# chapter 2 Cellular Networks

**Dario Betti,**
CEO,
Mobile Ecosystem Forum (MEF)

With 24% of Africans in the 18–24-year-old demographic, Africa is a young continent. It has been the fastest-growing continent by population since 1967, with this trajectory set to continue for years to come. Projections from the UN see sub-Saharan Africa alone contributing more than half of the global population increase through 2050. Whatever goods or services an organisation offers, there'll clearly be a market for them in Africa: both the potential and headroom for growth are huge. It's up to stakeholders across the mobile ecosystem to interact effectively at every turn, develop and share insights, ensuring this potential can be realised. It's all about creating impact in a responsible way that both benefits and protects people, and the environment.

## Strong foundations

Advancement in the mobile fintech arena (think Kenya and Nigeria) rivals the rest of the globe and such initiatives are shining light on a path all of Africa must surely tread. Connectivity is central to getting any potential there is just to the launchpad – never mind off the ground.

Kim Buller, co-founder and CFO of Alchemy Telco Ltd. in Gambia notes that "more people in our neck of the woods have a mobile phone than access to water. We believe mobile and the simple SMS/IVR have the acceleration potential for the region and Africa as a whole to leapfrog ahead in its economic development."

Charles Stretch, founder and CEO of SMSPortal, adds that "mobile has long been the go-to for communication within Africa because of its reach and reliability, but with the advancements within SMS and personalised two-way messaging, mobile is at a time and place where it truly has the ability to transform the way businesses operate." But it's not just about being connected, it's about how it is leveraged and having a real understanding of the wider environment.

There is plenty of work yet to be done though. Buller agrees: "we are a very long way from government and business utilising mobile to solve digitisation barriers in the value chain and addressing the informal economy challenges rural communities face."

Waheed Adam, executive chairperson of iTouch, brings to light something that could easily be overlooked by those not on the ground in Africa: "an unspoken reality of the African environment is the fact that there are so many 'informal' businesses that are excluded from the data we see reported. Hence most reports on potential opportunities on the continent do not reflect what is the true reality on the ground. These informal businesses are the future economy and solving real-life problems at grass root level."

## Inclusion

It's human nature to hold up shining examples of people or countries as inspiration for others. Aspiration and the desire to transform for the better are important, and along with necessity are what drives so much invention and innovation. We must regularly take a step back to gain some perspective though. Progress (in the widest sense) can only be affected if the majority are shown the benefits and are able to ride the wave of innovation.

Inclusion is critical as Tracey Maluleka Molete, managing director of The Apprentice Valley, comments: "the bridging of the digital divide is at the core of this topic for Africa. Some of us have enjoyed the transformative benefits through accessing services such as digital health services, entertainment, wellness applications, digital learning and teaching, digital financial services - as well as the convenience of navigating to a meeting venue, online meetings and accessing news by the minute. The list is endless and these experiences through mobile phones have truly transformed lives in Africa." Now surely it must be about turning the "some of us" Tracey refers to into "all of us."

"It's human nature to hold up shining examples of people or countries as inspiration for others."

That is not an easy ask and no stone should be left unturned in the quest to achieve this. Offering fantastic connectivity everywhere might appear to be THE way to make this a reality but the fact is, there is far more to it than that. One of the many other factors is the commercial model. So much comes down to consumer pricing.

In 2020 only 28% of the population in sub-Saharan Africa was connected to the mobile internet. Digital services being at the heart of so much, as already noted, there needs to be a real urgency to bring unconnected communities online, particularly vulnerable groups.

Taha Jiwaji, founder and CEO of Beem in Tanzania, has seen himself that "mobile commerce and social commerce on WhatsApp, Facebook and Instagram are driving data and digital consumption across Africa. In most African markets, social commerce has bypassed traditional online ecommerce as consumers are more comfortable with and trust the interactive format." But the spanner in the works today is that sub-Saharan Africa has the world's most expensive mobile data prices.

## Policy

Research shows time and again that increasingly, young Africans in particular see internet access as a basic right. This means that the high price of data is fast becoming a 'hot button' issue. Factors driving high pricing are many but in order to ensure that the power mobile has to truly transform people's


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daily lives can be leveraged to the max, policymakers have to make it worthwhile for telecoms companies to cut prices. This can be achieved, for example, by reducing licence fees and allowing them to lower costs by using government-funded infrastructure. African economies would see massive benefits if the internet became more affordable.

Policymakers need to be enablers in many ways and Teniola Stuffman, business development director with VAS2Nets Group, believes that "Africa needs to get it right with export supply chain management in order to be among the top exporting countries and not just import dependent. Creating an enabling environment with digital transformation and Artificial intelligence will help in security, environmental sustainability governance (ESG) and reduce the pressure on FX exchange. A good opportunity for Africa to produce its own and reduce the import bill."

Transformation does not have to take place in huge leaps and bounds either. We must be pragmatic and realistic. Surely, it's more about taking constant incremental steps towards improving the daily lives of billions? And to do that, all stakeholders across mobile must pull together in the same direction. ■

**Jordan Cox,**
research executive, GSA

Africa's lack of infrastructure and communication coverage, and its issues with older network infrastructure, are well-documented. But there is real potential for new-generation technologies to connect the continent to the rest of the world. Indeed, many operators and countries are now investing in and launching 5G networks across Africa.

Globally, there are more than 970 operators investing in LTE networks, with 813 now having launched public LTE networks in 241 countries and territories. In North Africa, 18 operators have rolled out LTE mobile services, of which nine have launched LTE-Advanced in Algeria, Libya, Morocco, Sudan, and Tunisia, with one other operator currently in a testing phase.

Of these 18 telecom providers in North Africa, 15 have also launched LTE fixed wireless access (FWA) services. In the larger sub-Saharan Africa region, 181 operators are investing in LTE, with 142 networks launched and a further 11 operators actively deploying LTE. Furthermore, 37 operators in this region have deployed LTE-Advanced, and a further five are deploying, plan to deploy or are testing the technology. There are also 84 operators in this area that have deployed or launched LTE FWA networks, with four more currently in the process or planning to deploy.

As a result, Africa now makes up 20.4% of the total number of operators investing in LTE and 19.6% of all commercially deployed networks. Although the continent still accounts for many places without LTE access, it has seen a dramatic drop in the number of not-spots. The only African countries and territories with no LTE network known to GSA are Central African Republic, Djibouti and Eritrea.

In terms of LTE and 5G subscribers,

however, the continent is further behind. Mobile subscriptions in Africa stood at 1.2 billion by the end of December 2021, according to data supplied by OMDIA. In absolute terms, LTE was the fastest-growing mobile technology in Africa in the 12 months to the end of 2021, gaining 57.3 million subscribers to reach a total of 247.9 million, although this pales in comparison with WCDMA networks, which reached 646.6 million subscribers by December 2021. GSM continued to decline, falling from 393.6 million to 337.9 million subscribers.

LTE is now gaining a foothold in Africa. It was the fastest-growing technology in percentage terms and just above WCDMA in absolute terms. LTE subscriptions hit 247.9 million by the end of 2021, up more than 30% over 12 months, accounting for slightly more than 20% of all mobile subscribers on the continent. In comparison, globally, LTE represents over 67%. As LTE gains ground, eventually delivering gigabit speeds, GSA expects a migration from 3G to 4G or LTE and later 5G. But for now, Africa represents only 3.6% of the world's LTE subscribers. It is important to note that LTE population penetration in Africa was still only about 18% in March 2021.

## New generation technologies

Along with the rise of LTE, we are starting to see more and more LTE-based solutions for voice and Internet of Things (IoT) services in Africa. VoLTE is now commercially available in at least 17 African networks, with three other operators known to be actively deploying the technology and two planning to do so. Narrowband IoT, meanwhile, has been launched in Kenya, South Africa, and Tunisia, with further investments in Liberia and Nigeria. Network operator MTN has been involved in trials of LTE-M in South Africa.

5G is on the horizon. Network suppliers and operators worldwide are currently testing and deploying 5G networks — in fact, 225 commercial 5G networks have now been launched worldwide. The pace of evaluation and deployment has been accelerating in Africa too. GSA is aware of 44 African operators from 29 countries that have been investing in 5G networks, including pre-commitment evaluation, testing, and trialling, all the way to service launch.

Southern African operators are at the vanguard of the region's 5G development efforts, with 5G network launches by MTN, Rain and Vodacom. GSA has also recorded 5G launches in Angola, Botswana, Madagascar, Mauritius, Reunion, Seychelles, South Africa, Togo and Zimbabwe. There has been a soft launch in Lesotho, pre-commercial deployments in Ethiopia, Kenya, Libya and Mozambique and further active deployments underway in Angola and South Africa. Furthermore, GSA has identified other operators with plans to deploy in Cape Verde, Cameroon, Ghana, Kenya, Mauritius, Namibia, Nigeria, Republic of the Congo, Seychelles, South Africa, and Tunisia.

## The year ahead

GSA expects LTE to continue its rise in Africa during 2023. With at least 11 operators known to be deploying new LTE networks as of September 2022, we might expect to reach nearly 175 LTE networks providing either FWA or full mobile services in Africa by the end of the year.

It will be a few years before the technology is as widely used as 3G. But given the recent rise in commercially launched networks, the expected launch of more LTE services in 2023 and the fact that it will be available to many more people as network coverage widens, LTE

will attract more and more users.

