chapter 1
State of the market

Sabelo Dlamini,
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IDC South Africa

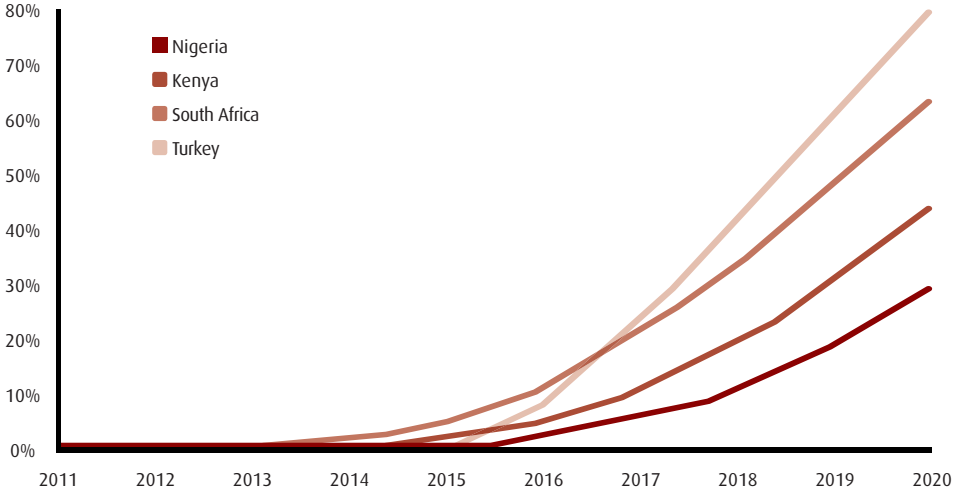
Last year was dominated by talks about 5G, but saw little tangible implementation of the technology. In South Africa, we have seen Rain commercialise their 5G products, largely non-standalone and thus a mixture of 4G and 5G on 3.5 GHz, with several trials across the continent. These trials are being conducted by other large operators in South Africa, as well as in Mozambique, Tunisia, Nigeria, Kenya, Algeria, Lesotho, Gabon and Egypt to name a few, for example MTN's 5G trials in Nigeria where they performed trials with different vendors across three regions in the country to test the technology. Yet, one of the biggest challenges facing the deployment of 5G in Africa remains the cost and allocation of spectrum. South Africa is one of a few countries in Africa where 4G spectrum remains unallocated - a process that has taken years to conclude. We expect to see this 5G trend continue, but with limited tangible adoption due to a lack of relevant use cases for the region.

Other highlights included several announcements around planned undersea cable development. Google announced plans to construct its Equiano cable that will run from Portugal to South Africa via Nigeria, which is expected to be completed in 2021. SAEx International and Alcatel Submarine Networks are similarly collaborating to build a 25,000km long undersea cable with a design capacity of 108Tbit/s. The cable is expected to connect countries in Asia, the Americas, and Africa (South Africa). In 2018, Seaborn Networks also announced plans to build the SABR cable that will run from South Africa to Brazil and then onward to North America. The cable is expected to deliver capacities of between 30 and 40Tbit/s. Facebook is also in talks to develop Simba, an underwater data cable that will encircle the continent. These developments will have a significant impact on the continent.

One of the major challenges facing Africa remains the high cost of data. Last year we saw the Competition Commission in South Africa flex its muscles to force the two dominant players, Vodacom and MTN, to drop their data prices significantly. While we are yet to see whether this will be implemented, it would have a huge impact on data pricing in the country and could also move towards the rest of Africa to drive down data prices. That said, there could also be a broader negative impact on the industry if both MTN and Vodacom halve their prices. Telkom and Cell C currently position themselves based on more affordable pricing. Should the two bigger operators bring their cost down significantly, it could have unintended consequences on the smaller operators, making it more difficult for them to compete. Telkom and the already embattled Cell C will also be forced to reduce their prices to compete, which would further reduce their profit margins and threaten their survival in the market.

Another big announcement was that Ethiopia will award two telecoms licenses to multinational mobile companies by April 2020. While this is a step in the right direction towards market accessibility, one must ask the question around how open it will be. While all the big operators in the region are equally anxious to enter this market, there are some key considerations to take into account such as how much autonomy they would have, the requirement around using local skills, tax structures and how conducive it is for non-Ethiopian organisations to operate in the country. While we believe that most of the big operators will line up for this opportunity,

While 5G is a big talking point among telcos, most operators in the region are still actively investing in 4G/LTE networks. As such, these networks are still maturing and the telcos have not received their return on investments on them. LTE connections are still yet to surpass the 50% mark in most countries in the region, outlining that widespread 5G is still in the distant future. Figure 2: LTE Connections as a % of Total Mobile Connections SOURCE: IDC



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they will have to do their homework to ensure they understand the market and its challenges, and will, therefore, be cautious about the move.

ICASA's spectrum woes

The issue around spectrum allocation in South Africa remains a huge hurdle. While we have seen some progress, we didn't believe any spectrum would be allocated in 2019 and are doubtful that it will happen in 2020. ICASA's decision to allocate both 4G and 5G spectrum at the same time could be another spoke in the wheel of the telco industry as operators will have to prioritise which spectrum to invest in. We believe they will most likely opt for 4G as it is more efficient and will fit into their existing product portfolios, while providing a return on investment much faster.

One of ICASA's biggest problems is that the organisation is dealing with highly skilled organisations that understand the fair value of each MHz of spectrum. They will, therefore, have to invest in the right skills and capacity to ensure that they Are able to determine the fair value of spectrum that will be reasonable and affordable to the industry players.

We have seen this trend across the African region, with several operators still waiting to realise a return on investment on their 4G infrastructure, so 5G could be premature for the continent. Buying the spectrum only gives the telco access to a licence and still requires an equal if not greater investment in deploying the actual infrastructure. In this regard, ICASA is effectively hindering the deployment of 5G by allocating both 4G and 5G at the same time.

How does SA have 4G if no spectrum has been allocated?

South African mobile operators have gone the extra mile in deploying their networks while they did not have the required 4G spectrum. These network operators had to work with 3G spectrum, re-farming that spectrum to deliver 4G services. They have invested a lot in terms of technological design and engineering to achieve this. On 5G, you cannot do re-farming and therefore the network operators will have to allocate the spectrum so that they can deploy 4G more efficiently. The process of spectrum allocation is also not very clear with many questions being raised around whether it will go to auction or whether outsiders will have access.

2020 – the year of diversification

Voice revenues are dropping for telcos in most countries in the region. Customers are migrating away from voice and data consumption is increasing. That said, there has been a lot of pressure from regulators and, in South Africa the Competition Commission, to reduce data costs. Most of the data revenues are also moving to over-the-top (OTT) players.

We are seeing more data centres being built in the region and more cloud providers growing their presence in Africa, which is creating an even bigger opportunity for OTTs. Additionally, innovation in technologies such as artificial intelligence (AI) and the Internet of Things (IoT) is putting pressure on telcos to rethink their business models. Telcos who continue to focus purely on providing only connectivity put themselves at risk of becoming a mere spectator in this new transition.

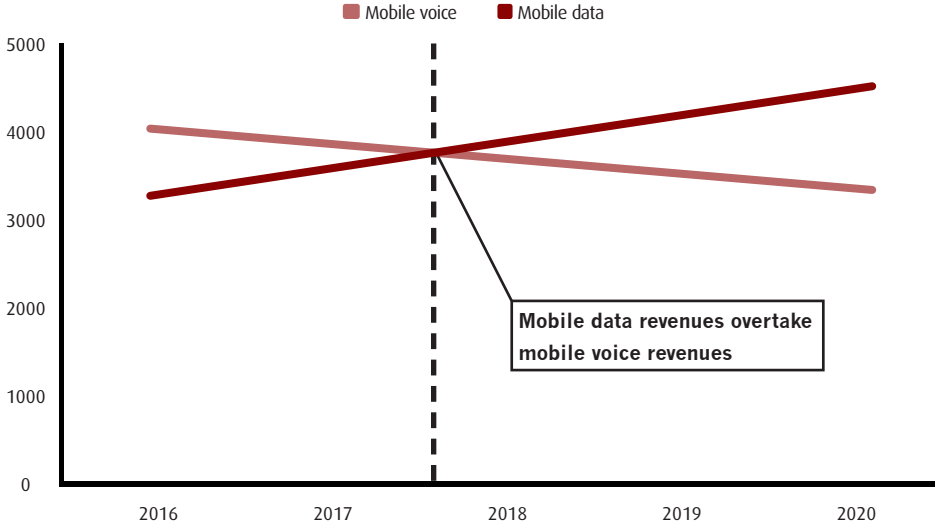
For telcos to survive this transition, they must develop their portfolios, expand and create diversified sources of revenue. We are already seeing some exploring fintech as an option while others are developing IT services. We believe that across the region, telcos will either try and build their IT services capability in-house or acquire a company that already has it. The next step will be to develop their presence in the cloud, and this will most likely be through reseller agreements with big cloud providers, to diversify their revenue streams. Other areas to consider include the IoT, but this needs specific domain expertise and knowledge to provide solutions and services to specific industries.

> "One of the major challenges facing Africa remains the high cost of data. Last year we saw the Competition Commission in South Africa flex its muscles to force the two dominant players, Vodacom and MTN, to drop their data prices significantly"

We have, for example, seen in Eastern Europe that telco companies are even selling utilities such as electricity, petrol, gas to ensure that their revenue streams are diversified. Connectivity alone is no longer financially viable.

Infrastructure maintenance is also very costly, and we have seen some telcos move their infrastructure into separate entities. We believe this will be a trend across the continent as the management of infrastructure will require specialised expertise and a deeper understanding of how to work with stakeholders to ensure they get revenue- and risk-sharing models in place to earn additional revenue. In 2020 we will see more companies implementing their transformation strategies.

Data revenues are continuously surpassing voice revenues, as can be seen South Africa has moved passed voice era. Figure 1: Evolution of Mobile Voice and Data Revenues in South Africa SOURCE: IDC



It's all about partnerships and collaboration

In 2020, partnerships and collaboration will be key. We have already observed some South African telcos moving towards acquiring specialist companies to bolster their skills set and this is set to continue. While some continue to try and develop capabilities in-house, we foresee a shift towards partnership with the vision to acquire those partners in the future.

This trend is likely to continue, so our advice to start-ups is, therefore, to ensure you have a solid vision and well-defined processes in place when starting your company. Ensure that all your processes are well developed so that if

you are partnering with someone and there is an opportunity to be acquired, it is easier to get a fair value for your business. ■

Communications in Africa: an emerging platform for economic and societal growth

Joe Barrett, president, GSA

Much has been written about the gaps that exist in Africa's infrastructure and communications coverage, both of which are essential to achieving the kind of universal access critical to connecting all citizens of Africa to the global society. Technological advancements such as 4G and 5G offer potential to transform the continent, drive forward economic growth, and deliver social benefits in countries throughout the region.

In that context, over 900 operators worldwide are known to have been investing in LTE, including pre-commercial trials, with dozens of others that have previously indicated their intentions to invest. 788 operators in 229 countries have now commercially launched LTE networks1.

Africa represents a small but growing and increasingly important part of this ecosystem. In North Africa, 16 operators have launched LTE (either offering fully mobile or fixed wireless broadband services), up from 15 in 2019, and of these, eight have launched LTE-Advanced, one is deploying LTE-A and one operator is in a testing phase. In the larger sub-Saharan Africa region, 172 operators are investing in LTE (up from 148 a year ago), with 140 networks launched (up twenty in a year); 28 of these have deployed LTE-A (up from 23 in 12 months), and a further six plan to deploy LTE-A or are testing the technology.

