TELECOMMUNICATIONS

2020/21

Published by:

Creamer Media's RESEARCH CHANNEL AFRICA

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A REVIEW OF SOUTH AFRICA'S TELECOMMUNICATIONS SECTOR

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The information in this report is correct as of January 13, 2021.

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CONTENTS

ABBREVIATIONS AND ACRONYMS 4

KEY DEVELOPMENTS 6

MARKET OVERVIEW 8

TELECOMMUNICATIONS COMPANIES 10
- Cell C 10
- MTN 12
- Rain 16
- Telkom 18
- Vodacom 23

INDUSTRY TRENDS AND CHALLENGES 30
- Covid-19 32
- Spectrum Crunch 34
- Mobile Broadband 36
- Fixed-line Broadband 40
- Fifth-Generation 43

INTERNATIONAL CONNECTIVITY 45
- 2Africa 45
- ACE 45
- EASSy 46
- Equiano 46
- Metiss 47
- PEACE 47
- SACS 47
- SAEx1 47
- SAT-3/WASC/SAFE 48
- Seacom 48
- WACS 48
- Satellite connectivity 48

POLICY AND REGULATORY DEVELOPMENTS 50
- Call Termination Regulations 50
- End-User and Subscriber Service Charter Regulations 50
- ICT Sector Code 51
- IMT Roadmap 51
- Number Portability Regulations 52
- Priority markets 52
- South Africa Connect 53

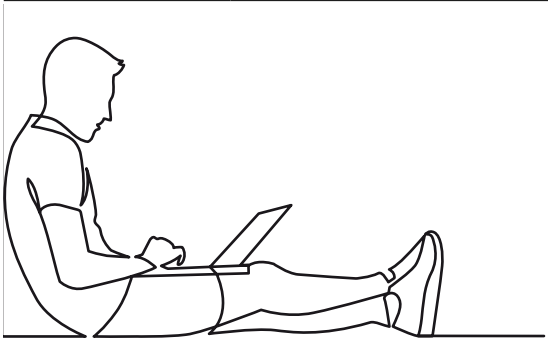
PROSPECTS 55

SOURCES 57

ABBREVIATIONS AND ACRONYMS

2G	second generation
3G	third generation
4G	fourth generation
5G	fifth generation
ADSL	asymmetric digital subscriber line
ARC	African Rainbow Capital
ARPU	average revenue per user
BBBEE	broad-based black economic empowerment
BEE	black economic empowerment
Brics	Brazil, Russia, India, China and South Africa
capex	capital expenditure
CBN	Central Bank of Nigeria
CIVH	Community Investment Ventures Holding
CTR	call termination regulations
CWU	Communication Workers Union
DBSA	Development Bank of Southern Africa
DCDT	Department of Communications and Digital Technologies
DRC	Democratic Republic of Congo
DSL	digital subscriber line
EASSy	Eastern Africa Submarine Cable System
Ebitda	earnings before interest, taxes, depreciation and amortisation
EUSSC	End-User and Subscriber Service Charter
EUSSCR	End-User and Subscriber Service Charter Regulations
Fintech	financial technology
FTTB	fibre-to-the-business
FTTbs	fibre-to-the-base-station
FTTC	fibre-to-the-cabinet
FTTH	fibre-to-the-home
FTTH/B	fibre-to-the-home/building
GDP	gross domestic product
HDG	historically disadvantaged group
Icasa	Independent Communications Authority of South Africa
ICT	information and communication technology
IMT	international mobile telecommunications
ISP	Internet service provider
IT	information technology
ITA	invitation to apply

ITU	International Telecommunication Union
LCA	Lesotho Communications Authority
LEO	low-Earth orbit
LTE	long-term evolution
LTE-A	long-term evolution-advanced
Mena	Middle East and North Africa
Metiss	Melting Pot Indianoceanic Submarine System
MVNO	mobile virtual network operators
NCA	National Communications Authority
OOB	out-of-bundle
PoP	point of presence
RIA	regulatory impact assessment
Rica	Regulation of Interception of Communication Act
SACS	South Atlantic Cable System
SAEx	South Atlantic Express
SAFE	South Africa Far East
SAT-3	South Atlantic 3
Seagha	Southern and East Africa and Ghana
SITA	State Information Technology Agency
SPV	special purpose vehicle
TCRA	Tanzania Communications Regulatory Authority
UCT	University of Cape Town
Usaasa	Universal Service and Access Agency of South Africa
USAF	Universal Service and Access Fund
VERPs	voluntary early retirement packages
VSP	voluntary severance package
WACS	West Africa Cable System
Weca	West and Central Africa
Woan	wireless open-access network



KEY DEVELOPMENTS

December 2019: The Competition Commission publishes its final report on its Data Services Market Inquiry, confirming that South Africa's cost of data services, particularly mobile prepaid data pricing, is high when benchmarked against the country's peers.

January 2020: Telecommunications network provider MTN relaunches its Mobile Money service in South Africa.

January 2020: Wireline and wireless telecommunications provider Telkom issues Section 189 notices to its employees that could result in up to 3 000 jobs being shed.

March 2020: Mobile communications network provider Vodacom reaches an agreement with the Competition Commission over the data-pricing recommendations outlined in the final report of the Data Services Market Inquiry, with the implementation of pricing transformation initiatives effective April 1, 2020.

March 2020: MTN CEO Rob Shuter announces plans to step down at the end of his four-year contract in March 2021 to accept the role of CEO of BT Enterprise, in the UK.

March 2020: Vodacom and Kenyan mobile network operator Safaricom complete the acquisition of the M-Pesa brand and product development and support services from Vodafone through a newly created 50:50 joint venture.

April 2020: The Independent Communications Authority of South Africa releases emergency spectrum to enable operators to alleviate some of the pressures placed on the network during the lockdown because of Covid-19.

April 2020: MTN and mobile operator Cell C sign agreements with the Competition Commission to implement reduced data prices and initiatives that are in line with the recommendations made in the final report of the Data Services Market Inquiry.

May 2020: Vodacom announces that it will separate its South African operations from the Vodacom Group, with the newly created standalone Vodacom South Africa to be led by MD Balesh Sharma.

May 2020: Cell C, with 11.80-million subscribers as at May 31, 2020, is now believed to be surpassed by Telkom, with 12-million customers reported in March, as South Africa's third-biggest mobile operator by subscriber numbers.

May 2020: An expanded three-year roaming agreement between Cell C and MTN becomes effective.

May 2020: Vodacom South Africa switches on its first mobile and fixed fifth-generation services network.

June 2020: MTN launches its fifth-generation network.

June 2020: Telkom suspends its dividend payouts, effective from the 2021 financial year, for three years to redirect the capital to acquire much-needed spectrum and complete its capital expenditure programme to ensure future sustainability.

June 2020: Cell C starts a Section 189 process that could affect 960 jobs.

July 2020: Mobile data-only network Rain launches a commercial standalone fifth-generation network, believed to be one of the first in Africa, in Cape Town.

August 2020: MTN announces plans to exit the Middle East region to focus on its African markets, starting with the sale of its 75% stake in MTN Syria to TeleInvest.

August 2020: Telkom enters the mobile financial services sector with insurance product offerings.

August 2020: Prepaid products and electronic distribution of virtual merchandise specialist Blue Label announces that Cell C's recapitalisation is on track to be concluded by the end of 2020.

August 2020: Cell C announces its intention of closing 128 of its 240 retail stores and cutting 546 jobs.

September 2020: MTN Group CFO Ralph Mupita assumes the role of MTN Group CEO after being appointed in August 2020 as Rob Shuter's successor.

September 2020: Telkom is confirmed as South Africa's third-biggest mobile operator by subscriber numbers. Cell C had 11.80-million subscribers, while Telkom had 13.68-million customers as at September 30, 2020.

September 2020: Telkom enters into a payment plan with the South African Revenue Service to settle an outstanding liability of R870-million from a dispute relating to the tax treatment on the sale of its subsidiary Multi-Links.

October 2020: The Independent Communications Authority of South Africa issues invitations to apply for the permanent assignment of the International Mobile Telephony spectrum, as well as the spectrum required for the wireless open-access network.

November 2020: Ratings agency Moody's Investors Service downgrades telecommunications group Telkom's corporate family rating to Ba2, from Ba1, with a negative outlook. This followed Moody's downgrading of South Africa's sovereign rating by one notch to Ba2 with a negative outlook on November 20.

December 2020: Telkom group CFO Tsholofelo Molefe resigns to pursue other interests. Wholesale connectivity division of Telkom, Openserve CFO Dirk Reyneke takes over the position of acting group CFO, effective December 7.

MARKET OVERVIEW

South Africa's telecommunications landscape has undergone a significant transformation over the past decade, with a shift from pure telecommunications services to the offering of a myriad of digital services that are highly dependent on data across some of the most advanced infrastructure in Africa. Along with main mobile operators Vodacom, MTN, Rain, Cell C and Telkom, South Africa is home to several Internet service providers (ISPs), satellite service providers and operators, a vast subsea cable network and a growing internal terrestrial fibre network.

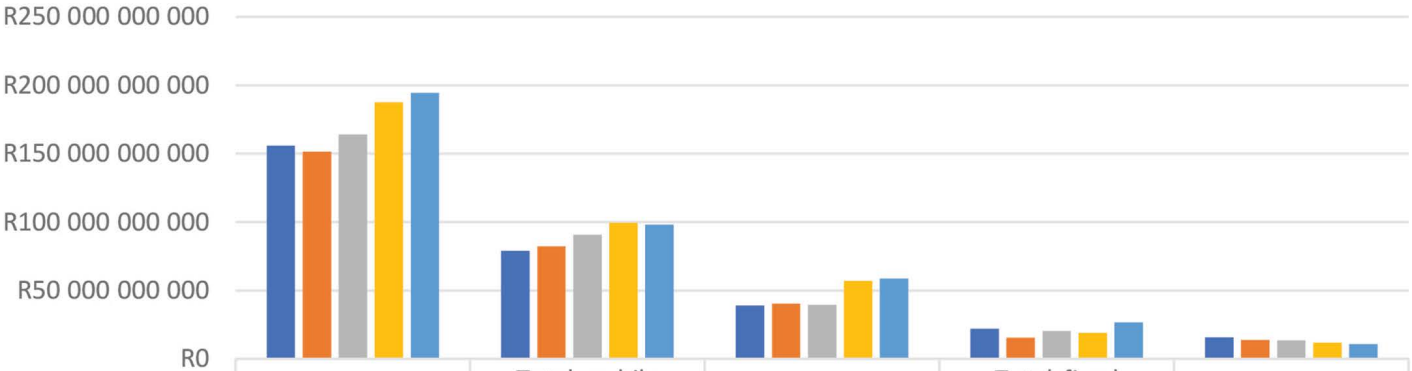
Mobile subscriptions and Internet penetration continue to grow year-on-year, commercial fifth-generation (5G) services deployments are under way and fibre networks and data centre markets are expanding rapidly to meet a growing user base. Firms continue to invest to ensure South Africa's population of nearly 60-million remains connected, with an increasing focus on revenue stream diversification.

The Independent Communication Authority of South Africa's (Icasa's) 'The State of the Information and Communication Technology (ICT) Sector Report in South Africa 2020', published in March 2020, shows that total mobile cellular phone voice subscriptions increased by 5.70% to 96-million in 2019 (2018: 91-million). Of this total, 82-million (85%) were prepaid subscriptions and 14-million (15%) were post-paid subscriptions. In South Africa's urban areas, prepaid mobile phone subscriptions comprised 77.50-million and post-paid subscriptions 13.70-million, while prepaid and post-paid mobile phone subscriptions in rural areas reached 4.70-million and just over 885 000 respectively.