In addition to the growth in use of LTE, GSA expects the quality of the LTE infrastructure to improve. We forecast that the number of networks being upgraded from LTE to LTE-Advanced and LTE Advanced Pro will increase — predominantly through the introduction of carrier aggregation to improve speeds, and the launch of 3GPP IoT technologies. Currently, few networks in Africa can boast maximum (peak theoretical) download speeds of much more than LTE Category 4. GSA has identified 20 operators offering Category 6 or better.

Beyond LTE-Advanced and LTE Advanced Pro services, the launch of 5G networks will help to deliver higher speeds for end-users and will additionally open new opportunities for industry. With more than 10 operators having launched or currently deploying 5G networks, roll-out of 5G will continue to gather pace across the African continent over the next few years, supported by more governments and regulators making spectrum available — a critical enabler for 5G deployment. At the same time, new technologies designed to improve rural coverage, coupled with wider availability of lower-cost mobile devices, will bring LTE and 5G within reach of more households. ■

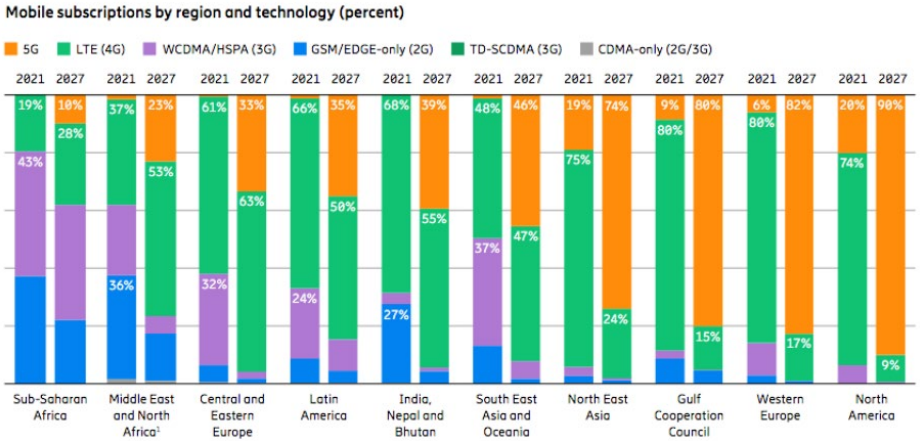
# Mobility in Africa

Ericsson Mobility Report (June 2022 edition) - Ericsson

## Mobile and data

Demand for mobile voice and data services continues to grow in the region. Investment in telecom infrastructure accelerated during 2020–2021 in the wake of COVID-19, including mobile coverage and fixed wireless access (FWA) build-out, enabling service providers to address additional subscriber segments with mobile broadband.

In 2021, the number of 4G subscriptions grew by 26%, and strong growth is expected to continue during 2022. Migration towards 4G devices continues to be an important driver for



4G subscription uptake, which in turn drives the growth of mobile data traffic. 3G mobile data traffic is still increasing, but most of the traffic growth is expected to be in 4G. Over the forecast period, total mobile broadband subscriptions are predicted to increase, reaching 78% of mobile subscriptions.

Regulatory initiatives are being taken to make more spectrum available in key markets across Africa. This will enable access to mobile services for a larger part of the population, especially in rural areas that have traditionally been underserved. Middle East and North Africa mobile subscription growth in the region is predominantly driven by the uptake of 4G services in less mature markets. In 2021, 4G subscriptions increased by about 54 million, while 2G and 3G declined.

Digitalization is a high priority in some countries as a means for transforming economies and societies. Service providers are motivated to undertake extensive network modernization and expansion to improve network performance, which stimulates further subscription growth. 5G subscriptions grew to around 10 million in 2021, and the region is forecast to reach nearly 200 million 5G subscriptions in 2027.

In the Middle East and North Africa (MENA) region, data traffic is expected to continue rising as the transition to 4G networks continues, coupled with the availability of more affordable 4G devices and data packages. The average data traffic per smartphone is expected to be around 45Gb per month in 2027.

Data traffic in sub-Saharan Africa will maintain an upward trajectory, as mobile broadband-capable devices become more accessible. This is due to increasingly affordable price plans and service provider subsidies in some parts of the region. In markets such as South Africa and Kenya, recent spectrum allocations will enable service providers to extend their coverage and capacity of 3G/4G networks, leading to rising data traffic. 3G mobile data traffic is still increasing, but most of the traffic growth is expected to be in the 4G networks. The average data traffic per smartphone is expected to reach 11Gb per month over the forecast period.

## The evolution of MTN's connectivity platform

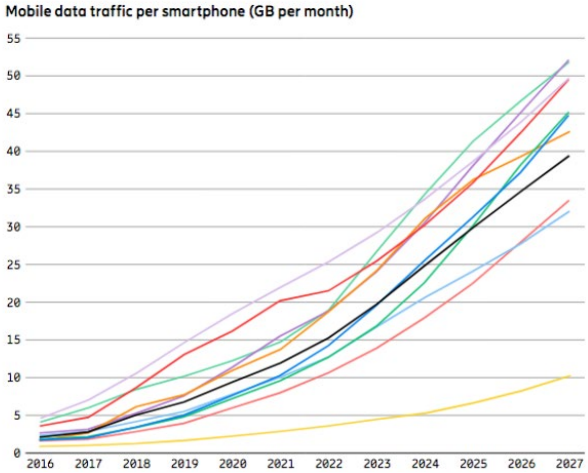
Continued investment in 4G – and the expansion of 5G – technologies are expected to play a crucial role in realizing MTN's ambitions and will enable it to meet evolving market demands and monetise new use cases across markets in the sub-Saharan Africa region.

MTN Group, South Africa, has defined its strategic 'Ambition 2025' plan, built on its current market position where connectivity is the foundation, while platforms are gradually expanded to capture new growth opportunities and deliver value. In this context, 5G network deployment and evolution across markets plays an important role in enabling new services for consumers, enterprises, industries, and society. For MTN, 5G is an innovation platform with the ability to transform various aspects of business and livelihoods beyond pure connectivity.

### Data connectivity and usage – drivers for revenue growth

In the sub-Saharan Africa region, connectivity is still dominated by 3G and 2G technologies, with 4G only making up around 20% of mobile subscriptions by the end of 2021. However, demand for data connectivity and digital services is increasing across markets. Operating in 18 markets across the Middle East and Africa, MTN is pursuing these new growth opportunities.

Continuous network modernization and




| Regions | 2021 | 2027 | CAGR 2021–2027 |
|---|---|---|---|
| North America | 15 | 52 | 24% |
| Western Europe | 15 | 52 | 23% |
| GCC | 22 | 50 | 15% |
| India, Nepal, Bhutan | 20 | 50 | 16% |
| South East Asia and Oceania | 9.4 | 45 | 30% |
| Middle East and North Africa[1] | 10 | 45 | 28% |
| North East Asia | 14 | 43 | 21% |
| Global average | 12 | 40 | 22% |
| Latin America | 7.9 | 34 | 28% |
| Central and Eastern Europe | 10 | 32 | 22% |
| Sub-Saharan Africa | 2.9 | 11 | 25% |

coverage build-out, supported by MTN's Rapid Rural Rollout (R3) program, has enabled it to capture strong new subscriber growth and stimulate increased data usage. This has resulted in increased data service revenues, despite price pressure in the markets. In South Africa, MTN networks experienced strong data growth as the number of customers actively using the internet grew by 12.5%, leading to a mobile data traffic growth of almost 60% in 2021. The average mobile data traffic per pre-paid subscriber was 2.3Gb and 10.3Gb for post-paid subscribers.

MTN considers data as a main driver of revenue growth over the medium term. Initiatives to stimulate further data adoption include data service bundling, segmented value propositions and the development and launch of freemium data propositions, supported by strategic over-the-top partnerships.

## MTN's strategic priorities up to 2025

MTN continues to invest in 4G technologies and has expansive plans for 5G to realize the opportunities it has identified to evolve and expand its service offerings for the consumer, enterprise, and industry segments.

MTN's strategic priorities are articulated in its Ambition 2025 strategic framework, which is underpinned by 10 key technology strategic pillars intended to enable growth in connectivity and platforms businesses. Some of the most important pillars are ensuring best-in-class, ubiquitous access across mobile and fixed networks, maintaining network leadership and efficiencies, and the monetization of infrastructure. Other priorities include investment in sustainable technologies and zero-touch, service-aware networks.

5G networks will play an essential role in delivering on the technology pillars to realize the Ambition 2025 plan. Monetization of network infrastructure includes a network-as-a-service (NaaS) strategy, where network sharing (national roaming, MOCN and MORAN) is the starting point, followed by 5G network slicing which enables exposure of network functionality via APIs to build new enterprise services. An additional step will be the monetization of data exposed via online third parties. ■

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# Mobile economy developments

The Mobile Economy Middle East & North Africa 2022; The Mobile Economy sub-Saharan Africa 2021 - GSMA

The GSMA reported earlier this year that mobile networks have proven key in delivering reliable connectivity to sustain social and economic activities throughout the COVID-19 pandemic. A top priority for governments in the Middle East & North Africa (MENA) is to drive economic recovery and promote sustainable development. Digital services and technologies will be crucial to realising this objective, by stimulating economic growth, mobilising the workforce, and enabling industrial efficiencies.

## MENA's mobile internet users surpass 300 million

The number of mobile internet users in MENA reached 307 million in 2021, with penetration due to reach 50% of the population by the end of 2022. The number of unique mobile internet users is expected to grow at a compound annual growth rate (CAGR) of 4.2% over 2021-2025 to reach 362 million, a market penetration of 54%, with almost a third of new subscribers coming from North Africa.

