chapter 4
Fixed wireless access

Lehlohonolo Mokenela,
senior analyst, Africa Analysis

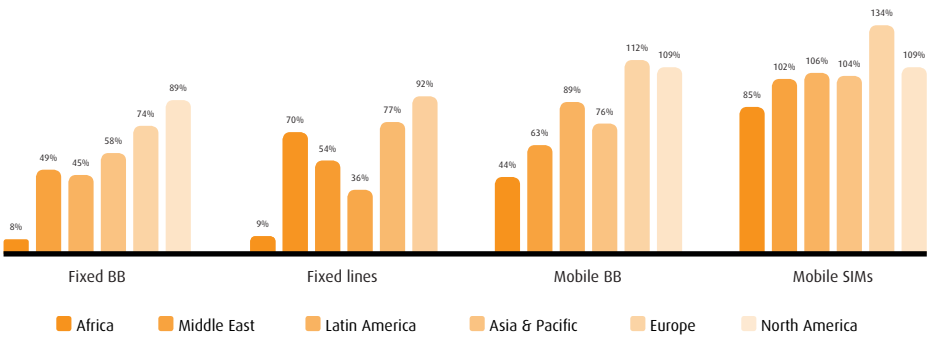
African operators have struggled to meet the continent's growing demand for connectivity due to the limited wireline infrastructure. Despite Africa's access to a growing number of undersea cables, deployment of fibre in the last mile is still limited. As a result, fixed wireless access (FWA), also referred to wireless to the x (WTTx), has come to represent the solution to Africa's last mile challenge that wired networks have been unable to solve.

While fibre to the home (FTTH) and fibre to the business (FTTB) deployments are on the rise in Africa, they are still not growing quickly enough to meet the broadband demand. With FWA operators are to provide internet access for the residential and enterprise markets, in areas with poor wireline infrastructure. Due to the slow pace of fibre deployments, African operators are expected to continue to focus primarily on growing their FWA business while gradually building out their fibre networks.

The status of connectivity in Africa

Africa has a legacy of under-investment in infrastructure that has left the development of the telecoms sector lagging behind most of the rest of the world. When the first high-capacity undersea cables landed in Africa in 2009, they were heralded as the key to unlocking the potential of the telecoms sector. However, the biggest challenge is still in taking the cables from the shore to provide affordable internet access. This has been due to the limited investment in terrestrial fibre networks, which have left countries such as Nigeria, the largest economy on the continent, under-utilizing its fibre capacity.

Exhibit 1 – Mobile and Fixed Broadband Penetration by Region and Technology, 2019



By 2019, Africa had the lowest fixed line penetration in the world at 8%, well behind LATAM's 45%, the region closest to Africa in terms of service penetration.

Africa's FTTH penetration stood at 0.5% in 2019, compared to the LATAM regional average of 4.1% and 9.9% in the Middle East. While most African countries have low FTTH penetration, Mauritius is the standout exception with a FTTH penetration 65.4%. This comes on the back of concerted efforts by the government and leading operators in the market to drive fibre deployment across the country. With a customer base of 640,000 in June 2019, South Africa had the highest number of FTTH subscribers in Africa, but a household FTTH penetration rate of only 2.7%. Other highly populated countries in the region such as DRC, Ethiopia, Kenya and Nigeria either have low FTTH penetration rates or are yet to launch the service. As a result, customers have come to rely on mobile connectivity to access the internet.

Evolution of FWA technology

Subsequent generations of mobile technology have widened the range of applications that can be offered over mobile networks. While the first and second generations supported voice, messaging and basic value-added services, LTE and 5G networks offer higher speeds on wireless broadband networks than on legacy wireline networks. They also offer operators the opportunity to drive innovation in more advanced applications such as, analytics, artificial intelligence, IoT and robotics. Moreover, with the high speed networks it offers, 5G is increasingly being touted as an alternative to FTTH services.

There is still some debate over the viability of 5G FWA as an alternative to fixed-line networks. While the argument for 5G FWA over xDSL and cable for fixed broadband services may be more straightforward, it is less in comparison to fibre. In developed markets where the coverage of fibre is fairly extensive, 5G FWA is likely to remain a long-term solution for rural and remote areas, with the metros mostly relying on fibre-based networks. In the early phases of 5G however, operators such as Verizon in the US are using 5G FWA to launch new services as well as lay the foundation for a full rollout for mobile services.