According to Icasa, mobile cellular data subscriptions increased by 18.80% to 78-million in 2019 (2018: 65-million); however, the total number of fixed-line subscriptions continued to decrease, declining by 38% to 2.70-million (2018: 4.40-million). While the total fixed-broadband subscriptions and digital subscriber lines (DSL) Internet subscriptions decreased by 19.60% and 42.80% respectively, fibre-to-the-home/building (FFTH/B) Internet subscriptions increased by 28.80% as telecommunications companies transitioned to newer technologies.

Social media firms We Are Social and Hootsuite's latest 'Digital 2020 Report', also published in March 2020, indicates that, by

Telecommunications revenue 2019



	Total revenue	Total mobile services revenue (Rm)	Total of any other revenue	Total fixed Internet and data revenue	Total fixed line revenue
2015	R155 731 039 861	R78 838 681 356	R39 059 280 775	R22 023 113 787	R15 809 963 943
2016	R151 569 024 076	R82 209 711 759	R40 295 245 779	R15 327 779 522	R13 736 287 016
2017	R163 987 306 320	R90 737 963 135	R39 400 714 280	R20 432 607 468	R13 416 021 437
2018	R187 587 374 843	R99 569 265 222	R57 011 037 623	R19 078 304 740	R11 928 767 258
2019	R194 284 132 172	R98 071 800 081	R58 768 274 771	R26 790 096 707	R10 653 960 614

Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020', Electronic Communications Questionnaire 2019

Note: Includes revenues from telecommunication services earned from retail fixed-telephone, mobile-cellular, Internet and data services offered by telecommunication operations (network and virtual, including resellers) and interconnection, equipment sales and any other revenue.

January 2020, South Africa's Internet penetration had reached 62%, representing a 3.10% year-on-year increase, with 96% of the 36.54-million Internet consumers using their mobile phones to get online.

Data consumption continues to grow as South Africans spend 9 hours and 22 minutes using the Internet, 3 hours and 10 minutes on social media, 3 hours and 33 minutes watching television and 1 hour and 37 minutes streaming music each day.

Meanwhile, South Africa's national population coverage for third-generation (3G) network services is nearing the 100% mark, increasing slightly to 99.70% in 2019 (2018: 99.50%). Long-term evolution (LTE) coverage, however, recorded a significant jump during 2019, to 92.80% (2018: 85.70%).

The speed of mobile Internet connectivity also continues to improve, with an average speed of 31.36 Mb/s reported in 2019, an increase of 23% from 2018, while the average speed of fixed-Internet connection was up 47% to 26.87 Mb/s.

During 2019, telecommunication services revenue increased by 3.60% to R194-billion (2018: R187-billion). Of this, total mobile services and total fixed-line revenue contracted to R98.07-billion (2018: R99.56-billion) and R10.65-billion (2018: R11.92-billion) respectively, while revenues from total fixed-Internet and data revenue increased to R26.79-billion (2018: R19.07-billion).

Telecommunications companies invested a combined R38-billion in 2019, a contraction of 17.10% from the R46.92-billion invested in 2018. However, over a five-year period, investments increased 13.30% from R23.63-billion in 2015, after peaking at R47.62-billion in 2017.

The biggest share in 2019, accounting for R18.43-billion of the investments (2018: R19.58-billion), was allocated to mobile communication services, while expansions accounted for R7.26-billion (2018: R10.48-billion), infrastructure R4.76-billion (2018: R5.91-billion), fixed-telephone services R2.43-billion (2018: R2.22-billion) and fixed- (wired-) broadband services R2.29-billion (2018: R4.55-billion).

Urban vs rural coverage

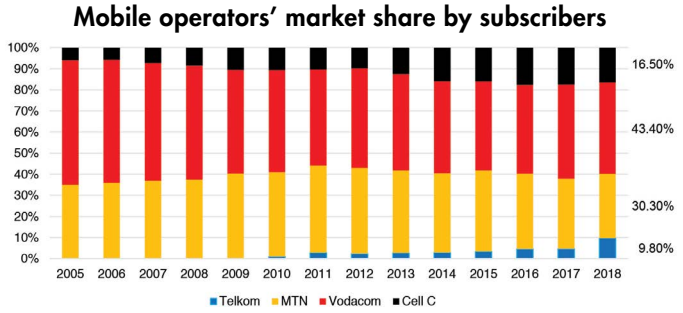
South Africa's nine provinces all had a 100% second-generation (2G) urban population coverage in 2019, while the Northern Cape had the lowest third-generation (3G) and long-term evolution (LTE) urban population coverage, at 99% and 98% respectively, compared with the 99% to 100% coverage of the urban population in the other eight provinces.

In terms of mobile phone network population coverage for rural areas in 2019, the Northern Cape had the lowest coverage for 2G, 3G and LTE at 99%, 97% and 72% respectively. Other than the Northern Cape, all provinces had 100% 2G rural coverage.

Gauteng, KwaZulu-Natal, Mpumalanga and the North West had 100% 3G coverage in their respective rural regions, while the remaining provinces, excluding the Northern Cape, had 99% coverage. Gauteng also had the highest mobile phone network population coverage of 99% for LTE, followed by Mpumalanga at 96% and Limpopo at 94%.

Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020'

TELECOMMUNICATIONS COMPANIES



Source: Icasa – Discussion document on the market inquiry into mobile broadband services

South Africa's most dominant telecommunication companies are Vodacom and MTN, with 43% and 30% market share by subscribers respectively, according to the Independent Communications Authority of South Africa (Icasa). Smaller rivals Cell C and Telkom have market shares of 16% and 10% respectively. The latest addition to the country's telecommunications sector is Rain, which provides data-only mobile offerings.

CELL C

Cell C was launched in 2001 as South Africa's third mobile operator, with 3C Telecommunications as the sole shareholder before a recapitalisation in August 2017 that led to Blue Label Telecoms owning a 45% stake. 3C Telecommunications now holds 30% (held 29.40% by the Employee Believe Trust, 45.60% by Oger Telecoms and 25% by broad-based black economic-empowerment group CellSAf), while Cell C management and staff hold 10% and Net1 UEPS Technologies holds 15%.

JSE-listed Blue Label came under significant fire from its shareholders after acquiring the majority stake in the embattled mobile operator through its wholly owned subsidiary, The Prepaid Company, for R5.50-billion. Cell C, which has struggled to make profits since its establishment and is weighed down by debt of close to R9-billion, subsequently dragged Blue Label's financial results into significant losses during the year ended May 31, 2019.

After writing down the value of its Cell C stake, the group swung back into the black during the financial year ended May 31, 2020. Blue Label's joint CEOs, brothers Mark and Brett Levy, resigned from the Cell C board in October 2019 as part of a broader reconstitution of the board that included the appointment of nonexecutive director Joe Mthimunye as Cell C chairperson.

During the financial year ended December 31, 2019, Cell C reported a 1% decline in service revenue to R14.21-billion (2018: R14.38-billion). Earnings before interest, taxes, depreciation and amortisation (Ebitda) decreased 15% to R2.46-billion (2018: R2.89-billion). Cell C had compressed its subscriber numbers, reporting a 16% drop in subscribers to 14.40-million in 2019, a sharp decline from 17.23-million as at December 2018 and 16.32-million as at May 2019. By June 2020, the operator reported a 28% drop in subscribers to 11.71-million. This means that Cell C has been surpassed by Telkom as South Africa's third-biggest mobile operator by subscriber numbers. During the six months ended September 30, 2020, Telkom reported an increase of 19% in its subscriber numbers to 13.68-million, owing to unprecedented data demand during South Africa's Covid-19-induced lockdown. Telkom had 12-million customers at its financial year-end in March 2020.

In the six months ended June 30, 2020, Cell C's service revenue had declined 6% to R6.50-billion, with a 12% drop in Ebitda to R1.25-billion.

CEO Douglas Craigie Stevenson said the company had been actively managing its customer base by pursuing more profitable customers, removing nonprofitable products and increasing its focus on retail product pricing after actively reviewing its product portfolio.

Cell C				
CEO Douglas Craigie Stevenson/Chairperson Joe Mthimunye				
	H1 2020	**2019**	**H1 2019**	**2018**
Revenue	R6.92-billion	R15.15-billion	R7.49-billion	R15.66-billion
Service revenue	R6.50-billion	R14.21-billion	R6.97-billion	R14.38-billion
Ebitda	R1.25-billion	R2.46-billion	R1.43-billion	R2.89-billion
Subscribers	11.71-million	14.40-million	16.26-million	17.23-million
Capital expenditure	R109-million	R273-million	R236-million	R2.11-billion

Compiled from Cell C's performance for the six months to June 30, 2020, and Cell C's annual results presentation for the 12-month period ending December 31, 2019

The mobile operator continues to search for cost-cutting and balance sheet strengthening initiatives through a significant turnaround strategy. This includes offloading its network through a deal with MTN and a second recapitalisation, which is expected to conclude by the end of 2020. The deal with MTN forms part of Cell C's efforts to evolve its network from a capital expenditure- (capex-) intensive, high fixed-cost, build, own and operate infrastructure-based network into a variable-cost, operating expenditure model that opens up focused investment and partnering, while positioning it as a buyer of services.

The initial roaming agreement in 2018 provided third-generation (3G) and fourth-generation (4G) services for Cell C customers in areas outside of the main metropolitans. An expanded three-year roaming agreement was implemented on May 1, 2020, to extend Cell C's 4G network coverage to 95% of the population and provide nationwide roaming for Cell C subscribers, with access to more than 12 500 sites. However, MTN's 2020 financial results showed that as of June 30, 2020, it had not recognised R673-million in roaming payments from Cell C.

Meanwhile, in January 2020, *Engineering News* reported that Cell C defaulted on the interest payment of a $184-million (R2.70-billion) loan that was due in December 2019, while newswire Reuters reported that the group defaulted on payments due on August 2, 2020. Cell C also defaulted on interest and capital repayments related to the respective bilateral loan facilities between itself and Nedbank, China Development Bank Corporation, the Development Bank of Southern Africa and the Industrial and Commercial Bank of China. These were due in January and July 2020. In an August 2020 statement, Craigie Stevenson, however, assured that Cell C was committed to resolving the situation with its lenders while improving its liquidity, debt profile and long-term competitiveness. Cell C's lenders, while entitled to call up the entire debt owed, have not accelerated debt payments and have not taken action yet to facilitate a commercial solution, he explained.

The proposed recapitalisation, Cell C's second within four years, is still under way after talks started in February 2019; however, it is

The Mobile Broadband Services Market Inquiry

In November 2018, the Independent Communications Authority of South Africa (Icasa) launched an inquiry into the mobile broadband market as part of its efforts and interventions to reduce the high cost of communication. It is the third intervention by Icasa following the completion of a priority markets inquiry to assess the state of competition and determine whether there are markets or segments within the mobile broadband services value chain that may require regulation in the context of a market review in terms of Section 67(4) of the Electronic Communications Act.

As part of efforts to deal with the high cost to communicate, Icasa, during 2018, also amended and published the End-User and Subscriber Service Charter Regulations and the Call Termination Regulations.

The Mobile Broadband Services Market Inquiry assessed the state of competition in the provision of mobile broadband services, the outcomes of which were to provide guidance in the development of regulations to address the high cost of data.

In December 2019, Icasa published its discussion document on the mobile broadband services inquiry for public comment on the preliminary findings regarding Icasa's definition of relevant mobile broadband services markets and the effectiveness of competition within these relevant markets.

The discussion document, informed also by information and data received from licensees in October 2020, identifies licensees that may have significant market power in the identified markets and proposes pro-competitive remedies.

Icasa received ten written submissions on the discussion document, eight of which, including Telkom, ISPA and Vodacom, presented their input at the public hearings held on October 26 and 27, 2020.

During the public hearings in October 2020, the issuance of the invitations to apply (ITA) for spectrum emerged as a key point for some participants, who noted that this should be taken into consideration when furthering the mobile broadband inquiry.