Smartphone adoption is growing well, accounting for 77% of connections in 2021, and is set to increase most strongly in MENA's less advanced mobile markets over the period to 2025, underpinned by continued network investment from operators. Smartphone adoption is expected to grow to 84% by 2025.

Increasing user engagement with bandwidth-hungry applications such as video will lead to a surge in data consumption across the region, growing by 430% over 2021-2027.

"4G is MENA's leading mobile technology, with almost 270 million connections at the end of 2021, accounting for 41% of connections, and expected to account for 44% by 2025."

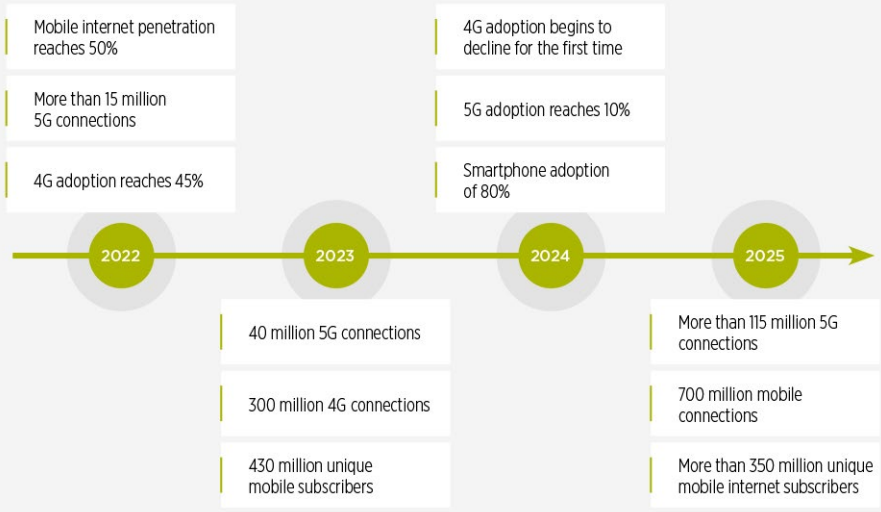
## 4G dominates but 5G's footprint expands

The GMSA reported that MENA had 412 million unique mobile subscribers in 2021, a penetration rate of 66%, which is expected to grow at a CAGR of 2.5% over 2021-2025 to 456 million unique subscribers, a 68% penetration rate.

4G is MENA's leading mobile technology, with almost 270 million connections at the end of 2021, accounting for 41% of connections, and expected to account for 44% by 2025. Take-up has more than doubled over the past five years, driven by network expansion (particularly in frontier markets) and efforts by mobile operators to transition users from legacy networks.

However, 4G adoption is projected to peak in 2023 as consumers move to 5G plans, which remain at a nascent stage regionally speaking. The current adoption rate of just 1% is expected

**Key milestones for the mobile industry in MENA to 2025**




Source: GSMA Intelligence

to grow to 17%, some 116 million connections, by 2025. While the consumer market has been the focus of early 5G deployments, B2B is the largest incremental opportunity in the 5G era, with a raft of digital transformation projects underway across industries.

To fully exploit these opportunities, 5G leaders in MENA are investing in new capabilities, with edge computing a priority. This ties in with operators' efforts to grow revenues beyond core telecoms services.

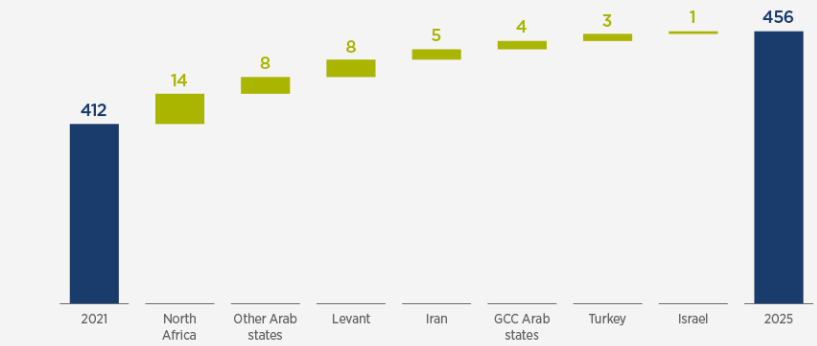
5G continues to make inroads in MENA, driven by developments in the GCC Arab states. With network coverage expanding, 5G adoption is steadily rising. However, as is the case in most countries around the world, 5G has yet to move beyond early-adopter status. Operators in MENA are therefore increasing their efforts to promote the incremental benefits that 5G brings and the services that benefit consumers the most. This includes cloud-based gaming, e-sports and extended reality (XR) applications.

Examples include:

- e& and Microsoft have formed an agreement to enable e& customers to bundle an Xbox Game Pass with their mobile subscription, providing access to Microsoft's library of games (including cloud gaming) across devices.
- Zain's e-sports subsidiary hosts a range of competitive gaming tournaments in the Middle East.
- Ooredoo has announced a three-year strategic collaboration with Snap to build augmented reality (AR) experiences at a range of sites across MENA, including

**Mobile subscribers to grow by nearly 45 million in MENA by 2025, with North Africa contributing nearly a third of new subscribers**

New mobile subscribers (million)




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

the National Museum of Qatar and FIFA World Cup 2022 stadia.

5G fixed wireless access (FWA) has also garnered significant early interest from operators in MENA and there have been some promising early signs in terms of user adoption.

## Operators pursue 5G enterprise opportunities

While the consumer market has been the focus of early 5G deployments, B2B is the largest incremental opportunity in the 5G era, with a raft of digital transformation projects underway across different industries. To fully exploit these opportunities, 5G leaders in MENA are investing in new capabilities.

Edge computing is a priority for operators in the region, with multiple routes to market available. In a GSMA survey, 50% of respondents reported that edge computing would be a key investment area over the 2021-2025 period. Those that can deliver complete solutions can position themselves as a 'one-stop shop' for enterprises. Alternatively, partnering with vendors, such as cloud service providers and telecoms vendors, can provide operators with a faster time-to-market with compelling solutions that take advantage of operators' unique 5G edge capabilities.

For example, e& launched its 5G Enterprise MEC solution in collaboration with Microsoft in October 2021. Oil & gas, transportation, smart manufacturing and logistics were touted as key industry sectors for the proposition. e& UAE announced a similar partnership with AWS in March 2022; the two companies will create a catalogue of pre-packaged 5G edge computing solutions for enterprises.

The GSMA has forecast mobile operator revenues to grow from US$63.3 billion in 2021 to US$66.5 billion in 2025, culminating in US$37.3 billion capex in 2025, of which 73% will be on 5G. The contribution made to MENA GDP from the mobile sector is expected to grow

from US$255 billion (5.4% of GDP) in 2021 to US$276 billion in 2025.

## Sub-Saharan Africa – the landscape

Meanwhile, in the latest version of the GSMA'S The Mobile Economy sub-Saharan Africa report (2021), analysts reported that revenue growth is benefitting from the recovery of economic activities, following disruptions caused by the pandemic in 2020. Data and mobile money remain the prime revenue growth drivers, with adoption and use of both services continuing to rise rapidly. Beyond this, operators are seeing strong demand for a wider range of digital services, reflecting a shift in consumer behaviour triggered by the pandemic.

COVID-19 has underscored the value of mobile networks, which remain the only form of internet access for many in sub-Saharan Africa. Mobile networks have remained resilient as operators implemented various measures, including investments in network capacity, to cope with the surge in data traffic. With the use of digital services likely to continue rising, operators' investments will only become more important. 5G will be a major part of this investment as commercial services are deployed in new parts of the region.

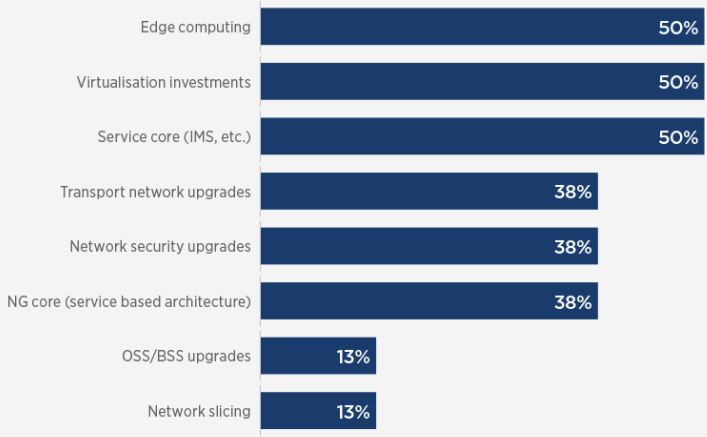
## 5G: sub-Saharan Africa takes a measured approach

5G continues to make progress globally; commercial 5G services are now available

**Edge computing is a top priority for operators in the Middle East and Africa**

Considering your 5G core and service network, which areas of investment are most important for delivering successful 5G services?

Percentage of respondents, Middle East and Africa




Source: GSMA Intelligence Operators in Focus: Network Transformation Survey 2021

in every region of the world, making it a truly global technology.

Network rollout is a first step to realising 5G's potential, with the availability of applications an important next stage. Operators and other stakeholders in pioneer 5G markets are increasingly focussing on the development of 5G labs dedicated to co-creating solutions with partners, including start-ups, academia, cloud providers and enterprises, to address specific needs.

In sub-Saharan Africa, the journey to 5G has begun but it is still early stages for network deployment and commercialisation. By the end of June 2021, there were seven commercial 5G networks in five markets across the region. In these markets, 5G coverage remains limited to major cities. Enhanced mobile broadband (eMBB) and fixed wireless access (FWA) services are the main use cases.

