chapter State of the Market



Oluwole Babatope, senior research analyst, data and analytics, International Data Corporation (IDC)

African challenges such as limited infrastructure, inflation, illiteracy, and foreign exchange issues, are well-documented. However, it's essential to recognize that these challenges also give rise to growth opportunities.

Take, for instance, the improved access to broadband, which has revolutionized education, extending it beyond the confines of traditional schools. Now, individuals with smart devices and internet connectivity can engage in learning through structured online curricula offered by educational institutions or opt for a more flexible, unstructured approach using platforms like YouTube, Udemy, and Coursera.

Content creators are also being encouraged by these platforms to share their knowledge and insights, making it possible to acquire expertise in nearly any subject without formal education. Thus, broadband connectivity is bridging the illiteracy gap.

Africa represents the next frontier for growth, especially as developed economies slow

down. Consequently, significant investments are being made in telecoms and IT services to offer improved experiences to consumers and enterprises. One notable example is the expanding deployment of 5G technology. While initial deployments may have commenced in major markets like Nigeria, South Africa, and Kenya, we are now witnessing 5G deployments in countries like Togo, Ethiopia, Senegal, and beyond.

Broadband infrastructure investment has become a prevailing trend throughout the continent. Simultaneously, consistent investments in 4G and 5G spectrum are shaping the telecommunications landscape across Africa.

Additionally, there has been substantial growth in mobile money adoption, facilitated by partnerships between regulatory bodies, mobile money operators, fintech companies, and financial institutions. These collaborations are driving the expansion of financial inclusion initiatives within their respective markets.

A unique market

The African market possesses distinct characteristics that set it apart from other global markets.

Firstly, Africa is comprised of over 50 diverse markets, each with its unique peculiarities and local nuances. Consequently, attempting to replicate identical strategies across the continent is a formidable challenge. It is crucial to consider the political, economic, and cultural intricacies of each market when pursuing opportunities in the region.

For instance, developing a mobile money product in Nigeria, with a mature banking industry, requires a different approach compared to what it takes to develop same product in Ivory Coast, where the banking sector is not as matured.

Moreover, when it comes to technology adoption, Africa typically lags 3-5 years behind global markets. Therefore, before new technologies become mainstream in Africa, there are often several case studies available that can be harnessed and adapted to ensure successful implementation across the continent. This trend proves advantageous for the entire ecosystem, benefiting end-users, service providers, equipment vendors, and regulatory bodies alike.

Cross-border cooperation

Cross-border cooperation has emerged pivotal in ensuring progress across the African continent, particularly in the realms of financial inclusion and telecommunications adoption.

One of such collaborative efforts is the East Africa One Network Area roaming initiative to facilitate access to cost-effective roaming mobile services. Furthermore, a recent development within the Economic Community of West African States (ECOWAS) highlights the region's commitment to fostering affordability of mobile services. Thirteen ECOWAS member states recently amended their policies to eliminate roaming surcharges within their borders. This policy adjustment is expected to enhance affordability of mobile services across these markets.

Moreover, proactive engagement between telecom regulators and service providers, with shared objective of promoting affordability in telecom services, driving financial inclusion and growth in digital economy, underscores the merits of collaboration.

The regulatory landscape has been notably active, serving as a middleman in executing national development and transformation initiatives. These activities are evident in the allocation of spectrum for 4G and 5G networks, the rollout of fibre broadband infrastructure, and the formulation of policies concerning data sovereignty and privacy. It is evident that regulatory bodies throughout the continent have emerged as agents of change in driving growth across diverse sectors.

Driving growth

I believe mobile data (4G and 5G), fibre-optic services, and initiatives targeted at financial inclusion will propel growth across Africa. Additionally, the momentum behind public cloud adoption is expected to continue, driven by digital transformation efforts aimed at offering improved experiences to employees and customers.

Furthermore, the demand for data center services is expected to grow, particularly as businesses continue to outsource non-core functions, therefore, redirecting focus towards elevating service delivery to customers.

Nigeria, South Africa, Kenya, and Egypt will always be vibrant in the technology landscape. These countries have mature markets, wellestablished local presences of global original equipment manufacturers (OEMs). Additionally,

they have vibrant startup ecosystems that keeps attracting investments from global markets. Meanwhile, emerging markets like Rwanda, Ethiopia, Senegal, and Ivory Coast are poised for growth.

A common thread among these nations is their governments' keen interest in achieving national development and transformation through technological empowerment. As a result, these countries are actively pursuing a top-down approach to formulate and implement tech policies aimed at fostering growth across all sectors.

The growing enthusiasm for blockchain adoption is particularly intriguing. Although early adoption was predominantly around cryptocurrency and decentralized finance use case, there is now a gradual shift in use case as African governments are now considering the technology to enhance transparency during elections.

I forecast growth across the entire region. Now, African governments are demonstrating commitment to nation-building, and are placing their strategic bets on technology to translate their visions into reality.

Consequently, I expect the formulation of policies aimed at facilitating collaboration with global partners to increase foreign direct investment across the region. Concurrently, I anticipate regulatory focus towards security and data privacy concerns as the adoption of emerging technologies like edge computing and the Internet of Things (IoT) gain momentum.