In October, Icasa published the ITAs for the licensing process for the Wireless Open Access Network and the International Mobile Telephony spectrum. The auction licensing process will start in March 2021.

Telkom Group executive regulatory affairs and government relations Dr Siyabonga Mahlangu said during the hearings that there are inconsistencies between the ITAs and mobile broadband inquiry discussions, noting that the authority should finalise the inquiry before assigning new spectrum, as the ITA process will need to fully take into account the findings of the inquiry.

Further, Icasa was urged to review the network sharing deals between operators and their impact on the market. Vodacom and MTN currently have agreements with Rain and Cell C, respectively, and both have deals with Liquid Telecom.

Telkom believes that the agreement between Rain and Vodacom constitutes a merger, with Vodacom's ability to control Rain's spectrum entrenching its position as a dominant player in a highly concentrated market.

Telkom approached the Competition Tribunal in October 2020 to declare the suite of spectrum arrangements between Vodacom and Rain as a merger that should have been notifiable in terms of the Competition Act.

During the public hearings in October, Cell C highlighted how the various agreements between operators enabled higher access to spectrum mostly for the two dominant players, contradictory to Icasa's finding that there is no concentrated spectrum in the hands of one operator.

More than 70% of subscribers in South Africa belong to MTN and Vodacom. Vodacom accounts for 56% of earnings before interest, taxes, depreciation and amortisation, followed by MTN at 32.70%. The two operators collectively account for more than 80% of the revenue.

Icasa plans to conclude the Mobile Broadband Services Market Inquiry by March 31, 2021.

Source: *Engineering News*, Icasa

Cell C starts migrating customers

Mobile operator Cell C started migrating its customers onto partner networks in January 2021.

This forms part of Cell C's three-year network strategy to enable the company to provide network services to customers through roaming agreements with partner networks and undertake a phased decommissioning of its own towers, effectively becoming a wholesale buyer of network capacity and infrastructure services.

"In response to a vastly changed business environment, the adoption of the network roaming model will promote more resourceful use of the telecommunications infrastructure capacity in the country, improve the overall network connectivity and provide Cell C customers with a better customer experience," Cell C CEO Douglas Craigie Stevenson explained.

"Our strategic vision is to differentiate ourselves by focusing on innovative products and services without being owners of capital-intensive infrastructure."

Source: *Engineering News*

expected to be completed by the end of 2020. During Blue Label's financial results presentation in August 2020, joint CEO Brett Levy said a term sheet was expected in due course, with "huge inroads" made into concluding the complex agreement, which Levy deemed to be fair for all stakeholders and lenders. The deal is being discussed with South African, US, Chinese and Lebanese banks, vendors and bondholders. On May 20, 2020, Business Day reported that the Competition Commission had conditionally approved Gatsby Security special purpose vehicle's (SPV's) acquiring certain aspects of Cell C under the recapitalisation plan. The ring-fenced SPV has been incorporated for the sole purpose of entering into the proposed transaction. According to TechCentral, records at the Companies and Intellectual Property Commission show that Gatsby Security SPV was registered on March 16, 2020. This followed Cell C's rejection of a takeover bid from Telkom at the end of 2019, despite the positive benefits of the combined financial muscle and about 28-million subscribers.

Meanwhile, in August 2020, Cell C announced plans to close 128 of its 240 retail stores and cut 546 jobs, after expanding a Section 189 retrenchment process to include its retail footprint. The original Section 189 process was initially announced in June 2020, when Cell C, which has a workforce of 2 500, indicated that 960 jobs within its junior management and semiskilled staff complement would be affected. The retrenchment consultation process started on July 30, 2020, and the company has subsequently offered voluntary severance packages to the affected employees.

MTN

Emerging markets mobile telecommunications operator MTN was launched in South Africa in 1994. The group, which provides voice, data and digital and financial services for customers in 20 countries across Africa and the Middle East, has been led by CEO and president Robert Shuter since March 2017. In March 2020, Shuter announced plans to step down at the end of his four-year contract in March 2021 to accept the role of CEO of BT Enterprise, in the UK. MTN Group CFO Ralph Mupita was appointed in August 2020 as Shuter's successor, effective September 1.

The group comprises five operational divisions – South Africa, Nigeria, the Southern and East Africa and Ghana (Seagha) region, the West and Central Africa (Weca) region and the Middle East and North Africa (Mena) region. The Seagha region comprises eSwatini (joint venture), Zambia, Rwanda, Uganda and Ghana; the Weca region Benin, Cameroon, Côte d'Ivoire, Guinea-Bissau, Guinea-Conakry, Liberia and Congo-Brazzaville; and the Mena region South Sudan, Sudan, Iran, Afghanistan, Syria and Yemen.

In August 2020, Shuter said the company will exit the Middle East regions to focus on its African markets, starting with the sale of its 75% stake in MTN Syria. TeleInvest, which is the minority shareholder in MTN Syria with a 25% holding, will acquire MTN Group's interest for about $65-million, with expectations that the deal will conclude by the end of 2020. MTN Syria forms part of MTN's Mena cluster, which also comprises Sudan, Yemen and Afghanistan, and a 49% joint venture in IranCell. The first phase will include a strategic exit of consolidated subsidiaries in Sudan, Yemen and Afghanistan, with plans to potentially divest from IranCell in the longer term.

In May 2019, MTN announced that it was considering expansion into Ethiopia, after Ethiopian Prime Minister Abiy Ahmed stated that he planned to open the telecommunications sector to private investors in a country that is dominated by a State-owned monopoly. Shuter believes that Ethiopia conforms to the company's new strategic direction and the group submitted a nonbinding expression of interest in June 2020. So far, MTN has received three of 12 directives from the authorities, which will enable the company to compile a business and investment case. However, no decision has been made as yet. According to CommsUpdate, in a note on September 11, 2020, Ethiopia set a new deadline of February 2021 to complete the sale of the two new mobile network operator licences. Bloomberg reported that the original timeline for the introduction of competition was delayed because of Covid-19, regulatory complexities and a delayed general election.

Meanwhile, the markets in which MTN operates remain challenging, with slow economic growth, volatile currencies, low oil prices, political instability in some instances and more recently, the

MTN				
Group President and CEO Robert Shuter (outgoing)/Chairperson Mcebisi Jonas				
	FY2019	FY 2018	H1 2020	H1 2019
Revenue	R151.46-billion	R134.56-billion	R84.08-billion	R72.51-billion
Service revenue	R140.92-billion	R125.25-billion	R80.39-billion	R67.66-billion
Ebitda	R64.09-billion	R48.25-billion	R41.78-billion	R31.38-billion
Capital expenditure	R26.12-billion	R26.09-billion	R10.05-billion	R12.24-billion
Subscribers	250.82-million	232.55-million	261.45-million	240.21-million
Data customers	95.35-million	78.75-million	101.89-million	82.26-million

Source: MTN financial results for the year ended December 31, 2019, and the interim financial results for the six months ended June 30, 2020

impact of Covid-19-linked restrictions. MTN Group reported a 9.70% increase in revenue to R151.46-billion for the year ended December 31, 2019. Service revenue increased 9.80% to R141.83-billion, owing to a 4.20% and 22.40% increase in voice and data revenue respectively. While there was a 39.60% decline in digital revenue, financial technology (fintech), and enterprise and wholesale revenue increased by 27%, 8.40% and 63.20% respectively.

Revenue continued to improve during the six months ended June 30, 2020, reaching R84.08-billion, while service revenue expanded 9.40% to R80.25-billion, owing to double-digit growth from MTN Nigeria and MTN Ghana. Group voice revenue grew by 2.60% to R44.50-billion, fintech by 18% to R6.10-billion and digital by 24.60% to R1.50-billion. Also supporting overall growth was enterprise revenue, which was up 14.20% to R7.90-billion. Wholesale revenue, however, declined by 30.70% to R1.80-billion. An increase in work-from-home activity and higher levels of online engagement because of Covid-19 restrictions boosted data revenue by 32.70% to R22.70-billion during the six months ended June 30, 2020.

MTN's operating profit increased to R31.29-billion in 2019 (2018: R23.57-billion) and capex was R26.12-billion, with MTN rolling out 5 795 3G and 10 895 4G sites. During the half-year to June 2020, MTN invested R10.20-billion in its networks, deploying a further 1 425 3G and 2 614 4G sites. During the year ended December 2019, MTN's subscriber base increased to an estimated 251-million (2018: 233-million), with 95-million active data users (2019: 79-million) and 35-million active Mobile Money (MoMo) users. MTN's subscriber base in the first half of 2020 increased further to 261.46-million, with active data users increasing to 101.89-million (H1 2019: 82.26-million). The number of active MoMo users increased to 38.27-million (H1 2019: 29.49-million).

South Africa

South Africa's second-biggest mobile operator, MTN South Africa, recorded a subscriber contraction to 28.89-million in 2019 (2018: 31.19-million), owing to a churn of 2.30-million SIM cards after discontinuing its loss-generating prepaid 1 GB acquisition promotion and similar incentives. This had subsequently resulted in savings of more than R80-million and, during the six months to June 2020, MTN started to recover some customers with total subscribers increasing by 137 000 to 29-million.

During the year ended December 31, 2019, service revenue increased 0.40% to R36.43-billion (2018: R36.27-billion), supported by growth in national roaming revenue that was slightly offset by a 4.10% reduction in consumer prepaid service revenue.

The prepaid business came under pressure, owing to the Independent Communications Authority of South Africa's (Icasa's) End-User and Subscriber Service Charter Regulations, which came into effect on March 1, 2019, impacting out-of-bundle data revenue. By June 2020, the prepaid segment started to recover from the impact of the changes in regulations and there was a marked improvement in the consumer business unit and enterprise business unit.

During the six months to June 2020, MTN recorded a 2.50% decline in service revenue, owing to lost national roaming revenues arising from the discontinuation of a roaming agreement with Telkom and the effects of the continued accounting for Cell C revenue on a cash basis, which dragged wholesale revenue down by 41.40%. Overall data revenue increased by 16.70%, supported by a 77% increase in traffic and an increase of 14.10% in active data subscribers to 14.20-million. MTN South Africa also implemented reductions in data prices, in line with an agreement with the Competition Commission on April 30, 2020.

During the 2019 financial year, the group posted Ebitda of R15.29-billion (2018: R15.66-billion) and capex of R7.56-billion (2018: R9.45-billion).

On November 18, 2019, MTN South Africa signed a new long-form roaming and services agreement with Cell C, subject to certain conditions. Phase 2 of the roaming agreement became effective on May 1, 2020, with the arrangement envisaging a three-year transition towards a full national roaming arrangement under which MTN will carry all Cell C's network traffic. In January 2020, MTN relaunched its Mobile Money (MoMo) service in South Africa, with the number of registered users accelerating to 1.10-million as at June 30, 2020.

MTN named best mobile network for 2020

Telecommunications group MTN secured the title of the best mobile network in South Africa for 2020.

This is according to the MyBroadband Insights 2020 Mobile Network Quality Report, released on January 11, 2021, which is based on 1.20-million speed tests performed by 41 099 MyBroadband Speed Test App users across South Africa between January 1 and December 31, 2020. The report shows that MTN had a network quality score, which considers download speed, upload speed and latency, of 9.86 out of ten, while Vodacom had a score of 6.17. This was followed by Telkom with a network quality score of 4.87 and Cell C and Rain, which both had a score of 4.35.

MTN had the highest average download speed at 52.84 Mb/s and upload speed at 19.92 Mb/s, followed by Vodacom with 29.39 Mb/s download speed and 10.43 Mb/s upload speed.

The Mobile Network Quality Report showed that Telkom had a download speed of 21.58 Mb/s and a 5.85 Mb/s upload speed during 2020. Cell C and Rain had average download speeds of 17.46 Mb/s and 11.90 Mb/s and upload speeds of 7.91 Mb/s and 9.93 Mb/s respectively.