## Youthful generation sustains subscriber growth

By the end of 2020, 495 million people subscribed to mobile services in sub-Saharan Africa, representing 46% of the region's population – an increase of almost 20 million on 2019. With more than 40% of the region's population under the age of 15, young consumers owning a mobile phone for the first time will remain the primary source of growth for the foreseeable future. There will be around 120 million new subscribers by 2025, taking the total number of subscribers to 615 million (50% of the region's population).

"In sub-Saharan Africa, the journey to 5G has begun but it is still early stages for network deployment and commercialisation."

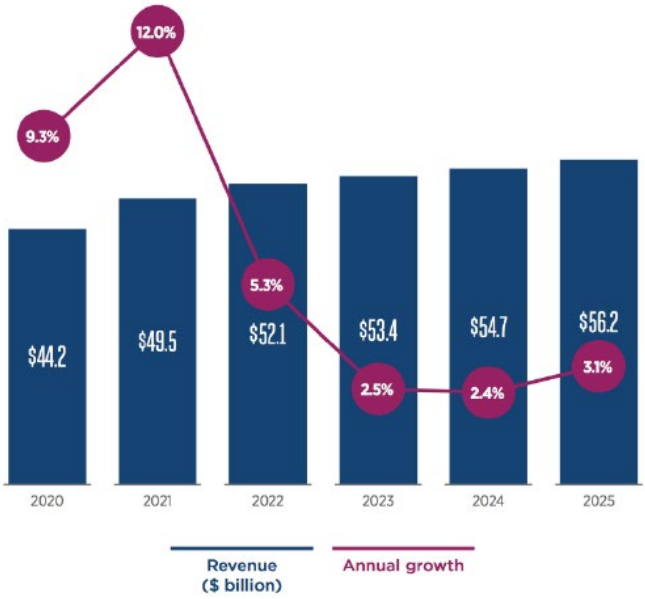
"With digital services set to be at the heart of a post-pandemic world, the urgency to bring unconnected communities online, particularly vulnerable groups such as women, has never been greater."

At the end of 2020, 303 million people across sub-Saharan Africa were connected via mobile internet, equivalent to 28% of the population. With digital services set to be at the heart of a post-pandemic world, the urgency to bring unconnected communities online, particularly vulnerable groups such as women, has never been greater. Several operators in sub-Saharan Africa have implemented initiatives to improve digital inclusion for women. By 2025, more than 170 million people across the region will have started using mobile internet for the first time, taking the penetration rate to just under 40% of the population.

## Lessons from Safaricom's Maisha Ni Digital campaign

In Kenya, mobile users who are aware of mobile internet but do not use it face three main barriers: affordability of handsets; knowledge and digital skills; and relevance of mobile internet to their lives. To address these barriers,

**Revenue growth remained in positive territory during the pandemic, underpinned by strong demand for mobile services**




Safaricom launched the Maisha Ni Digital (Life Is Digital) campaign in partnership with Google in 2018, which takes a holistic approach to increasing mobile internet use among priority groups, including women, by offering a 4G smartphone at an attractive price.

In 2019, the 4G-enabled Neon Ray smartphone, sold for KSH3,999, was the flagship device for the campaign. More than 500,000 Neon Ray smartphones have been purchased, 54% by women. A GSMA study found that after a smartphone was acquired through the Maisha Ni Digital campaign, internet use tended to increase substantially.

The Maisha Ni Digital campaign has helped Safaricom and Google increase the number of women using mobile internet in Kenya. To implement initiatives that can help close the gender gap in other markets, mobile operators and other stakeholders should look to the following:

- Provide customers in underserved groups, especially women, with more affordable internet- enabled handsets
- Address barriers beyond affordability in parallel, such as digital skills and relevance
- Improve understanding of how data packages work to help address data affordability
- Make digital skills training material more accessible by using local languages, audio and video, and images. This is particularly relevant when targeting women in LMICs, given lower literacy levels relative to men ■

**Nicholas Van Slyck,**
senior director, Africa and Asia,
SBA Communications

Africa is a large and diverse continent with over 50 countries. Our experience so far has been limited to just two of them, and one, Tanzania, is a very recent new foothold. In South Africa, we have approximately 1,700 high quality multi-tenant towers, and as of January this year, we have acquired 1,445 sites in Tanzania from Airtel as part of a joint venture with Paradigm Infrastructure Partners.

With entry into our new market in Tanzania, we have begun to think about a more regional management structure making the most of synergies between our teams. For example, theft and vandalism have been a real challenge in South Africa and developing creative solutions to combat this is an ongoing effort. These solutions can be shared with our operations team in Tanzania to address similar challenges.

Meanwhile, in the Tanzanian market, towercos are responsible for power; our local team there is quite skilled at managing this part of the business. In South Africa, in contrast, power is just beginning to shift from the MNOs to the towercos, meaning that there is a lot for our local team to learn from their counterparts in Tanzania.

"With entry into our new market in Tanzania, we have begun to think about a more regional management structure making the most of synergies between our teams."

"This year, the two biggest challenges that we've faced in our African markets are grid reliability, and theft and vandalism."

Across the African continent, green solutions are growing in demand. There have been several technological advancements with solar power over the last decade resulting in greater dependability at reduced costs. Solar power is now offering a compelling alternative energy solution for carriers.

In fact, we have an ongoing solar business in Jamaica where we are using solar power and batteries to provide backup power to one of our customers. This has lowered the customer's energy costs by reducing dependency and power consumption from the grid. This is a model that could possibly be used in other markets.

We have a few sites in Tanzania in areas that have either bad grid or no grid at all. Solar solutions are used at some of those sites, but not all. With fuel prices going up so sharply over the last 12 months coupled with the fact that carriers and infrastructure companies both want to reduce their carbon footprint, it seems that there's a strong case for more solar powered solutions in this market.

This year, the two biggest challenges that we've faced in our African markets are grid reliability, and theft and vandalism. In South

Africa, grid reliability has deteriorated over the last few years resulting in daily load shedding. In a country with 40%

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unemployment, theft and vandalism are also big problems resulting in substantial losses of batteries, fuel, and even entire generators. MNOs want to pass this responsibility over to the towercos for obvious reasons.

The challenge for our industry is to develop a cost-effective solution that is both reliable and has an effective anti-theft system built in to withstand the constant threat.

Looking at the market as a whole, colocation has been a real theme recently among wireless service providers. Demand for colocation has been strong in South Africa, where we average 2.3 tenants per tower. In Tanzania, we are beginning to see real interest in colocation from all MNOs, so that's another area to watch.

From the carrier perspective, the African market seems to prefer to lease infrastructure rather than ownership, and the number of sale lease back transactions across the continent over the last decade supports this view as well. Over time, MNOs have come to accept that building redundant infrastructure is inefficient and not the best use of their capital; they've decided it's better to use their resources to invest in network improvements and expansion so they can attract more subscribers.

From their perspective, why tie up capital via ownership and take on the challenges of ongoing operations when that can be easily outsourced instead? ■

"Colocation has been a real theme recently among wireless service providers. Demand for colocation has been strong in South Africa, where we average 2.3 tenants per tower. In Tanzania, we are beginning to see real interest in colocation from all MNOs."

**Looking ahead:** We see sustained growth coming from our existing markets in South Africa and Tanzania in terms of new builds and lease-up.

In South Africa, growth has been steady with a lot of repeat business. In Tanzania, we are just getting started, but we like what we see so far. MNOs clearly embrace the shared infrastructure model, so we see very good potential for lease-up on our existing portfolio. Additionally, we expect to have some new build opportunities.

We always have our eyes open for new market opportunities, but they must meet our disciplined investment criteria. Our approach over the years has been to look for high quality growth in stable markets, so we are extremely selective in terms of the countries and assets we invest in.

Having said that, we are a growth company, so we do have a vision that includes extending our activities into other countries. How we do that varies from market to market. For example, expansion could come in the form of a sizable build-to-suit opportunity in a stable market with three or more healthy MNOs. This was our approach in South Africa seven years ago and that strategy has been executed very well. Another approach is from a sale lease back transaction much like what we did in Tanzania. The third option would be a hybrid of the first two, where we would look to do a sale lease back with a commitment for decent volume of BTS over a defined period.

**Chuninda Mittal,**
sr marketing manager,
Tecnotree Corporation

The African telecommunication sector has grown and made a crucial impact to Africa's economic growth. From unique mobile subscribers to mobile internet users, and 4G to 5G, the African telecom market has shown tremendous growth in recent years.

The market has undergone rapid development due to the increasing demand for services like 5G, fintech, AI, virtual reality, etc., which is leading to increased adoption of digital services in Africa. With telecom companies now moving from being telco to techco, the African telecom industry has opened up to many new business opportunities.

Vodacom South Africa was the first company in the world to launch the prepaid system in November 1996, under the name Vodago package. Using an intelligent network platform made it possible to debit customers' accounts in real time. Vodacom also received an award for the Best GSM Service from GSMA. The concept was further copied by a lot of companies under different brands globally before CSPs viewed themselves as DSPs or experience providers.

The African entertainment and telecommunication market is expected to list a compound annual growth rate (CAGR) of 11.2% from 2021 to 2026, rendering Africa's digital consumption growth among the highest in the world, as per Mordor Intelligence's report.

According to Statista's report on the share of internet users in Africa published in January 2022, Morocco has the highest share with around 84%, followed by Seychelles and Egypt with 79% and 71.9%.

As per the report from the Broadband Commission, the World Bank Group introduced a promising initiative to connect African countries with high broadband speed by the year 2030, to drive economic transformation across the region. These kinds of initiatives will mark a significant impact on the telecom industry.