Nsikak Emmanuel Ekere, research writer consultant with WATRA

Wireless communication in West Africa – expectations for 2024 and beyond

West Africa's telecommunications sector has experienced substantial growth, with increased efforts to enhance connectivity and digital inclusion. The growth is driven by efforts to harmonize regulations, value-added services (VAS), and wireless data. The increase in mobile penetration across developing countries is raising investments, access, and affordability of telecommunication services. Through productivity, the Internet of Things (IoT) has boosted new changes with digitisation and Major socioeconomic growth and trends.

In 2023, West Africa has shown great potential in adopting emerging technologies, high-speed spectrum, and improving its wireless policy roadmap. Contributing an estimated \$70 billion to the GDP of West Africa in 2023, the number of mobile internet users is 184 million. The transformation is driven by the 17% growth rate of the total 4G network connections. However, investment from the government in wireless communication has been relatively low when compared to private and foreign investments.

A thriving economy

West Africa's digital economy is thriving with increased usage of WiFi routers, 4G/LTE services, and the low latency benefit of 5G networks in major cities.

There's a clear trend towards broadband connectivity, WiFi-enabled laptops and phones, wireless LAN, wireless wide area network,

cloud computing, and augmented, mixed, and virtual reality (AR/MR/VR) technology for user experience, including virtual reality gaming. Also, startups are thriving because of data obtained from mobile apps, social media, and website traffic.

Efforts in the sub-region from the private sector focused on expanding high-speed internet access and AI technology integration, which is crucial for cellular phones and various sectors like education, health, and small businesses in the informal sector. This trend is likely to continue as wireless communication penetration and the spectrum quality of WiFi 6 and WiFi 5 are becoming increasingly used by corporate businesses.

Driven by the COVID-19 pandemic, workingfrom-home router connections for businesses, podcasts, online learning, software apps, and e-commerce have sped up internet use, digital solutions, and device upgrades to smartphones and gadgets.

A new market for smartphone IT companies

According to the West Africa Telecommunications Regulators Assembly (WATRA), increased investment in the region will rise proportionally with new integrated policies to reduce operational costs and multi-taxing systems.

By the third quarter of 2024, wireless communication through SIM card registration will surge owing to the global rise in internet penetration, IoT, and online banking, prioritising the adoption and roll-out of 4G, 5G, and 5.5G services.

According to the Global System for Mobile Communications Association (GSMA), the 5G network will provide \$11 billion to sub-Saharan Africa by 2030, having a 6% impact on the economic value of mobile technology. In 2024-2025, a new market will open up for smartphone IT companies with heavy traffic in the broadcasting industry in West Africa fuelled by the foregoing market of advertisement, urbanisation, and remote and virtual working. Localised innovation in West Africa and the government digital plan framework in Ghana, Cape Verde, Nigeria, Togo, Cote d'Ivoire, and Burkina Faso, among others, encourage over 200,000 direct jobs.

Global investors' interest in wireless infrastructure companies will bolster subcontracts and revenue, while the growing demand for wireless products and services in West Africa will influence big data for the industry. Market share rose for major telecom companies like MTN (38.70%), Glo, Airtel (27.24%), Orange, and Sonatel, which are still experiencing great results on the stock exchange.

Regulatory bottlenecks

West Africa's wireless communication faces regulatory bottlenecks at the sub-state levels, affected by administrative priorities and little budgeting for the industry. Others include the digital divide, quality of experience (QoE), particularly between underserved urban and rural areas, and poor big data management and storage.

However. these challenges present opportunities to innovate and tailor to the West solutions specific African context, such as increasing rural internet coverage and encouraging the sharing of wireless infrastructure to reduce capital expenditure (CapEx) and governmentpartnered infrastructure development to lower operating expenses (OpEx).

IT operators and consumers face challenges

in operations like power supply, signal strength, interference, local currency weakness, inflation rate, and service cost while setting up business WiFi. Meanwhile, the presence of 2G/3G services is large in West Africa when compared to 4G and 5G services. This affects the quality of data, spectrum speed, and digital key performance index of multiple sectors. In 2024, there will be over 40% 4G presence in the sub-region; however, the infrastructure quality may suffer from inadequate substantial funding, a shortage of advanced software and IT professionals, and the cost of maintaining and upgrading to 5G and 6G.

According to the Internet Society, West Africa's enabling technology networks are Https (80%), IPv6 (10%), and DNSSEC TLDs (above 40%). In a 2021-2023 report by the Internet World Statistics, the sub-region has a 43.2% internet penetration rate, the lowest among the six regions.

Reforming policy

The 2023 Africa Internet Governance Forum (AFIGF) in Nigeria left a lot to ponder about local content development, cybersecurity, internet governance and enabling regulatory terms at the national level on the continent. The widespread wireless communication industry towards the 4IR is triggering more multi-stakeholder collaboration and policies bv national regulators to strengthen a unilateral market for affordability and access. The internet in rural communities is unreliable; however, non-extra taxation on country-to-country roaming data and the rollout of 5G services are encouraging. Countries like Nigeria, Ghana, and Senegal demonstrate high demand and potential for further broadband penetration, market return on investments, and digital services.

Through an interview with the executive secretary of WATRA, Aliyu Yusuf Aboki emphasized that collective efforts to reduce roaming charges can improve connectivity across Africa, especially in the recent case of the Ghana-Cote d'Ivoire roaming partnership. With the indicators experienced in 2021-2023, he said that "lowering tariffs with a reformed policy regulation can quickly attract foreign investments in the industry and further make the sector have broader inter-country partnerships." Another is the African Union roaming through the African Internet Exchange System (AXIS), which was launched in Kenya in 2016 and has 32 country signatories.

