

Table 3

Considerations for consumer 5G mobile commercial strategies

5G monetisation strategy	Prerequisites for success	Go-to-market considerations
Speed-based pricing	• Mature markets with ubiquitous connectivity • Highly digitised consumers • Resilient and reliable networks	• Trade-offs between monetising volumes and speeds • Network management considerations, such as side benefits to better manage network congestion in peak areas or at peak times
Customer segmentation	• Significant number of new customers that would otherwise be underserved • The existence of multiple customer segments, which makes it difficult for operator groups to implement one-size-fits-all, multi-market strategies	• Avoiding cannibalisation of revenues • Network management and capacity considerations (e.g. time-of-use tariffs)
Bundling and zero-rating	• Partnerships with key over-the-top (OTT) and content players • Bilateral agreements with OTT and content players for zero-rating and bundling • Availability of enabling regulations	• Bundling of content and services is generally popular with consumers and drives stickiness immediately • Assuming an enabling regulatory environment, zero-rating can help boost ARPU indirectly, particularly in lower-spend markets

Source: GSMA Intelligence

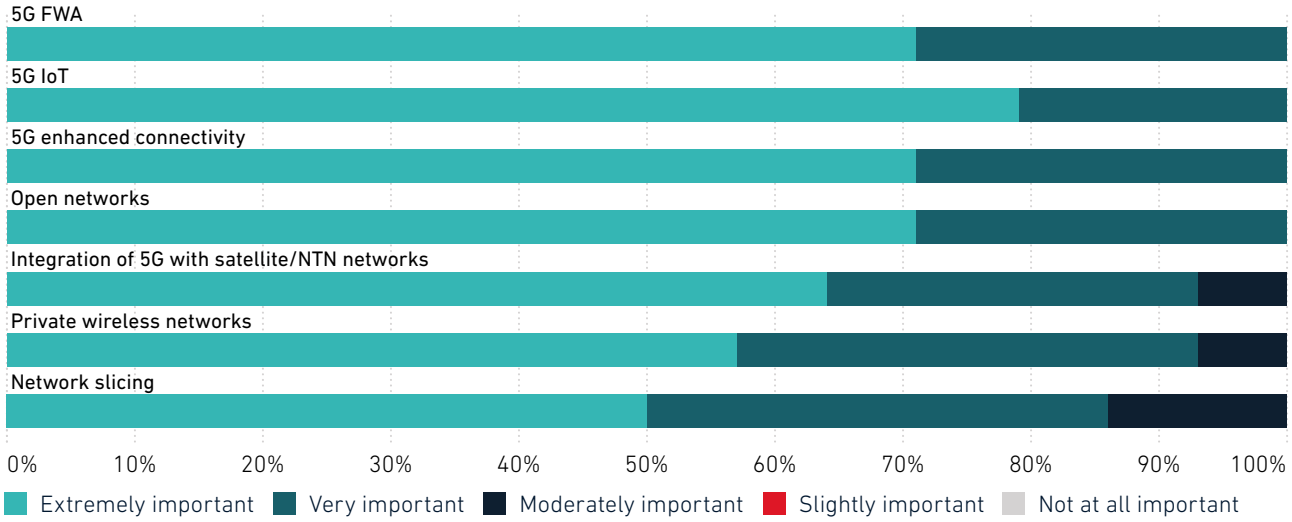
Enterprise 5G

Generating new revenues in the enterprise market is widely regarded as one the biggest opportunities for operators in the 5G era. An array of 5G capabilities and technologies will be required to fully leverage this potential. While the foundation of operators' enterprise 5G offerings will be 5G enhanced connectivity and 5G FWA, Figure 7 shows that operators recognise the importance of developing other capabilities and technologies for achieving enterprise success.