"Southern African operators are at the vanguard of the region's 5G development efforts. Among those, Vodacom has activated a limited availability fixed wireless access network for a handful of business customers in Lesotho and states"

As a result of these recent launches, the African region as a whole now accounts for just over 20% of the total number of operators investing in LTE and nearly 20% of all the commercially deployed networks. It remains the case that most of the countries globally that are currently without LTE are either on the continent of Africa or islands in the Pacific and Atlantic Oceans. African countries with no LTE network known to GSA include Central African Republic, Djibouti, Equatorial Guinea, Eritrea, French Southern Ocean Territories, Mauritania, São Tomé and Príncipe, South Sudan, and Western Sahara. But the national not-spots are disappearing. LTE networks were launched for the first time in Cabo Verde, Guinea, and Niger during 2019.

In terms of LTE subscribers, the continent is further behind. According to data supplied by Omdia, the number of mobile subscriptions in Africa totalled 1.086 billion by end September 2019. In absolute terms 3G was by far the fastest growing mobile technology in Africa in the twelve months to the end of September, gaining 96.8 million subscribers to reach a total of 542.3 million. In 2019 3G also became the biggest technology, overtaking GSM which continued to decline, falling from 508.6 million to 444.6 million subscribers.

LTE, meanwhile, is just gaining a foothold in Africa. LTE subscriptions reached 95.2 million by the end of September 2019, up more than 50% over twelve months, but still well short of 20% of all mobile subscribers on the continent. (By way of comparison, worldwide, LTE represents over half of all mobile subscribers). As it becomes the preferred technology, eventually delivering a Gigabit service, GSA expects a migration from 3G to 4G/LTE and then eventually, 5G. But for now, Africa represents only 2% of the world's LTE subscribers. This means there is potential for tremendous growth.

New generation technologies

Along with the rise of LTE, we are starting to see increased availability in Africa of LTE-based solutions for voice and IoT services. VoLTE is now commercially available in at least thirteen African networks, with six other operators known to be either investing in trials, planning to deploy or in the process of deploying VoLTE. NB-IoT, meanwhile, has been launched in Tunisia and South Africa, with operators also investing in the technology in Kenya, Liberia and Nigeria. MTN has been trialling LTE-M in South Africa.

5G is on the horizon. Network vendors and operators worldwide are currently testing and are already deploying 5G networks – in fact sixty-three commercial 5G networks have now been launched globally. 5G has been appearing on a small scale in Africa too. Whilst they are not yet ready to launch commercial 5G

Figure 1: LTE networks (mobile and FWA) in the Middle East and Africa

Figure 2: LTE-Advanced networks in the Middle East and Africa

Figure 3: 5G trials in the Middle East and Africa

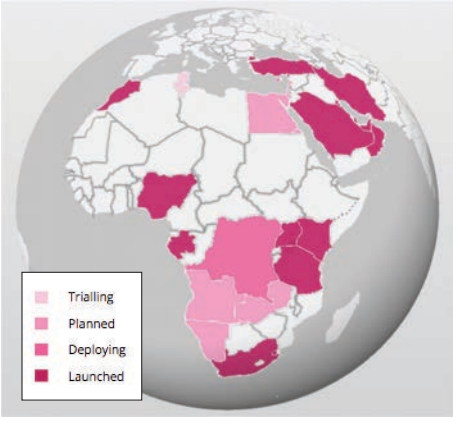


Figure 4: VoLTE status in the Middle East and Africa

services en masse, African operators have been investing in 5G. GSA is aware of twenty African operators from 15 countries that are investing in 5G networks (including pre-commitment evaluation, testing and trialling).

Southern African operators are at the vanguard of the region's 5G development efforts. Among those, Vodacom has activated a limited availability fixed wireless access network for a handful of business customers in Lesotho and states it is ready to launch services in South Africa as soon as the spectrum is made available. Rain has launched 5G FWA services in parts of South Africa. Liquid Telecom is deploying a wholesale 5G network, and in late 2019 MTN awarded the contract for the deployment of its 5G infrastructure. Elsewhere in Africa, Al Madar announced the deployment of 5G infrastructure in Libya in 2019, and operators in Algeria, Cabo Verde, Cameroon, Congo-Brazzaville, Gabon, Kenya, Madagascar, Morocco, Nigeria, Réunion, Seychelles, and Uganda are known to be testing or trialling or have announced plans to deploy 5G networks.

The year ahead

GSA expects LTE to continue its rise in Africa during 2020. With at least ten operators known to be deploying new LTE networks as of April 2020 we might expect to reach a total of 165 LTE networks providing either fixed wireless access or full mobile services in Africa by the end of the year.

Whilst it will be a few years before the technology is as widely used as 2G or 3G, given the recent increase in the number of commercially launched networks, the anticipated launch of more LTE services during 2020, and the fact that it will be physically available to a larger number of people, and networks will cover wider areas, the technology will attract more and more end users. It would not be unreasonable to expect LTE subscriber numbers in Africa to top the 130 million mark by the end of 2020.

In addition to the growth in use of LTE, GSA also 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 end users speeds, and the launch of 3GPP IoT technologies. At the moment, few networks in Africa can boast maximum (peak theoretical) download speeds of much more than Cat-4. (GSA has identified 16 operators offering Cat-6 or better).

Whilst the continent is still predominantly a consumer of technology, a harmonised approach to ICT development, including enabling policy and regulatory frameworks can transform the 60+ individual markets into an opportunity of over one billion people. The benefits of such harmonisation include achieving new economies of scale, and creating leverage that will enable African nations to start influencing technology and policy developments to ensure they best serve the continent's requirements. We already see evidence of this in the way they have become increasingly influential in international/ICT spectrum proceedings. The African Continental Free Trade Agreement provides an additional framework to pursue harmonisation, and increased collaboration/partnership/engagement with industry stakeholders will be useful in helping to customise technology to suit African realities.

GSA is the voice of the global mobile ecosystem and has been representing mobile suppliers since 1998. The GSA, as a source of objective, current and accurate technological input, and by virtue of its membership (including innovators and suppliers of broadband solutions) offers a forum that has the potential to help open up some of those engagement opportunities. GSA intelligence is regularly referenced by the broader mobile industry, and the organisation is also very active in numerous spectrum forums around the world, including Africa.

Financial outlook
Service provider results

Matthew Reed, practice leader, Omdia

Africa is seen as a growth market and MTN Group, Africa's biggest telecoms operator by subscriptions, saw its service revenue rise by 9.7% year on year (YoY) in 1H19, to ZAR67.9bn ($4.58bn). MTN Group's data revenue grew at an even faster rate, increasing by 19.8% YoY in 1H19 to ZAR16.1bn, while fintech revenue increased 30.7% to ZAR4.7bn. MTN Group says it is also seeing growth in its voice revenue, which increased by 4.5% in 1H19.

However, MTN sees data as the main driver of growth in the medium term, and it also sees further growth opportunities in fintech, enterprise, and wholesale. Revenue at MTN's wholesale unit, MTN GlobalConnect, more than doubled between 1H18 and 1H19.Vodacom Group's service revenue rose by 3.9% YoY in 2Q19, with revenue at Vodacom's international (non-South African) operations increasing by 19.6%, largely due to rising demand for data and the M-Pesa mobile money service. However, Vodacom's service revenue in South Africa declined by 1.2% in 2Q19, which the company attributed to new data usage regulations and difficult economic conditions. Airtel Africa reported revenue of $795.9m in 2Q19, a YoY rise of 6.9% (or 10.2% in constant currency terms). Airtel Africa said its voice revenue increased by 3%, while data revenue increased by 36% as a growing number of customers used LTE. Mobile money revenue increased by 42%. Airtel Africa's subscriptions increased by 9.3% to 99.7 million at end-June. Orange described its operations in Africa and the Middle East as a "powerful engine" for growth, with revenue up by 5.8% YoY in 2Q19, compared to a rise of 0.5% for Orange's total revenue. Orange's roll out of LTE in Africa and the Middle East has played an important part in its growth: almost 20 million customers in the region were using LTE at end-June 2019 – an increase of 54% on the previous year, according to Orange.

Merger & acquisition update

In March 2019, Maroc Telecom – which is controlled by Etisalat in the UAE – completed the acquisition of the Tigo Chad unit from Millicom, which has retreated in Africa over the past few years to focus on Latin America. In April, submarine cable operator Seacom completed its acquisition of South African wholesale fibre provider, FibreCo. In June, Vodacom reached agreements to sell its Vodacom Business Africa operations in Nigeria, Zambia, Angola, Ghana, and the Ivory Coast to local partners. Vodacom is planning to buy a 51% stake in South Africa-based IoT specialist IoT.nxt. A planned merger between Airtel Kenya and Telkom Kenya was suspended in August pending an investigation by the Communications Authority of Kenya into the deal. MTN is selling its stake in Botswanan operator Mascom for $300m, and the Travelstart e-commerce business and Amadeus investment fund for ZAR1.2bn ($80.8m), as part of a plan to dispose of non-core assets.

Revenue forecast

Due to the overall growth in the market and continued relevance of voice calling for many customers, some major African operators such as Airtel and MTN are still seeing growth in mobile voice revenue – but data revenue is growing at a faster rate and its share of overall revenue is rising. Omdia forecasts that mobile revenue in Africa will rise from $54.31bn in 2019 to $67.12bn in 2024, with non-SMS mobile data revenue on the continent more than doubling over that period from $14.91bn in 2019 to $31.42bn in 2024 (see Figure 1). Omdia expects mobile voice revenue in Africa to rise modestly through to 2021, but to decline thereafter to the end of the forecast period.

Market dynamics
Macroeconomic trends

There is a continuing economic recovery underway in sub-Saharan Africa (SSA), according to the IMF's most recent report for the region (April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2019). Economic growth in SSA will rise from 3% in 2018 to 3.5% in 2019, and stabilize at a little below 4% over the medium term, said the IMF. Additionally, SSA will account for most of the growth of the world's population over the coming decades, according to the United Nations, which expects SSA's population count to rise from 1.07 billion in 2019 to 1.40 billion in 2030 and 2.12 billion in 2050.The IMF identified two trends in economic growth in the region, with non-resource-intensive economies expected to grow at 5% or more, with a faster rise in income per capita than the rest of the world on average over the medium term, while more resource-intensive countries, including the two major economies, Nigeria and South Africa, are expected to fall behind. Conflict is also having an impact on economic growth. Although the intensity of conflicts in SSA in recent years has been lower than in the 1990s, the region remains prone to conflict, which has negative economic consequences, the IMF said. In 2018, Africa and Asia were the world regions most affected by internet shutdowns, which are often linked to political instability, according to research by Access Now, an advocacy group for digital rights. More positively, the IMF said that the newly-established African Continental Free Trade Area (AfCFTA) could be an economic "game changer" for the continent. The AfCFTA is expected to significantly raise intra-African trade, though it should be accompanied by policies to deal with adjustment costs and income inequality, the IMF said. Additionally, the World Bank is developing a new initiative for Africa to rapidly adopt digital technologies – the All Africa Digital Economy Moonshot Initiative – which the bank said would create jobs, reduce poverty, and encourage economic growth on the continent. The World Bank's April 2019 edition of its Africa's Pulse report stated that to move to a digital economy, African countries should focus on five key areas – digital infrastructure, digital skills, digital platforms, digital financial services, and digital entrepreneurship – with specific targets for each. The targets should include: universal internet coverage, affordable internet access (costing less than 2% of income), 100,000 graduates in advanced digital skills annually, universal access to digital financial services, and a pan-African payments platform. The World Bank's plan is an attractive concept, but challenges may arise in implementation.