Broadband connectivity for sharing and using online technology services is driving growth across various sectors like online banking, the transport sector, health tech, and startups to perform economically well, reach more customers, transform work culture and transition to various digital services. Cross-border cooperation and promoting regional regulatory knowledge sharing have yielded results. This has evolved with a better commitment to creating affordable telecommunications services, improved quality of service (QoS) policies, and integrated digital economic frameworks.

Thoughts for the future

There'll be an alternative impact of the telecommunications industry on the environment and economy and potentially on climate-resilient products like Ethernet switches, modernized 5G cellular networks, wireless LANs, and wireless wide area networks for video conferencing.

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economy will provide in-depth data insights on climate change, awareness, knowledge sharing, and capacity development to foster innovations and fact-based decision-making. There's a need to integrate AI chatbots and underscore operators' licensing.

WATRA secretariat forecasts that broadband connectivity will remain the key driver for the African telecommunications market. Highquality, reliable internet access is crucial for the burgeoning digital economy and is expected to catalyze growth and quality job creation across various sectors with a view to the 5.5G network. There is the potential for enablers to minimise data costs for



Dario Betti, CEO, Mobile Ecosystem Forum

Unveiling the dynamic landscape of mobile operators across the continent

In the heart of the African continent, where vibrant cultures, diverse landscapes, and a tapestry of histories intersect, another remarkable tapestry is being woven – that of the telecommunications industry. This network of networks reflects the political, economic, and even social evolutions in the continent. 2023 brought with it five big themes.

Big telco in Africa – and big growth

Just like the continent, the African telecom industry is big, very big – yet showing potential

video conferencing, AI messaging and call interpretation, and money services connectivity for cross-sector growth and opportunities. Positive interest will attract WiFi 7 in 2024, which will enable strong throughput, connect more devices, enhance stable transmission, and enhance network security.

According to WATRA's expectations, the sub-region can propel its economy's \$3 billion export value through the export of wireless communication to an annual contribution of \$20 billion, if local tech is produced in large quantities and incorporated with emerging global standards and the expansion of services to other regions in the world.

for considerable growth. According to MEF Data, in 2023 there are 1.82 billion people in Middle East and Africa (a 2% year on year increase) and for the first time, the continent will see 1 billion users of mobile phones (+4% year on year).

Phones are emerging as broadband and fixed line replacement and demand is growing. More users now own a smartphone: 770 million users in the region, a healthy 6% increase from 2022. Among the surprises from this is seeing the number of Apple users growing to 109 million – a sign that new affluent users are emerging as well.

Telecom deals: Africa is opening up and connecting

Ethiopia is the country that has once again attracted lots of attention in terms of telecom deals. As a later market to be fully liberalised, it has seen some important changes in in 2023. The Ethiopian state has put 45% of the incumbent Ethio Telecom up for sale. The sale has generated interest from the e& group and Orange as well as other groups. The country has also invited bids for a third mobile operator licence in the country. The newcomer would join Safaricom Ethiopia and Ethio Telecom.

African operations continue to show growth signs and are in fact some of the highlights for international groups. Orange reported growth in its operation in Africa and the Middle East, posting revenues increasing by 12% yearon-year to €1.77 billion in Q2 2023 due to the rapid development of retail services. The region continued to demonstrate its agility, and resilience to the currency instability. Mobile subscribers for the African base of the French group grew by 5% year-on-year to 146.2 million, and average revenue per order grew 4.3%.

The race to 5G is on in the continent too. South African operators can claim big results, but many more countries are joining. The Uganda Communications Commission (UCC) announced its first 5G spectrum awards in July with MTN and Airtel communicating their first 5G transmission in the year.

There has been good news with new announcements for subsea cable connection to Africa, from Equiano, ECOWAS, PEACE, Amilcar Cabral, Medusa and Angola. Cables are only some of the extensions discussed for Africa. In addition, the profile of satellite solutions is rising. For instance, Orange announced a partnership with LEO satellite broadband network operator OneWeb for rural coverage.

Towers and financing

As the world hurtles into the 5G era and beyond, Africa stands on the cusp of another technological leap while upgrading its infrastructure. In a world of low ARPUs funding, telecom revolutions can be a challenging task for mobile operators. The increasing cost of capital is putting funding at the top of the agenda for many operators and groups.

In August 2023, the Qatari telecoms company Ooredoo, Kuwait's Zain Group and Dubai-based TASC Towers Holding announced the creation of the Middle East and North Africa's largest cellphone tower company. The companies intend to combine their 30,000 telecommunications 'towers' in Qatar, Kuwait, Algeria, Tunisia, Iraq, and Jordan. Divesting from tower assets is a common route globally for mobile telecoms to increase efficiencies in the infrastructure and release capital to fund information and communications technology projects. The CEO of MTN Ralph Mupita also reported in August that he will be selling minorities participation including fibre, tower and fintech to access more capital.

The importance of fintech

Africa has developed some of the most innovative approaches taken by mobile operators to cater to their diverse customer base. In particular, the region has created some of the most ground-breaking financial services. Mobile fintech is showing a strong performance.

Airtel Africa's mobile money business continues to grow at nearly 30% year on year, in constant currency terms. The mobile operator generates more than 13% of the group's total revenues, an increase from 12% from the year before, and its EBITDA margins stand at about 50%. The Orange Money service in Africa surged 25.5% across the territories of the French telecom group during 2023.