Figure 7

Most promising 5G capabilities or technologies to drive success

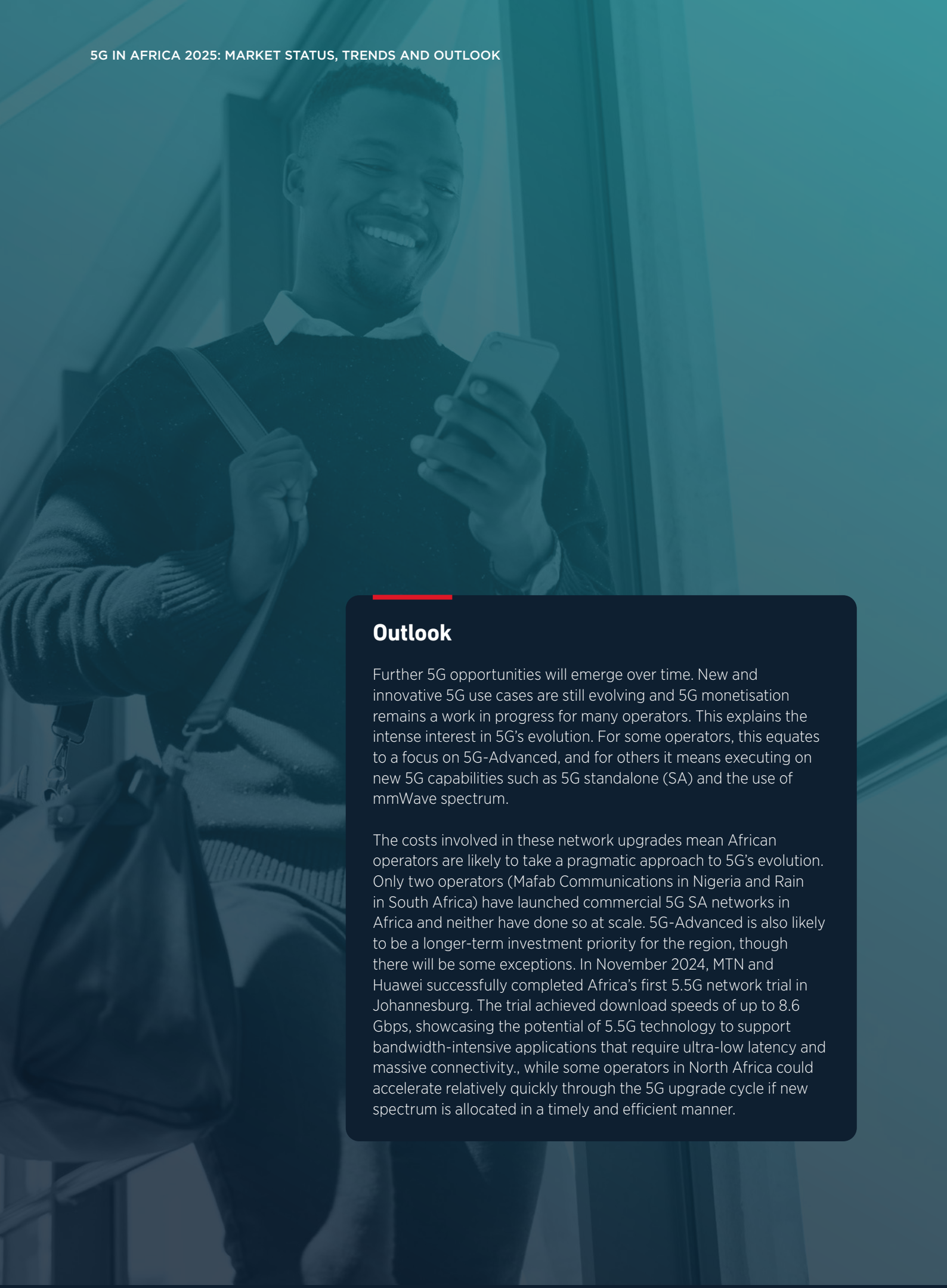
Which of the following 5G capabilities or technologies currently hold the most promise of driving the success of your enterprise offerings? (Percentage of respondents)



Source: GSMA Intelligence Operators in Focus: Enterprise Opportunity Survey, December 2024