At the 2019 AfricaCom Conference in South Africa, the general consensus was that 5G represented a massive opportunity for African operators to provide high speed internet for regions with limited fibre coverage. The spectrum that it uses and the technology that it is built on, makes it ideal for offering consumers and enterprises a fibre-like experience. African

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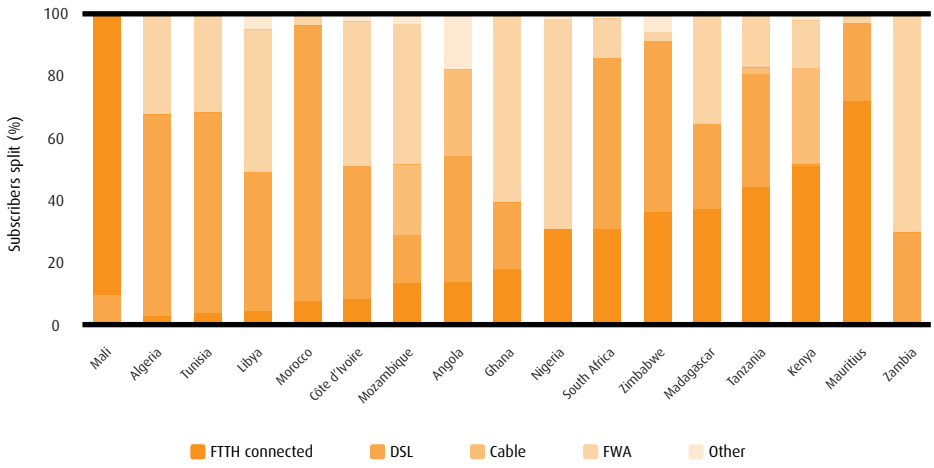
operators are therefore expected to use their 5G networks to offer FWA services as the supporting technologies such as smartphones and the cost of the service may not make it commercially viable for mobile market.

Most of the focus for 5G FWA will be on the higher-income residential sector such as those targeted by fibre, and on the larger enterprises making extensive use of cloud and IoT applications. The challenge for the 5G networks however, is that operators in Africa are still awaiting allocation of the spectrum they need to offer the service. Vodacom SA and MTN SA have been running tests 5G and believe the only hindrance to their launching 5G is access to spectrum.

The introduction of FWA services based on LTE and 5G has opened the market to a range of potential applications that make it relevant to the consumer and enterprise market. While the uptake of LTE FWA in the residential segment was fairly rapid in Africa, it is expected that the enterprise segment will lead the 5G FWA adoption. The speeds and cost of the technology will initially be more relevant and viable for enterprises who can make more use of its potential capabilities such as artificial intelligence, robotics and augmented reality. In the residential sector, there will be a case for using 5G FWA for smart home applications. This is particularly the case as Africa is still lagging behind the rest of the world to get customers on 3G and LTE, while other parts of the world have gone on to switch off their 2G networks.

Exhibit 2 – Fixed Broadband User Split by Technology in Selected Countries



FWA networks in Africa

In Africa, most of the focus has been on developing LTE-based FWA services targeted mostly at the residential sector. This is due to the dramatic increase in data consumption by subscribers who had in the past mostly used 3G networks for basic internet services, such as emails, browsing, social media and messaging applications. However, 4G/LTE networks promise higher speeds and better user experience to support more bandwidth-intensive applications such as video content and calling. Pan-African mobile operator, MTN, reported a 95% 4G/LTE population in South Africa.

The operator also began offering LTE-based FWA as a wholesale service that ISPs across the country could resell in the consumer market. The introduction of 4G/LTE networks has also seen the emergence of data-only operators such as Smile Telecom, Surfline Communications and Rain who are looking to capitalize on the limited reach of fixed-line networks. Smile has

JANUARY

Liquid Telecom plans to invest EGP8bn (USD400m) in Egypt as part of a major partnership with Telecom Egypt that includes network infrastructure and data centres. Over a three-year period, Liquid will initially spend USD50m in data centres and cloud services. It then plans to invest a further USD350m in broadband and financial inclusion initiatives, as well as what's described as "high capacity" data centres. The precise number and locations of these facilities have yet to be announced. Telecom Egypt will partner with Liquid to build the data centres across the country as well as use the network to connect local businesses to the rest of Africa. Egyptian president Abdel Fattah el-Sisi welcomed the development as a major milestone in connecting his country to the continent. el-Sisi said he would continue to push the initiative after he takes over from Rwandan president Paul Kagame as chair of the African Union (AU) later in 2019. Liquid reckons this latest deal will enable it to "significantly expand" its position as a connectivity and cloud solutions provider in North Africa. The company adds that through its data centre subsidiary, Africa Data Centres, it is providing a platform for cloud services to be delivered locally in many markets for the first time. As part of the 'One Africa' broadband network initiative, Liquid signed a partnership agreement with Telecom Egypt last year to mark the completion of the first direct terrestrial fibre link from Cape Town to Cairo (*see News, Jun/Jul 2018 issue*). Strive Masiyiwa, executive chairman of Liquid Telecom's parent company, Econet Group, the next mission is to complete a link between Cairo and Dakar as well as the rest of West Africa. He says "We have already crossed Africa from East to West through Sudan and Chad. We are at the Nigerian border and we expect to reach Abuja by the end of January in time for the AU summit. We want to reach Dakar before president el-Sisi finishes his term."