Mastercard has agreed to take a minority stake in the fintech subsidiary of MTN, Africa's biggest mobile company by subscribers. The deal values the unit that includes payments and remittances at more than \$5 billion. Mastercard had already invested \$100 million in the mobile money business of Airtel Africa in 2021. Airtel is a competitor of MTN in multiple markets, the unit was valued about \$2.6 billion at the time.

MTN's unit MoMo showed strong performance. with mobile money transactions up 61% in the six months to June 2023 to \$135 billion and 60 million users. Mobile money is a major driver for a telco on a financial level too. MoMo helped MTN Uganda to achieve an impressive set of results during 2023. MTN Uganda is the country's largest telecom company with 17.2 million users. It announced a 20% rise in pretax profit for the full year 2022 ending in March 2023. The numbers were boosted by fintech and data service sales - accounting for a rise in pre-tax profit to \$160 million. The impact of the digital transformation triggered by COVID-19 is now showing in East Africa. Mobile payments have grown in Uganda as businesses have embraced cashless payments and e-commerce.

Nigeria is the fintech centre of Africa, stealing the title after Safaricom in Kenya first opened the market. Local start-ups including PalmPay are growing fast. PalmPay has increased its users by 500% in the last two years to 25 million. The other main rival is OPay, backed by Softbank and valued at \$2 billion. Both have got the support of local smartphone brands that carry the apps as preloads. Chinese giants' super-apps are now active, increasing competition further for mobile operators. Alipay and Wechat Pay have offices in Lagos.

Geopolitical impact: foreign investments and oil are important elements of telecom

The change in the global political balance is now mirrored in the region. The increased competition for influence in the region between China and the United States is potentially good news for

"Africa has developed some of the most innovative approaches taken by mobile operators to cater to their diverse customer base."

the states looking for aid. The EU and US have re-initiated new digital infrastructure projects in the region, in response to growing influence of Chinese telecom players. For instance, during 2023 the EU and US have agreed a joint plan to upgrade the country's telecoms infrastructure in Kenya. Kenya is the continent's seventh-largest economy by purchasing power parity, according to the World Bank - a large market that will see new growth. British support has been critical in the creation of local digital champions such as Liquid Telecom in the past. The UK development agency CDC Group sponsored the African fibre company Liquid Telecom for \$230 million in 2020-2021 to expand its fibre network further into central and western Africa. Africa currently has the lowest rates of fixed and mobile broadband subscription penetration in the world according to the ITU.

Oil prices seems to have also had an impact in the telecom region. It might not sound surprising, but the continent includes oil rich economies that had to adjust its macroeconomic profile. For Airtel Africa, Nigeria accounts for 40% of revenue of the group, and Nigeria is an oil rich country that suffered from the drop of oil value of near 30% during the year. The Nigerian naira has devalued by roughly half at one point in the year. Falling oil prices should decrease the cost of running generators to power cell towers on diesel. Airtel Africa's foreign exchange losses reported in 2023 summed to \$178 million, almost half of which came from Nigeria, despite a good underlying performance. ■ Es'hailSat delivers satellite services for broadcast, broadband, mobility, corporate and government services across the Middle East and North Africa, and beyond.



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Telecommunications in Africa

An exert from EMIS' Africa Telecommunications Sector 2023/2024

In recent years, Africa's telecommunications industry has expanded rapidly, driven primarily by the mobile services segment. According to the International Telecommunications Union (ITU), mobile telephone subscriptions grew at a compound annual growth rate (CAGR) of 7.5% between 2011-2021, the fastest rate in the world, allowing Africa to account for 11% of all mobile users worldwide in 2021.

However, the number of active users is significantly lower than the number of subscriptions due to the widespread ownership of multiple SIM cards, a result of the inadequate quality of mobile services in terms of both coverage and customer rights. Prepaid subscriptions continue to dominate on every continent. The mobile segment is currently driven primarily by mobile data and the mobile money service in terms of both users and revenue. The penetration of mobile phone services, however, is low by global standards, with only 0.6 users per 100 inhabitants in 2021, versus a global average of 17.7%.

While 60% of Africa's population accesses the internet via mobile device, most mobile connections are 2G, primarily due to their affordability. Even though the average selling price of smartphones has decreased substantially over the past few years, particularly with the influx of Chinese brands with prices below US\$100, many Africans are unable to afford the one-time upfront cost of purchasing a device.

GSMA Intelligence predicts that by 2025, 58% and 28% of all connections in sub-Saharan Africa will be 3G and 4G broadband connections, respectively. 52% of all connections at the end of 2020 were 3G, followed by 36% for 2G and 12% for 4G. In 2025, the proportion of 5G connections is projected to reach only 3%. A quarter of the 500 million new mobile phone subscribers expected to join the global market by 2025 will be from sub-Saharan Africa.

In line with global trends, fixed telephony on the continent has declined over the past decade, with the number of subscriptions declining at a CAGR of 5.9% between 2011-2021. In 2021 alone, subscriptions fell by 16.9% y/y to 6.4 million, comprising only 0.7% of the global total.