The affordability – or perhaps more accurately unaffordability – of telecoms services remains a problem in Africa. The average cost of a 1GB prepaid mobile broadband plan was equivalent to 8% of average monthly income in Africa in 2018, according to figures from the Alliance for Affordable Internet (A4AI) cited in the ITU/UNESCO Broadband Commission for Sustainable Development's State of Broadband 2019 report. Although the affordability of mobile broadband has improved in Africa (in 2015 a 1GB plan cost 12.5% of average income in Africa), the results for the continent compare badly to equivalent markets in Asia and the Americas. In 2018, a 1GB plan cost 1.5% of average income in Asia, and 2.7% in the Americas. The Broadband Commission has adopted the A4AI's affordability benchmark, which is that a 1GB mobile broadband plan should not cost more than 2% of average monthly income. Ethiopia revealed a significant policy change with its announcement in July that it plans to award two new telecoms licenses to private companies and sell a 49% stake in state-owned operator Ethio Telecom. Currently, Ethio Telecom has a monopoly over the country's telecoms market, and previously Ethiopia has rejected the idea of competition or privatization in the country's telecoms sector. With a population of about 108 million and a mobile penetration of less than 39% in June 2019, the Ethiopian market holds growth prospects that are likely to be of interest to most major operators on the continent (see Table 1). Mobile broadband penetration in Ethiopia is also below the average for Africa at less than 17% of total mobile subscriptions. Separately, the Angolan government is planning to sell a 45% stake in state-owned operator Angola Telecom to the private sector.

Figure 1: Africa, mobile revenue forecast 2019-24 ($bn)

SOURCE: OMDIA

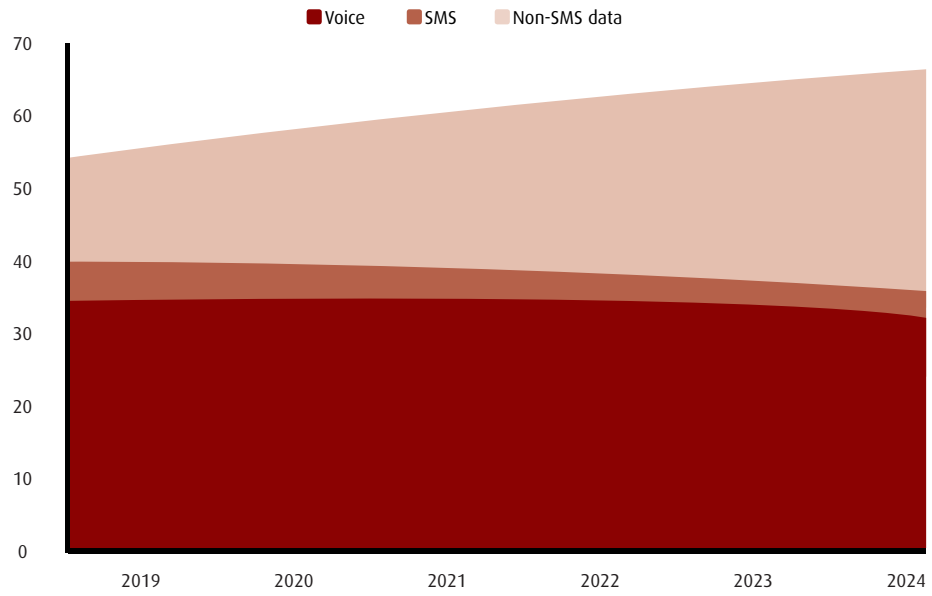
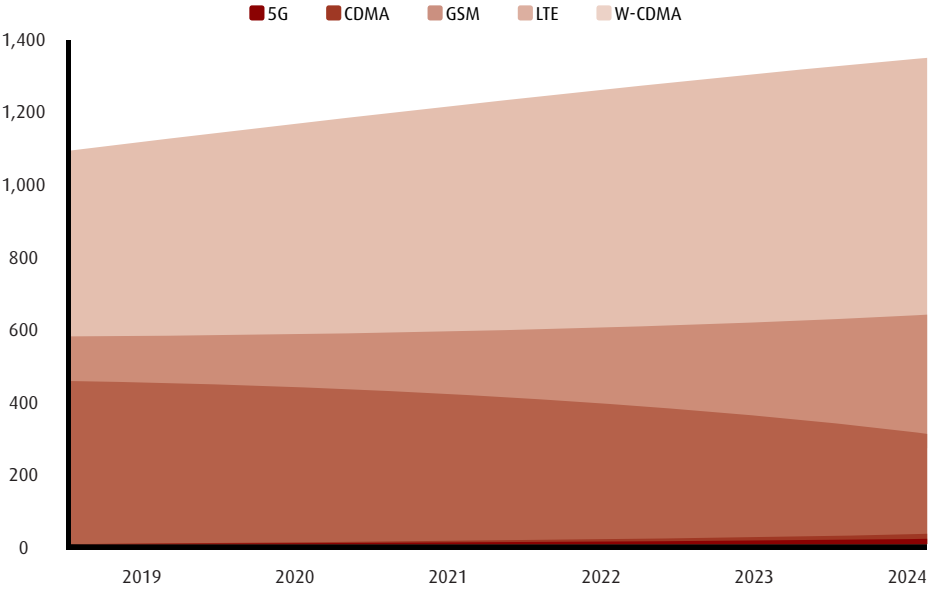


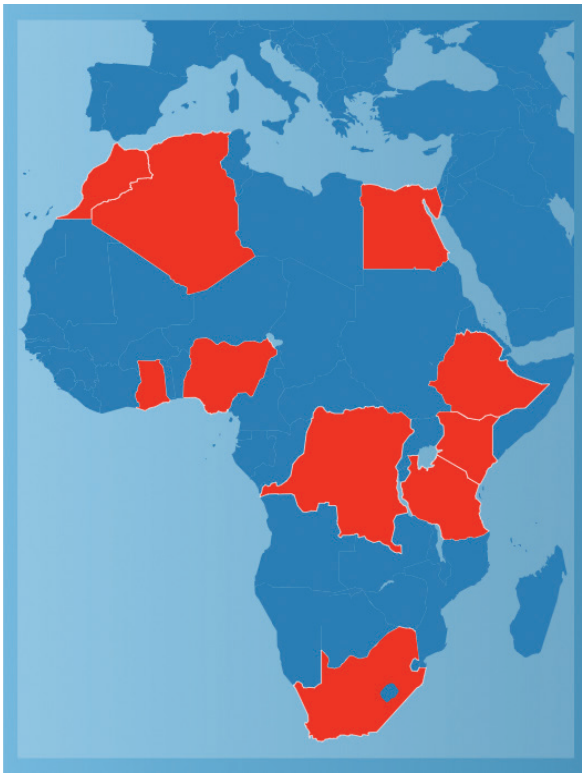
Figure 3: Africa, mobile subscriptions forecast by technology 2019-24 (millions)

SOURCE: OMDIA | (NOTE: FIGURES INCLUDE M2M SUBSCRIPTIONS)



Subscription trends

The number of mobile subscriptions in Africa passed the 1 billion mark in 2017, and reached about 1.07 billion in June 2019,



Africa's 10 largest mobile markets by subscriptions, 2Q19

Country	Mobile subscriptions (millions)	Mobile subscriptions penetration (% of population)	Mobile broadband penetration (% of subscriptions)
Nigeria	170.0	82.3	65.3
South Africa	104.3	186.0	85.0
Egypt	93.8	95.8	58.6
Kenya	50.2	99.8	30.7
Algeria	47.5	112.9	84.1
Morocco	45.2	126.1	52.7
Tanzania	43.8	73.5	51.5
Ethiopia	41.9	38.8	16.9
Ghana	41.5	140.2	54.0
DR Congo	34.9	40.5	48.4
Africa total	**1067.7**	**82.6**	**57.1**

with a population penetration of 82.6% (see Figure 2). Nigeria, the most populous country on the continent, also has Africa's biggest mobile market by subscriptions, with 170 million mobile subscriptions in 2Q19. The next-biggest markets are South Africa, with 104.3 million mobile subscriptions, and Egypt, with 93.8 million mobile subscriptions. Mobile broadband devices and networks – based on 3G and more advanced technologies – accounted for 57.1% of connections on the continent in 2Q19. A sizeable majority (85.3%) of mobile broadband connections on the continent were accounted for by 3G W-CDMA in 2Q19. LTE accounted for just 14.2% of Africa's mobile broadband connections in 2Q19. 2G GSM still has a substantial market share, accounting for 42.9% of Africa's mobile connections in 2Q19. Fixed broadband household penetration in Africa was about 8.5% at end-2Q19, lower than in any other world region except Central and Southern Asia.

Digital outlook Digital strategies and services outlook

Rising connectivity in Africa is allowing telecoms service providers to move into new service segments. It is also enabling growth in the broader technology sector, including start-ups. In 2018, African tech start-ups raised $1.16bn in funding, a 108% YoY increase, according to a report by investment firm Partech Africa. Start-ups in Kenya, Nigeria, South Africa, and Egypt received the most funding. By service sector, financial services accounted for 50% of the funding, followed by B2B services, and consumer services.

Service provider digital strategies

Part of MTN's digital strategy is to widen access to data by increasing the roll out of 3G and 4G mobile broadband networks. Another of MTN's efforts to increase data access, particularly for those on lower incomes, has been its launch of the low-cost smart feature phone that uses the Kai operating system. MTN said it had sold 281,000 of the device, the Smart S, by the end of June 2019. MTN said that its new messaging service, Ayoba, will also help to increase data adoption. By June 2019, MTN had launched Ayoba in three markets and the service had 300,000 active users. MTN has also identified fintech as a major growth sector, while in digital media it has launched its own prepaid music streaming service, MusicTime! Vodacom aims to transform itself from a traditional telco to "a fully-fledged digital services company," CEO Shameel Joosub wrote in the company's report for the year to March 2019.

Vodacom will focus on developing its financial services including M-Pesa, and encouraging take-up of its digital media offering, according to Joosub. In digital media, Vodacom offers video and music services and is developing a gaming platform. Vodacom offers a range of IoT services for enterprises and consumers, and the company is acquiring IoT specialist IoT.nxt to expand its capabilities in the segment. In enterprise services, Vodacom has formed a partnership with AWS that will allow Vodacom to sell cloud-based technology and services. Vodacom is also using AI, automation, and big data to improve operational efficiency and business returns.

Mobile financial services

Mobile financial services continue to be the most important category of digital services for most African operators. For example, MTN Group's fintech revenue increased by 30.7% YoY in 1H19 and it had 30 million active users for its mobile money service at end-June 2019. Additionally, MTN has said that it plans to integrate payments into messaging service Ayoba. Significantly, Nigeria recently introduced regulations that will allow telecoms operators to offer financial services, in a development that could enable the kind of growth in mobile financial services in Nigeria

"Rising connectivity in Africa is allowing telecoms service providers to move into new service segments. It is also enabling growth in the broader technology sector, including start-ups"

that has already taken place in some other markets on the continent. In July 2019, MTN Nigeria – the country's biggest mobile operator – was awarded a Super Agent license by the Central Bank of Nigeria, which MTN said would allow it to offer financial services more widely in the country. MTN Nigeria also hopes to be awarded a Payment Service Bank license, which will allow it to offer a broader range of fintech services. Airtel Africa said that the 42% growth in its mobile money revenue over the year to June 2019 was largely due to the expansion of its distribution network including kiosks, branches, and merchant partners. Airtel Africa is also preparing to launch its mobile money service in Nigeria. Vodacom said in its June 2019 trading update that it aims to strengthen its financial services business through its planned acquisition, through a joint venture with Safaricom, of the M-Pesa brand and platform from the UK's Vodafone. The move could make it easier for Vodacom and Safaricom to develop new financial products and services for African markets. Vodacom has a 35% stake in Safaricom. Vodacom recently launched the VodaPay Masterpass, an app-based digital wallet that can be used to pay bills and to buy goods and services.