FEBRUARY

Internet speed in Nigeria is still slow despite an increase in subscriptions to 3G and 4G in the past year, according to the latest data from the Ookla Speedtest Global Index (OSGI). Nigeria ranked 107th with a mobile internet download speed of 12.22 megabits per second (mb/s) compared to 12.76 mb/s in January. The OSGI, which compared internet speed data from around the world each month, found that the global average for mobile internet download speed for the 136 countries surveyed in February was 25.27mb/s, while 10.05mb/s was the global average upload speed achieved. Industry data from the Nigerian Communications Commission (NCC) indicated that about 23 million new 3G and 4G subscriptions were added by telecom operators in the 11 months since March 2018. As of January 2019, the country attracted 61.7 million new 3G and 4G subscriptions. The OSGI also found that Nigeria's ranking for fixed broadband download speed also dropped six places from 133rd position in January to 139th position globally in February this year. In the fixed broadband category, the country recorded a 10.47mb/s average download speed and an 8.83mb/s upload speed in February. The global average for fixed broadband download speed for the 177 countries examined was 55.58mb/s while it recorded 27.64mb/s for the upload speed.

MARCH

The Zambian government has entered into talks with Chinese tech giant Huawei over the possibility of deploying 5G in Zambia. The move was disclosed by transport and communications minister Brian Mushimba who met Huawei officials. Mushimba said Huawei, the technology partner for the GRZ Communication Tower Project Phase II, has committed to upgrading

built its growth on the consumer and enterprise markets in East and West Africa, where it has built a strong and growing customer base.

By June 2019, all but 4 of the 54 African countries had a 4G network but is still some way to reaching full coverage on the continent. However, some operators are already exploring and testing the next generation of mobile connectivity 5G. Vodacom Lesotho became the first operator in Africa to offer a commercial 5G network, when it launched the network in August 2018. This was followed by Rain Mobile when it launched its commercial 5G network in South Africa in October 2019. While Vodacom Lesotho's 5G network is targeted at enterprise market and Rain at both enterprise and consumer, both operators are offering 5G access as an FWA service. Other major operators in the region, such as Vodacom and MTN have also been testing 5G technology, with launch expected in 2020 pending the allocation of spectrum by the regulator.

The case for FWA in Africa

Despite the strides operators have made to extend terrestrial fibre, particularly in the metro areas, most of the region is still expected to rely on mobile networks for broadband services. The growing deployment of LTE networks and the arrival of 5G, will plug the gap left by the limited fibre network. One of the main advantages of FWA over fibre-based networks is the relatively low cost of deployment.

Conversely, while fibre is relatively more CAPEX-intensive, once laid, it has a comparatively lower OPEX than wireless networks, which require more maintenance. The fibre CAPEX per capita can also be significantly reduced when the network is deployed in densely populated areas. Some of the leading FNOs in South Africa are gradually turning their attention to the highly populated townships with households in close proximity to each other, in order to lower the cost of deployment. In addition, as a wireline infrastructure, fibre tends to offer a more stable network, suffering less line degradation than FWA services.

Christoph Fitih, director sales, Africa, Parallel Wireless

As the new decade dawns, the telecommunications industry (specifically mobile), has finally woken up to the fact that its economics need to change, especially with the advent and expected widespread uptake of 5G. Much of this realisation has been driven by a need to move away from the consolidation of the RAN industry that has seen Huawei, Ericsson and Nokia dominate the space and in the process, creating a closed, almost anti-competitive market. The development of OpenRAN, which in 2019, really gathered momentum, has really changed the playing field.

OpenRAN by its very nature, has also facilitated a more open and collaborative approach among a host of service providers who have collectively, developed more innovative solutions to the rapidly developing communications space's needs. This ability to be creative and offer alternatives to operators, has also created the ability for operators to expand their networks and include more users for their services.

An open market and mindset have also driven efficiencies. The traditional proprietary and closed nature of RAN technology has made it costly and difficult to upgrade technology once it is deployed. The option to choose and use multiple vendors, changes this now that a wide range of product, price and services are on offer. The competitive nature of an open market will also mean that innovation will be a constant – not a bad thing if you consider just how fast the sector is evolving.

Here in Africa, OpenRAN is set to play a vital role in the connectivity race. Much of the continent is still unconnected and those that are, are largely dependent on legacy

all the sites seamlessly to 5G capability. He was speaking at Zamtel House in Lusaka in April when he officiated at the launch of ZamPay Number Neutral Capability Feature. He added that Zambia does not want to be left behind in innovation and adoption of internet technologies. 5G is the next generation of mobile internet that is expected to enable everything from instant downloads of movies to connected self-driving cars.

APRIL

Orange has launched its 4G mobile technology in Conakry, making the service available in all the areas of the capital: Kaloum, Dixinn, Ratoma, Matoto and Matam. As part of a second phase, it will be deployed to cover the whole country, in accordance with the guidelines set by the specifications, which provides coverage for at least 90 per cent of the population. Sékou Dramé, managing director of Orange Guinea, said that 4G would give the company the opportunity to offering the country and its people growth and development opportunities to which they aspire to shine in the subregion, the continent and globally. The launch of 4G by Orange occurred almost two months after the company obtained a global 10-year licence valid, for some USD90m. With the launch of the 4G, Orange takes comfort in its position as the market leader with 67 per cent market share ahead of Cellcom and MTN, its main competitor.