Meanwhile, as per the GSMA, by 2025, 4G adoption in sub-Saharan Africa will double to 28%, compared to a global average of 57%. Although 5G is still in its early ages in sub-Saharan Africa, by 2025 end 5G will account for 3% of total mobile connections in the region. The GSMA has also reported that there will also be a profound shift in consumer mobile engagement across the young customer base in West Africa. This will show an increase in voice-centric engagement and non-core communications services like online gaming, video streaming, VR, etc...which is expected to grow sevenfold across the wider sub-Saharan Africa and West-Africa region by 2024.

According to the Fintech Times as of 2021, 57% of the African population do not have traditional bank accounts. However, mobile penetration is high and sub-Saharan Africa is the world's fastest growing mobile phone market. As per the report by QuartzAfrica, the region has shown increasing demand in the fintech market which now accounts for 70% of the US$1 trillion global mobile market. Africa's top telecom companies are getting bank licenses to deliver the increasing fintech demand. The Central bank of Nigeria is also issuing banking licenses to the big MNOs.

An example of the increasing fintech demand can be the success of M-pesa, a fintech wallet of Safaricom and Vodafone. This wallet is operating in many African countries and has become one of the most successful fintech wallets in developing countries, within just three years of its launch.

MTN Uganda has also implemented DLM (Digital Loyalty Management) Platform with Tecnotree and branded it as 'MTN Senkyu' which means thank you in Uganda. The number of

subscribers enrolled in the program increased by 45% to more than 13 million, which is nearly 90% of MTN's entire customer base. TM Forum has recognized the success of Senkyu as a TM Forum excellence awards category winner under Customer Trust.

MTN Group is one of the largest telecommunications providers in the region, operating across different countries in Africa and the Middle East. MTN is one of Tecnotree's key accounts as we have transformed their legacy BSS system into digital BSS. We have also recently launched our digital multi-experience platform, Tecnotree Moments in collaboration with MTN Nigeria, which will create lifestyle bundles of content, applications, and connectivity through a pre-integrated digital partner ecosystem for global and local high-demand and hyper-growth sectors in PAN Africa.

The platform will attract leading partners across different sectors such as education, entertainment, gaming, sports, health, and wellness, to enter PAN Africa and use direct customer billing to convert ecosystem partners into instant revenue generators.

We have also announced a successful go-live of DSPS (Digital Service Provisioning System) with Zain South Sudan and marked another global footprint in African telecom market. This deal will allow Zain to leverage the 5G Cloud Native platform to meet its current and future market requirements. It is quite evident that the 5G footprint is expanding with services now available in a lot of countries in Africa, which is showing great progress in digital transformation in this region.

We have also deployed our digital BSS solution for MTN Nigeria. The operator aims to provide leading digital services to drive this transformation journey. The deal will incorporate the first phase of digital transformation with catalogue-driven order fulfilment using Tecnotree's Digital Catalogue Manager (DCM) and Digital Order Management (DOM) in Africa. Tecnotree will also deploy its next set of market-proven BSS solutions - Digital Customer Lifecycle Manager (DCLM), Digital Resource Management (DRM), and Digital Business & Operations Dashboard (DBOD). The solutions will enable omni-channel customer engagement and journey management using a data-driven approach which will enable faster customer onboarding, 360-degree customer view, and a simplified payment process. ■

**Looking ahead:** The telecom industry across the globe is competing fiercely to survive in the digital environment where private networks are operating. It requires a very strong omnichannel strategy and extensive technology investments especially in 5G, to succeed in a world where customer demands are changing rapidly.

The future of Africa's telecom industry is quite bright as opportunities are increasing. Africa has become a hot spot for foreign investors which are investing in Africa's telecom infrastructure by expanding fibre coverage, cloud computing, and new mobile networks. This will even attract more foreign direct investments.

Investment in expanding revenue streams by leveraging digital services, communication solutions, VR, AI, and fintech is resulting in huge business opportunities. This industry is overcoming under-connectivity to bridge the gaps with other countries by increasing and creating new industry standards, investing in digital transformation, and understanding the high need and demand for digital services across the African population. With over 650 million mobile users across Africa, a lot of big digital transformations and opportunities are yet to come.

**David Lotfi,**
CEO, Evina

After raising the most money globally in the area of cybersecurity for telecom payments in 2021, Evina has expanded its activities in the MEA region, signing with major telco groups such as Orange, Ooredoo and Vodacom. This expansion has allowed Evina to witness and take part in the major transformation that telecoms are undertaking.

The most forward-thinking telecoms are beginning to realize that they could be the biggest fintech companies to come and MEA operators are particularly ahead of the curve in this realization.

In sub-Saharan Africa, telecom operators continue to successfully capitalize on their strategic assets to further develop mobile money. Their huge customer base, network of agents and the rapid spread of cell phones and smartphones allow them to offer a range of financial services that banks are unable to provide.

For Safaricom, the fintech business now represents nearly 40% of its annual revenue. 346 million mobile money accounts are currently active in Africa and the region accounts for 70% of mobile money users worldwide.

This positive momentum is good news for mobile operators which have faced a deterioration of their profitability on data and voice supply activities during and after the pandemic.

With mobile payments operated by telecoms steadily growing, 2022 can be defined as the year of the rise in attacks on mobile payments by cybercriminals. Cybercriminals have acknowledged the revolutionary efficiency of carrier billing and its rapid growth is an incredible windfall. These attacks specifically target unprotected transactions on carrier billing.

These are serious attacks, not only because they result in stolen money, but because they jeopardize the telecom's capacity to grow a healthier payment business. For the DCB, many operators have reacted in a hurry by setting up complex payment flows, introducing One Time Passwords (OTPs), and reducing their partner networks.

Yet these measures aren't always the right answer, as cybercriminals have found ways to bypass these. When it comes to mobile money, many operators targeted by cybercriminals have simply decided to cut back, reduce their commercial actions and focus efforts on cyber-hygiene. This did not work either.

That's why in 2022, Evina's solutions have proven more necessary than ever.

On DCB, Evina has allowed operators to deploy one-click payments and expand their partnerships without worrying about increasing customer complaints. Apart from resulting satisfied customers, these actions make way for a strengthened brand image and new contracts with premium merchants.

On mobile money, Evina has enabled operators to grow fast, expand their network and conduct targeted marketing operations in a secure way without cybercriminals being able to

"This positive momentum is good news for mobile operators which have faced a deterioration of their profitability on data and voice supply activities during and after the pandemic."

interfere. With the fraud risk eliminated, partner operators can grow quickly and effectively - which is key in an expansion phase - and offer a range of new services such as micro-credit.

Evina can deliver unique results thanks to the continuous improvement of its algorithms, the synergistic collaboration between machine learning and human analysis, and its continuous monitoring of threats, and the analysis of deep web forums or feedback from experts in the field.

Our €20 million funding in November 2021 has also allowed us to increase our research and development, recruit new industry experts and hire the best malware analysts. This has paid off. Our teams identified, before anyone, a new family of sophisticated malware: the Autolycos malware. This malware can make mobile users sign up for subscriptions without their consent and is hidden among apps downloaded on Android app stores.

We now protect more than 20 million transactions a day, operate in over 80 countries, and have surpassed the value of transactions Apple announced it was protecting against fraud last June (US$1.5 billion).

"The partners who put their trust in us this year have seen their business grow by up to tenfold while complaints have been cut in half. They could develop their business beyond what they thought possible once they got rid of fraud"

The partners who put their trust in us this year have seen their business grow by up to tenfold while complaints have been cut in half. They could develop their business beyond what they thought possible once they got rid of fraud. ■

**Looking ahead:** Telecoms that will accelerate the protection of their payments will play a major part not only in the fintech economy but also in the digital economy.

Two factors will come into full play.

Rising rates and a deteriorating global growth outlook will put a lot of bad and weak fintech players out of business. The latter are highly dependent on financial leverage to grow their customer base, and as money dries up, the game is going to get harder for them. The telecom giants don't have this problem and already have huge customer bases that they just need to tap into. Now is the time for operators to create sustainable consumer habits and to create a sustainable alliance between telecom operators and payments.

On the OTT side, streaming subscription services are under pressure. Consumers who are suffering from inflation are reluctant to subscribe and others simply cancel their subscriptions. This is an opportunity for operators to offer large platforms the DCB technology that is able to boost their conversion rates (10 times higher than credit cards).

It is possible to take advantage of these opportunities as long as the payment is secure.

As previous crises have shown, hackers are very resilient in the face of crises, and worse, they thrive when investments in cybersecurity decline. Investments in payment protection will therefore be key in the coming year, both as a necessary condition for the growth of the sector and as a key to its longevity.

**George Kalyvas,**
chief commercial officer, Upstream

As in much of the world, in Africa, it's not just that businesses should be mobile too, but mobile first. From engaging customers and expanding revenue streams to streamlining operations and enabling more agile processes, mobile sits at the centre of business innovation.

Boosted by the COVID-19 pandemic, connectivity is now the most important thread holding the economy together. At the same time, the ability to target users via third-party cookies is soon to be completely phased out. This means direct mobile channels are now even more important. At Upstream, we focus on enabling businesses to put this to their advantage and use mobile marketing technology to push their campaigns to new heights.

With over 495 million people currently subscribed to mobile services in sub-Saharan Africa, the GSMA predicts that by 2025 mobile technologies and services will generate US$155 billion of economic value.