Enterprise 5G strategies are beginning to take shape in Africa, with operators converging on opportunities in private wireless networks, edge computing and cloud services:

- **Private wireless networks**: There is growing enterprise demand for dedicated mobile networks in areas where existing public networks are either lacking or inadequate for certain use cases. For example, MTN has advanced its deployment of private 5G networks for industrial applications in South Africa. In January 2025, MTN, in collaboration with Huawei and China Telecom, launched Africa's largest 5G-enabled smart mine in the Northern Cape. The private network supports applications such as personnel surveillance, vehicle tracking and unmanned trucks, enhancing productivity, safety and sustainability in mining operations. Building on this success, MTN is expanding its private 5G network offerings across several sectors, including ports, manufacturing, oil and gas and education in various African countries. Meanwhile, Ooredoo Group has established a similar partnership with Nokia to develop and deploy private 5G networks for the energy sector.
- **Multi-access edge computing**: Edge networking and cloud is a burgeoning opportunity for African operators with the growing need to store and manage data locally, rather than relying on data centres located in other regions. This is leading to an increasing number of telco-cloud partnerships. In 2025, Orange and AWS successfully launched AWS Wavelength Zones in Morocco and Senegal, marking the first deployment of AWS Wavelength in countries without existing AWS Regions or Local Zones. These deployments allow businesses to run applications locally on AWS compute and storage located within Orange's data centres, facilitating low-latency user experiences and compliance with data residency requirements in sectors such as telecoms, finance, public sector, healthcare and entertainment.



Outlook

Further 5G opportunities will emerge over time. New and innovative 5G use cases are still evolving and 5G monetisation remains a work in progress for many operators. This explains the intense interest in 5G's evolution. For some operators, this equates to a focus on 5G-Advanced, and for others it means executing on new 5G capabilities such as 5G standalone (SA) and the use of mmWave spectrum.

The costs involved in these network upgrades mean African operators are likely to take a pragmatic approach to 5G's evolution. Only two operators (Mafab Communications in Nigeria and Rain in South Africa) have launched commercial 5G SA networks in Africa and neither have done so at scale. 5G-Advanced is also likely to be a longer-term investment priority for the region, though there will be some exceptions. In November 2024, MTN and Huawei successfully completed Africa's first 5.5G network trial in Johannesburg. The trial achieved download speeds of up to 8.6 Gbps, showcasing the potential of 5.5G technology to support bandwidth-intensive applications that require ultra-low latency and massive connectivity., while some operators in North Africa could accelerate relatively quickly through the 5G upgrade cycle if new spectrum is allocated in a timely and efficient manner.



4

Country deep dives

Botswana

Table 4

5G forecast for Botswana

	2025	2030
5G mobile connections	390,000	1.5 million
5G adoption (percentage of total connections)	9%	30%
5G population coverage	25%	46%

Source: GSMA Intelligence

Background

In February 2022, Mascom became the first operator to launch commercial 5G services in Botswana, deploying 5G across numerous sites in the capital Gaborone. Orange Botswana launched commercial 5G services in the same year, with its 5G network covering over 30% of the population by the end of 2022.

5G in action

At the end of September 2025, 5G accounted for 9% of total connections in Botswana, with only two African markets (South Africa and Réunion) having a higher rate of 5G adoption. This is testament to the early launch of commercial 5G services in Botswana, as well as the country's position as one of Africa's wealthiest in terms of GDP per capita.

5G FWA has been at the centre of initial 5G marketing efforts in Botswana. Orange already offers 4G-based FWA in Botswana, where half of its 2 million broadband customers are connected wirelessly, with the other half connected by fibre.[7] The operator is targeting residential customers and MSMEs for its 5G FWA services. Mascom's 5G FWA service, which offers discounted bundles that combine fixed and mobile services, is targeted at similar customer segments.