Africa's internet access has improved significantly in recent years, but still lags far behind the rest of the world. According to ITU data, by the end of 2021, 392 million Africans were using the internet, double the number in 2016, but accounting for only 8% of the world's total users. Strong mobile service penetration has significantly contributed to enhanced internet access. During 2011-2021, the number of active mobile broadband users in Africa grew at a CAGR of 34%, nearly double the 18.8% growth rate of global subscriptions during the same period. The number of active mobile-broadband subscriptions in Africa increased by 4.2% y/y to 430 million in 2021. While the share of population covered by at least a 3G mobile network is high at 78.4% in 2021, the LTE/WiMAX mobile network is accessible to only 47% of the African population.

During 2011–2021, fixed broadband usage increased at a much slower CAGR of 16.2% to reach 7.2 million users. Its high price and digital illiteracy continue to limit usage. In addition, only 22.7% of households possess a personal computer.

50 of the 54 African countries had adopted a national broadband strategy as part of efforts to support investments in telecom infrastructure by the end of 2020. The African Union Commission's adoption of the Digital Transformation Strategy



for Africa in February 2020 was also a significant achievement. Under these strategies, investments are directed toward, among other things, terrestrial backbone fibre and undersea fibre-optic cable projects. 25 backbone fibre projects were announced in 2020. Among these, the One Africa fibre-optic network project stands out, as it aims to connect Cape Town, South Africa, and Cairo, Egypt. Undersea fibre-optic cable projects also advanced, with the most notable being the launch of the South Atlantic Cable System, which offers alternative lower-latency routes to the Americas via a direct connection between Africa and South America (Angola and Brazil).

Africa's expanding digital economy is key for the expansion of the telecommunications industry. The digital market has attracted more venture capital and fostered the expansion of numerous industries, including mature ones such as the mobile money market in Kenya. Additionally, the digital economy has fostered new talent among the continent's young population. COVID-19 has highlighted how digital platforms that target the informal sector can contribute to societal resilience. In several markets, digital platforms played a crucial role in supporting government responses to the outbreak, particularly in reaching the underserved, due to their ability to rapidly reengineer their platforms.

Twiga Foods has partnered with Jumia to deliver agricultural products to consumers, for instance. The Nigerian government relies on payment service providers to distribute cash to impoverished households. Digital platforms have enabled the rapid deployment of social protection programs and the continued operation of some essential government services.

Northern Africa

In terms of ICT development, Northern Africa is the most developed region in Africa. It has the highest number of fixed-line telephony and broadband users and the second highest number of mobile phone users in Africa. Egypt,

Algeria, and Morocco are the three largest African markets by number of subscribers in this region. In contrast to most of sub-Saharan Africa, the fixed telephony market is relatively mature and accounted for 71.8% or 20.2 million of Africa's subscriptions in 2020.

According to ITU data, despite the region's well-developed fixed-line broadband segment, the penetration rate is low, with Tunisia having the highest rate of 12.2% fixed broadband users per 100 inhabitants in 2021, followed by Egypt and Algeria with 9.94 and 9.46, respectively. The least-developed Sudan had a rate of just 0.07. 3G technology is the most advanced, accounting for 51% of all mobile subscriptions in 2020, while only 14% of subscriptions were 4G.

In terms of mobile broadband penetration, the northern African region has one of the highest rates on the continent, in as much as most countries having an internet access rate exceeding 70%. Algeria is the leader with 97.58 mobile data subscriptions per 100 inhabitants in 2021. Even Sudan is faring considerably with a rate of 40.66.

Western Africa

Western Africa is Africa's largest mobile market, with 452 million users in 2020, or 37.8% of the continent's total. Nigeria is by far the largest market, with 195.1 million subscribers in 2021, a decrease of 4.5% y/y. Ivory Coast and Ghana follow, each with users exceeding 40 million.

The region's 3G connection has expanded because of increased infrastructure investments and falling mobile device prices. The large young population also contributes to growth. Over 40% of the region's population under the age of eighteen will be first-time mobile phone owners.

Investments in submarine fibre optic cables have resulted in significantly increased mobile broadband usage, expanding access to more advanced network connections. Even though more than four international submarine cables traverse the region, no other country in Western Africa has an internet penetration rate exceeding 50%. As landlocked nations continue to be constrained by infrastructure shortages, only coastal regions have a chance to profit.



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Nigeria is the largest market in terms of the number of mobile users, primarily because it is the most populous nation in the region. In addition to a lack of infrastructure, lack of access to electricity is a major impediment to Internet access. As a result, the problem of consumers possessing multiple SIM cards persists, particularly in the country's rural areas, as a means of avoiding coverage gaps.

Eastern Africa

In 2020, Eastern Africa ranked third on the continent in terms of mobile phone subscriptions, although the number of users increased by 4.8% y/y to 230.4 million. The mobile penetration rate in the region is also high, with most countries exceeding 100. Ivory Coast had the highest mobile penetration rate with 162.17 users per 100 inhabitants in 2021, followed by Ghana and Senegal with a rate of 123.21 and 117.68, respectively.

Due to a lack of infrastructure development,

access to the region's fixed telephone lines remained prohibitively expensive, and there were no incentives for investors to enter the market. Low levels of electrification and legacy fixedline infrastructure shortages have resulted in Eastern Africa having one of the lowest fixed-line broadband penetration rates on the continent.

Eastern Africa is one of the continent's most unexplored regions due to the dominance of governments in markets such as Eritrea, Ethiopia, Sudan, and Somalia. Tanzania, Sudan, and Uganda, on the other hand, enjoy the presence of international MNOs, but there is no incentive to invest in rural network expansion because most of the population in these regions has low purchasing power. Ethiopia is the most lucrative of the unliberalised markets due to its large population and expanding middle class.