MAY

Malawi Telecommunications and fibreoptic network operator SimbaNet last month joined the list of African service providers that have experienced disrupted internet connectivity during crucial election periods. The internet providers saw service interruptions as results from the general election came in on Tuesday May 21st. It is understood the disruption lasted six hours in some cases. According to reports, the suspension came after a tight election in which president Peter Mutharika was seeking a second term in office. Data from digital advocacy group NetBlocks showed the outage began at 6:30pm local time, half-an-hour after counting began around the country and results were being sent to the electoral commission. Fixed network carrier Malawi Telecommunications and SimbaNET were reported to be among those affected. Local media also noted television and radio communications were taken off air in different parts of Malawi. Despite the high cost of internet combined with low internet and mobile penetration in Malawi, fake news made its way on to social media in the weeks prior to the elections, prompting a warning from the telecom regulator, The Malawi Communications Regulatory Authority.

JUNE

Telecom firm Airtel has launched Republic of the Niger's first 4G LTE network, almost a year after it paid US$22m for its 4G licence. The 4G network is available nationally, making Niger the first country in Africa where Airtel's 4G network is available nationwide from launch. Airtel, the dominant player in the country, described the feat as "a new chapter in the telecommunications revolution in Niger". At the official launch ceremony in the capital Niamey, Sani Maigochi, Niger's minister of posts, telecommunications and digital economy, said the launch chimed with the government's vision for the digitisation of the country. Airtel Niger chief executive officer Pierre Canton-Bacara agreed. "Airtel's 4G LTE network will undoubtedly trigger a new phase of accelerated, equitable and inclusive economic growth, thanks to the increase in broadband services," he said. The Nigerien government said it was hoping the introduction of the 4G LTE network would revitalise the telecom sector, improve digital services and accelerate the slow growth rate of

infrastructure, with 2G and 3G abounding, and 4G still in its infancy. That has not stopped the sprint to bring 5G to Africa though, with Uganda recently being the first country in Western and Central Africa to deploy 5G Internet.

However, although there are capabilities to deploy 5G, Africa-based operators will require the ability to run 5G alongside their existing 2G, 3G and 4G networks. At present, that can only be solved with either erecting new infrastructure or, deploying OpenRAN, which can run alongside existing infrastructure. It's a no brainer really...

On that note, here's what I see as the key components that will happen in the African telecoms market in 2020 to set up for the next decade:

5G

- Widespread rollout of 5G, including Africa.
- The first commercial deployment of stand-alone core. With the 3GPP Release-16 standard being finalized mid-2020, companies will be racing to be the first in the world with stand-alone 5G core.
- Further development of network slicing.
- 5G advancement will also accelerate OpenRAN hardware and software, and open collaboration partnerships to run 5G technology efficiently alongside their 2G, 3G an 4G networks.

4G and OpenRAN

- 4G is growing and will grow even faster in 2020. OpenRAN will allow operators to perform more deployments, including connecting rural and hard-to-reach areas.
- We may see operators move heavy data users from 4G to 5G to improve user experience for those on the 4G network.

Legacy 2G & 3G Networks and OpenRAN

- Uptake in transition from legacy infrastructure (2G and 3G) enabled by widespread deployment of OpenRAN solutions. 3G sunset but 2G will more than likely remain.

Internet of Things (IoT)

- IoT will continue to grow, but at a slower pace than previously predicted. The connectivity will include many different options, including cellular, wi-fi, Bluetooth, non-cellular LPWA technologies, and more.
- Enterprise use of IoT will increase, specifically with regard to smart manufacturing.

Private Networks

- Private networks will start to gain importance, which will help solve tasks that were traditionally difficult to perform using other wireless technologies, while improving performance and productivity and ensuring security.

Smartphones and Smart Feature Phones

- As 5G rollout becomes more widespread and consumer interest grows, we will start to see cheaper 5G smartphones. Apple have already hinted at a small, cheap 5G handset for first half 2020
- Smart Feature Phones will continue to gain traction, especially in developing countries, allowing people to move from 2G technology to 3G and 4G technologies.

Blockchain and Payment gateways

- The World Economic Forum's Africa Growth Platform and the development of open public Blockchain initiatives like The African Chain, will see Africans connecting to the digital economy in a big way. This will work hand in hand with expansion of the telecoms network across the continent.

2020 will also see the roll-out and uptake of other smart technologies such as XR/VR SIM driven glasses, advancements in the research of Autonomous Vehicles, smart homes and cities (a focus will be on bettering privacy and security). All in all, the advent of this new decade is an exciting time for the global telecoms sector, but especially for Africa and Africans who can look forward to being actively involved in a vibrant and sustainable digital

the local telecoms sector – specifically to help achieve the goal of 70% penetration by 2020. Airtel controls more than half of the market share, according to the Regulatory Authority for Telecommunications and the Post (ARTP). Other players are Atlantique Telecom Niger SA, Orange Niger SA and Niger Telecom SA.