There is also growing interest in private 5G solutions, particularly in the country's large mining sector. In 2023, Botswana's Debswana Diamond Company Limited and Huawei announced the world's first 5G-oriented smart diamond mine project, expanding on their private 4G deployment for the Jwaneng mine. The companies connected more than 260 pieces of equipment, including drilling rigs, excavators, heavy trucks and pickup trucks.

Looking ahead, Botswana will likely be among the first countries in Africa to deploy 5G SA and 5G-Advanced services. Discussions between operators and network vendors have already taken place as operators consider the business case for upgrading 5G networks to the latest 5G releases.[8]

7 5G FWA in Africa: emerging trends and opportunities, GSMA Intelligence, 2023
8 "Huawei to rollout 5.5G network in Botswana", Mmegi Online, April 2024

Ethiopia

Table 5

5G forecast for Ethiopia

	2025	2030
5G mobile connections	3.4 million	14.8 million
5G adoption (percentage of total connections)	3.6%	11%
5G population coverage	10%	44%

Source: GSMA Intelligence

Background

In September 2023, Ethio Telecom launched the first commercial 5G service in Ethiopia. The operator's initial rollout resulted in the activation of 145 5G sites in the capital city of Addis Ababa. By February 2024, the operator had expanded 5G coverage to Ethiopia's central east region, including Harar and Haromaya.

5G in action

At the end of September 2025, Ethio Telecom reached 2.9 million 5G connections. This is equivalent to around 3% of the operator's total connections. South Africa and Nigeria are the only African countries that have more 5G connections than Ethiopia, highlighting the size of the 5G opportunity in the country.

5G adoption in Ethiopia has been helped by the growing availability of 5G devices. Ethio Telecom lists over 110 5G-compatible devices on its website, including sub-$150 devices. The operator offers four 5G mobile service plans, ranging from ETB929 ($8.10) per month ETB1,299 ($11.30) per month. These represent a significant premium on Ethiopia's average monthly ARPU ($1.40), suggesting a focus on attracting high-value customers by offering 5G tariffs with greater data allowances and faster network speeds than 4G plans.

Ethio Telecom also offers a range of volume-based and speed-based 5G FWA tariffs. Prices start at ETB789 ($6.90) per month for 150 GB of data, rising to ETB4,499 ($39.20) per month for an unlimited plan and 100 Mbps download speeds. The fact that Ethio Telecom's most expensive 5G FWA plan is almost four times the price of its most expensive 5G mobile plan indicates that FWA could translate into a significant revenue uplift for African operators if they are able to grow sales.

Senegal

Table 6

5G forecast for Senegal

	2025	2030
5G mobile connections	369,000	2.5 million
5G adoption (percentage of total connections)	1.6%	8%
5G population coverage	14%	41%

Source: GSMA Intelligence

Background

It took nearly three years to go from initial 5G trials to 5G spectrum auctions in Senegal. Orange Senegal (Sonatel) began testing 5G in November 2020, securing 5G spectrum in the 700 MHz and 3.4 GHz bands in July 2023. Additionally, Free Senegal held extensive 5G trials before it acquired 3.5 GHz spectrum in December 2023. Both operators have subsequently launched commercial 5G services, while Senegal's Regulatory Authority for Telecommunications and Posts (ARTP) is now helping telecoms regulators in other countries develop their 5G roadmaps.[9]

5G in action

In March 2024, Free became the first operator to launch commercial 5G fixed and mobile services in Senegal. The rollout began with five 5G sites in Dakar, with plans to gradually expand coverage by deploying around 50 additional sites in other regions of the country.

Orange Senegal also launched a commercial 5G FWA service in March 2024, before going live with its 5G mobile service in June 2024. The operator's 5G network covers the cities of Dakar, Thiès, Saint-Louis, Diourbel, Kaolack and Louga, with 176 5G sites deployed as of mid-2024.

With 5G commercialisation still in its infancy, operators are focused on driving 5G awareness among consumers and businesses. For example, Orange Senegal has invited prospective customers to see 5G in action at the Orange Digital Center in Dakar. The 100 square metre facility was the first Orange 5G Lab to open outside of Europe. It features areas dedicated to specific sectors, including health, education and agriculture, with support from partners Huawei and Nokia, as well as startups such as Caytu and Senvital.