Enterprise digital services

Enterprises in South Africa are keen to digitize processes and operations, to cut costs, and improve efficiency, according to recent research by Omdia. And those enterprises are looking for service providers that can not only help them to transform their operations, but can also support them in their wider plans such as global expansion. Enterprises also see mobile and social platforms as being key for customer engagement and marketing, so service providers should focus on mobile applications.

Below is taken from the GSMA report: The Mobile Economy Sub-Saharan Africa 2019

Expansion of the mobile money ecosystem

Sub-Saharan Africa remains a hotbed for mobile money services. By the end of 2018, there were 395.7 million registered mobile money accounts in the region, representing nearly half of total global mobile money accounts. The region is now served by more than 130 live mobile money services, many of them led by mobile operators, and a network of more than 1.4 million active agents. Today, more than 60% of the adult population in a growing number of countries, including Ghana, Kenya and Zimbabwe, has a mobile money account.

Over the past year, several underserved markets in the region have taken steps to accelerate mobile money adoption and, by extension, financial inclusion among citizens. In Nigeria, regulatory reforms introduced in October 2018 allow mobile operators to obtain licences to operate payment service banks (PSBs), while in Ethiopia an ambitious financial inclusion strategy has been attracting investment into mobile money services. Meanwhile, the Angola national bank plans to submit new laws governing payment systems, including mobile payments, to parliament for approval in 2019.

These developments notwithstanding, future growth of mobile money services in the region will be largely driven by interoperability of mobile money services. Account-to-account (A2A) interoperability gives users the ability to transfer between customer accounts held with different mobile money providers and other financial system players. Tanzania led the way in 2014, but several countries across the region, including Kenya, Rwanda, Nigeria and Ghana, have now launched interoperability projects and use cases. Mobile money providers' integration with banks is one particular use case that has significantly increased volumes moving between mobile money and banking systems.

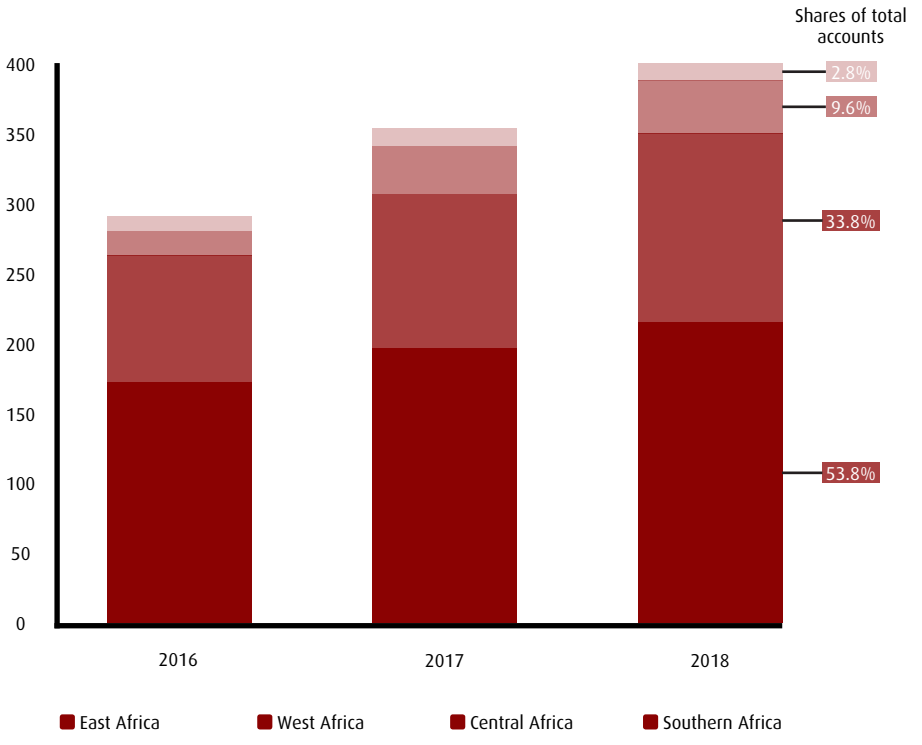
A next step in the interoperability journey will be implementation of innovative solutions to integrate mobile money platforms with the broader financial ecosystem. A number of options exist around central switching infrastructure for the industry to enable nascent use cases to scale, including merchant payments and efficient connections to domestic and international financial system players. This is already happening at sub-regional levels. For example, the eight countries of the West African Economic Monetary Union (WAEMU) are building an interoperable system that will connect 110 million people to more than 125 banks, dozens of e-money issuers, and more than 600 micro finance institutions.

However, much of the existing bank-focused infrastructure is not optimal for mobile money. In an effort to solve this, MTN and Orange, with the support of the GSMA, launched a joint venture to enable interoperable payments across Africa. Known as Mowali ('mobile wallet interoperability'), the service is open to any mobile money provider in Africa, as well as banks, money transfer operators and other financial services providers. With its pan- African footprint allowing for economies of scale and a cost-recovery commercial model, Mowali has the potential to drive down the price of services offered to lower-income customers. Additionally, Mowali could shape the future of the mobile money ecosystem in the region by creating a common mobile money acceptance brand with the potential to connect fintechs, banks, merchants and other ecosystem players to nearly 400 million mobile money accounts across Africa.

The rise of the platform economy

Mobile-enabled platforms are increasingly disrupting traditional value chains in different verticals across the region. These platforms – mostly developed by a rapidly expanding local tech start-up ecosystem – aim to eliminate inefficiencies in conventional business models, as well as extend the reach of services and

Nearly 9 in 10 registered mobile money accounts are in East and West Africa – registered accounts (million) SOURCE: GSMA

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provide greater choice to customers. Four key verticals on which mobile platforms are having a significant impact are financial services, commerce, transport and logistics.

Financial services

Over the last 12–18 months, Sub-Saharan Africa has emerged as one of the fastest growing fintech hubs in the world in terms of investments, albeit from a low base. Investment in African fintechs nearly quadrupled in 2018 to $357 million, with startups in Kenya, Nigeria and South Africa accounting for the largest share. This trend has continued into 2019, with a number of high-profile deals. For example, three Nigerian fintech start-ups – Kudi, OneFi and TeamApt – each raised around $5 million in funding during the first half of the year.

Commerce

E-commerce is on the rise in Africa; e-commerce sales in the region reached $16.5 billion in 2017 and are expected to reach $29 billion by 2022. This trend is primarily driven by lifestyle changes among the expanding middle class, increasing internet and smartphone adoption, and the growth of digital payment solutions.

Mobile money, in particular, has become a key enabler of e-commerce, by facilitating online payments amid low bank card penetration and the risks associated with cash-on-delivery. In Kenya, the Central Bank has attributed the growth in mobile money transactions to e-commerce adoption. Safaricom's recent payment partnerships with PayPal and Aliexpress.com further open up global marketplaces to Kenyan consumers and entrepreneurs.

Leading e-commerce platforms in the region:

- Jumia – the largest e-commerce retailer in Nigeria with operations spread across 14 countries. Jumia's post-IPO results showed that gross merchandise value for the first quarter of 2019 grew by 58% year-on-year to €240 million.
- Mall for Africa – enables local buyers to directly purchase goods from global retailers online. It is present in 15 countries across the region.
- Takealot – the largest e-commerce retailer in South Africa. Takealot is majority owned by Naspers and Tiger Global following significant investments in 2017 and 2014, respectively.

Safaricom's Masoko

In November 2017, Safaricom became the first mobile operator in Africa to launch an independent e-commerce platform, as part of plans to grow revenues outside its core connectivity business. The e-commerce platform, Masoko, builds on the reputation and trust of Safaricom's successful mobile money proposition, M-Pesa, which can be used to complete transactions on the platform. Safaricom also offers other payment methods (such as VISA and MasterCard) but does not provide the option of cash-on-delivery. As a payment service provider itself, Safaricom can guarantee payment for an order the moment it is placed – a core added value.

Masoko follows the marketplace model used by Amazon and Alibaba. While it screens merchants and provides e-commerce enablement services (such as payment processing and customer support channels), it operates on an asset-light basis and does not own the inventory on offer. With regards to logistics, Safaricom leverages its sizeable mobile money agent network (160,000+) as delivery and collection points, as well as multiple delivery partners. This approach enables Masoko to deliver products to 45 of 47 counties in Kenya. By November 2018, Masoko had 120 (pre-approved) active vendors and more than 30,000 stock keeping units (SKUs) on the website.

Transport

Increasing urbanisation across Sub-Saharan Africa means more people will rely on public transportation. However, conventional public transport services in many parts of the region are notoriously inefficient and fraught with poor quality and safety standards. The arrival of global taxi- hailing service Uber in 2013 and Taxify (now Bolt) a few years later has started to change that narrative. Today, both services are well established in major cities across the region, with an estimated 4 million active passengers between them. In recent years, a number of homegrown platforms have emerged to challenge the established platforms, and create solutions that aim to address uniquely local transport challenges.

The disruption of the transport sector using digital technologies has significant implications for society. The solutions offered by transport platforms are often designed to provide greater safety, convenience and predictability for users. There is also the potential for increased transparency in revenue collection and usage to support governments' scale and planning objectives.

Côte d'Ivoire: mTick enables passengers to pay for bus tickets via mobile money, eliminating the risks and inconvenience of making cash payments in person, while also enabling transport companies to receive and monitor sales updates in real-time, reducing losses due to fraud.

Uganda: SafeBoda is one of several ride-hailing apps for motor cycle transportation – one of the most popular forms of urban transit – in the region. Kampala-headquartered SafeBoda offers on- demand ride-hailing services in Uganda and Kenya.

South Africa: Lifti is a lift-club app that matches car owners with passengers from the same neighbourhoods. For riders, the service can be up to 90% cheaper than a typical taxi.

Kenya: In early 2019, ride-hailing firm Little launched a bus sharing service in Nairobi to disrupt the widely used but often chaotic Matatu buses. Little Shuttle owns and operates its own buses, with free WiFi and vehicle tracking among the comfort and safety propositions for users. Buupass.com also launched a platform to reserve, book and pay for long-distance bus travel in Kenya, paying remotely by mobile phone.

Logistics

As consumers turn to e-commerce, enabled by increasing connectivity and online payments, there is a growing expectation for safe and speedy delivery of their online purchase. This is a key factor behind the emerging disruption of the hitherto inefficient, expensive and in some cases non-existent last-mile logistics in several countries across the region. While the physical infrastructure challenges still exist (for example, poor road and rail networks and a lack of addressing system), tech start-ups are leveraging digital platforms, such as mapping, tracking and even basic SMS, to optimise deliveries and drive cost efficiencies.

Zambia: In 2016, Musanga Logistics launched an on-demand, mobile-based delivery solution that connects independent cyclists, motorbike riders and truck drivers to those in need of last- mile logistics support. The platform offers a fast, low-cost delivery service within one to three hours in the capital, Lusaka. Users can also track their packages via smartphone until they are delivered. Meanwhile, cyclists and drivers with smartphones and underutilised assets (bicycles, motorbikes or trucks) can earn additional income on the Musanga Logistics online marketplace. Musanga Logistics had more than 1,500 trucks registered on its platform as of early 2019.