Several countries in the region have implemented national programs for the development of their broadband networks. The National ICT Broadband Backbone of Tanzania



aims to increase the availability of fibre networks for urban consumers and businesses.

Southern Africa

Southern Africa ranks third in mobile subscriptions and second in fixed-line telephone users. In 2020, the region's 191.4 million mobile subscribers represented 16% of Africa's total users. In the segment of fixed-line telephony, the region accounted for 12.5% of the continent's total users. South Africa is the dominant player in the region, accounting for most of the users in both segments.

The region stands out for its high rate of penetration. South Africa (168.9%), Botswana (160.7%) and Namibia (115.2%) all have mobile phone penetration rates greater than 100%. According to DataReportal, South Africa and Namibia had internet penetration rates of 68.2% and 51%, respectively, at the start of 2022, which is high by continental standards.

Central Africa

Central Africa is the least developed region in Africa in terms of ICT, primarily due to its ongoing political instability, which frequently leads to infrastructure destruction and market disruption. In the Economic Community of Central African States, only 11.4% of households have access to a computer and the internet, while approximately 1 in 100 residents subscribe to fixed-line telephone service, compared to 46 in 100 for mobile telephone service. Moreover, only 46% of the population is connected to the 3G mobile network. With 99.9 million users in 2020, Central Africa accounted for only 8.4% of the continent's mobile subscriptions and 0.8% of its fixed broadband subscriptions (823,613). Except for Gabon and the Republic of Congo (134% and 95%, respectively in 2021), mobile phone penetration rates are low. In all countries except Gabon (62%), internet access is low, at or below 30%.



The mobile landscape in sub-Saharan Africa

An exert from The GSMA's Mobile Economy sub-Saharan Africa 2023

There has been a steady growth of unique mobile subscribers in sub-Saharan Africa. This will continue over the next seven years, taking the total to nearly 700 million by the end of 2030. Nigeria and Ethiopia will account for almost a third of total subscribers.

Mobile penetration will reach 50%, much lower than the global average of 73%. Within the region, penetration will be highest in Mauritius at 93% of the population.

In 2022, sub-Saharan Africa had around 287 million mobile internet subscribers. The mobile internet usage gap in the region remains significant, highlighting the impact of the barriers to mobile internet adoption, including lack of affordability and low levels of digital skills. The mobile internet landscape in the region varies significantly: mobile internet penetration levels are over 50% in Mauritius, South Africa, and the Seychelles, but still below 15% in Benin, Chad, and the Democratic Republic of Congo.

4G connections will almost double by 2030, increasing the 4G adoption rate, as a percentage of total connections, to 49%. This will be driven by continued network upgrades and efforts to make 4G devices more affordable. The number of connections on legacy networks will decline steadily.

In July 2023, MTN and Airtel launched 4G LTE services in Rwanda after the government amended their operating licences. They were previously only able to offer 4G services using the infrastructure of wholesale provider KT Rwanda Networks (KTRN), highlighting the importance of competition at the infrastructure level.

Growing 5G momentum

In 2022, there was an uptick in 5G-related activities, including 5G commercial launches in 15 countries and a growing number of spectrum allocations.

sub-Saharan Africa will have 226 million 5G



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connections in 2030, equivalent to an adoption rate of 17%. Nigeria and South Africa will account for almost half of these connections. 5G growth in the region will be slow but steady, as a larger share of the customer base will continue to migrate to 4G.

The approach to 5G must consider the current connectivity landscape and unique market features that could affect its rollout and adoption. 5G network ecosystem players in the region must also find ways to deliver cost-effective and efficient 5G networks, balancing investment and value creation.

FWA boosts 5G adoption

FWA provides an opportunity to enhance last-mile connectivity for home broadband services. Although it is already frequently used as a substitute for fixed broadband, new global standards and 4G have improved the economics and performance of FWA in recent years.

Looking ahead, 5G will further catalyse the growth of FWA in sub-Saharan Africa, making it a primary broadband option. Along with providing basic connectivity, FWA will help operators reach unconnected areas.

As of September 2023, 12 operators in the region provide 5G FWA services across 7 countries, including Botswana, Kenya, South Africa, and Tanzania. These include MTN Nigeria, which launched commercial 5G services in September 2022, Orange Botswana, and Telkom South Africa.

The number of FWA services will continue to rise as more operator networks are upgraded, more 5G networks are built out and more customer-premises equipment (CPE) devices (particularly 5G ones) are commercialised.

Operators are also leveraging FWA to improve other areas, such as education. Free and Ericsson will provide FWA connectivity to schools in Senegal, demonstrating how FWA can utilise existing mobile radio networks to effectively bridge the educational divide. While FWA has a lot of potential, practical limitations and regulatory considerations are holding back largescale deployment. These include the high cost of CPE devices, low household incomes and the lack of sufficient spectrum for network deployment. That said, some operators are implementing measures, such as subsidies and payment in instalments, to make CPE devices more affordable for users.

Addressing smartphone affordability

60% of the population does not use mobile internet despite living in an area with coverage. Smartphone affordability is a key barrier to using mobile internet. This is an area of growing concern, as reducing the internet usage gap is critical to closing the digital divide. In Senegal, 61% of women and 46% of men who do not own a mobile phone reported that the lack of an affordable handset was the top reason.