Overall, South Africa had an average download speed of 29.33 Mb/s and an average upload speed of 11.24 Mb/s, the report shows.

Despite the significant increase in data use during the year, owing to the various restrictions in place amid the global Covid-19 pandemic, the average network speed of South Africa's mobile operators during 2020 increased.

Temporary spectrum issued by the Independent Communications Authority of South Africa (Icasa) to mobile operators in April 2020 helped them to increase their network capacity and improve their average network.

MTN said that the release of temporary spectrum boosted its network, commending the Department of Communications and Digital Technologies (DCDT) and Icasa.

"While work on the spectrum auction was already under way when the pandemic hit, the DCDT and Icasa responded swiftly to release temporary spectrum, which had an immediate impact on our ability to reach more South Africans with even better coverage and quality," MTN South Africa CEO Godfrey Motsa commented.

The use of the temporary spectrum enabled MTN South Africa to meet the demands of total data traffic doubling from 2019.

The group also used some of the temporary spectrum to showcase fifth-generation (5G) speed and capabilities in large cities, as well as smaller towns.

Vodacom also launched its 5G network during the lockdown using the temporary spectrum.

Further, during 2020, MTN's download speeds increased from 43.47 Mb/s in the first quarter of the year to 64.31 Mb/s by the fourth quarter.

Vodacom and Telkom recorded increases in download speeds from a respective 29.79 Mb/s and 19.11 Mb/s in the first quarter to 33.71 Mb/s and 25.74 Mb/s.

Cell C experienced an increase in download speeds from 17.52 Mb/s in the first quarter to 18.79 Mb/s by the fourth quarter.

However, the average download speed on Rain's network declined from 15.20 Mb/s in the first quarter of the year to 11.41 Mb/s in the fourth quarter, owing to network congestion in areas where Rain oversubscribed its service.

MyBroadband commented that Rain, which quadrupled its sign-ups after South Africa's hard lockdown started at the end of March, struggled to cope with the increased demand for data.

"The situation was aggravated by the fact that Rain offers uncapped products and that many people stuck at home started to use streaming services like Netflix to stay entertained," it concluded.

Source: *Engineering News*

MTN also launched its fifth-generation (5G) network on June 30, 2020, with 100 sites live in Johannesburg, Cape Town, Bloemfontein and Port Elizabeth, following extensive 5G trials and testing, and enabled by the allocation of temporary spectrum issued by Icasa in April 2020.

Nigeria

MTN Nigeria, which is the group's biggest segment, delivered strong service revenue during the year ended December 31, 2019, with growth of 12.60% to R46.61-billion (2018: R37.89-billion), largely driven by increases in voice and data revenue. The group maintained this growth during the first six months of the 2020 financial year, with an increase of 12.40% in revenue supported by fintech and digital. The growth in voice revenue (2.50%) in the half-year to June 2020 was subdued, owing to a shift in traffic patterns arising from the national lockdown.

MTN Nigeria reported Ebitda of R20.94-billion in 2019 (2018: R18.09-billion) and a subscriber base of 64.31-million (2018: 58.20-million). Data revenue grew by 42.70% in 2019, achieved through a 34.90% growth in active data users to 25.20-million. In the six months to June 2020, data revenue continued to increase strongly and was up by 57.70%, owing to a 3.90-million boost in data subscribers to 29-million, improved 4G penetration and enhanced network capacity to support traffic growth arising from the lockdown.

During the first half of 2020, data traffic rose by 141.20% and use – in terms of megabyte per user – increased by 76.60%. MTN Nigeria added four-million new smartphones to its network, increasing smartphone penetration to 43.50%. Fintech revenue grew to represent a contribution of 3% of service revenue in 2019 (2018: 2.80%), supported by increased adoption of the airtime lending service, while the enterprise business segment had revenue growth of 22%.

Regional Performance

The Seagha region reported overall service revenue of R26.75-billion, up 21.70%, in 2019. MTN Ghana was a significant contributor, with service revenue increasing 22.90%, underpinned by voice and data revenue growth of 19.40% and 32.50% respectively, as well as a 28.20% growth from the MoMo platform. MoMo's revenue contribution to service revenue rose to 18.60% in 2019 (2018: 17.90%).

During the six months to June 2020, Ghana continued to perform well, with service revenue growth of 19.40% underpinned by double-digit growth across all key revenue curves, while voice revenue increased 14%, owing to an increase in the number of active subscribers and various customer value management initiatives, which helped to manage churn and improve use. The 22.10% growth in data revenue was supported by higher active data users and smartphones on the network.

During the six months to June 2020, the growth in MoMo revenue was up 25.80%. MTN Uganda also made a positive contribution during the 2019 financial year, with service revenue up 12.50%, as mobile data and MoMo delivered double-digit revenue growth of 39.70% and 13.90% respectively, along with voice revenue growth of 3.40%. Overall, the Seagha portfolio, excluding MTN Ghana, achieved service revenue growth of 20.40% in 2019.

The Weca region reported service revenue growth of 2.90% to R21.65-billion for the year ended December 2019, with service revenue growth of 7% in the six months to June 2020. MTN Cameroon also grew service revenue by 3.30% for the year, with data and fintech yielding double-digit revenue growth of 18.90% and 59.30% respectively. In the first half of 2020, MTN Cameroon reported service revenue growth of 5.30%, stemming primarily from strong growth in data (up 20.80%) and mobile financial services (up 40%), and supported by a 10.20% increase in subscribers. By the first half of 2020, the 6% growth in service revenue achieved by MTN Ivory Coast was a turnaround from the decline recorded in 2019, with the division regaining market and value share. Data revenue was also strong, increasing by 24.80%. Excluding MTN Cameroon and MTN Ivory Coast, the Weca markets increased revenue by an aggregate 11.60% in 2019 and 8.70% in the first half of 2020.

Meanwhile, service revenue in the Mena region increased 18.80% in 2019 to R8.94-billion, increasing a further 21.80% in the first six months of 2020. MTN Syria had service revenue growth of 19.10%, underpinned by a 35% growth in data revenue, while MTN Sudan grew its service revenue by 50.20%, supported by a 41.70% increase in voice revenue and 66.70% growth in data revenue, despite Internet disruptions during June and July 2019. In June 2020, MTN Syria increased its service revenue by 22.40%, owing to 9.70% and 28.50% growth in voice and revenue respectively, while MTN Sudan increased its service revenue by 68.60%, supported by a 46.40% increase in voice revenue and a 128.40% increase in data revenue. MTN Yemen's service revenue expanded by 14.20% on the back of a 28.80% increase in data revenue amid a challenging macroeconomic backdrop and political instability.

MTN Irancell's service revenue also increased by 20.10%, with voice revenue up by 24.20% and data revenue by 23.20%. Service revenue was up 33.80%, supported by voice (14%) and data revenue (51%), during the first six months to June 2020, amid US sanctions, the depreciation of the currency and a high rate of inflation.

Portfolio optimisation

MTN has been reviewing its portfolio of investments under a three-year plan that includes shedding lossmaking e-commerce assets and exiting countries where it has no probability of reaching the top two spots in terms of market share. The group launched its asset realisation programme in March 2019 to reduce debt and risk, simplify the portfolio, improve returns and realise R15-billion in capital over three years.

As MTN achieved the R15-billion asset realisation within the first year, it subsequently increased its medium-term target to R25-billion. In the first half of 2019, MTN disposed of its shareholder loan in ATC Ghana to American Tower Corporation, and its interests in investment fund Amadeus and its associated holding in Travelstart. During the same period, Jumia Technologies successfully raised capital and listed on the New York Stock Exchange, resulting in the dilution of MTN's shareholding from 29.70% to 18.90%. MTN Nigeria redeemed its preference shares in 2019 as part of a process to simplify its capital structure.

By January 2020, MTN had agreed to sell its 49% equity holdings in Ghana Tower Interco and Uganda Tower Interco to AT Sher Netherlands for $523-million in cash. The group is awaiting the finalisation of the regulatory approvals for the transaction. Further, MTN is also in discussions regarding the potential sale of its 20% stake in carrier business Belgacom International Carrier Services.

Further, as part of the review of the portfolio, MTN plans to refocus on its pan-African strategy and simplify its portfolio by exiting the Middle East region over the medium term. MTN's interest in MTN Syria will be sold to TeleInvest, the minority shareholder in MTN Syria with a 25% holding, for a net selling price of about $65-million. The deal is expected to conclude by the end of 2020.

MTN Syria forms part of MTN's Mena cluster, which also comprises Sudan, Yemen and Afghanistan, and a 49% joint venture in IranCell. The first phase will include a strategic exit of consolidated subsidiaries in Sudan, Yemen and Afghanistan, with plans to potentially divest in IranCell in the longer term. The Middle East assets contributed less than 4% to group Ebitda during the first half of 2020.

Regulatory and legal matters

MTN continues to face political, regulatory and legal challenges in some of its markets, most notably in Nigeria, where the company was ordered to pay $5.20-billion in October 2015 for failing to deactivate the SIM cards of more than five-million subscribers amid concerns about the SIM cards being used by Boko Haram insurgents. The penalty was reduced to $1.50-billion after a series of negotiations, leading to MTN's posting a loss of $108-million in 2016, its first loss in two decades. As part of the settlement with Nigerian authorities concerning the 2015 SIM card case, MTN listed its Nigerian unit on the Nigerian Stock Exchange, approval of which was granted in May 2019.

MTN was also involved in a dispute with Nigeria's Attorney-General's office over a claim for $2-billion in back taxes and penalties. The case was initially scheduled to be heard in June 2019 but was adjourned following a request by lawyers of the Attorney-General's office. The case was heard in January 2020, when the Attorney-General referred the matter to the tax and customs authorities and withdrew the demand for $2-billion from MTN Nigeria. MTN Nigeria consequently withdrew its legal action and remains committed to building and maintaining cordial relationships with all regulatory authorities in Nigeria.

Meanwhile, the contestation of the award of MTN's telecommunications operating licence in Iran in 2005 remains in legal limbo after Istanbul-based Turkcell took the years-long battle to the South African High Court in 2017. The Turkish rival has brought several international and local claims against MTN for allegedly causing the operator to lose the licence bid, through an overturned decision, by using alleged acts of bribery and corruption. MTN denied that it had offered a former ambassador to Iran any money to obtain the licence. Turkcell first sued MTN in the US in 2012, accusing MTN of offering bribes to secure the licence, but was forced to withdraw the case after the Supreme Court ruled that it could not be heard in the country. The case was later filed in South Africa in 2013, but it was delayed following objections by MTN and subsequent amendments. The Istanbul-based company is demanding about $4.20-billion in damages, based on profits it says it could have generated had it been able to keep the licence, in addition to interest.

Iran remains a challenging market for MTN, with US-led sanctions preventing MTN from repatriating funds from that country. The sanctions were lifted in 2016 after more than a decade; however, new sanctions were reimposed on the country by then US President Donald Trump in 2018.

Meanwhile, MTN faces a fresh suit of legal battles after a complaint for violation of the Anti-Terrorism Act was filed in the US District Court for the District of Columbia on December 27, 2019, against six firms, including MTN, operating in Afghanistan. The suit was brought on behalf of the families of 200 American service members and civilians who were killed or wounded in Afghanistan from 2009 to 2017, with allegations that MTN had paid the Taliban to ensure the protection of their infrastructure. In April 2020, MTN filed a motion to dismiss, asking the court to end the lawsuit and grant a judgment in MTN's favour, as the court lacks jurisdiction over MTN, which does not operate in the US, and because the complaint does not allege any conduct by MTN that would have violated the Anti-Terrorism Act. In June 2020, the plaintiffs filed an amended complaint to which further complainants, defendants and allegations were added. MTN expects to file another motion to dismiss on largely the same grounds as the April motion to take these new allegations into account. MTN said in its financial results documents for the six months to June 30, 2020, released in August 2020, that it conducts its business in a responsible and compliant manner in all its territories and will defend its position where necessary.