In October 2018, Musanga Logistics signed a mobile money integration partnership with MTN Zambia. The partnership simplifies Musanga's payment collection and reduces reliance on cash. It also allows users and drivers to access other mobile financial services on the MTN mobile money platform, such as microloans.

Musanga Logistics has reduced the average customer delivery time in Lusaka from seven to three hours. By making use of underutilised assets, Musanga Logistics has reduced inefficiencies in the supply chain (half-empty trucks doing most deliveries) and the negative per capita environmental impact, thereby contributing to a more sustainable city.

Musanga Logistics received a grant from the GSMA Ecosystem Accelerator Innovation Fund in February 2018 to expand its operations and platform in three cities across Zambia.

Nigeria: Kobo360 launched in Nigeria in 2016, enabling individuals and businesses to schedule pickup of packages, and track the driver to the final destination. Through an integrated system that leverages mobile technology, IoT solutions and data analytics, the platform aims to match a user's request with a selection of trucks, delivery options and transparent pricing within six hours.

The company has partnered with global brands, including Dangote Group, DHL, Unilever and Lafarge, serviced over 1,450 businesses and aggregated a fleet of more than 10,000 drivers and trucks. In the last year, Kobo360 has raised $7.2 million from investors, including the IFC, YCombinator, WTI, Cardinal Stone Partners, Chandaria Capital and TLcom, to fund its expansion into other countries in the region. Kobo360 is now present in Ghana, Kenya and Togo, with plans to expand into other countries in the coming years.

Digital transformation is already happening across Sub-Saharan Africa. Increasingly, governments, public institutions, private sector players and development organisations are using digital platforms to increase engagement and improve service delivery to citizens, as well as drive social development and economic growth. With mobile technology at the heart of Sub-Saharan Africa's digital journey, it is essential for policymakers in the region to implement policies and best practices that enable sustainable growth for the mobile industry.

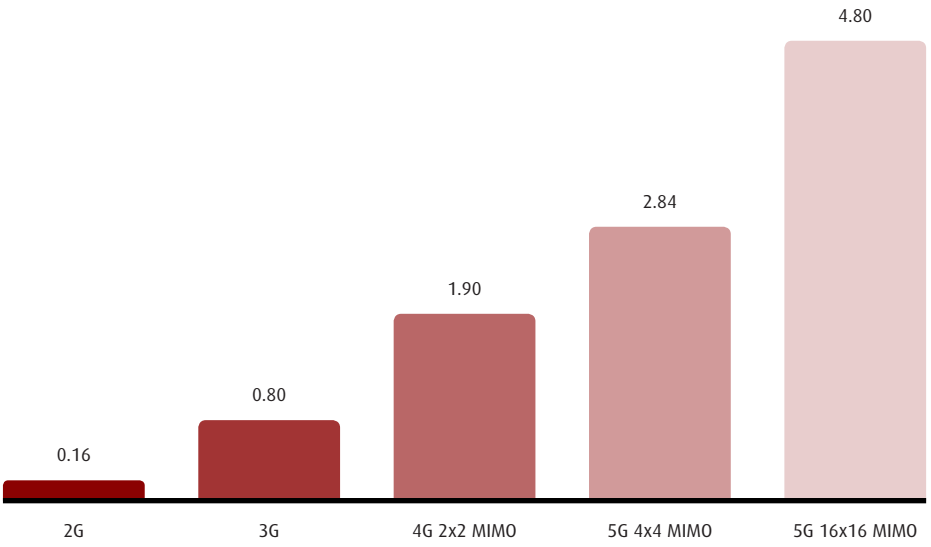
Arguably the most significant enabler is radio spectrum. Efficient and effective management of this vital but finite resource is key to maximising the opportunities that mobile connectivity can bring to society. This is especially important as the region transitions from 2G to next-generation mobile broadband networks. While high mobile broadband speeds and increased mobile data consumption have been proven to generate economic benefits, they also require adequate and sufficient spectrum to function effectively and attract the necessary investment for network infrastructure development. Here, we highlight best practices for two key areas: technology-neutral spectrum licensing and spectrum auctions.

The need for technology-neutral spectrum licensing

For governments that want consumers and businesses to benefit from the best possible mobile broadband experience, support for technology- neutral spectrum licensing is a must. It is widely recognised as best practice when assigning spectrum to mobile operators.

Regional Average spectral efficiencies (bits per Hz)

SOURCE: GSMA



It enables 2G or 3G spectrum to be reformed for 4G as well as 5G, at a pace driven by market demand. Beyond mobile broadband, the rapidly growing IoT market is also making the need to adopt neutral licences more urgent.

To get technology neutrality right, key considerations include the following:

- Attempts to extract additional revenue have misfired and held back the introduction of new mobile technologies.
- While a renewal process provides an opportunity to re-issue spectrum licences as neutral, regulators should not delay the introduction by waiting for the expiry dates of existing licences.
- When assigning new spectrum, regulators should do so in a technology-neutral manner or at the very least not restrict the introduction of next- generation technologies, such as 5G.

Some countries in the region have not yet moved to technology-neutral spectrum licences and are still issuing technology-specific licences or have not decoupled spectrum licences from operating licences. This means consumers and businesses do not benefit from the best possible mobile broadband experience and can end up paying more for inferior services.

Senegal provides an example of where a technology-specific 4G licence has been issued. The 800 MHz licence issued to Sonatel in 2016 has a duration of 17 years and is technology specific to 4G. It is highly likely that prior to the expiration of the 4G licence the operator will want to reform at least one 2x5 MHz block of the 800 MHz to 5G. With 5G on the horizon, mobile operators elsewhere are taking advantage of specifications that allow 4G and 5G to operate in the same radio to deploy multi-mode radios capable of 4G and 5G with a software upgrade. Regulators that issue 4G spectrum licences are limiting the use of spectrum to what could be a legacy technology before the expiration of the licence.

If spectral efficiency is to be maximised, operators need to be free to deploy the latest technology. For example, using 4G (LTE) rather than 2G (GSM), operators can produce much higher levels of throughput for the same cost (a lower cost per bit). This enables mobile operators to offer their customers large data bundles at the same cost.

Creating an effective framework for spectrum auctions

Over the past three decades, auctions have become the dominant mechanism for mobile spectrum assignment. They were designed to provide a transparent, impartial and legally robust means of assigning spectrum to those who will use it most efficiently to support competitive, high-quality mobile services. Alternative approaches such as administrative awards and beauty contests have generally proved less able to assign spectrum in an efficient, impartial and legally robust way. Against this backdrop, effective auction design has become vital to delivering the best possible mobile services. The GSMA public policy on spectrum auctions outlines 10 best-practice positions:

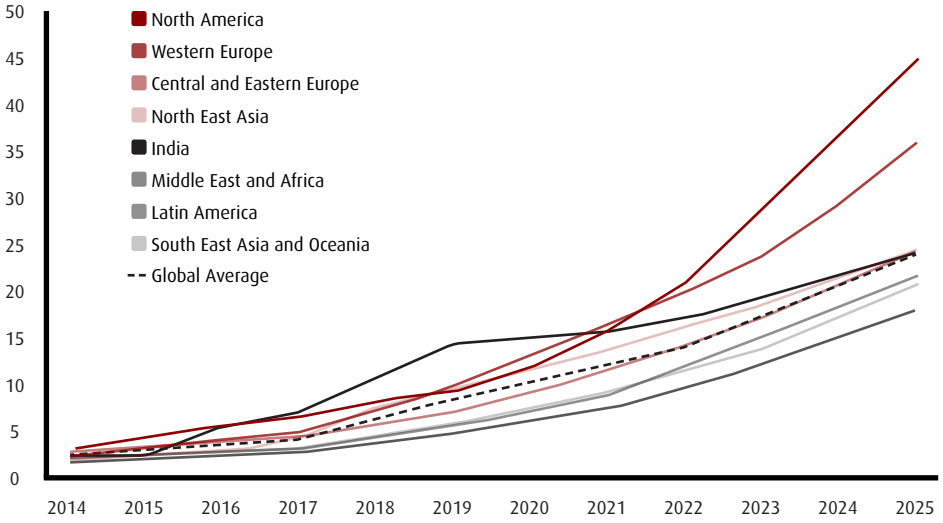
1. **Spectrum auctions should support affordable, high-quality mobile services** – Given the limited supply of mobile spectrum, the primary goal should be to ensure spectrum is awarded to operators who will use it most efficiently to support affordable, high-quality mobile services.
2. **Auctions are a tried and tested award mechanism but can and do fail when poorly designed** – Failures are frequently due to the auction design or wider regulatory issues, such as high reserve prices, artificial spectrum scarcity and auction rules which prevent price discovery or flexible bidding.
3. **Auctions should not be the only award process as they are not always suitable** –

For example, alternatives to auctions can be considered when there is evidence of lack of excess demand, or when all qualified operators and the government/regulator are able to find a mutually agreeable split of the spectrum on offer at a fair price. Auctions are almost always inappropriate for renewing expiring mobile spectrum licences. The key focus for renewals should be to provide the predictability licence holders need to invest heavily in their networks throughout the term of the licence.

4. **Auctions that are designed to maximise state revenues risk impacting consumers** – Policy measures that inflate the price of spectrum can result in spectrum remaining unsold, or sold at such a high price that the affordability and quality of services are adversely affected, thus impacting the broader digital economy.
5. **Assign a sufficiently large amount of spectrum and publish future spectrum roadmaps to support high-quality mobile services** – Regulators should publish, and regularly update, a spectrum roadmap for at least the following five years, detailing how much is planned to be made available in which bands and when.
6. **Spectrum caps and set-asides distort the level playing field** – Setting aside spectrum or stipulating spectrum caps can restrict the amount operators can access, which in turn can negatively impact mobile broadband speed and coverage, and inflate spectrum prices.
7. **Licence obligations and conditions should be designed to minimise the cost of covering non-profitable areas** – Coverage obligations should be used with caution. They should not result in inefficient duplication of networks in non-profitable areas or distort efficient assignments. As a first step, once policymakers have decided which objectives they wish to prioritise, they should consult with stakeholders on how best to achieve them.
8. **The chosen auction design should not create additional risk and uncertainty for bidders** – There is no single auction design for all types of spectrum award; factors such as individual market dynamics and the type and amount of spectrum auctioned need to be factored into the auction design.
9. **Poorly chosen lot sizes or inflexible packages of spectrum lots risk inefficient outcomes** – Auctioning frequency-specific lots can lead to distortions. Auctions should be designed to allow operators to secure the optimum spectrum to meet their needs (e.g. amount, type and location)
10. **Policymakers should work in partnership with stakeholders to enable timely, fair and effective awards** – A comprehensive consultation with all stakeholders allows sufficient time for all issues to be adequately discussed and where necessary revised. Mobile users and the wider digital economy are best served when key spectrum management decisions support sustainable growth in the mobile industry. To this end, telecoms regulators and policymakers should take steps to make all existing spectrum licences technology neutral, ensure the spectrum will be made available in time to meet market demand, and adopt spectrum auction best practices for continued investment in next-generation mobile networks and cutting-edge mobile services.

Regional Average spectral efficiencies (bits per Hz)

SOURCE: GSMA



The Ericsson Mobility Report provides key industry projections and analyses of the latest trends in the mobile industry, including subscription, mobile data traffic and population coverage. The following was taken from the June 2019 edition

In the India region, LTE subscriptions are forecast to increase by 150 million during 2019 and pass GSM/EDGE as the dominant technology. Mobile broadband1 technologies will account for 57 percent of mobile subscriptions at the end of the year, and the share of smartphone subscriptions is expected to have increased from 48 percent to 54 percent.