9 "Guinea draws inspiration from Senegal's 5G success", Ecofin Agency, June 2024



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Policy imperatives for a 5G future

As 5G rollout continues to gain momentum across Africa, the role of forward-looking policies and regulatory frameworks cannot be overemphasised. Fundamentally, government policies and regulations, particularly on key 5G enablers such as spectrum, play a crucial role in stimulating much-needed investments in infrastructure deployment and fostering innovation around the development of relevant 5G use cases and applications. Here, we highlight five key policy imperatives to accelerate 5G development across the region.

Technology-neutral spectrum licensing

Spectrum is a scarce resource, so its use needs to be optimised. This means that as mobile operators adopt new technologies, they often need to rely on existing spectrum resources. The need for additional spectrum to meet the coverage and capacity expectations for 4G and 5G services is driving the refarming of spectrum from legacy technologies. Technology-neutral spectrum licensing (also referred to as technology neutrality) is crucial to allow mobile operators to refarm spectrum used for legacy networks (2G and 3G) for 4G and 5G services, at a pace driven by market demand.

Refarming exercises have involved:

- 850 and 900 MHz from 2G to 4G
- 900 MHz from 2G to 3G
- 1800 and 1900 MHz from 2G to 4G
- 2100 MHz from 3G to 4G
- all of the above to 5G.

With its performance capabilities, 5G has brought a new dimension to the spectrum refarming space. While the majority of 5G deployments to date have been in new mobile broadband frequency bands, notably 3.5 GHz, it is essential that operators have the ability to refarm existing spectrum assignments, particularly to meet the requirements of the 5G coverage layer, which benefits from the propagation capabilities of sub-1 GHz spectrum (700, 800, 850 and 900 MHz). Some of the spectrum in these bands has been licensed as 2G, 3G or 4G technology-specific spectrum but would be useful as a 5G coverage layer.

As new 5G spectrum has yet to be assigned in many markets – only 15 markets in Africa have assigned or plan to assign new spectrum by the end of 2025 – operators are using spectrum refarming in certain legacy bands to support 5G deployments. Technology neutrality is also necessary for dynamic spectrum sharing (DSS), which allows operators to use the same spectrum band for different radio access technologies such as 4G and 5G, to combat the absence of new 5G spectrum. It works by allocating spectrum to different technologies in real time, based on demand.

RoW regulations

RoW permissions are a key factor in the deployment of 5G infrastructure. If the procedure for obtaining RoW permits for building cell sites or laying optical fibre cable is complicated, time consuming and expensive, this can serve as a disincentive for operators and thus delay the expansion of 5G networks. Issues around RoWs are particularly challenging in Africa, with complex bureaucratic processes, multi-layered permits and misalignment between central and municipal authorities among the top barriers.

The telecoms industry depends on timely approvals for RoWs to roll out infrastructure. As such, governments should put in place procedures for easier RoW processes to expand fixed, fibre and tower infrastructure. Best-practice RoW rules to support faster 5G rollout include the simplification of RoW application procedures for infrastructure deployment, including small cells, and the reduction or elimination of administrative fees for establishing towers. In Nigeria, for example, several state governments, including Anambra, Katsina and Nasarawa, have removed RoWs for the construction, placement, laying and maintenance of telecoms network equipment.