In June 2020, MTN's Ghana operations were classified as a significant market power by the country's National Communications Authority (NCA). The NCA determined that special regulatory restrictions would be enforced on the West African subsidiary, with proposed measures including a 30% asymmetrical interconnect rate for two years; a price floor/ceiling on voice, data, SMS and MoMo; the review and approval of all MTN pricing by the NCA; the removal of on-net/off-net price differentials; and the implementation of a national roaming scheme.

In September 2020, MTN Ghana applied to the courts for relief in the form of a judicial review of the NCA's June 9 decision to ensure that the requirements of procedural fairness are observed, and the applicable legislation and global industry best practices are followed. This followed engagements with regulatory and other stakeholders, with the company assuring that it is a responsible market player in a highly competitive market and does not engage in anticompetitive behaviour. In October 2020, Reuters reported that MTN Ghana had withdrawn its legal challenge in a bid to open further discussions with the NCA toward an amicable resolution.

RAIN

Stellenbosch-based Rain entered the South African telecommunications market as a data-only network operator in July 2018, with its main income sourced from wholesale and roaming services, 4G data sales, 5G subscriptions and a niche direct-to-consumer unit. Rain is aiming to become a full-service mobile network operator, focusing on data-only SIM connectivity as its primary offering.

Businessperson Patrice Motsepe's African Rainbow Capital (ARC) has a shareholding of 20.70% in the company, with Rain accounting for 27.90% of the fund's value as at June 30, 2020. According to the JSE-listed investment group's annual financial statements for the year ended June 2020, the stake had a value of R2.70-billion at

the end of December 2019, increasing to R3.11-billion by June 30, 2020, owing to a fair value write up of R479-million.

The Rain network is based on three frequency bands, with an allocation in the 1 800 MHz band, as well as in the sought-after 2.6 GHz band, where it holds the only licence, and the 3.6 GHz band, on which the 5G network is being built. The 4G network was built as part of a services infrastructure agreement with Vodacom. The construction and day-to-day management of a large portion of the 4G sites are outsourced to Vodacom, while a large percentage of Vodacom's 4G traffic flows over the Rain network as a performance layer. The agreement has come under

Rain's valuation

In its financial results for the year ended June 30, 2020, African Rainbow Capital (ARC) said its investments had an intrinsic portfolio value of R11.14-billion. Rain accounts for 27.90% of the fund's total value, with a 20.70% stake valued at R3.11-billion, which means the mobile operator's total valuation is R15.03-billion, according to MyBroadband.

Rain's evaluation by ARC			
Date	**ARC shareholding**	**ARC's shareholding value**	**Rain's valuation**
December 2017	20%	R1.89-billion	R9.46-billion
June 2018	20%	R2.11-billion	R10.57-billion
December 2018	20%	R2.33-billion	R11.65-billion
June 2019	20.60%	R2.51-billion	R12.18-billion
December 2019	20.70%	R2.71-billion	R13.10-billion
June 2020	20.70%	R3.11-billion	R15.03-billion

Figures have been rounded

While Rain's lack of legacy revenue streams and good assets positions it well for future growth, its valuation has been questioned with regard to its financial performance and subscriber growth.

As ARC does not release Rain's financials or subscriber numbers, analysts are unable to accurately calculate the value of Rain, which created speculation among industry players who spoke to MyBroadband that the operator is overvalued. Rain's R15-billion valuation exceeds Telkom's current market cap of R12.40-billion. Telkom has valuable telecommunications assets, along with millions of subscribers, the country's biggest fibre network and an extensive mobile network, as well as properties across the country worth billions of rands, and more spectrum.

Rain, compared with Telkom and Cell C, in terms of assets and valuation:

Mobile operator comparison			
Company	**Telkom**	**Cell C**	**Rain**
Subscribers	12-million	11.80-million	400 000
Mobile data	Yes	Yes	Yes
Fixed wireless data	Yes	No	Yes
Voice services	Yes	Yes	No
Fixed-line broadband	Yes	Yes	No
National mobile network	Yes	Yes	Yes
National fixed-line network	Yes	No	No
Mobile Spectrum			
900 MHz	–	22 MHz	–
1 800 MHz	24 MHz	24 MHz	34 MHz
2 100 MHz	30 MHz	30 MHz	–
2 300 MHz	68 MHz	–	–
2 600 MHz	–	–	15 MHz
3 500 MHz	28 MHz	–	142 MHz
Valuation	R12.40-billion	R0-billion	R15-billion

Source: MyBroadband

scrutiny after Telkom approached the Competition Tribunal in October 2020, claiming that the arrangement amounts to a merger that should have been notifiable in terms of the Competition Act. According to a report by Business Day, Telkom alleges that Vodacom can access Rain's coveted spectrum, as well as holding control over the smaller operator's planning, roll-out and maintenance of its radio access network. During public hearings for Icasa's Mobile Broadband Services Market Inquiry in October 2020, Telkom Group executive regulatory affairs and government relations Dr Siyabonga Mahlangu said that Vodacom's ability to control Rain's spectrum entrenched its position as a dominant player in a highly concentrated market.

In September 2020, ARC co-CEO Johan van Zyl said Rain showed good growth during 2020, with a surge in data use of more than 30% from April to June, expanding its subscribers base significantly beyond forecast growth and leading to a cash-flow positive position sooner than expected.

While roaming agreements comprise the bulk of the group's revenue, Rain intends to expand its currently small niche consumer base to ensure a larger portion of the revenue contribution in the future. Subscriber numbers are not disclosed, but CEO Willem Roos reported close to 100 000 consumer subscribers as at November 2019, with indications that this has now been surpassed.

Prior to South Africa's national lockdown, which started on March 27, Rain signed up between 10 000 and 20 000 SIM subscribers a month; however, strong demand for data services during the lockdown period increased the number of sign-ups to between 60 000 and 80 000 a month. Demand for Rain's unlimited 5G products nearly doubled the average revenue per user.

Roos told MyBroadband that while the company is generating a positive Ebitda, it requires capex to build out the 5G network, with the group raising R720-million in June to support the roll-out.

In early 2019, Rain announced it was finalising its planned 5G commercial network, which it started building in October 2018 in partnership with information and communication technology (ICT) group Nokia and Chinese ICT solutions provider Huawei.

The 5G network was launched in September 2019 – making South Africa one of the first countries in the world to deploy this new technology – with the first-phase roll-out of several 5G sites in key areas in Johannesburg and Tshwane. By the end of April 2020, the group had 5 500 active 4G sites, more than 3 000 active long-term evolution (LTE) sites and had rolled out 447 5G towers, with ambitions to increase this to 1 500 by December 2021. Ultimately, more than 2 000 5G towers in larger metropolitan areas throughout South Africa are planned. The company is leveraging its existing LTE network to build the 5G network using the 3.6 GHz spectrum.

Meanwhile, on July 20, 2020, Rain launched a commercial standalone 5G network, believed to be one of the first in Africa, in Cape Town , in the Western Cape. Built on its own sites, it enhanced the company's fixed-wireless broadband service experience in Sea Point, Claremont, Goodwood, Bellville, Durbanville and Cape Town's city centre. Standalone 5G is expected to further improve 5G network performance with increased uplink rate, lower latency and improved reliability. Powered by Huawei's 5G solutions, the standalone 5G will allow for digital transformation initiatives, such as smart healthcare, smart ports, smart mining and smart manufacturing, in South Africa.

Rain also keeps its distribution costs low, offering online-only purchases, with the SIM card delivered and the Regulation of Interception of Communication Act (Rica) process completed upon delivery, as traditional retail outlets are costly to establish and maintain. The group is exploring options of a Rica online Web or application service, where an identity document and proof of address can be uploaded, as well as access to a platform that is interlinked to the Department of Home Affairs, in addition to facial recognition and proof-of-life test options. The operator is also working on expanding its product range to include electronic SIM cards, commonly called eSIMs.

In April 2020, Rain teamed up with Pargo to make Rain SIM cards available at more than 100 pickup points at selected Clicks stores. By July, the number of Clicks-based Pargo pickup points doubled to 260 across Gauteng, KwaZulu-Natal, the Western Cape, North West, the Eastern Cape and the Free State. Customers can also choose to have their SIM cards delivered through the website or by ordering through Takealot and on-demand delivery service Mr D Food.

However, Rain's overall network score declined from 5.51 in the first quarter of 2020 to 4.24 in the second quarter, according to the MyBroadband Insights quarterly 'Mobile Network Quality Report'. The average download speed on Rain's network declined a significant 30% to 10.64 Mb/s during lockdown in April, owing to the allocation of the incorrect emergency spectrum issued by Icasa for the duration of the State of Disaster that has been in place since March 2020. The assigned spectrum, which was unsuitable for rapid deployment with their current radios, was not what Rain requested. Rain is procuring new radios to use the new spectrum and was temporarily assigned 30 MHz, in addition to the 20 MHz it already has in this band.

TELKOM

Telkom is a JSE-listed ICT services provider in South Africa, offering fixed-line, mobile and data services, as well as information technology (IT) services and broadband solutions across its copper and fibre infrastructure. As at March 31, 2020, Telkom

Telkom				
Group CEO Sipho Maseko/Chairperson Sello Moloko				
	FY2020	FY2019	H1 2021	H1 2020
Revenue	R43.04-billion	R41.77-billion	R21.39-billion	R21.47-billion
Ebitda	R9.60-billion	R10.58-billion	R5.90-billion	R5.56-billion
Capital expenditure	R7.75-billion	R7.67-billion	R2.94-billion	R4.23-billion
Mobile subscribers	12-million	9.68-million	13.68-million	11.50-million
Mobile broadband subscribers	8.16-million	6.38-million	9.64-million	7.82-million

Source: Compiled from Telkom Group Annual results for the year ended March 31, 2020

is owned by the South African government (40.50%), institutional shareholders (50.50%), noninstitutional shareholders (6.40%) and the National Treasury (2.60%).

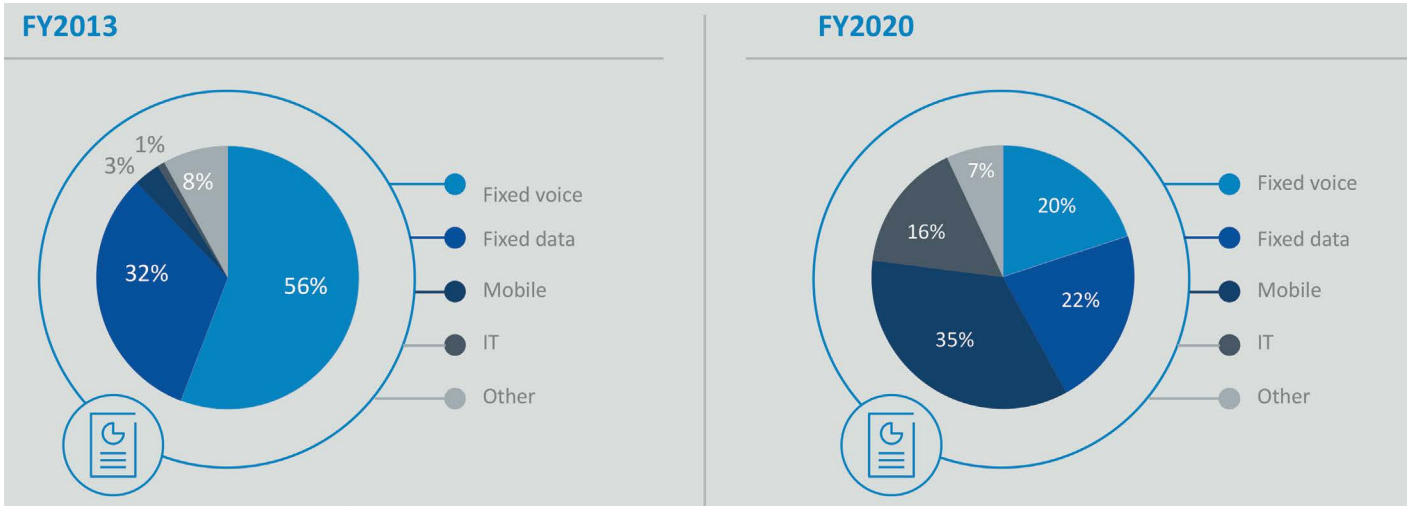
Telkom comprises several divisions – its Openserve corporate centre, Telkom Consumer, and Telkom Small and Medium Business (Telkom SMB), as well as subsidiaries BCX, Gyro and Yellow Pages. BusinessTech reported on August 3, 2020, that Telkom had entered the financial services space, launching a life insurance business, with Telkom Financial Services further aiming to address the needs of more than 11-million South Africans who do not have bank accounts, and expand its mobile payment applications into a variety of e-commerce platforms.