JUNE

South Africa's Competition Commission (CC) has welcomed the government's new spectrum policy and has pledged that customers will experience better coverage and lower data prices. The CC said in a statement that it backed the department of communication's plans to establish a wireless open access network (WOAN) and offer high demand spectrum to smaller players. "At a time when public finances are under such pressure, it is tempting to try (to) maximise revenues by simply auctioning spectrum to the highest bidder," the CC said." However, as the data market inquiry provisional recommendations counselled, such short-term thinking would deny South Africa a unique opportunity to bring about lower data costs both now and in the future. High demand spectrum is a scarce national resource and its allocation should be done in a manner which ultimately benefits the citizens of the country," it said. The CC added that it would continue to be engaged with the spectrum licensing process as the new policy takes shape. "This may include obligations to ensure affordable data prices immediately, but also how relative allocations between operators may shape competition going forward into new generation networks such as 5G," it said. "It will also include measures to ensure the commercial and competitive success of the WOAN, avoiding some of the difficulties faced by other late entrants, as well as appropriate regulatory oversight of that entity." The CC published a provisional market inquiry published in April, in which it said that international benchmarking confirmed that South African data prices are high – particularly for mobile prepaid data. It also said that existing data prices were "anti-poor" and "lack transparency" – and recommended that South African telecom firms address the problem. It recommended that networks should also reduce the price of sub1GB bundles to within range of an "objectively justifiable and socially defensible range of the 1GB price".

AUGUST

Huawei has partnered with Belgium non-profit organisation Close the Gap to provide digital skills training to rural and remote communities in Kenya. Huawei's DigiTruck is a mobile digital classroom implemented by Huawei as part of Tech4ALL. Huawei stated, "In Kenya, for example, despite being the ICT hub in Africa, internet users account for less than 50% of the total population, not only because more than 75% of the population live in remote areas, lacking stable power supply, but also because many people do not realise the real value of digital skills, who have never been exposed to smartphones or used the internet,". Huawei said its DigiTruck is designed to deliver digital skills to remote homes through mobile digital classrooms converted from truck containers. It is equipped with wireless broadband enabled by fixed wireless access, laptops and smart phones enabling internet skills to be taught aboard and incorporating VR content in digital education. It also has solar panels and batteries capable of powering it, so it can reach remote rural villages without electricity. "For over 15 years, Close the Gap has been bridging the digital divide in developing countries by providing high quality refurbished ICT-devices to more than 5700 projects with a social impact," said Olivier Vanden Eynde, founder and chief executive officer of Close the Gap. "With the different DigiTrucks we have been able to reach even the most isolated communities that have little or no

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Year in review

There was worldwide growth in Fixed Wireless Access (FWA) in 2019 and Africa was a major beneficiary of this growth. The previous negatives of using copper cable and resultant thefts are now being consigned to history in Africa, as wireless broadband takes the lead in urban and rural areas. The capability of 4G and 5G networks, with high data throughput and low latency to provide fibre like performance is now well established.

Wireless has the key advantage in that it doesn't require the physical connectivity of cable or fibre and the associated trench digging for cables and is therefore a cheaper alternative.

5G to start producing a ROI

Ericsson believes that African and Middle Eastern network developers can expect potential revenues of up to US$46 billion by 2030, if they adapt their business model and become service enablers and creators. Ericsson's 5G Business potential beyond mobile broadband report, alludes that operators could adopt new business models and develop new services, applications and revenue streams.

Given that Ericsson predicts that 5G will cover 65% of the world's population by 2025 and handle 45% of global mobile data traffic, the African market will consequently substantially benefit. With a projected 2.6 billion 5G subscribers by 2025 it is a market that Africa cannot ignore.

The leading communication providers outside of the African continent, switched on their 5G networks in 2019. Africa is in the early stages and just commencing, a very limited, roll out which will see consumers facing high costs of 5G access, as well as the cost of acquiring 5G compatible devices such as smartphones, compared to the ever widening coverage of 4G LTE.

It will be the mining, oil, gas, transportation systems, public safety and manufacturing sectors that will have the greatest opportunities to increase profits by capitalizing on 5G. Potentially there could be 60 million mobile 5G users in the Middle east and Africa by the end of 2024.

African internet access is priced too high

With all the advances in African networks and service improvements in 2019, there is still the inequality that African nations are paying some of the highest rates, for what is often basic internet access. Although access costs have fallen and continue to fall, they are still higher than what most of the world must pay.

Research by the Alliance for Affordable Internet highlights the need for policy makers and regulators to promote competitive and diverse broadband markets as key ingredients to drive down the cost of internet access.

Being able to connect to the internet can be transformative for individuals in Africa, due to educational, health and business opportunity that such access enables.

In Africa limited competition means that the absence of a strong pressure of market competition, results in the price of mobile data remaining high. The cost of establishing networks in Africa also means that the return on investment is limited to the ability of consumers to pay for services to produce profit. The Alliance reported that citizens of Chad, the Democratic Republic of the Congo and Central African Republic pay more than 20% of average earnings for 1 GB of data. The most affordable areas of the continent are in Egypt at 0.5% and Mauritius at 0.59%. There has been some indication of price reduction such as in Sierra Leone, where the relative cost of 1GB of data fell from 25.9% to 9.9% after the introduction of more affordable data plans by

access to ICT, also bring quality training and education to these areas.