Upstream, having started its operations in Africa in 2008, has an established presence across the continent, with a particularly strong focus on South Africa, Nigeria and Kenya, addressing millions of mobile users across the continent. Firmly committed to the African market and having worked with the most important MNOs on the continent, we see huge opportunities for even more businesses in all sectors to engage with consumers via mobile.

Mobile networks are the gateway to reaching consumers directly and accurately and our strong know-how on the MNO multiple channels and how to maximize their potential, has been the perfect recipe for our campaigns' success.

When the largest mobile operator in Africa asked our help for its recently rolled out music streaming service, we managed to deliver a staggering fourfold increase in the service's active user base within the first three months of the campaign. Over the course of the eight-month campaign, almost 1.8 million new subscribers were delivered to the service. The cost-per-acquisition was also minimal, as the operator owned most touchpoints leveraged in the campaign.

Upstream also supported another major African MNO in pushing their messaging super-app to subscribers with minimum costs. In South Africa, the app was installed 72,000 times in two months at a 25% conversion rate with 20% decrease in cost per installation.

Our unique and long-lasting experience as a go-to partner for African mobile operators has allowed us to take our offering further and today we work across verticals from FMCGs to financial institutions, insurance and more.

In South Africa, Upstream worked with a popular food retailer to maximize digital traffic for its online store. Before working with Upstream, the retailer's campaigns had struggled to reach a mass audience via digital touchpoints. However, once Upstream introduced rich communication services (RCS) to encourage customers to visit the retailer's home page and view current deals, the brand was able to achieve 12,000 clicks in just two weeks with a CTR of 22.2%. It was clear that deploying mobile marketing technology as part of a multichannel strategy was the boost needed to level up the performance of the campaign.

Similarly, when approached by a multinational consumer goods company to relaunch its popular rewards and loyalty platform under a new name, again in South Africa, Upstream was able to boost digital traffic to the sign-ups branded page by leveraging RCS communications to engage customers with rich video and animated ads.

Just as the COVID-19 pandemic made digital engagement a necessity for most businesses, we unveiled Grow – our innovative multi-channel technology-enabled mobile marketing automation platform.

Grow enables mobile operators, advertisers, and brands to easily deliver multi-channel customer engagement, predominantly through mobile devices, using channels such as mobile websites, SMS, RCS, device notifications and social networks. With Grow, it's now possible within a single platform, to have a clear view of users' flow, at any level of the funnel, apply different tactics for each level, optimise results, and feel assured about the validity of the acquisitions reported.

Grow also offers advanced capabilities that enable faster and more informed decision making, with deep insights, analysis, and audience management. These capabilities also allow the implementation of high conversion strategies, incorporating user identification, targeting, and retargeting across different channels.

Despite the dramatic increase in demand expected for digital services, our in-house research has revealed that the majority of operators in Africa rely on physical revenues with their sales coming mostly from physical stores and call centres. The opportunity is there, waiting to be tapped.

"Now is the time when brands, mobile network operators and advertisers across Africa should consider the mobile first mindset of consumers."

Digital customer engagement with the consumer on the mobile, will not only help open lucrative new revenue streams for operators, but it would also provide new opportunities for other businesses wanting to use their services to engage more closely with consumers.

Now is the time when brands, mobile network operators and advertisers across Africa should consider the mobile first mindset of consumers. Putting mobile front-and-centre of their multichannel marketing campaigns and using a platform such as Grow to manage performance and decision-making with ease is an essential part of the picture. ■

**Looking ahead:** With Africa's population set to double and reach 2.5 billion by 2050, Upstream is dedicated to helping MNOs and increasingly brands and advertisers reach and engage with this growing consumer base in the most effective and efficient ways possible.

However, with privacy trends across the world also leading to the phasing out of third-party cookies, the growing importance of 'first-party data,' conversational communications channels on the rise and a revival of SMS as a highly effective marketing channel, the old ways of reaching consumers will no longer be enough. Consumer appetite for mobile engagement across Africa is growing and this must be where brands place most of their energy.

Using our mobile marketing technology, our partners across Africa have the chance to communicate more effectively with their customers, increase overall digital sales, upsell tariff plans and push their product portfolio, as well as tap into new revenue streams via harnessing the power of first-party data and the mobile identity. We expect significant growth across multiple promising domains as our innovative Grow platform is being adopted by enterprises to meet and fulfil these needs.

**Mark Joseph,**
CEO for Africa, Amdocs

It has been a fantastic 12 months for Amdocs in Africa, securing several strategically important deals with the continent's leading telco providers and executing multiple projects as we continue to unlock our customers' innovative potential, empowering them to provide next-generation communication and media experiences for consumers and enterprises. Our success in Africa contributed to a landmark year for Amdocs, leading to us reporting record global revenue of US$4.58 billion in fiscal year 2022.

For many of our customers in Africa, the priority is making the transition from telco to tech-co. This means moving beyond the traditional focus of providing connectivity to building an ecosystem of partners in the open, platform-based digital economy that we see today. This is a journey we're supporting customers on around the globe. A key focus is digital transformation of systems and processes to ensure they are robust and future-proof.

Africa plays an increasingly important role in the global economy and is well placed to benefit from its fourth industrial revolution. Africa is awash with untapped talent and ideas, and it offers exciting new growth opportunities for Amdocs and our customers.

Communications service providers (CSPs) are here to provide connectivity, but today the role goes beyond that: it's about benefiting society. Whether it's tackling the digital divide by ensuring that even remote communities are connected, and all children can enjoy the benefits of online learning or ensuring that more citizens can secure online appointments with a doctor, the telecoms sector is a driver of positive social change. Indeed, for me, there are three key areas in which telecoms can spearhead improvements in African society: education, healthcare, and governance. There is a golden opportunity for the telecoms sector to lead the change in all these areas and more, building its reputation as a force for good.

We have operated in South Africa for two decades and have an office in the Johannesburg region, but now we're focusing on expansion. We're here to provide innovative new ways for telcos to be more creative and efficient, so that they can launch exciting new products and services quickly. This means that they can provide next-generation experiences for their customers while offering better solutions to broader social and economic challenges. That's where our 'Make it Amazing' brand message comes from: we help those who build the future to make it amazing. ■

**Looking ahead:** The telecoms sector has a critical role in enabling Africa to fulfil its potential and achieve improved social and economic outcomes for its citizens. CSPs have an opportunity and a responsibility to be the catalyst for greater fairness, equality, and attainment across Africa.

Looking ahead to 2023 and beyond, 5G will gain momentum. South Africa was the first country in Africa to launch 5G and has since been joined by a handful of other countries. 5G is mission critical to the future of enhanced connectivity and all the innovations and transformative technology that come along with that, so delaying investment or waiting for a 'killer' use case will only make companies vulnerable to having to play catch up in the future. Those telcos who capitalized on 5G's early commercialization will be the first to reap the rewards from the new revenue streams it creates.

**Jukka Heiska,**
CMO, Qvantel

In North Africa we are seeing many operators progressing with digital transformation. As ARPUs slide, many are looking to become digital operators and open new revenue streams beyond connectivity.

This is being driven by the increased roll out of 4G and the increase in smartphone adoption. This move to digital is helping with digital inclusion in society and some operators are looking at working with partners to provide digital healthcare and education services.

Another trend we're seeing in North Africa is that the digitalisation of channels and services is first provided for B2C customers, and then operators look to digitalise their B2B operations too.

Qvantel implemented a digital BSS for a leading North African operator to enable digital transformation. This required a replacement of legacy business support systems (BSS) to enable customers to engage via digital channels and for the operator to sell a wide range of additional digital services, such as gaming and entertainment offers. By investing in a digital BSS, this operator has been able to make more focused offers and peronalised services. The result is that net promotor score (NPS) shot up and this operator now has the highest NPS in their country.

In sub-Saharan Africa many operators are starting digital transformation projects. More than half of mobile customers use a smartphone, and this rate is only going to increase as we see an increase, opening the door for digital transformation. Operators are starting to look at upgrading their business support systems, not just to support apps and websites, but also to speed up time to market and enable new business processes to be developed quickly and cost effectively.

While digital transformation is the main activity now, many operators are kicking off transformation projects with an eye on the 5G future. The GSMA is forecasting that 5G usage in sub-Saharan Africa will account for 1-6% of mobile usage by 2025.

Even at these levels, operators in sub-Saharan Africa are checking that the BSS they are upgrading to support their digital transformation journeys will also support 5G and provide the agility required to develop new business models and enter new vertical markets. This future proofing of BSS makes sense and will help drive transformation and ensure that operators are ready for 5G. ■

**Looking ahead:** I'm expecting to see more innovative ideas come to fruition with more 'beyond connectivity' services being offered as 4G rolls out and smartphone penetration increases. This will also increase the usage of operators' mobile banking services and deliver more digital inclusion.

Countries with relatively low mobile ARPUs often have very innovative operators as they develop ideas to provide new services to existing customers. There is also a drive to deliver the best customer experience possible so that their customers will want to use services provided by their mobile operator - be it a banking, TV, music, telehealth, or an education service. This comes back to the example of the North African operator who underwent a digital transformation process and as a result has the highest NPS in the market.

Customers prefer to buy services from companies they trust and like. This focus on customer experience will be key as operators look to develop, launch, and monetise a range of new digital services that go beyond connectivity.

**Waheed Adam,**
executive chairperson, iTouch

iTouch, a South African based Mobile Solutions provider and one of South Africa's oldest messaging providers, has since 1995 focused on enterprise, retail, and more heavily on the banking sector, internationally.