During the year ended March 31, 2020, Telkom's revenue increased 3% to R43.04-billion (2019: R41.77-billion), driven by an increase in mobile service revenue that was underpinned by accelerated capital investment and mobile broadband-led propositions. Mobile service revenue during the 2020 financial year was up 54.40% to R12.59-billion (2019: R8.16-billion), supported by a net customer addition of about 1.90-million, bringing Telkom's mobile subscriber base to 12-million, with a R91 blended average revenue per user. Supporting a 47.80% growth in mobile service revenue to R8.28-billion during the six months ended September 30, 2020, was a further increase of 19% in the group's subscriber numbers to 13.68-million, owing to unprecedented data demand during South Africa's Covid-19-induced lockdown. Owing to this surge in customers, Telkom's mobile business, the fastest growing mobile operator in South Africa, has now surpassed Cell C as the country's third-biggest mobile operator by subscriber numbers. Further, the blended average revenue per user increased 36.70% to reach an historic high of R113 during the first half of the 2021 financial year.

Mobile data revenue, meanwhile, increased 48.20% to R8.80-billion during the year ended March 31, 2020, supported by a 28% increase in mobile broadband subscribers to 8.16-million (2019: 6.38-million), as well as the use of data by about 70% to 80% of Telkom's active mobile customers. Further, Telkom's mobile broadband traffic increased 69.90% to 615 petabytes (2019: 362 petabytes), while fixed-line broadband consumption increased 11.40% to 1 113 petabytes (2019: 999 petabytes) supported by about 724 000 fixed customers, CEO Sipho Maseko said during the results presentation for the year ended March 31, 2020.

However, Telkom's fixed-voice revenue continues to decline, contracting 22.20% to R8.74-billion in the year ended March 30,

Telkom's revenue mix evolution 2013 vs 2020



Source: Telkom, Annual Results Presentation for the year ended March 31, 2020

2020, along with traditional fixed-data revenue, which declined 13.50% to R7-billion, mostly owing to the continued migration from copper-based to next-generation technology. The group's IT revenue increased 1.80% to R6.86-billion.

The group's profit after tax for the year ended March 31, 2020, decreased to R2.08-billion (2019: R3.34-billion). Maseko said the group's performance during the 2020 financial year depicted the evolution of technologies and revenue mix and was impacted on by the migration of customers to new technologies, which was not yet sufficient to offset the decline in the traditional business. The next-generation technologies, which are at a lower price point, need to generate 2 to 2.5 times more traffic to compensate for the price differential. The group's multiyear transformation programme has reduced the legacy fixed-voice revenue contribution from 56% in 2013 to 20% in 2020.

During the year to March 31, 2020, Openserve's revenue declined by 10.70% to R15.13-billion, driven by a 25% decline in fixed-voice revenue. Telkom noted that the impact of the fixed-voice decline on Ebitda is significant as it has high margins, with underlying Ebitda reduced by 39.40% to R3.81-billion. Revenue declined a further 13.60% to R6.84-billion in the six months to September 30, 2020, owing to a 22.70% decline in fixed voice revenue. This impacted Openserve's Ebitda for the first half of the 2021 financial year, which decreased 24.70% to R1.93-billion.

Telkom Consumer's revenue improved by 13% to R21.70-billion, driven by the mobile business's continued growth trajectory, with service revenue increasing 54.40% to R12.59-billion. During the six months to September 30, 2020, Telkom Consumer recorded a 10.60% increase in revenue to R12.69-billion and a 47.80% increase in service revenue to R8.28-billion.

Telkom Consumer's Ebitda breached the R1.50-billion mark during the 12 months to March 31, 2020. However, by the first half of the 2021 financial year, Ebitda increased a significant 131.10% to R2.59-billion, supported by a strong mobile business and continued cost containment initiatives.

Meanwhile, BCX revenue declined 4.30% to R18.74-billion in 2020, despite a 15.80% decline in the fixed-voice business, while growth in the IT business was 2.30%, reaching R9.08-billion.

In August 2020, BCX launched a new digital transformation division, BCX Exa, under its IT solutions portfolio, to advise clients on digital transformation solutions and co-create such solutions with clients. In the six months ended September 30, 2020, BCX reported a further 10.70% decrease in revenue to R7.94-billion, while Ebitda declined 15.3% to R1.14-billion.

Gyro's revenue grew by 29.50% to R1.51-billion in the year ended March 31, 2020, mainly driven by the masts and towers

Telkom SMB: Targeting small business development

Telkom is increasingly targeting South Africa's small business sector and aims to position Telkom SMB as a go-to place for all small and medium-sized enterprises (SMEs) to connect and grow. The division will evolve from connectivity products to e-commerce products and expand to adjacent offerings in information technology, procurement and financial services delivered through a digital marketplace platform. Telkom's board approved the new Telkom SMB business unit, effective April 1, 2019, to capture lost market share and venture into new revenue lines.

Built from the ground up, with a lean operating model and about 250 employees, the Telkom SMB executive committee was fully resourced from January 2020. Further, following the Competition Commission's unconditional approval of the sale of the 35.10% stake of Yellow Pages by minority shareholders to Telkom during the year to March 2020, Telkom now owns 100% of Yellow Pages. The process of the financial separation is under way and the integration of Yellow Pages' capabilities has started, with cross-functional teams working on platform and product development.

In January 2020, Telkom SMB launched a business in a box, named BizExpander, after a gap analysis identified channel gaps to service SME business customers with easy access to products and services. Third-party call centres were identified as cost-effective channels that can reach most customers nationally, and Telkom appointed four call centres to target mainly mobile customers, while increasing its direct-sales force footprint to reach customers and advise on tailored solution requirements. The group also appointed 18 third-party dealers to increase the channel footprint and service customers. The first phase of the platform included redesigning the user journey and building a new SMB website, where customers can explore and buy some of Telkom's connectivity, productivity and marketing products. In line with this, Telkom SMB launched Yep, an e-marketplace for SMEs, which will revamp the current Yellow Pages Web and application platforms, and introduce functionality that enables customers to sell their products online, buy from the marketplace and access business opportunities on the platform from other SMEs and corporates.

In addition, in August 2020, Yellow Pages and fintech Fundrr partnered to offer loans to small businesses and provide support packages that help develop their online visibility and increase their sales and branding into new markets. The collaboration will enable the growth of SMEs by unlocking access to working capital, as well as marketing and online support. Fundrr provides a quick turnaround on business loan applications, with the application and onboarding completed online in under eight minutes and responses and decisions provided within 24 hours.

Sources: *Engineering News*, Telkom Annual Report 2020

portfolio. The masts and towers revenue increased by 34% to R1.25-billion. The demand for sites by Telkom Mobile and new external leases augmented Gyro's revenue. In the first half of the 2021 financial year, revenue for the masts and towers business increased 7.70% to R628-million, with external revenue increasing 10.90% to R346-million.

Meanwhile, *Engineering News* reported in June 2020 that Telkom had suspended its dividend payouts from the 2021 financial year for three years to redirect the capital to acquire much-needed spectrum and complete its capex programme to ensure future sustainability. The group, which announced its intention to review its dividend policy early in the 2020 financial year, aims to prioritise its capital investment programme, maintain a healthy balance sheet and consider its cash position within its capital allocation framework. Telkom added that the imminent spectrum auction, which is of strategic importance for the group, would require a significant amount of capital to ensure the sustainability of its mobile business.

Telkom has also withdrawn its medium-term targets until it can ascertain the impact of the Covid-19 pandemic on the group. Telkom recognised a total provision of R1.14-billion in the year ended March 2020 for the impairment of trade receivables and contract assets, of which R626-million is owing to the expected impact of Covid-19, which, in turn, could negatively impact on the group's 2020 financial performance.

Network Modernisation

Telkom has been undertaking a significant network modernisation programme over the past few years and the ongoing capex has enabled Telkom to grow new revenue streams and offset the traditional business decline through growth in evolving technology. Capex for the year was R7.75-billion (2019: R7.67-billion), with a capex-to-revenue of 18% to increase coverage and the capacity of the mobile and fixed business, Telkom CEO Sipho Maseko said during the group's 2020 annual results conference call in June. More than 47% of the capital investment was injected into the mobile business, increasing by 22.10% to R3.70-billion to support growth and prepare for the accelerated migration of customers to long-term evolution (LTE), LTE-Advanced (LTE-A) and fibre. Telkom Consumer increased its base stations by 14.60% to 5 862, of which 71.10% are LTE time division duplex capable and 100% are LTE frequency division duplex capable. Telkom also refarmed a significant portion of its 1 800 MHz spectrum, enabling the company to switch off and decommission most second-generation (2G) access nationally; the refarming of portions of 2 100 MHz for LTE and LTE-A is under way.

About R2.70-billion was invested in Openserve during the year to March 2020, allowing for a 33% reduction of a legacy-services footprint by upgrading them to next-generation access technologies, such as fibre, as Telkom migrated from copper-based asymmetric digital subscriber line (ADSL) Internet.

Complementary to its overall fixed-broadband strategy, Openserve started wholesaling its copper-broadband access network through its new suite of Openserve Pure Connect products from May 1, 2020, following changes to its wholesale fixed-broadband products across its network earlier in April 2020.

According to TechCentral, Openserve CEO Althon Beukes said in April that, while the company continued to modernise its fixed infrastructure and upgrade its network, it believed that its current copper-broadband infrastructure was well positioned to be wholesaled where it was viable and available. However, Telkom will continue with the decommissioning of the copper network in areas where it is not economically viable.

Meanwhile, Gyro's capital portfolio boasts 3 648 towers, comprising 1 119 mature towers and 2 529 growth towers, with ambitions of building 1 000 new towers by 2023. There are 600 sites in the new build pipeline. Gyro, as part of Telkom's plans to enhance the penetration of 4G and prepare for 5G requirements, is pursuing small cell opportunities. The first small cell site, with a full service offering to mobile network operators, went live during the year ended March 2020. Further, the property group has 13 properties suitable for greenfield and brownfield developments in planning. A further 40 properties with development potential will undergo research assessments to determine the best use and suitable development projects. The group continues to decommission, dispose or repurpose noncore properties. Of the 520 sites earmarked for decommissioning, 73 were listed for auction during the 2020 financial year.

Leaner Structure

In January 2020, Telkom issued Section 189 notices, as required by the Labour Relations Act, to its employees, which could result in up to 3 000 jobs being shed. This was in addition to the offering of voluntary severance packages (VSPs) and voluntary early retirement packages (VERPs) as an alternative to retrenchments. Telkom temporarily suspended the Section 189 consultation process in March 2020, after the announcement of the initial national lockdown because of Covid-19, but lifted the suspension when South Africa moved to Level 3 of the lockdown, consequently enabling the parties to resume consultation. The Commission for Conciliation, Mediation and Arbitration will facilitate the Section 189 process.