To help address the issue, operators and manufacturers have devised solutions targeting the cost of devices. The average selling price of smartphones has reduced significantly in recent years, with an influx of devices priced at under \$100.

The challenge for manufacturers in sub-Saharan Africa is to produce devices at a low enough price point to gain market share, particularly in the 5G and 4G markets, where devices remain prohibitively expensive. Along with the manufacturing costs, other costs such as fees and taxation directly impact the final selling price. Taxation and duty fees add 10–30% to smartphone costs, depending on the country. To improve affordability, governments should reconsider these fees by offering tax exemptions on low-cost handsets, as is available in Rwanda.

IoT and smart cities

There will be around 53 million licensed cellular IoT connections in sub-Saharan Africa by 2030. South Africa is the leading contributor of IoT connections and will cover almost half of the total connections in 2030.

Sub-Saharan Africa: smartphone adoption





Government initiatives to use innovative solutions as part of smart city programmes are also boosting IoT deployment. IoT devices have reached households and businesses, helping streamline processes and increase efficiency in the utilities sector, including through smart sensors for waste management in Kenya. Operators are increasing IoT coverage by targeting a range of vertical use cases, including digital payments, smart metering and smart utilities, digital agriculture, digital health, telematics, and fleet management.

Ethio Telecom, in partnership with the Addis Ababa city administration in Ethiopia, will install a wide area network (SD-WAN network) to interconnect different bureaus and service-rendering institutions of the city with the main data centre. The project will address the growing technology demands of digital transformation and data security concerns of the city administration, interconnecting the sub-cities and woredas (administrative divisions of Ethiopia) with higher-speed and greater-bandwidth optical services.

Mobile operators have been playing a pivotal role

within the IoT ecosystem, contributing significantly to various applications in the utility sectors, including digital meters and monitoring and managing resources such as water and treatment plants. In sub-Saharan Africa, smart utility IoT connections will increase almost sixfold over 2021-2030. By 2030, utility solutions will account for nearly 30% of IoT connections in the region.

Operators have been collaborating in trials using IoT solutions, with many leveraging the available low-power wide-area network (LPWA) networks. In Kenya, Safaricom's NB-IoT network has been used for smart meter pilots in Kisumu, Embu and Eldoret, among other cities, and has led to an IoT product line for water. In addition, Safaricom has partnered with Kenya Water Institute to deploy a smart water system that uses IoT to manage production, distribution, and consumption at the institute's campuses. The smart water system will be used to facilitate practical training and to co-create and run a smart water management curriculum for students at the institution.

Tapping into Al

There has been a wave of growing momentum behind AI in the last few years, with increasing investments into new AI capabilities and applications as well as debates on the responsible use of the technology.

Mobile operators have employed AI at different levels, from improving network operations and customer services to achieving efficiencies and cost savings. Several network infrastructure vendors are creating new AI-enabled products to make the technology more accessible and to drive larger-scale deployments. MTN will migrate to Microsoft's Azure's cloud computing platform to tap into machine learning and AI to deliver operational efficiency across its footprint, starting with Nigeria and South Africa. Further, MTN Benin and Ericsson have entered a partnership to deploy AI and machine-learning solutions to address throughput degradation and, ultimately, provide improved customer satisfaction.

Connecting the unconnected

As of 2022, around 15% of the population in sub-Saharan Africa is not covered by mobile broadband networks. The coverage gap remains significant, especially in rural and remote areas.

The lack of mobile broadband coverage in rural areas is primarily an economic challenge: costs can be prohibitive; revenues are lower; and logistics are more complex. This has led operators to explore new infrastructure models through collaborations, such as MTN Uganda's turnkey solution with iSAT Africa under the GSMA Innovation Fund for Rural Connectivity. As part of the partnership, iSAT deployed five mobile network sites in rural areas of Uganda using concrete-less towers, solar power, and an open radio access network (RAN) to provide 2G and 3G connectivity.

Such initiatives offer operators an opportunity to expand into uncovered areas while sharing the cost of infrastructure development, and the related responsibilities, and to utilise available resources. Operators and infrastructure companies have also announced renewed commitments to improving connectivity in sub-Saharan Africa. Vodacom plans to invest \$3.3 billion to upgrade network resilience, maintain connectivity and boost rural coverage in South Africa over the next five years, while Africa Mobile Networks has secured a \$20 million loan package to build new base stations in rural areas.

Mobile operators have been innovating business models and improving coverage; however, the usage gap remains sizeable. More than half of the population do not utilise mobile internet despite living in an area with mobile internet coverage. The mobile industry has been taking steps to tackle the key issues restricting usage.

Opportunities for operators

Mobile operators have ventured into the fintech space with mobile money services, along with an increase in collaborations with fintech companies and financial institutions.

In early 2023, MTN and Mastercard announced a partnership to enable Mastercard's virtual cards to be linked with MTN's MoMo wallets. The partnership allows the expansion of their services by leveraging the networks of both companies.

Similarly, in August 2023, Airtel Africa and Mastercard announced the launch of a new crossborder remittance service, which will enable subscribers across 14 African markets to send and receive money safely and securely.

The growing role of mobile financial services in sub-Saharan Africa has been supported by an improved regulatory outlook, which is allowing further innovations. These regulatory developments have opened new avenues of growth for the fintech sector and present opportunities for mobile operators to expand services and generate additional revenue streams. By leveraging their existing infrastructure and customer data, operators can continue to create new value-added services for customers.