We serve banks in 10 African countries wherein we are integrated into the banking platforms and to deliver transactional and one-time passwords (OTP). This is a time-critical service to the banks and requires 'bank-grade' security, capacity, and reliability, ensuring iTouch is compliant in all aspects.

When a transactional message or an OTP is sent, it needs to deliver instantaneously, necessitating secure, stable, and reliable routing via the MNOs. SMS remains ubiquitous and cost effective and has for many decades been the chosen channel for delivering such communication, until now...

In recent years MNOs have decided to create 'international hubs' whereby any company sending messages from an international destination in-country - or are internationally owned, meaning they may have a presence in-country but are owned by international shareholders - are obliged to route their messages via an international hub. The reason given is for the MNOs to be able to view what comes into the country and to ensure security measures to block international fraudulent opportunists.

While I support this initiative - as I regard mobile fraud a global pandemic of its own - the MNOs have conveniently invented a different pricing model.

This initiative may carry some additional costs and one can expect to pay a higher price per message, however the MNOs have decided to use this opportunity to support their declining revenue model to exploit international businesses wanting to deliver their services in-country. And by 'exploit' I mean commercial models that are somewhere between 300-800% higher than their usual price per message.

The higher costs in most cases, if not all, are - down the value chain – regrettably passed onto the client. The bank's client is a local, using a bank in their location, for a local service, but they must pay an exorbitant fee because of profiteering?! It's another case of win the battle but lose the war. The service will have to move away from A2P messaging because of unnecessarily high costs.

I once sat on a panel with an MNO lead at the ITU conference and when asked why the hefty commercial model, her answer was precisely what I suggest above.

There is no justifiable reason other than a great opportunity to increase the MNOs bottom line, she said.

MNOs reserve the right to choose how they want to price the service, but when it becomes a risk to its utilization then that not only impacts the MNO itself but the entire A2P messaging sector. Companies like iTouch that provide messaging services fall victim to this loss too, hence my intervention in creating a global committee that serves to educate the market - including the MNOs - of the impact their decision is likely to cause.

"There is no justifiable reason other than a great opportunity to increase the MNOs bottom line."

One of the banking institutions we serve has branches across several African countries.

Each entity is locally registered, employs local people from each country, including upper management and executives, and serves the local banking community. However, their cost per message rose month by month in a short space of time to the numbers above, 300-800% higher! This is a pain point for the bank and one they regard preposterous.

Each MNO has a different policy of what qualifies as an international business. There is no clear definition to whether this bank is deemed international or not. As a bank that has a local legal entity, employs local people, and serves the local communities, should they be deemed international?

Lastly, is banking not a critical service to the local market? Should it be labelled as an international company in this instance and be forced to pay the high prices set by the MNOs?

In a world where there are many channels of communication, and a time where new channels have made major ground, such as WhatsApp business, iMessenger, etc., the bank has new options to consider. Africa's smartphone penetration is growing exponentially which also gives rise to in-app messaging as an option.

The banks are considering alternatives and spending their R&D budget on exploring these options. Some have already made the move to alternatives, and some are using a hybrid of different channels, keeping A2P SMS as the fall back while testing the reliability of other channels. According to a Mobile Squared presentation at a MEF conference in June 2022, the financial sector is still the largest user of A2P messaging, and the 'international hub' commercial model is directly impacting the future of this channel.

This commercial model is likely to negatively impact the use of A2P messaging, which will only result in the further decline of MNO revenue in the long run, though they may enjoy short term growth.

The irony is that these MNOs are themselves internationally owned and don't qualify for lower pricing under their own criteria if they were a consumer of the service. It has sadly become an accepted commercial model amongst many MNOs now but one I hope to change by highlighting the risks associated. ■

**Looking ahead:** As the pandemic gave rise to the convenience of home shopping, e-commerce has catapulted to new heights while technology enhancements and the streamlining of logistics is securing it as the way of the future. More businesses, particularly small and medium size businesses (SMBs) are entering the e-commerce environment to benefit from the wider pool of customers.

This move is increasing the need for digital communication channels to serve the transaction process. Just when we thought we may be reaching a peak in A2P SMS messaging, this new SMB market is fast changing that.

According to Mobile Squared, there are over 304 million registered businesses in the world of which most don't use SMS as a communications tool. However, as they enter the e-commerce environment, they will need SMS. Some markets are already experiencing over 25% growth in SMS usage. If only 30% of the SMBs use SMS it will grow this sector to over $140 billion. This resurgence is testament to the long life we can expect from the SMS channel of communication.

**Willem Wentzel,**
head of wireless, NEC XON

5G and Open RAN are changing connectivity in Africa and other emerging markets in different ways than developed markets such as Japan, the US, and Europe.

Developed markets have focused on embracing 5G's high speeds, bandwidth, and low latency. However, emerging market service providers are primarily focusing on a connectivity play. They are leaning harder into 5G's capabilities to provide dense connectivity in urban settings.

Coupled with the opportunity to integrate new Open RAN 5G equipment with legacy infrastructure, they can leverage new Opex and Capex benefits, further driving the connectivity business case across Africa.

This shakes up how mobile network operators have traditionally operated in Africa. That many network operators want 5G's speed, bandwidth and latency benefits is not news. However, that they want it using Open RAN is because it is a marked departure from how they have traditionally operated.

5G offers better mobile broadband connectivity and massive machine-type communication. Smart farming, smart cities, digital mining, smart logistics, advanced healthcare, industry 4.0, energy, retail and more have caught the imagination of many through the media.

"50% of the world's children younger than five who die of pneumonia, diarrhoea, measles, HIV, tuberculosis and malaria are African, according to the United Nations World Health Organization (WHO)."

But, while all of that and more are possible, not a lot of it is highly probable in Africa. For example, 5G can be enormously beneficial to smart farming. However, The Borgen Project is a non-profit addressing hunger and poverty in Africa that estimates as much as 65% of farming in Africa is subsistence farming.

Additionally, as much as 92% of platinum, 73% of diamonds, and 89% of the world's gold come from Africa. But there has not yet been any significant smart and digitised mining in Africa. Not least among the challenges are the economic realities of cheaper labour and commodity pricing volatility.

Africa could benefit from advanced healthcare. But on a continent where more immediate concerns are providing primary healthcare, we are unlikely to see wide scale remote surgical procedures. 50% of the world's children younger than five who die of pneumonia, diarrhoea, measles, HIV, tuberculosis and malaria are African, according to the United Nations World Health Organization (WHO).

Many of the more than 1.2 billion Africans use some form of cellular communication. 2G's main benefits are cheaper handsets, long range, low power needs and long battery life. 3G offers more scope for a higher level of user services, likewise 4G, and so too will 5G. However, each step up also requires more energy, operates reliably over shorter distances, and is increasingly affected by adverse terrain.

The ideal would be to combine all the technologies into one network, something that can be next to impossible without the integration capabilities that Open RAN offers.

Mobile network operators used to buy their

proprietary network kit from a single vendor. It wasn't economically feasible for large-scale commercial networks to develop the high level of skills necessary to use previous generation open technologies for the core and radio networks. It was, nonetheless, expensive to buy exclusively from a single provider.

That is how the Open RAN movement gained momentum and support from global vendors, including NEC.

Open RAN makes it possible for mobile operators and other communications service providers (CSPs) to integrate with the legacy equipment, eliminating the need to forklift the old network whenever a new generation of technology is introduced. It significantly reduces Capex and Opex requirements, as much as 40% Capex and 30% Opex, according to analysts and early commercial results from our partner Rakuten's deployment in Japan.

Africa's tiered markets require different services from markets overseas. More than 650 million Africans lived in rural areas in 2020. However, more than 40% of Africans were also urbanised, according to The World Bank and Statista.

Rural Africans use different services from urban Africans. Rural Africans prefer plain text messages and services such as mobile money. In fact, 548 million mobile money accounts were registered in Africa in 2020.

Those services typically do not need 5G's benefits that include low latency, high speed, and high throughput. That is why mobile operators can deploy 5G in Open RAN architectures to the dense urban centres. Since it can be integrated with their existing equipment, they can shift the current infrastructure one step further out to gain many advantages. They increase coverage on a much smaller investment, gain the ability to offer new services, and they can expand their subscriber and user base. ■

**Looking ahead:** The future of 5G in Africa relies heavily on Open RAN, the success of which is heavily determined by the partnership ecosystem to support it.

While mobile operators and CSPs previously relied on a single Capex- and Opex-intensive supplier for their proprietary networks, Open RAN enables more cost-effective sourcing from multiple suppliers. However, they must either develop the skills to integrate, service and maintain the network themselves or work with partners who can.

This will elevate these partner ecosystems a lot more in future in Africa. It's an extension of a shift many of the mobile operators and CSPs have already been making, which is to either absorb systems integrators through acquisition or joint venture or develop close operational partnerships.

The requisite skills are intense, which is why we partnered with Rakuten Symphony, to extend their global expertise to African organisations. For example, they developed the automation to reduce site deployments from days or weeks to just minutes or hours. They now run a six million subscriber network with just 250 engineers and have developed and deployed their own RAN technology that enabled them to deploy over 270,000 cells and achieve 97% coverage within three years.

The future of telecommunications in Africa will remain mobile and it will advance on 5G Open RAN technologies and cloud-native services. This is the most cost-effective and fastest way to deploy and it offers support for numerous use cases, which are what ultimately drive the adoption of any technology.

**Faisal Ghazaleh,**
VP Sales for MEA & India, Infovista

From Infovista's point of view, the African countries we traditionally focus on such as Egypt, Morocco, South Africa, and Algeria have been quite active over the past year as we have supported them with 5G network rollouts and optimization. They aim to adopt the latest technologies and are consistently at the forefront of new network technology.