Telkom offered VSP and VERPs to 2 271 employees at a cost of R1.18-billion in the 2020 financial year. About 75% of the employees took early retirement packages – with no retrenchments in 2020 – as Openserve, Telkom Consumer and Yellow Pages embarked on a judicious process to redefine their operating and service delivery models. This was Phase 1 of the two-phase restructuring programme. Phase 2 includes the Telkom Group head office and support functions across Telkom and BCX. Reuters

Telkom's shrinking employee base			
Employees	**March 2020**	**March 2019**	**% variance**
Group	15 099	15 635	(3.40)
Telkom:	9 508	9 541	(0.30)
Consumer	1 299	1 105	17.60
Openserve	7 870	8 097	(2.80)
Corporate	339	339	–
BCX group	5 315	5 782	(8.10)
Yellow Pages	176	216	(18.50)
Gyro	100	96	4.20

Source: Telkom, Annual Results for the year ended March 31, 2020

reported on January 16, 2020, that the affected jobs included support, specialist and operational employees, as well as those at supervisory and management levels in its wholesale division Openserve; the consumer unit; and its corporate centre. Telkom's headcount decreased by 536 employees to 15 099 in 2020 (2019: 15 635), with its workforce having shrunk by 2 176, or 12.50%, in 2018, mainly owing to the VSPs accepted.

Telkom has blamed the dominance of Vodacom and MTN, in addition to the fundamental changes within South Africa's telecommunications industry, for its decision to let go about 20% of its workforce, according to Tech Central. Unions, however, have fought the move. Solidarity asked for a moratorium on forced retrenchments in a statement issued to Telkom on January 16, 2020. The union requested an aggressive retraining programme as an alternative to job losses to equip workers with new skills to help Telkom grow in the fast-changing information technology environment. The Federation of Unions of South Africa called for the JSE-listed group's board to be axed for gross leadership failure, while ITWeb reported on August 24 that trade union Communication Workers Union (CWU) launched an urgent court application to interdict Telkom from implementing a new organisational structure until it complied with a fair labour process. Despite a legal challenge to the introduction of VSPs and VERPs, the court affirmed that Telkom conducted itself in the best interest of its employees and the group. The CWU told ITWeb it wanted Telkom to be interdicted from conducting interviews, short-listing and appointing candidates for advertised posts. The labour court was expected to hear arguments on September 1, 2020.

Regulatory and legal matters

On August 18, 2020, the Pretoria High Court handed a legal defeat to Telkom over the use of the partially State-owned operator's ducts that are used to carry broadband cables, TechCentral reported. The dispute dates back to August 2015, when Vodacom asked Telkom to lease it space in the ducts of 15 private residential estates in the Western Cape for fibre cabling to connect residents to the Internet, a request that Telkom declined. Following this, Vodacom approached Icasa for clarity and to investigate the matter.

In a preliminary report published in October 2017, the authority concluded that there was sufficient space in most of the existing ducts for additional installations, while keeping 25% spare capacity for cable kinks and crossovers, and that it was generally technically feasible for Telkom to lease space in the ducts. However, Telkom sought, in its application to the High Court, to have Icasa's decision reviewed and set aside. Tech Central reported that Judge Neil Tuchten, in a judgment handed down on August 15, 2020, found no basis for the operator's claim that the regulator erred in allowing Vodacom access to Telkom's ducts. The Supreme Court of Appeal also found in favour of Vodacom in a related case heard in 2019. Telkom is reviewing the judgment and is yet to decide on its next course of action.

Transformation

During the year ended March 31, 2020, Telkom South Africa achieved broad-based black economic-empowerment (BBBEE) Level 3 status, largely a result of its ownership score. Ownership was adjusted following a recent decision by the High Court to set aside the decision of Minister Rob Davies to grant facilitator status to government in respect of its shareholding in Telkom. Tech Central reported that Altron, joined by MTN as co-applicant, had brought the application against the Minister.

The court ruled, however, that the setting aside of Davies' decision would not affect the BBBEE status of Telkom and its subsidiaries for tenders or contracts awarded or concluded from May 7, 2019, to July 8, 2020, which is the date of the judgment. The court further ruled that, for the purposes of these tenders and contracts, the BBBEE status was to continue to be treated as though government's facilitator status remained valid until the dates of termination of the contracts. This decision necessitated the resubmission of BCX's BBBEE rating to the verification agency for reverification. BCX subsequently achieved BBBEE Level 2 status.

Consequently, the ownership score has decreased from 52.45% to 27.84% and black women ownership from 20.92% to 13.41%.

Telkom's black employee representation increased by 1% to 65%, while its female representation, which has remained a challenge for the company, decreased by 1% during the 2020 financial year. Telkom attributed this to competing for required skills such as cloud, data science, engineering, Internet of Things, security and e-commerce, where there is a shortage of female candidates.

VODACOM

Vodacom, South Africa's biggest mobile operator, is majority-owned by telecommunications multinational Vodafone (60.50%), and provides a wide range of communication services, including data, mobile and fixed-voice, messaging, financial services, enterprise information technology and converged services.

The group has a presence in the Democratic Republic of Congo (DRC), Mozambique, Lesotho, Kenya and Tanzania, as well as a business-managed services footprint in 63 countries through Vodacom Business Africa.

In May 2020, the company announced that it would separate its South African operations from the Vodacom Group, with the newly minted standalone Vodacom South Africa to be led by MD Balesh Sharma. This formed part of Vodacom Group's efforts to ensure that it can play a central role in overseeing all operations across its African footprint, as it accelerated its financial and digital services growth ambitions on the continent.

Meanwhile, Vodacom Group assumed management responsibility for Vodafone Ghana from April 1, 2020, and subsequently concluded a joint venture with Safaricom to accelerate the expansion of M-Pesa, having acquired the brand, product development and support services from Vodafone.

M-Pesa is a mobile phone-based money transfer, payments and micro-financing service, launched in 2007 by Vodafone Group and Safaricom, Vodacom and Safaricom, in which Vodacom owns a 34% stake, have also expressed interest in bidding for an Ethiopian telecommunications licence as part of a consortium.

In July 2020, Vodacom Business Africa extended its geographic footprint by providing connectivity for partners and clients in 12 new countries in the Middle East region through strategic business partnerships. The new countries added to its network include Afghanistan, Bahrain, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia and the United Arab Emirates.

Engineering News reported in May 2020 that Convergence Partners' pan-African digital service provider platform inq. Holdings, formerly Synergy Communications, acquired Vodacom Business Africa's operations in Nigeria, Zambia and Côte d'Ivoire, with further plans to acquire the Cameroon operations, pending regulatory approvals.

During the year ended March 31, 2020, Vodacom Group reported revenue of R90.75-billion (2019: R86.63-billion) and group service revenue of R73.40-billion (2019: R69.86-billion), with strong growth in the Vodacom International division and improved growth in South Africa.

In the six months ended September 30, 2020, the group's revenue increased 7.80% to R47.80-billion.

Vodacom				
CEO Shameel Aziz Joosub/Chairperson Phillip Jabulani Moleketi				
South Africa	**FY2020**	**FY2019**	**H1 2021**	**H1 2020**
Revenue	R69.59-billion	R67.89-billion	R36.71-billion	R33.91-billion
Ebitda	R29.09-billion	R27.74-billion	R15.29-billion	R13.91-billion
Capital expenditure	R9.86-billion	R9.58-billion	R5.02-billion	R4.77-billion
Subscribers	41.31-million	43.17-million	42.86-million	43.85-million
Data customers	21.89-million	19.95-million	22.30-million	21.42-million
International	**FY2020**	**FY2019**	**H1 2021**	**H1 2020**
Revenue	R22.49-billion	R19.98-billion	R11.74-billion	R11.14-billion
Ebitda	R8.68-billion	R6.25-billion	R4.21-billion	R4.29-billion
Capital expenditure	R3.36-billion	R3.38-billion	R1.52-billion	R1.57-billion
Subscribers	38.60-million	34.62-million	38.60-million	36.58-million
Data customers	19.98-million	17.66-million	20.44-million	19.67-million

Source: Compiled from Vodacom Group's financial report for the year ended March 31, 2020, Vodacom Group's financial report for the six months ended September 30, 2020, and Vodacom historical financial information September 30, 2020

Vodacom customers split		
Customers	**2020**	**2019**
South Africa	41.31-million	43.17-million
Tanzania	15.51-million	14.13-million
Democratic Republic of Congo	13.77-million	12.18-million
Mozambique	7.66-million	6.84-million
Lesotho	1.66-million	1.46-million
Safaricom	35.61-million	31.73-million

Source: Vodacom's financial report for the year ended March 31, 2020

The group's operating profit reached R27.71-billion (2019: R24.49-billion) and capex for the group increased 2% year-on-year to R13.22-billion – representing 14.60% of revenue – with South Africa accounting for R9.86-billion (2019: R9.58-billion) and the International operations accounting for R3.36-billion (2019: R3.38-billion). Safaricom 2020 capex was R5.21-billion (2019: R5.11-billion). Vodacom Group's operating profit for the first six months of the 2021 financial year increased 12.30% to R14.50-billion and capex for the group was R6.60-billion.

Vodacom Group also added 5.90-million customers to its network in the 2020 financial year, bringing the number of subscribers to 115.50-million (2019: 110-million) customers across the group, including Safaricom (35.61-million). The group added another 4.10-million customers during the six months to September 30, 2020, to reach 120-million customers across the group, including Safaricom.

According to Vodacom Group's integrated annual report to March 2020, the company has 22 183 base stations, adding 790 new second-generation (2G) sites, 845 new third-generation (3G) sites, 2 307 new fourth-generation (4G) sites and passing 109 536 fibre end-points during the year.

South Africa

In the group's South African segment, revenue increased 2.50% to R69.59-billion (2019: R67.89-billion) and service revenue 2.30% to R52.71-billion (2019: R51.54-billion), supported by an increase in data elasticity and use following the out-of-bundle rate reductions and the implementation of the End-User and Subscriber Services Charter Regulations in 2019.

Ebitda increased 4.90% to R29.09-billion (2019: R27.74-billion).

The local operation's enterprise service revenue increased 6.70% to R14.30-billion, with fixed-line revenue up 8.50%, supported by strong growth in revenue from the hosting and connecting of their cloud services. Internet of Things (IoT) connections increased 17.20% to 5.30-million, with revenue growth of 38.50% leveraging a relationship with IoT.nxt, which Vodacom acquired in the first half of 2020. Vodacom's financial services offering continues to expand, delivering revenue growth of 21.50% to R2-billion for the year, with 13.60-million customers now using one of its financial services products.

The South African operations recorded 41.31-million customers (2019: 43.17-million), of which 35.23-million were prepaid customers. During the 2020 financial year, data customers increased to 21.89-million (2019: 19.95-million), as elasticity compensated for the pricing transformation initiatives agreed with the Competition Commission and implemented from April 1, 2020. The R9.86-billion capex was directed at modernising the network and enhancing systems to cater for a diversified range of products and support, as well as to ensure that the mobile core network is 5G ready.

While Vodacom South Africa's 2G coverage remains at 99.90% of the population, 3G was extended to 99.70% of the population and 4G coverage to 95.40% (2019: 90.40%), despite not having access to dedicated sub 1 GHz 4G spectrum.

Vodacom Group CEO Shameel Joosub said in February 2020 that Vodacom's 4G capacity in South Africa would expand after it had agreed a revised roaming deal with data-only network provider Rain to extend its roaming and facilities leasing agreements beyond its original agreement of 5 000 sites to virtually all Vodacom sites. The agreement also incorporates the use of Rain's 1 800 MHz and 2 600 MHz spectrum bands to enhance the capacity and performance of Vodacom's network. In addition, the group secured access to the required 3.5 GHz spectrum for 5G through a December 2019 managed network services and roaming agreement with Liquid Telecom.