SEPTEMBER

South African telecom operator Rain has launched a commercial 5G wireless home broadband service, becoming the first in the country to do so. The mobile data-only provider has started rolling out the service, offering uncapped internet usage for R1,000/ month, to selected areas where the company has network coverage. The fixed-wireless 5G service is aimed at home broadband and is currently only available in parts of Johannesburg and Pretoria for now. "During 2019 and 2020, coverage will expand to Cape Town, Durban and other major metros," said Rain chief marketing officer Khaya Dlanga. "Selected customers in Rain's 5G coverage area have been invited to be the first to purchase ultra-fast 5G". The service has been promoted as an alternative to ADSL, fibre and fixed-LTE offerings. "In the next couple of weeks, Rain will open up the offer to all homes and small businesses within the coverage area of Johannesburg and Tshwane," Dlanga added. Rain has built its 5G network using technology from China's Huawei atop its spectrum allocation in the 3.6GHz radio frequency spectrum band. South Africa's bigger and more established mobile operators are still unable to launch 5G services until they get access to more spectrum from the regulator.

OCTOBER

African and Middle Eastern network developers can expect a potential revenue opportunity up to US$46bn by 2030, provided they adapt their business model to become service enablers and creators. That is according to Ericsson's 5G Business Potential beyond Mobile Broadband report. A sequel to the 5G Business Potential report, Ericsson highlighted the "industry verticals" that are prominent in the region and offer clear opportunities for 5G use cases. "5G will introduce opportunities that will allow operators to adopt new business models and develop new services, applications and revenue streams," Chafic Traboulsi, VP and head of networks, Ericsson Middle East and Africa said at GITEX Technology 2019 in Dubai. "These new 5G applications and services are expected to have a profound impact on consumers, businesses and industry digitalisation which underscores the importance of releasing our research at this time." Ericsson has identified four industry verticals that form the primary focus in the addressable 5G business potential opportunity and cited clear opportunities for the following 5G use cases: oil and gas (mining), transport and automotive, public Safety and critical infrastructure and manufacturing.

NOVEMBER

Seychelles company Intelvision, which provides TV and internet services to the local market, is understood to be moving into the mobile sector.

The only fixed broadband and pay TV provider across the archipelago revealed that it was planning a network rollout in 2020 alongside Chinese tech vendor Huawei.

There will be an initial focus on 4.5G services but deploying 5G technology will also be part of the plan. The company said that it intends to roll out a 5G network in Seychelles' inner islands as and when 5G devices become more accessible. The next generation will be introduced in June 2020 in the largest island Mahé, beginning with the capital, Victoria, north Mahé and the airport. Over the following 12-18 months it will be extended through much of the rest of the nation.

Currently only two network operators share the mobile market of the Seychelles: Bharti Airtel and Cable and Wireless Seychelles.

DECEMBER

Ghanaian technology company Celltel Networks has appointed local finance company Ed&Co Capital as financial advisors for the US$500m Ghana Smart Cities project. The idea is to provide an affordable nationwide Wi-Fi network in collaboration with local government institutions and other strategic and relevant government agencies in the west African nation. It is scheduled to begin in the second quarter of 2020.

the country's largest operator. Income increases for some customers drops the relative cost of data, even if the data cost itself is not reduced. The Alliance has shown that seven countries in 2019 reached the international threshold of affordability, including those at below average income levels in Algeria, Cape Verde and Namibia.

Are Towers growing in importance?

The last 12 months has seen changes in tower design to improve sustainability, security and operation. The importance of towers for the provision of 4G and 5G is self-evident and with the requirement for a greater density of towers for 5G, the future for tower companies and component providers looks bright.

In a world that demands sustainability and compliance with low carbon emissions, the question has been raised as to why so many towers in developing countries are still powered by diesel generators.

Commercial alternatives are available that can provide relatively clean power for tower site operations, ranging from solar and wind power, to batteries and fuel cells.

Companies such as, MTN Cameroon, have been trail blazers in Africa by going green with solar-powered base stations. Estimates of the number of towers in Africa come in at just over 180,000 with some 35% not connected to the electricity grid, while diesel still provides a cheap and readily available fuel to generate electricity.

The last year has seen some tower companies increase their number of towers, while others have been involved in number reduction or consolidation.

South Africa's tower market has been up and down, with just over 30,000 operational towers. One company, MTN is in the process of consolidating its tower numbers, after several years of growth, as is Telkom's Gyro Group. American Tower has seen modest growth in its operational tower number. The latter part of 2019 saw the listing of shares in Helios Towers on the London Stock Exchange which raised over US$300 million to help towards its expansion in the African market and to fund the purchase and development of new sites. Helios has over 6,900 sites spread across South Africa, the Democratic republic of Congo, Ghana, the Republic of Congo and Tanzania, which it rents to Mobile Network Operators providing wireless voice and data services. It saw an increase in tower numbers and acquired SA Towers to increase its tower presence in South Africa, though Helios Tower saw a rationalization of its towers in Central Africa.