As the transformation toward more advanced technologies continues in India, LTE is forecast to represent 80 percent of mobile subscriptions by the end of 2025. 5G subscriptions are expected to become available in 2022 and will represent 11 percent of mobile subscriptions at the end of 2025.

The Middle East and Africa comprises over 70 countries and is a diverse region. It varies from advanced markets with 100 percent mobile broadband subscription penetration, to emerging markets, where around 40 percent of mobile subscriptions are for mobile broadband. At the end of 2019, around 25 percent of mobile subscriptions are expected to be for LTE in the Middle East and North Africa, while in Sub-Saharan Africa, LTE will account for around 11 percent of subscriptions. The region is anticipated to evolve over the forecast period, and by 2025, 82 percent of subscriptions in the Middle East and North Africa are expected to be for mobile broadband, while in Sub-Saharan Africa mobile broadband subscriptions will increase to reach around 70 percent of mobile subscriptions. Driving factors behind this shift include a young and growing population with increasing digital skills, as well as more affordable smartphones.

The Middle East and Africa region is expected to have the highest growth rate during the forecast period, increasing total mobile data traffic by a factor of 7 between 2019 and 2025. The average data per smartphone is expected to reach 18GB per user per month in 2025 in the

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Middle East and Africa region – as Sub-Saharan Africa is expected to reach on average 7GB.

Network performance as a lever for business growth

Of the global population, 13 percent lives in Sub-Saharan Africa, which is served by less than 2 percent of the mobile base stations installed worldwide. Mobile data penetration is relatively low, with data usage, smartphone penetration and 4G population coverage all only around 30 percent. However, there is increasing demand for digital services and financial inclusion, including in rural low-income areas.

Operating in 21 markets across the Middle East and Africa, MTN is pursuing 6 distinct growth opportunities, 4 of which target the consumer segment. Voice is still a significant business, presently generating almost three times more revenue than data does for MTN. However, the data revenue market is projected to increase at a compound annual growth rate (CAGR) of 20 percent in MTN markets over the coming 3 years, while the voice revenue market is expected to decline at a rate of 2 percent over the same period. Nevertheless, MTN continues to protect and increase its voice business, while pursuing data revenues to drive growth. Another ambition is to increase revenues from new digital services (mobile music, advanced messaging, mobile advertising and local content). However, from its small base, an expected 50 percent CAGR will bring the market size in 2021 to only about one-tenth of that for data and voice respectively. The fourth opportunity is financial services (mobile money, banking and insurance). MTN considers data to be its core medium-term growth driver and is deploying 3G and 4G network technologies to provide sufficient data coverage in rural areas to meet increasing demand.

In the Sub-Saharan Africa region, mobile broadband subscription penetration of the population is approximately 30 percent, but – with a young and fast-growing population – it is forecast to reach over 50 percent by the end of 2025. With customers still early in the data adoption journey, MTN is focused on realizing its belief that everyone deserves the benefits of a modern connected life, and contributing to the UN's Sustainable Development Goals, which include reducing poverty, improving health and wellbeing, and stimulating economic growth.

Strategy to connect the unconnected MTN applies a "connect the unconnected" strategy, named CHASE. It includes initiatives to build sufficient data coverage in rural low-income areas, to make data-enabled devices accessible and affordable, to promote mobile money solutions for those without banking opportunities, and to expand awareness and availability of digital services.

A cornerstone of MTN's operational strategy is to achieve best network performance in its markets by 2022. Initiatives include employing rural coverage solutions to increase 3G and 4G population coverage, plus steps to improve network quality and user experience to become a leader in network Net Promoter Score (NPS). These initiatives support an overall objective of providing best customer experience in markets where MTN is present.

Customer experience program: a structured approach MTN's objective of improving overall customer experience is built into the entire group's processes. In addition, there is dedicated management and governance directing central and local expertise in a program to identify network quality issues and implement appropriate improvements – reusing best practices across the different markets, including forward-looking services and recommendations for constant performance improvements.

Important measures when improving network quality are moving subscribers to the highest possible network layer, activation of key software features, removal of inconsistencies and alignment of parameters supporting selected network improvements.

MTN applies this methodology in several markets across the Sub-Saharan region. Two examples are Rwanda and Ghana, which illustrate different aspects of the strategy.

Network improvements in Rwanda

Rwanda is a country in central Africa, with a young, mostly rural population of nearly 13 million. It is very densely populated, with an average of 460 people per square kilometer. Over 80 percent of inhabitants live in rural areas.

The mobile internet user penetration is around 40 percent in Rwanda, indicating strong growth potential for mobile broadband, addressable by expanding 3G/4G network coverage into rural and other previously under-served areas.

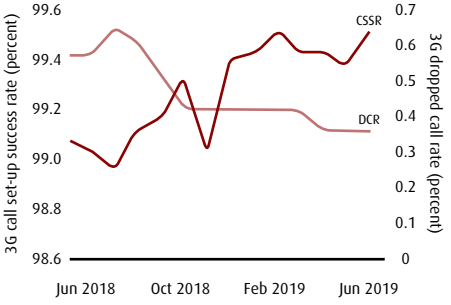
The 3G/4G subscription uptake is forecast to be high, driven by more affordable data plans. Monthly average revenue per user (ARPU) was USD2.24 in Q2 2019. Rwanda currently has a single 4G wholesale network with national roaming. Consequently, MTN's focus is to extend and improve its 3G coverage. It does this through aligning network and handset planning, and focusing on voice stability and data growth. Economically, expanding rural coverage requires cost optimization through prioritized capex planning and opex optimization.

MTN Rwanda's 2G network carries one of the highest average loads of data traffic per site and voice traffic per subscriber in the region. In 2018, there was high growth in smartphone usage and average data consumption in the MTN Rwanda network, driven by significantly improved 3G coverage and a growing customer base with 3G/4G devices. UTMS 900MHz technology was deployed to enhance internet coverage, cater for data traffic growth and improve data speeds across the countrywide network.

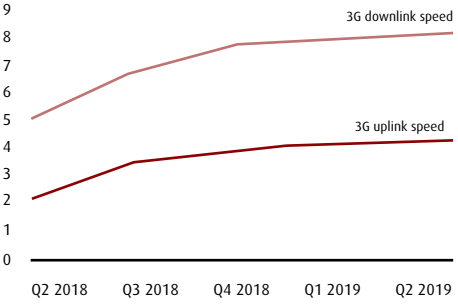
During 2019, MTN rolled out more capacity and additional sites on its 3G network to drive efficiency and better customer experience. Steps included adding software features and parameter settings to improve voice accessibility, call set-up time, and 3G data uplink coverage and capacity.

From Q2 2018 to Q2 2019, MTN Rwanda's network improvements led to positive developments across the board, with all key network indicators improving, including call set-up success rates and dropped-call rates. The network KPIs and data from performance monitor (PM) counters, combined with improving median uplink and downlink speeds gathered from drive tests, are correlated with the network NPS data. Recent root cause analysis of the network NPS data indicates the positive contribution of a good, reliable, strong and fast internet connection.

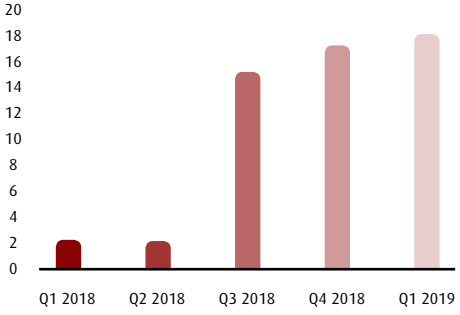
MTN Rwanda – voice 3G



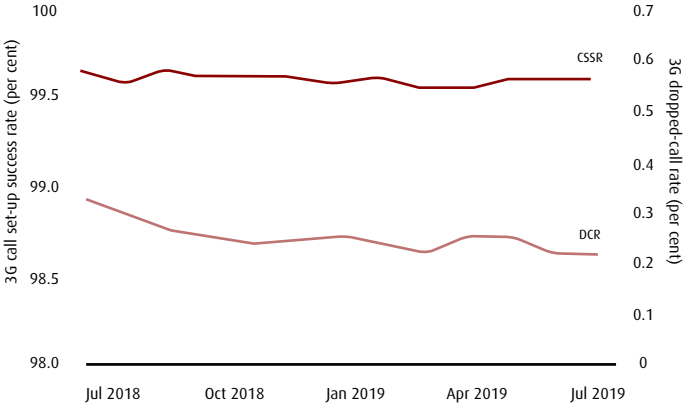
MTN Rwanda – data 3G (Mbps)



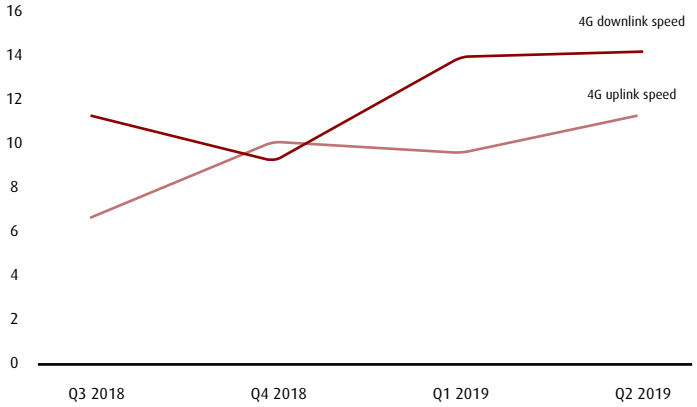
MTN Rwanda network NPS (per cent)



MTN Ghana – voice 3G



MTN Ghana – data 4G (Mbps)



The network improvements and customer satisfaction increases are reflected in solid business performance for MTN Rwanda. This includes a market share increase of 11 percentage points to 54 percent at the end of the first half of 2019, compared with the first half of 2018, as subscribers grew by 23 percent – with revenue and EBITDA up 27 percent and 24 percent respectively over the same period.

Network improvements in Ghana

Ghana, in West Africa, is a nation of 30 million inhabitants with a moderate population density of 130 people per square kilometer.

The mobile internet user penetration is around 30 percent, ARPU is over USD 4 per month, and service revenues are increasing at more than 20 percent per year.

MTN Ghana network improvements during 2018–2019 have included expanding and densifying 3G and 4G, as well as optimizing each access layer in turn, steered by KPIs covering availability, retainability, quality and traffic volume.

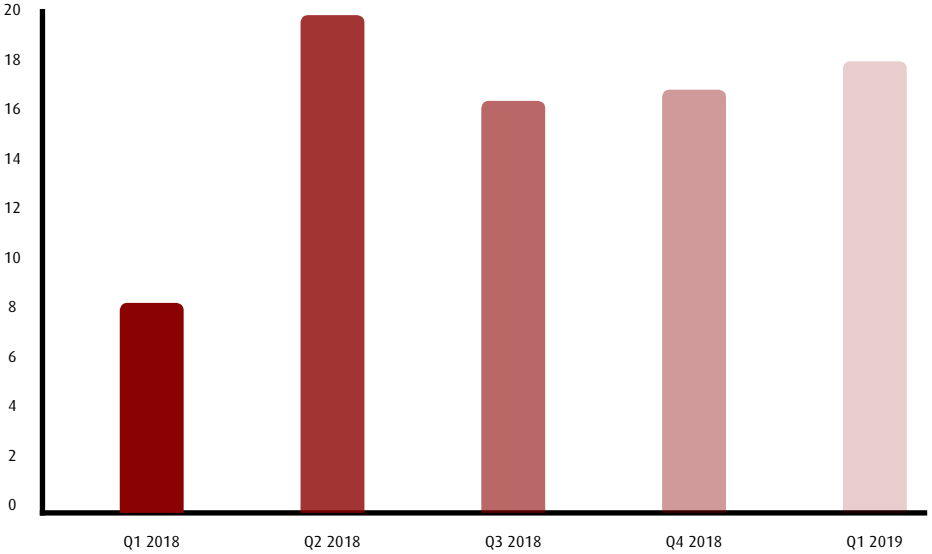
The 4G share of devices is rapidly increasing, driving data traffic volumes, with over two-thirds of the total data traffic volume coming from 4G devices. The number of 4G devices is projected to outnumber that of 3G devices by early 2020.