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Mobile trends across Africa

An exert from the Ericsson Mobility Report November 2023

sub-Saharan Africa - catalysing connectivity

The telecom sector in sub-Saharan Africa remains resilient despite funding challenges and high inflation. However, in the face of a global economic slowdown, the economies of sub-Saharan Africa are set for a period of robust 4% short-term growth.

Connectivity has become a basic need for voice and data communications, as well as for enabling services such as banking, which have traditionally had low penetration. Service providers are also exploring additional offerings on mobile platforms, such as health, education, and e-commerce.

Total mobile subscriptions are projected to

rise 3% year-on-year for the next six years. 2G subscriptions will maintain a significant share of total subscriptions at 27%, mainly due to the region's largely rural population, for whom broadband coverage is limited and smartphone affordability is a challenge. However, a 9% increase in 4G subscriptions will bring the total to 49% by 2029, as access to lower-priced smartphones and data services increases. While 5G will be the fastest-growing subscription type over 2023-2029 at 60% annually, it will account for 16% · 180 million – of mobile subscriptions at the end of this period.

sub-Saharan Africa is poised to remain the region with the highest growth in total mobile data traffic, with a compound annual growth rate (CAGR) of 33% anticipated over



sub-Saharan Africa mobile subscriptions by technology (billion)



sub-Saharan Africa mobile data traffic (EB per month)

2023-2029. This growth will be driven by the expansion of 4G network coverage across the continent and the increasing affordability of data and smartphones. Smartphone traffic is expected to be the primary contributor to total mobile traffic, with average data usage per smartphone reaching 23Gb by 2029.

This technological shift underscores a pivotal moment in the region's telecom landscape. 4G's prevalence is poised to redefine the way communities engage with digital services. Service providers are evolving into technology companies, integrating mobile money services into their digital portfolios. This shift not only enhances financial inclusion in society but also significantly boosts revenue for service providers, complementing traditional voice and data services.

sub-Saharan Africa's strategic network infrastructure investment ICT can play a pivotal role in enabling critical climate action, steering industries toward a lowcarbon economic model.

Several countries in the region are demonstrating a strong commitment to making substantial investments in their network infrastructure, driven by the region's demographic advantage of a largely youthful population, alongside a marked surge in demand for enhanced connectivity solutions.

Forward-looking 5G investments in sub-Saharan Africa are supported by spectrum releases in low- and mid-bands. The bulk of mobile subscribers will remain on 4G networks for several years, and it will be some time before subscribers who have migrated to 5G reach a more considerable proportion. Many African governments and service providers have nonetheless made measurable progress over the past year when it comes to releasing the relevant spectrum resources for launching 5G and activating them on compatible network equipment. More than a dozen countries – which, with the exception of Nigeria, are mostly in Eastern and Southern Africa – now have 5G services available. Urban areas are increasingly reaching maximum capacity, given the site density and available spectrum, leading to service disruption.

Many governments, including Kenya and Tanzania, have allowed service providers to reuse existing spectrum assets, enabling frequency refarming in line with technology neutrality principles. Most also granted access to additional frequencies, especially in the midband, in sizable amounts to allow 5G to fully deliver on its promises of higher download speeds. As these frequencies have a limited reach, releasing some low-band frequencies alongside them offers a strategic combination of 5G resources to simultaneously expand capacity and extend coverage. Only a few countries have released frequencies higher than 6GHz, which are needed for ultra-high performance 5G services. This includes around 80GHz in the E-band for high-capacity microwave links to connect towers, which is especially effective in suburban settings where fibre may not yet be available.

The Middle East and North Africa – 5G adoption on the up

Telecom industry growth remains strong in the Middle East and North Africa (MENA), despite economic uncertainty in some countries, with 2.4% overall subscription growth forecast over 2023-2029.

Smartphone subscriptions will experience strong growth through 2029, rising at 5% annually, second only to sub-Saharan Africa. While 4G subscriptions will account for the bulk at 54% by 2029, 5G subscriptions are projected to register the strongest growth in the period, at 41% compounded annually, to account for around 40% of total subscriptions by 2029.

Service providers are expected to increasingly push solutions such as mobile financial services – especially in parts of North Africa, where financial inclusion remains a priority – and fixed wireless access (FWA), which shows a discernible growth trend in the region.

The Middle East and North Africa region is also expected to experience significant mobile data traffic growth, with a CAGR of 23% forecast over 2023.2029. This growth will be fuelled by the transition of more subscribers to 4G, the increasing uptake of 5G, and attractive variable data service offerings. Monthly data usage per smartphone is expected to reach 45Gb by 2029, rising 17% annually.

FWA takes centre stage

In the quest to meet Africa's increasing broadband demands, FWA emerges as a pivotal technology.

sub-Saharan Africa has many unconnected households, especially in rural areas, and this digital divide can be effectively and quickly addressed by FWA. It is also a cost-effective solution for bringing digital connectivity to other segments, such as schools, opening a world of access to information and learning.

While 4G FWA is an initial stepping stone, 5G's potential is increasingly coming to the forefront due to its capability to deliver fibre-like speeds. This advancement complements traditional fixed broadband infrastructure within the region.

Several key African markets, including Angola, South Africa, Nigeria, Kenya, Zambia, and Zimbabwe, have already launched 5G FWA services. This shift can be attributed to its cost effectiveness, rapid deployment capabilities and inherent flexibility. ■



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