Things can only get better, IoT in 2019

The Internet of Things (IoT), or the connection of sensors, smart meters, machines, appliances and devices amongst an ever increasing list of things, via networks and technology to the internet is a growing sector and a potentially very profitable one, which has seen strong growth in 2019. Its application in smart cities, remote monitoring and consumer items is growing exponentially, as is the amount of data being generated by IoT devices.

Leaving aside two aspects, firstly the fear that Huawei could share IoT derived information with the Chinese state and secondly the consumer aspect, (and specifically the growth generator of Smart home devices) that consumer activity can be monitored via IoT and the potential privacy issues which this raises, both of which are for governments to legislate on, the major benefit of the Internet of Things will be for industry and commerce. With predictions that connections for IoT will be in the region of 25 to 28 billion in the next 5 years up from the 10 to12 billion estimate at the close of 2019, business will need to address the massive increase in data generation.

Africa is a continent comprised of regions that are developed and developing and the impact of IoT is therefore mixed. The deployment of devices in undeveloped regions that have IoT capability, but no connectivity or poor connectivity will limit the potential for revenue generation. This should be addressed as Africa benefits from a future increase in deployment of Nano Satellites, that will provide a lower cost connectivity to support the IoT market.

It is data mining and analysis of data that is the challenge in an African market that will generate immense amounts of data from IoT devices, and no doubt the deployment of Artificial Intelligence and machine learning will fit in somewhere in the solving of these problems to enable the generation of income streams.

The division between consumer aspects and business aspects will see an overwhelming shift to the importance of enterprise connections, as IoT connections in the Machine to Machine (M2M) and Cellular IoT Business increase, enterprise IoT connections will exceed consumer ones by 2024 and are expected to triple between 2019 and 2025.

For the Africa market, Big Data Analytics is a challenge, without the provision of extensive 5G coverage, data centres and a market for the mined and analysed information.

The relative underdevelopment and poverty of some African regions means that consumer IoT generated data may not lead to additional sales. As mentioned previously the privacy aspect for the individual and the data IoT devices will generate, needs to be legislated for. The reality of interconnected autonomous cars is still some time away for most of Africa and the last year saw little development of that market. But on the positive side agricultural applications for IoT devices, from monitoring cattle to crop protection and supply chain support are important to African regions as they can increase productivity and crop production, not only to feed Africans but also to increase revenue from food exports. The questions an African enterprise needs to consider are: why is the enterprise attracted to IoT, are its competitors using it and using it for the right commercial reasons and is there an IoT fit in the enterprise's strategy? The reality is, that many African enterprises still require the skilled individuals to implement IoT and to draw down the benefits for the enterprise. African enterprises must decide if IoT is critical to their business, that it will produce a return on investment, is safe and secure from hacking, that they have the right people and skill sets in place to implement it and the funding to implement and maintain it.

Fixed Wireless Access (FWA) African growth

Africa has a long way to progress to increase the penetration of Fixed Wireless Access across the continent. This is where the progression of 5G, although itself not rapidly deploying, can increase the percentage of FWA coverage. LTE has been launched via FWA in dense population areas and where there is a concentration of potential enterprise use.

There is slow but increasing demand, though this demand is end user cost related for FWA and its enhanced capabilities for low latency and stability. Although FWA is readily accessible as regards coverage and ease of application and installation, the cost as mentioned above, for domestic users means that provision is directed at the more affluent communities. The opportunity for cost

Lehlohonolo Mokenela, senior analyst, Africa Analysis

The year ahead: As a result of the Covid-19 pandemic, more companies have adopted "work from home" models to ensure their employees remain productive during the lockdown. This has included assisting them with broadband access from the home, using FTTH and LTE and 5G-based FWA connectivity. During the lockdown, mobile operators have witnessed a growth in data traffic on their networks as consumers use FWA solutions to access the internet. With the conclusion of the pandemic still unclear and companies realizing the viability of the "work from home" model, the demand FWA and fibre broadband services for the home are expected to remain fairly high even after the lockdown.

saving by means of using spare capacity for FWA that may be available on existing tower constructions is advantageous.

FWA is not a universal solution but is dependent on the topography of a location and its suitability to provide the best connection for domestic and business customers.

Business has a slightly different requirement to that of the domestic customer, in that business will pay a premium for reliability and speed. The potential for 5G to be the primary support for the development of the Fourth Industrial Revolution, which is touted as the upheaval of societal, political, economic and cultural aspects of the last century due to an increase in digital technologies of this century. The convergence of biological and physical innovations with digital innovation is the core to the fourth industrial revolution. The constraint is the willingness for humans to be acquiescent to the impact of the new revolution and its supercomputing, intelligent robots, self-driving autonomous cars, augmented reality and Artificial intelligence and ubiquitous Internet of Things.