With low voice tariffs, average voice traffic per device in the network is very high. Around half of voice traffic comes from 2G devices, while the 2G network carries two-thirds of voice traffic.

From Q2 2018 to Q2 2019, the MTN Ghana network improvements also led to better KPIs, including call set-up success rates and dropped-call rates. As in Rwanda, Ghana's KPIs were tracked along with data from PM counters, and matched with improving median uplink and downlink speeds gathered from drive tests to be correlated with network NPS data. Recent root cause analysis of these scores highlighted the positive contribution of good coverage and data speeds.

The network and customer satisfaction improvements translated into positive business results. Comparing MTN Ghana's first half of 2019 with the first half of 2018, voice revenue was up 13 percent, and data revenue increased by 26 percent. Overall, in constant currency, revenues increased 19 percent and EBITDA increased 24 percent over the same time period.

MTN Ghana network NPS (per cent)



Leveraging network performance to address growth opportunities

The effects of network improvements on customer loyalty are measured monthly through NPS, then disaggregated into major root causes, including network performance. NPS benchmarking illustrates how user-experience improvements translate into loyalty. The network NPS is further separated into detailed root causes to analyse contributing factors.

It has substantially evolved over the past year, allowing greater precision in assessing network improvements, and is a major component in gauging performance throughout the MTN group. All network improvements are carried out within the context of actively lifting users to the highest network technology possible, to optimize the cost per Erlang (voice) and gigabyte (data) served. Integral to this is the smart capex concept which involves ranking and prioritizing radio sites identified for improvements. The goal of smart capex is to achieve the greatest return from budgeted network investments.

From network KPIs and NPS benchmarking to business performance, both Rwanda and Ghana's networks are improving user experience and results, while expanding further into rural areas and offering services to connect the unconnected. While much attention worldwide is focused on initial 5G roll-outs, for many regions the reality is continued demand for expanding 2G, 3G and 4G network coverage and capacity. The insight from these countries is that customer satisfaction and commercial success are not mutually exclusive but require regular and consistent processes to expand and optimize network services.

Regional subscriptions outlook

In Sub-Saharan Africa, LTE accounted for around 11 percent of subscriptions in 2019. Over the forecast period mobile

broadband1 subscriptions are predicted to increase, reaching over 70 percent of mobile subscriptions. LTE share will reach around 30 percent by the end of the forecast period, but HSPA will remain the dominant technology with a share of around 40 percent, which is similar to 2019. Driving factors behind the growth of mobile broadband subscriptions include a young, growing population with increasing digital skills, and more affordable smartphones. Over the forecast period, discernible volumes of 5G subscriptions are expected from 2022, reaching 3 percent by 2025. In the Middle East and North Africa region, around 23 percent of mobile subscriptions were for LTE at the end of 2019. The region is anticipated to evolve over the forecast period, and by 2025, 77 percent of subscriptions are expected to be for mobile broadband. Commercial 5G deployments with leading service providers have taken place here during 2019 and 5G subscriptions have already passed 500,000, mainly in the Gulf countries. Significant volumes are expected in 2021 and the region is likely to reach around 80 million 5G subscriptions by 2025, representing around 10 percent of total mobile subscriptions.

Voice and communication services trends and outlook

VoLTE is the foundation for enabling globally interoperable voice and communication services on 4G and 5G devices. Subscriptions are expected to reach 3 billion by the end of 2020.

Reliable, high-quality voice services are more crucial than ever. Service providers continue to evolve their networks to support VoLTE-based services. These have now been launched in more than 210 networks in 100 countries. VoLTE services are being deployed using cloud technologies to enable cost-efficient network operations, easier capacity scaling and faster service deployment.

VoLTE subscriptions are estimated to reach 3 billion at the end of 2020 and 6.4 billion by the end of 2025. This will account for almost 90 percent of all combined LTE and 5G subscriptions. The shutdown of 2G and 3G networks will accelerate VoLTE adoption and VoLTE roaming agreements. VoLTE will support subscribers and roamers with voice services, as the current most used 4G voice solution, Circuit-Switched Fallback (CSFB), will not work without 2G or 3G. VoLTE (using IP Multimedia Subsystem, or IMS) is also the foundation for enabling 5G voice calls, SMS, rich communications services (RCS), and new communication services on 5G devices. IMS is the only standardized voice solution for 5G, and there is no CSFB of voice from 5G. 5G voice will be deployed stepwise in 4G and 5G networks, using LTE-NR dual connectivity, Evolved Packet System fallback and voice over New Radio (VoNR). Successful end-to-end testing of 5G voice (VoNR) and 5G video calling with network infrastructure and the device ecosystem has been conducted.

Device availability and use case uptake There are over 2,650 VoLTE-enabled 4G devices, of which around 85 percent are phones. More than 40 5G phones include VoLTE support. VoLTE-enabled smartphones also have enhanced functionalities, such as the latest voice codecs and native video calling. There are more than 165 models supporting HD Voice+ (Evolved Voice System, or EVS), and more than 400 devices capable of video calling over LTE (ViLTE).

The latest service provider market offering is smart speakers with voice calling capabilities, using the same mobile phone number as that of a smartphone. This builds on VoLTE multi-device network capabilities which tie several devices, such as phones, smartwatches and smart speakers, to the same phone number. Over 90 service provider networks support cellular smartwatches enabled with voice services.

Other VoLTE-based services include additional phone lines on the same phone, shared phone lines, video calling, enterprise collaboration services in combination with mobile HD voice, and voice for IoT devices. 5G-related service innovations for consumers, enterprises and industries are being explored, including combinations with AR and VR. 5G interactive calling – combining a 5G voice call with real-time content sharing, for example, joint web browsing on 5G smartphones, or business and enterprise media sharing between different devices and endpoints – could become a radically improved, mainstream 5G voice service in the future.

Analysis of VoLTE usage across Europe during the weeks before and after the recent global lockdowns began revealed a significant increase in traffic, mainly due to longer call times. Due to reduced mobility of users across networks, the retainability of voice calls was improved. The VoLTE traffic increase varied by 20–50 percent across different markets in Europe. In some other markets, service providers experienced up to a 90 percent increase in Voice over Wi-Fi calls as people spent more time at home.

Mobile data traffic outlook

In 2025, 5G networks will carry nearly half of the world's mobile data traffic. Global total mobile data traffic reached around 33EB per month by the end of 2019, and is projected to grow by a factor close to 5 to reach 164EB per month in 2025. This figure represents the mobile data that will be consumed by over 6 billion people using smartphones, laptops and a multitude of new devices at that time. Smartphones continue to be at the epicenter of this development as they generate most of the mobile data traffic – about 95 percent – today, a share that is projected to increase throughout the forecast period.

Populous markets that launch 5G early are likely to lead traffic growth over the forecast period. By 2025, we expect that 45 percent of total mobile data traffic will be carried by 5G networks.

Traffic growth can be very volatile between years, and can also vary significantly between countries, depending on local market dynamics. In the US, the traffic growth rate declined slightly during 2018 but recovered to previously expected rates during 2019. In China, 2018 was a year of record traffic growth. India's traffic growth continued its upward trajectory and it remains the region with the highest usage per smartphone and per month.

Globally, the growth in mobile data traffic per smartphone can be attributed to three main drivers: improved device capabilities, an increase in data-intensive content and more affordable data plans.

In the India region, the average monthly mobile data usage per smartphone continues to show robust growth, boosted by the rapid adoption of 4G. Low prices for mobile broadband services, affordable smartphones and people's changing video viewing habits have continued to drive monthly usage growth in the region. Only 4 percent of households have fixed broadband, making smartphones the only way to access the internet in many cases.

Total traffic is projected to triple, reaching 21EB per month in 2025. This comes from two factors: high growth in the number of smartphone users, including growth in rural areas, and an increase in average usage per smartphone. A total of around 410 million additional smartphone users are expected in India by 2025. Even if the traffic per existing smartphone user continues to grow significantly over time, the increase in average traffic per smartphone is expected to moderate as more consumers in India acquire smartphones. The average traffic per smartphone is expected to increase to around 25GB per month in 2025.

The Middle East and North Africa region is expected to have one of the highest growth rates during the forecast period, increasing total mobile data traffic by a factor of almost 9 between 2019 and 2025. The average data per smartphone is expected to reach 23GB per month in 2025. Sub-Saharan Africa also has a very high growth rate, but from a relatively small base, with total traffic increasing from

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0.33EB per month to 4EB by 2025. Average traffic per smartphone is expected to reach 7.1GB over the forecast period

The Fourth Industrial Revolution and digitisation will transform Africa into a global powerhouse

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The Fourth Industrial Revolution (4IR)—characterized by the fusion of the digital, biological, and physical worlds, as well as the growing utilization of new technologies such as artificial intelligence, cloud computing, robotics, 3D printing, the Internet of Things, and advanced wireless technologies, among others—has ushered in a new era of economic disruption with uncertain socio-economic consequences for Africa. However, Africa has been left behind during the past industrial revolutions. Will this time be different?

So far, it does not appear that Africa has yet claimed the 21st century, as it still lags behind in several indicators essential for a successful digital revolution (see Figure 5.1).

Improvements in Africa's ICT sector have been largely driven by expanding mobile digital financial services: The region had nearly half of global mobile money accounts in 2018 and will see the fastest growth in mobile money through 2025.

But artificial intelligence (AI) and blockchain are also attracting interest in Africa, as they have the potential to successfully address social and economic challenges there. And there are so many other areas in which 4IR technology can be transformational.

The transformative potential of 4IR in Africa is substantial

Encouraging economic growth and structural transformation

In recent years, the ICT sector in Africa has continued to grow, a trend that is likely to continue. Of late, mobile technologies and services have generated 1.7 million direct jobs (both formal and informal), contributed to US$144 billion of economic value (8.5 percent of the GDP of sub-Saharan Africa), and contributed $15.6 billion to the public sector through taxation. Digitisation has also resolved information asymmetry problems in the financial system and labour market, thus increasing efficiency, certainty, and security in an environment where information flow is critical for economic growth and job creation.

Failure to recognize and capitalize on 4IR opportunities, conversely, will impose considerable risks on African stakeholders: Without attempts to move beyond existing models of innovation, entrepreneurship, and digital growth on the continent, African businesses risk falling further behind, exacerbating the global "digital divide" and lowering their global competitiveness. Going beyond the existing models requires discipline in governance to allow an endogenous innovative environment. At the same time, institutions must protect the market through consumer protection laws and regulations that encourage competition.

Fighting poverty and inequality

The spread of digital technologies can empower the poor with access to information, job opportunities, and services that improve their standard of living. AI, the Internet of Things (IoT), and blockchain can enhance opportunities for data gathering and analysis for more targeted and effective poverty reduction strategies. Already, we have witnessed the transformational power of formal financial services through mobile phones, such as M-Pesa, reaching the underserved, including women, who are important drivers for sustainable poverty eradication. These financial services allow households to save in secure instruments to enlarge their asset base and escape cycles of poverty.