Across the rest of the continent, we have addressed business opportunities coming from growing economies such as Niger, Rwanda, DRC and most recently in Botswana, where we are helping with the modernization of the existing mobile network and optimizing the planning of future 5G-ready network infrastructure.

"Deploying cellular networks across huge areas of 'rural and remote' territory is a massive logistical challenge."

Our work allows Botswana's leading CSP to test, benchmark and optimize the performance delivered by its mobile network, helping ensure its subscribers using connected services enjoy the best possible quality of experience. Finally, we have been involved in some of the major projects funded by the IMF and Bank of Africa to help develop the telecommunication sector within Africa.

Some of the biggest challenges that we deal with in our work in Africa arise from geography. Deploying cellular networks across huge areas of what we call 'rural and remote' territory is a massive logistical challenge, and we employ the latest hard and software to plot the optimal location of network infrastructure – ensuring the delivery of the best possible network for CSPs and their customers.

Alongside this, we have discovered that monitoring and maintaining some legacy technologies such as 2G and 3G, which less and less meet the needs of the different African markets but remain vital (for now), can raise interesting challenges for our technical teams. Finally, geopolitical stability can impact the development and deployment of telecommunications networks and services – and so we must always be mindful of the situation in the countries where we operate. ■

**Looking ahead:** To date, African regulators are our main customers, followed by CSPs operating across the continent that are expanding their LTE networks and have adopted some unique services such as mobile money and multiple over the top (OTT) applications and services.

In Africa, most of the countries are among the later adoptors of technology, and therefore, we expect 5G to continue gaining momentum over the coming 3-5 years and, along with 5G network rollouts, we anticipate technologies such as network automation, analytics, AI/ML, IoT, blockchain, Open RAN, and private networks to be emerging as trending technologies throughout that timeframe.

We also envision the development of 5G specialized offerings towards industries such as mining, oil and gas, retail or healthcare. This would make 5G a key factor in unlocking the potential of African countries to grow further and increase their contribution into the world economy. A good example is the impact of IoT on farming, which directly contributes to improving the production yields and quality.

**Andrew Schafer,**
CEO, PowerX

2022 was a major turning point for Africa. It's the first time that major towercos utilised artificial intelligence (AI) to increase the efficiency of passive infrastructure and reduce carbon emissions.

It has been a buoyant year with continued growth of mobile coverage across Africa. Traditional technologies have proven insufficient for tower operations; only by overlaying more advanced, artificial intelligence (AI) led analysis and resultant workflow can passive infrastructure truly be digitised, and assets optimally used to deliver financial returns at scale. This is fantastic news for PowerX. Our industry-first AI tools place data intelligence at the heart of tower operations. Recent customer announcements demonstrate that this approach is endorsed by market-leading tower companies and new market entrants.

There is pressure to expand connectivity in Africa, whilst ensuring resilient, cost-effective service delivery. Yet, there are a multitude of inefficiencies occurring every day at every site. With current systems and resource limitations, only a small proportion of those are ever identified.

The industry relies upon manual operations; however, historical investments often leave tower teams with limited data availability, a lack of actionable insights and an inability to act at scale across tower estates. More focus needs to be placed on better use of site data so that data intelligence-led optimizations and future autonomous AI control can be applied.

PowerX is working with partners and customers to identify these data gaps and establish a robust foundation for machine learning (ML) / AI technologies. Even where data sets are limited, there is significant value in applying AI-led intelligence to optimise operations. AI-driven automation is rapidly becoming a pre-requisite for modern, resilient, cost-effective tower operations. Benefits realised with PowerX's AI-led solutions include:

- Fuel consumption reduction of 20-30%
- Diesel generation run time reductions of 15-20% with resultant savings in maintenance, re-fuelling, and extended asset life
- Solar yield improvement of 10-15%
- Reduced maintenance trips and resultant costs by 15-20%
- Overall asset utilisation improvement of over 10%
- CO2e/GHG reduction of 10-30%
- Improved resilience with reduced risk of SLAs breaches
- Improved revenue assurance and tenant billing accuracy
- Improved grid classification with resultant cost and revenue benefits
- Labour savings on reporting and analysis

The industry can redefine tower performance using AI. PowerX AI sees through 100s of billions of data sets, delivers 100+ millions of automated improvements and scales existing team expertise by a factor of 30-50. ■

**Looking ahead:** The growing interest we have seen in 2022 re-enforces our vision. There is a better way to manage tower passive infrastructure sustainably so that our customers can deliver on their vision of connecting more customers without compromise, whilst improving operational efficiency. History has shown that once market leaders embrace a new technology and gain a competitive edge, it rapidly becomes the market norm. Thus, we expect to see more towercos, MNOs, ESCOs and tower passive infrastructure providers roll out PowerX technology.

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Advantage 360 is a leading supplier of Convergent Telecom OSS/BSS solutions world-wide. Leveraging more than 25 years of experience, we provide a completely integrated platform with robust features supporting service provider's billing and operational requirements.

Our products consist of core modules that include Point of Sale, Inventory, Locations, Employees, Service Fulfillment, CRM, Accounting, Collections, Provisioning, Mediation, Online/Offline Rating, Convergent Billing & Invoicing, Self-Care, open APIs, and much more with support for GSM, CDMA, 4G, LTE, 5G, VoLTE, TAP, CIBER, NRTRDE, Interconnect, Wholesale, ILEC, CLEC, Long Distance, POTS, Centrex, PRI, BRI, Special Circuits, DSL, CATV, FTTx, Broadband, VoIP, IPTV, PPV, VOD, Home Automation, and much more.

Our products support limitless language, currency, and taxing requirements in addition to integration with various 3rd parties for ERP Systems, Workforce Management, Plant Management, Fiber Asset Management, Address Validation, Credit Scoring, Taxing, Toll Destinations, Currency Conversions, Payment Gateway & ACH Bank Debit, Document Presentation, AppleCare Warranty, POS Hardware, and much more.

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As a leading international communications enabler, BICS is at the heart of the communications ecosystem. We enable people, applications and things to connect, wherever they are. We are a global provider of international voice, messaging, mobile data, cloud communications and IoT services. Our solutions, delivered seamlessly and securely, are essential for supporting today's data-hungry consumers and digitally driven enterprises. Headquartered in Brussels, with a strong presence in Africa, Americas, Asia, Europe and Middle East, BICS powers the global communications that connect the world.

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Cerillion is a leading provider of billing, charging and customer management systems with more than 20 years' experience delivering its solutions to mobile, fixed, cable and multi-service communications providers worldwide. These are used to price and bill subscriptions and variable usage for wholesale, retail and white label services; B2B and B2C offerings and multi-country service provider portfolios.

With more than 80 customer installations, Cerillion has a proven track record of delivering cost-effective solutions to the billing, charging and CRM challenges of today and tomorrow. We combine leading edge products with highly skilled and experienced staff, to provide long-term solutions to your business challenges. From fully integrated systems to managed services and SaaS, we offer a range of approaches and business models to suit your needs now and in the future.


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**Towers**

**Rooftops**

**Indoor DAS**

**Green Power**

**Expertise, Resources and a Proven Track Record**
At Minara Tanzania, our robust wireless communications infrastructure portfolio, combined with our multi-tenant leasing model, allows us to provide mobile network operators with an array of towers and other assets that help meet their coverage and capacity needs.

We are leading the way in providing wireless communications infrastructure, with wireless service solutions that help carriers meet current and future network demands including:

- Towers – A portfolio of 1,400+ towers with locations and heights to fit your coverage needs
- Rooftops – Our extensive rooftop portfolio at premium sites in major urban areas help you increase network coverage and capacity
- Indoor DAS – Our system enables property owners to install one wireless infrastructure solution supporting all service providers and frequencies
- Green Power – Renewable energy solutions to power telecom towers as an alternative to diesel generators

As a preferred communications infrastructure provider, we are continuously setting the standard for customer satisfaction by "Building Better Wireless."®

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**Solutions**

**Customers**

**Company**

**Resources**

Parallel Wireless is a leading provider of centralized RAN over cloud-based Open RAN technology for wireless network operators. We design our Centralized RAN solution to introduce new innovations and reduce total cost of ownership (TCO), improve scalability options, and increase power efficiency for global MNOs.

We achieve this through full RAN centralization, RU-DU separation, and power efficiency. We are engaged with over 50 global MNOs and have been recognized with over 74 industry awards. We believe the power of software can unlock amazing opportunities for the telecom industry by helping customers reimagine their networks. At the core of what we do is our team of re-imaginers who value innovation, collaboration, openness, and customer success.

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**Who we are**

**Site Leasing**

**Site Development**

**Tower Acquisitions**

**Put Our Capabilities to Work for You**

SBA South Africa is a preferred provider for mobile network operators. Our experience, capabilities and resources assist carriers to meet their network coverage, capacity and performance requirements. Working with our experienced team ensures speed to market while helping carriers provide high quality, feature-rich voice and data service.

SBA South Africa is a leader in providing wireless communications infrastructure including towers, buildings and rooftops, with more than 1,000 communications sites throughout the country. We offer wireless service solutions that help carriers meet current and future network demand while remaining flexible with build times and design including:

- Site Leasing – leasing antenna space on our multi-tenant towers under long-term lease contracts.
- Site Development – Constructing towers in strategically chosen locations or at the request of wireless carriers under a build-to-suit arrangement.

As a preferred provider for mobile network operators, we are continuously setting the standard for customer satisfaction by "Building Better Wireless."®