According to the research company Ovum, there were 4 million Fixed Wireless Access subscriptions towards the close of 2018 in sub Saharan Africa, representing some 62% of the region's fixed broadband usage. South Africa and Nigeria accounting for the Lion's share of this. Although Mobile broadband is the faster growing technology in sub Saharan Africa. FWA has its place especially when mobile is more of a scattergun approach with FWA networks being more defined as regards geographic coverage and designed as a network around a specific user's needs. This specific design network can guarantee the enterprise a specific service level and continuity. ■

Justin Farnell, founder, WiFiontheMove

WiFiontheMove delivers managed cloud (mobile LTE data, passenger WiFi access and analytics, geo location and advertising) services to the following transport verticals across the southern Africa region: coach tour and inter-city operators, public commuter buses and trains.

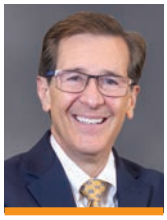
The company was founded back in April 2018 by Justin Farnell, an English telecom entrepreneur who has been delivering connectivity solutions to Southern African enterprises for over 10 years.

The value proposition is offering managed Wi-Fi to bus and coach operators, with the vehicle router, passenger access and analytics, and mobile data, all managed through the cloud.

To date, there are seven coach operators who are currently using the service. In South Africa, the principal customer is Mega Coach, but through an OEM partnership with global coach builder Irizar, there are now Zambian, Zimbabwean, Malawian and Botswanan operators looking to offer value add services to their long haul intercity passengers.

"The focus for 2020 is to monetise the WiFi through personalised advertising and loyalty promotions," Farnell says. "In addition, he is testing a new integrated Wi-Fi and VOD platform that also has vehicle telemetry data, all managed via a single cloud dashboard.

Finally, Farnell sees the public transport sector in South Africa opening up "in a big way: in 2020. "For too long the focus of transport operators has been to move people from A to B and that's it," he adds. "Onboard Wi-Fi presents a fantastic opportunity to offer a host of cloud services to commuters, whilst enabling the operator to build an interactive (mobile app) based relationship with their customers, enhance security, optimise travel routes, and reduce operational expenses, by improved telemetry."



Robert Schena, CEO, Rajant

Rajant Corporation has been involved in some heavy-duty industries for a number of years now, such as mining and oil and gas, spanning Africa and other continents.

"It's no secret that those are potentially hazardous sectors to work in, so the thrust is, understandably, to make conditions safer by moving toward autonomy," says Robert Schena, CEO Rajant. That means a combination of deploying robots underground and turning 300 and 400 ton trucks into robots above it. In other words, letting robots do the dirty work. Autonomous trucks are able to operate in unforgiving conditions, be it high altitude, sparsely populated desert areas, while reducing the need to recruit a workforce in a given region. Emissions are also saved, as the trucks always take the most efficient route possible. What's more, while trucks need maintenance, they don't need lunch breaks, they don't get vacations and are very consistent in their behaviour."

Schena says "that's not to say adopting and embracing automation is a simple operation" – far from it. "First a start, key things need to be in place. If you are going to rely on networking technology in order to have trustworthy autonomous networks, your network better really work otherwise you're going to get people killed," he adds. "That means partnering with the right people is essential. Secondly, should autonomy work as planned – it will, but may take a little longer than some people think – when it's deployed, functional and reliable, the operating costs are going to be tremendous. The aim, therefore, is to make it affordable, particularly to the industries and people that need it most.

He compares Africa/with Asia, highlighting the different needs, highlighting the fact autonomous technology will evolve in various places at different speeds. "For example, there is a separation between the local economy and mining in particular. Mining is a global market in terms of who the customer is. Sometimes the local economy has less impact on the need for the output of mining. You're selling it to China and US and so customers may not be local.

That means the local economy may not have as big an impact on a particular global vertical."

As far as Rajant's client base goes, they're giant multinationals. "Whether its Rio Tinto, De Beers or Anglo, they are thinking in five to 10-year increments and the amount of dollars they invest before they ever take a shovel to the ground is so big that they have to think long term, so the individual vagaries in a local environment impacts them less," Schena says.

David Sumi, vice president, marketing, Siklu

"The year 2019 will be remembered as the year of 5G as companies and the media rushed to talk about and share their 5G plans, both 5G Mobile and 5G Fixed," says David Sumi, vice president of marketing at Siklu. He says this is all being driven by the 'need for speed' as gigabit connections become table stakes for consumers and enterprises alike.

"For Siklu, we have been a gigabit company for years, and now the market demand for what we offer is soaring," Sumi continues. "As operators and cities become familiar with wireless fibre and what it can do, they realize that no one box will meet all their needs. With the industry's broadest portfolio of point to point, point to multipoint and mesh products backed by a suite of SaaS applications Siklu has everything necessary for massive city wide or regional wide mmWave, wireless fiber networks and continued to add products – hardware and software in 2019."

Sumi adds that the Telecom Infrastructure Project launched by Facebook also saw progress in offering Terragraph (TG) compliant systems to the market. "This industry forum is delivering interoperable equipment for 60GHz mesh networks to deliver gigabit connections to homes and businesses," he says. "Siklu was proud to announce at the TIP Summit in November a complete TG line of products which will be rolled out over the course of 2020 further driving Fixed 5G to the end user."

With 2019 being the year of 5G announcements, Sumi says Siklu expects 2020 to see a massive ramp in deployments of fixed 5G networks - all being driven by the demand for gigabits. ■

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