Affordable 5G devices

5G adoption relies on the affordability of devices, especially smartphones and CPE. Although the average selling price (ASP) of 5G devices has been falling in recent years, largely due to competition in the OEM market, they still remain relatively expensive for users in Africa, particularly in the consumer segment. Globally, the ASP of 5G smartphones is still above $300, an amount that is several times higher than the minimum monthly wage in most African countries. Similarly, a GSMA Intelligence study to ascertain the affordability of CPE devices for local customers found that 5G CPE devices cost more than 400% of the minimum monthly wage in Nigeria, Tanzania and Zimbabwe, compared to less than 30% in most advanced markets.[10]

Governments across Africa should use policy levers to make 5G devices more affordable. According to GSMA research, post-production costs (e.g. shipping, customs and tariffs, local taxes and retail channel costs) account for a significant proportion of the retail price of connectivity devices, including smartphones and CPE. As such, governments should reduce or eliminate import and excise duties on devices to increase uptake. By aligning tax policies with governments' digital transformation objectives, policymakers can bring sustained long-term social and economic benefits through the positive impact of greater connectivity across society. Other opportunities to bring affordable devices to market include financing, local manufacturing and refurbishment.

Transition to renewable energy

In advanced markets, telecoms operators typically spend 5–6% of their operating expenses on energy costs. In Africa, however, this is considerably more (up to 10× more according to operator estimates) due to the overreliance on diesel generators and other expensive energy sources. Public power supply remains inconsistent in many urban areas, while large swathes of rural areas completely lack access to grid electricity. The impact of high energy costs will be more pronounced in the 5G era considering the network densification requirement of the technology.

In this context, operators across the region are increasingly exploring cheaper alternative sources of energy, particularly solar energy solutions. For example, MTN has developed a solar park in South Africa with a storage capacity of 6 MWh, reducing its reliance on the municipal grid and diesel generator by 40%,[11] and deployed a compressed natural gas power plant in Nigeria, with the potential for up to 60% lower costs per kilowatt-hour compared to diesel.[12]

Enabling policy and regulatory frameworks to promote renewable energy deployment for telecoms networks is still lacking in many countries in Africa. As such, more policy-related dialogue is needed between telecoms and power-sector stakeholders on policy levers to accelerate the transition to alternative energy sources for telecoms networks. Potential policy levers include:

- incentives to deploy renewable energy for telecoms networks, such as discounts on spectrum fees or concessional finance under universal service obligation funds
- enabling policy for corporate procurement/power purchase agreements of renewable energy by operators
- favourable customs duty regimes and tax rebates for the deployment of renewable energy equipment.

10 5G FWA in Africa: emerging trends and opportunities, GSMA Intelligence, 2023
11 "Clean Energy Solutions: MTN SA", MTN, April 2024
12 "From Challenge to Opportunity: MTN Nigeria's Drive for Sustainable Energy", MTN, September 2023

Network competition

To date, all commercial 5G networks in Africa have been developed on the basis of competition at the network level, with the assignment of 5G spectrum and/or the deployment of 5G services in existing spectrum holdings by individual market players. One possible exception, however, appears to be Ghana, which in May 2024 announced plans for a national open-access 5G single wholesale network (SWN) that will be built and managed by Next Gen InfraCo.

A key objective of SWNs is to achieve nationwide coverage (including rural areas). However, the history of SWNs shows this is rarely achieved. Many SWNs have failed to materialise or have been significantly delayed (e.g. in Kenya, Russia and South Africa). Of those that took effect, challenges down the line ultimately led to a change of strategy. For example, in Malaysia the government has switched to a dual network strategy, while Rwanda's National Broadband Policy and Strategy, adopted in October 2022, allows operators to launch their own 4G services, increasing competition and accelerating mobile broadband adoption.

Network competition is a key underpinning for innovation, whether in private networks, edge compute or open RAN. So in an SWN environment where no network competition exists, the propensity to innovate is reduced. SWNs also aim to lower network deployment costs and increase resource efficiency. But this comes at the expense of network competition – which again means that it decreases innovation, as well as investment. Furthermore, operators have achieved the same network efficiencies by engaging in voluntary network sharing. A GSMA and World Bank study of seven Sub-Saharan African markets showed that active sharing can deliver similar levels of coverage to SWNs while maintaining a greater degree of service competition.[13] Operators should therefore be allowed to fully leverage the benefits of both voluntary passive and active network sharing.

13 Using Geospatial Analysis to Overhaul Connectivity Policies, The World Bank, 2022

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