Reinventing labour, skills, and production

By 2030, Africa's potential workforce will be among the world's largest and so, paired with the needed infrastructure and skills for innovation and technology use, the 4IR represents a massive opportunity for growth. Indeed, the 4IR is dramatically changing global systems of labour and production, requiring that job seekers cultivate the skills and capabilities necessary for adapting rapidly to the needs of African firms and automation more broadly. Already, Africa's working population is becoming better educated and prepared to seize the opportunities provided by the 4IR: For example, the share of workers with at least a secondary education is set to increase from 36 percent in 2010 to 52 percent in 2030.

Increasing financial services and investment

Digitisation has impacted economic growth through inclusive finance, enabling the unbanked to enter formality through retail electronic payments platforms and virtual savings and credit supply technological platforms. More broadly, digitisation is enabling entrepreneurs and businesses to rethink business models that are more impactful, sustainable, and connected to other sectors of the economy. For example, with fintech, digitization has gone beyond the financial sector to affect the real sector and households, transforming product designs and business models across market segments. Businesses are able to design products and trade online, and individuals are able to operate financial services and payments for shopping and investments. The government is also migrating to online platforms to conveniently provide public services.

Other 4IR technologies are also having impact. For example, in West Africa and Kenya, blockchain has enabled efficient verification of property records and transactions, and expanded access to credit in some previously informal sectors of the economy. Since blockchains are immutable, fraud—and thus the cost of risk—is reduced. There are also immense opportunities for job creation in Africa. Given the informal sector is estimated to constitute 55 percent of sub-Saharan Africa's GDP (with significant heterogeneity across countries), these tools can be transformational. Their consequences can cascade: Increased financial inclusion contributes to greater capital accumulation and investment, hence potential for employment creation.

Modernising agriculture and agro-industries

Africa has yet to harness the full potential of its agricultural sector, and 4IR technologies provide an opportunity to do so. Farming alone accounts for 60 percent of total employment in sub-Saharan Africa, and the food system is projected to add more jobs than the rest of the economy between 2010 and 2025. Farm labour and income is especially important in sub-Saharan Africa, where on-farm activities represent almost 50 percent of all rural income in countries like Ethiopia, Malawi, Nigeria, and Tanzania. Information on competitive pricing, monitored crop information, disease prevention tips, and disaster mitigation support has the potential to transform the agriculture sector to improve income, production, and demand throughout the continent. Furthermore, as incomes rise across the continent, growing consumer demand for food and beverages will coincide with business-to-business growth in agro-processing.

Ghana-based companies Farmerline and Agrocenta offer farmers mobile and web technology for agricultural advice, weather information, and financial tips. Zenvus, a Nigerian

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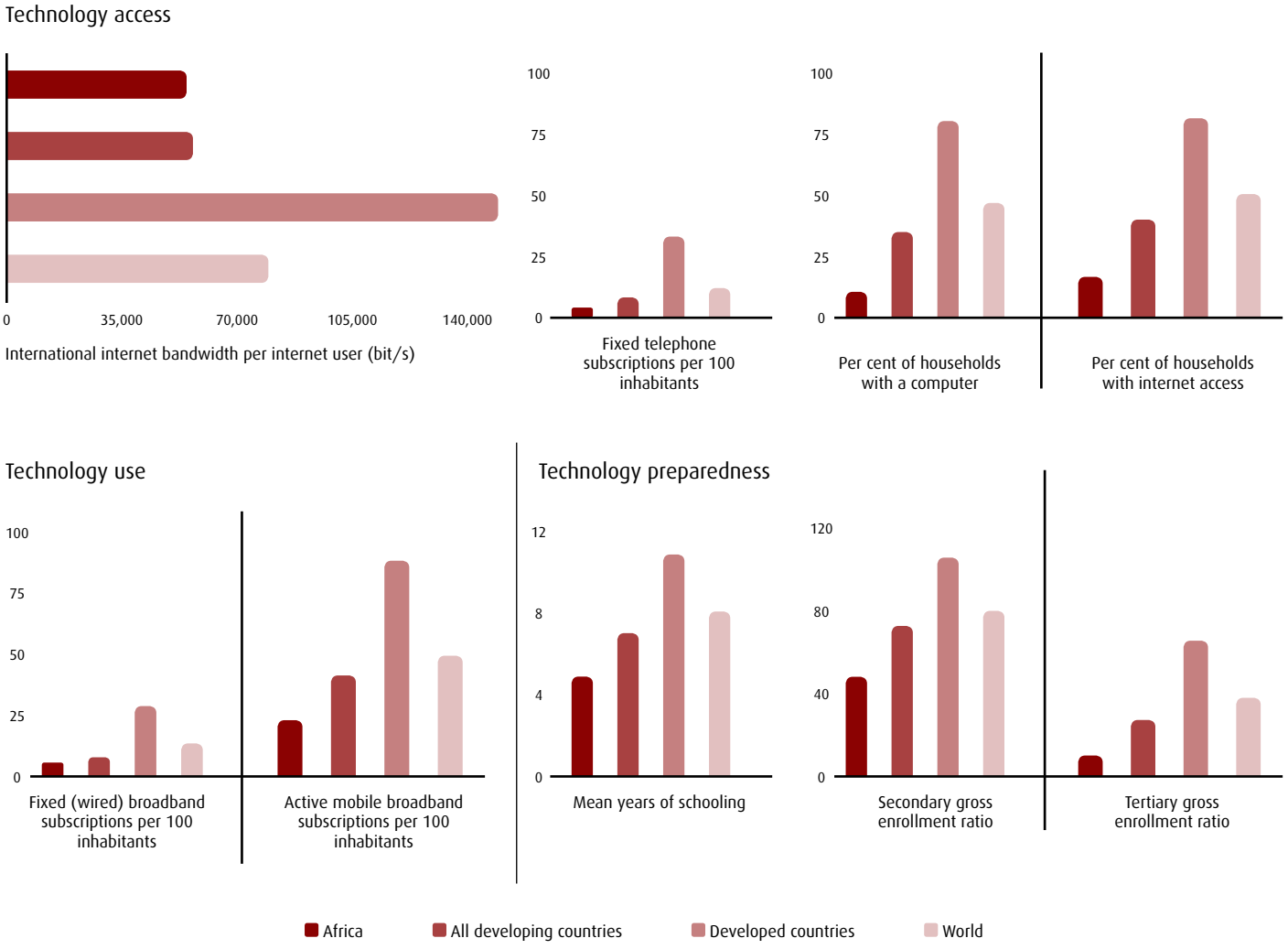
Africa's ICT development indicators: Africa still lags behind both developed and other developing countries in several indicators essential for the Fourth Industrial Revolution, especially in infrastructure, technology access and education



startup, measures and analyses soil data to help farmers apply the right fertilizer and optimally irrigate farms. The "Sparky Dryer," a dehydration machine invented by a Ugandan engineer, uses biofuel to dehydrate produce and reduce food waste. African entrepreneurs and start-ups are also using the Internet of Things to help farmers optimize productivity and reduce waste through data-driven "precision farming" techniques.

Improving health care and human capital

African countries face numerous health challenges exacerbated by climate change, limited physical infrastructure, and a lack of qualified professionals. 4IR technology can help mitigate these threats and build sustainable health care systems, especially in fragile states.

Mobile technology has become a platform for improving medical data and service delivery: About 27,000 public health workers in Uganda use a mobile system called mTrac to report medicine stocks. The SMS for Life program, a public-private partnership, reduces medicine shortages in primary health care facilities by using mobile phones to track and manage stocks levels of malaria treatments and other essential drugs. Rwanda became the first country to incorporate drones into its health care system, using autonomous air vehicles to deliver blood transfusions to remote regions. Technology has also improved disaster response: During the West African Ebola outbreak in 2014, WhatsApp became an easy method of dispersing information, checking symptoms, and communicating under quarantine.

Illness detection and pharmaceutical production have most immediately benefited from digitization. AI is being slowly implemented in Ethiopia to help medical professionals correctly diagnose cervical cancer and other abnormalities. IBM Research Africa is also using AI to determine the optimal methods for eradicating malaria in specific locations and using game theory and deep learning data analytics to diagnose pathological diseases and birth asphyxia.

Strategies for overcoming key challenges facing Africa

Clearly, the 4IR presents significant opportunities as well as challenges for Africa. The key issue for policymakers is how to position their economies to benefit from the 4IR while managing the challenges that it presents. Below are three strategies that leaders should prioritize.

Fixing the labour-skills mismatch

Since creating jobs for the burgeoning youth population is a priority in most African countries, many governments are reluctant to support technologies that threaten existing jobs. Some of the current technologies tend to replace low-skilled workers—of which Africa has an abundance—with higher-skilled workers, constraining participation in the 4IR to economies with relevant skills. African governments must invest in education and reskilling programs to ensure that technology supplements, instead of replaces, labour.

Enhancing agile governance for secure, effective management of the 4IR and integration into global value chains

As innovation is at the heart of the 4IR, reinforcing state and institutional capacity to drive and support innovation and create an enabling business environment is essential for success.

A major regulatory challenge involves increasing cybersecurity. Most African countries lack a comprehensive legal framework and institutional capacity to address cybercrime. Instead, efforts to prevent cybercrime are appearing at the more local level or are implemented by private sector actors themselves. For example, between 2015 and 2016, there was a 73 percent increase in Information Security Management System-certified companies, from 129 in 2015 to 224 in 2016, with the majority in South Africa, Nigeria, and Morocco. Adopting widely accepted and appropriate norms and regulations, such as these, is a first step to increasing cybersecurity. At the same time, companies should invest in their employees to develop cybersecurity skills and integrate cyber risk protection in their decision making process.

The African Continental Free Trade Agreement offers a unique opportunity to enhance governance around the 4IR. With aligned policies and procedures, the continent can adapt to the rapid changes of the 4IR and leverage it to accelerate participation in global value chains.

More broadly, the 4IR can actually empower service delivery, through, for example, national identification and a new generation of biometrics that can centralize data for a variety of uses and users.

Developing physical and digital infrastructure

Access to advanced technology in Africa is constrained by infrastructure parameters such as lack of electricity and low tele-density, internet density, and broadband penetration. As a result, mobile phone and internet use remains low (Figure 5.2). (For more on strategies for upgrading Africa's ICT infrastructure, see the viewpoint on page 71). Other technological bottlenecks include a lack of standardized application programming interfaces and common data languages for the increased integration of largely self-sufficient systems as well as exposure to the dangers of cyberattacks. Accelerating the physical connectivity of fibre-optic networks as well as the interoperability of virtual platforms is critical not only for upgrading technology on the continent, but also for reaching and lowering unit costs for the underserved.

More broadly, adequate infrastructure development will drive and sustain economic transformation in Africa. With lower transport and communication costs, countries with suitable agro-ecological conditions can produce high-value products. Closing the internet connectivity and access gap with advanced economies will enable more African countries to enter service export markets. Small-scale manufacturers in Africa may also become more competitive with access to digital platforms for research, sales, and distribution.

To make the most of the 4IR, African governments and entrepreneurs need to recognize new niches for industry and leverage them to achieve sustainable, inclusive growth, and take decisive steps to close the gaps in digital skills, infrastructure, and research and development. ■

in recent years, Africa has begun to close the gap in mobile phone and internet access. In 2018, compared to the European Union, the average gap in mobile phone access was only 44.6 mobile cell phone subscriptions per 100 people, down from a high of 92.8 in 2007. For internet access, the gap is also lessening, although at a slower rate: The access gap in 2017 was 55.4 percentage points, down from a high of 63.8 in 2010. By 2030, given current trends, these gaps are projected to decrease to 19.4 and 21.8 for mobile phone and internet access, respectively