Further, following the allocation of temporary spectrum during the Covid-19 crisis, Vodacom South Africa selectively launched its first mobile and fixed 5G services in May.

The South African division extended rural coverage to 377 deep rural network sites (2019: 240) for communities that previously did not have coverage. Vodacom's fibre roll-out also improved in the second half of the year, with the total number of homes

South Africa key indicators

Year ended March 31			
	2020	2019	2019/20
Customers[1] (thousand)	41 312	43 166	(4.30)
Prepaid	35 231	37 331	(5.60)
Contract	6 081	5 835	4.20
Data customers[2] (thousand)	21 891	19 952	9.70
Internet of Things connections[3] (thousand)	5 289	4 514	17.20
Traffic[4] (millions of minutes)	64 070	63 073	1.60
Outgoing	53 875	53 692	0.30
Incoming	10 195	9 381	8.70
MoU per month[5]	122	121	0.80
Prepaid	112	110	1.80
Contract	189	198	(4.50)
Total ARPU[6] (rands per months)	86	87	(1.10)
Prepaid	54	54	–
Contract	290	315	(7.90)
Messaging (millions)	8 885	9 057	(1.90)
Number of employees	5 403	5 197	4

Source: Vodacom, Annual Results for the year ended March 31, 2020

Notes:

1. Customers are based on the total number of mobile customers using any service during the last three months. This includes customers paying a monthly fee that entitles them to use the service even if they do not actually use the service and those customers who are active whilst roaming.
2. Data customers are based on the number of unique users generating billable data traffic during the month. Also included are users on integrated tariff plans, or who have access to corporate APNs, and users who have been allocated a revenue generating data bundle during the month. A user is defined as being active if they are paying a contractual monthly fee for this service or have used the service during the reported month.
3. Internet of Things connections (IoT), is the remote wireless interchange between two or more predefined devices or a central station without direct relationship with an end customer, in order to support a specific business process or product.
4. Traffic comprises total traffic registered on Vodacom's mobile network, including bundled minutes, promotional minutes and outgoing international roaming calls, but excluding national roaming calls, incoming international roaming calls and calls to free services.
5. Minutes of use (MOU) per month is calculated by dividing the average monthly minutes (traffic) during the period by the average monthly customers during the period.
6. Total average revenue per user (ARPU) is calculated by dividing the average monthly service revenue by the average monthly customers during the period. Prepaid and contract ARPU only include service revenue generated from Vodacom mobile customers.

connected more than doubling, to 61 427, with owned fibre passing 109 536 homes and businesses.

In April 2020, Joosub announced Vodacom's intention to spend R500-million within two months to add network capacity and increase network resilience during South Africa's National State of Disaster, and to help cope with any possible load-shedding.

This included accelerating the installation of smart energy management solutions and supplementary network capacity.

Vodacom also announced various data price-reduction initiatives that came into effect from April 1, 2020, which Joosub said would save customers R2.70-billion, following the signing of a consent agreement with the Competition Commission, wherein the group would introduce price reductions across all its monthly bundles, provide free access to basic Internet for essential services and offer lower prices to poor communities.

Meanwhile, in July, Vodacom Financial Services entered into an agreement with Alipay to develop a superapp that will enable access to inclusive mobile solutions for South African consumers and merchants in a technology partnership to reinvent the mobile fintech ecosystem.

Operated by Vodacom Financial Services, with Alipay as the technology provider, the superapp will offer a marketplace of goods and services tailored to the needs of South African customers.

Vodacom Financial Services will work closely with Alipay to develop the app by early next year.

International

Vodacom's international portfolio continues to grow in the double-digit range year-on-year and currently contributes 29.70% to the group's service revenue.

During the year to March 2020, service revenue expanded to R21.80-billion (2019: R19.38-billion), owing to increased demand for data and sustained growth in M-Pesa. The International division added four-million new customers during the 12 months to March 2020, up 11.50% from the prior year to 38.60-million.

International key indicators

	Year ended March 31		% change
	2020	2019	2019/20
Customers[1] (thousands)	38 595	34 620	11.50
Tanzania	15 513	14 133	9.80
Democratic Republic of Congo	13 766	12 180	13.00
Mozambique	7 656	6 843	11.90
Lesotho	1 660	1 464	13.40
Data customers[2] (thousands)	19 983	17 664	13.10
Tanzania	7 687	7 892	(2.60)
Democratic Republic of Congo	6 594	4 749	38.90
Mozambique	4 855	4 289	13.20
Lesotho	847	734	15.40
30-day active customers[3]	14 738	13 500	9.20
Tanzania	6 685	6 989	(4.30)
Democratic Republic of Congo	2 864	2 116	35.30
Mozambique	4 389	3 860	13.70
Lesotho	800	535	49.50
MOU per month[4]			
Tanzania	172	172	–
Democratic Republic of Congo	34	36	(5.60)
Mozambique	132	136	(2.90)
Lesotho	80	74	8.10
Total ARPU[5] (rands per month)			
Tanzania	36	36	–
Democratic Republic of Congo	46	41	12.20
Mozambique	59	55	7.30
Lesotho	69	66	4.50
Total ARPU[5] (local currency per month)			
Tanzania (TSh)	5 616	6 010	(6.60)
Democratic Republic of Congo ($)	3.10	3	3.30
Mozambique (MT)	252	244	3.30
Number of employees	2 054	2 357	(12.90)

Source: Vodacom, Annual Results for the year ended March 31, 2020

1. Customers are based on the total number of mobile customers using any service during the last three months. This includes customers paying a monthly fee that entitles them to use the service even if they do not actually use the service and those customers who are active whilst roaming.
2. Data customers are based on the number of unique users generating billable data traffic during the month. Also included are users on integrated tariff plans, or who have access to corporate APNs, and users who have been allocated a revenue generating data bundle during the month. A user is defined as being active if they are paying a contractual monthly fee for this service or have used the service during the reported month. Three month active.
3. M-Pesa customers are based on the number of unique customers who have generated revenue related to M-Pesa during the last month.
4. Minutes of use (MOU) per month is calculated by dividing the average monthly minutes (traffic) during the period by the average monthly customers during the period.
5. Total ARPU is calculated by dividing the average monthly service revenue by the average monthly customers during the period.

Safaricom key indicators

	Year ended		%change
	2020	2019	19/20
Customers (thousand)	35 610	31 750	12.20
Data customers (thousand)	19 622	17 808	10.20
M-Pesa customers (thousand)	24 910	22 604	10.00
ARPU (local currency per month	614.58	659.34	(6.8)

Source: Vodacom, Annual Results for the year ended March 31, 2020

1. A customer is defined as a Subscriber Identity Module (SIM), or in territories where SIMs do not exist, a unique mobile telephone number, which has access to the network for any purpose (including data only usage) except telemetric applications.
2. Data customers are based on the number of unique users generating billable data traffic during the month. Also included are users on integrated tariff plans, or who have access to corporate APNs, and users who have been allocated a revenue generating data bundle during the month. A user is defined as being active if they are paying a contractual monthly fee for this service or have used the service during the month reported.
3. Number of unique customers who have generated revenue related to M-Pesa in the past 30 days.
4. Average revenue per user is calculated by dividing the average total service revenue by the average monthly customers during the period.

Data services remain a key area of growth, with the division adding 2.30-million new customers to reach 20-million, of which only 10.20-million customers are on smartphones.

The International division added 452 2G sites, 546 3G sites and 1 079 4G sites, including 47 in the DRC, since March 2019, reaching a total of 8 032 2G sites, 6 175 3G sites and more than 2 672 4G sites across all international markets.

In Mozambique, the group had to deal with challenges regarding the network early in the 2020 financial year, following two consecutive cyclones that damaged major roads and infrastructure, delaying Vodacom's ability to restore network services. In May 2020, US multinational conglomerate Alphabet's Loon and Vodacom signed a deal to use Loon's balloon-powered Internet solution to expand the Vodacom network access to the Cabo Delgado and Niassa provinces through a network of floating cell phone towers that operate 20 km above Earth.

In Tanzania, the group barred services to 2.90-million customers from January 2020, in line with government and regulatory requirements for customers to biometrically register all SIM cards. Low penetration of identity numbers across the country significantly affected the registration process; however, Vodacom reconnected 707 000 of these customers and 2.50-million customers remain nonbiometrically registered as at March 31, 2020.

After becoming the first company to commercially launch 5G in Lesotho, in 2019, the group invested in further expanding network coverage, quality and efficiencies, addressing the country's high 3G use with layer upgrades using the 900 MHz and 2 100 MHz spectrum bands, as well expanding the 4G network in areas with high traffic demands.

Vodacom continues to engage with regulatory authorities regarding enforcement proceedings of the Lesotho Communications Authority pertaining to the alleged lack of independence of Vodacom's external auditors.

Meanwhile, in Kenya, Safaricom's service revenue increased to R36.32-billion (2019: R32.70-billion), driven by M-Pesa growth and supported by strong customer acquisition, a recovery of market share and mobile data returning to double-digit growth. Safaricom's Ebitda increased to R19.95-billion (2019: R16.91-billion). The East African company's customer base increased 12.20% to 35.61-million (2019: 31.73-million), while data customer users increased 10.20% to 19.62-million (2019: 17.81-million) using 1.3 GB per customer.

Mobile Money

Since launching in 2007, M-Pesa has grown to have the biggest reach of any financial services provider in Africa. M-Pesa is operational in Kenya, Tanzania, Lesotho, the DRC, Ghana, Mozambique and Egypt. According to Vodacom's 2020 integrated report, the platform, including Safaricom, has 39.60-million active customers and processes more than one billion transactions valued at $14.70-billion every month.

During the year ended March 31, 2020, M-Pesa revenue from Vodacom's International markets grew 29.80% to R4-billion, representing 18.30% of total service revenue. This was attributed to robust revenue growth in Mozambique (59.40%), strong growth in the DRC (48.30%) and Lesotho (27%), and a solid performance in Tanzania (7.40%), despite intensifying competitive pressure and a more challenging regulatory environment.

During the 2020 financial year, M-Pesa revenue in Mozambique increased by 59.40%, contributing 15.80% in 2020 (2019: 11.50%) to service revenue. In the DRC, M-Pesa revenue increased 48.30% and now represents 9.70% of service revenue (2019: 7.10%), while in Lesotho, M-Pesa revenue increased 27%, supported by a 49.50% increase in M-Pesa customers.

In Kenya, Safaricom's M-Pesa revenue was up 12.60% to R12.20-billion, representing 33.60% of service revenue, while its M-Pesa customers increased 9.2% to 14.70-million, representing 38.20% of the group's customer base.

In March 2020, Vodacom Group and Safaricom completed the acquisition of the M-Pesa brand, product development and support services from Vodafone through a newly-created 50:50 joint venture. The acquisition gave Vodacom Group and Safaricom full control of the M-Pesa brand, as well as the opportunity to expand M-Pesa into new African markets.

Currently, more than 900 enterprise organisations use M-Pesa to collect and disburse payments, more than 20-million customers use M-Pesa to access formal savings and loan products with partner banks, and more than 20 000 retail and online merchants now accept M-Pesa. Vodacom also partnered with multiple service providers and banks across its international markets to launch various microloan and savings products, overdraft facilities, savings group initiatives and international money transfer services, besides others.

Regulatory and legal matters

In the company's annual integrated report, Vodacom chairperson Phillip Moleketi says Vodacom experienced significant regulatory and policy challenges throughout the year ended March 2020.

On May 1, 2019, the Tanzania Communications Regulatory Authority (TCRA) required Tanzanian operators to start implementing biometric registration using national identification documents, with an initial deadline of December 30, 2019, which was subsequently extended to January 20, 2020. On February 7, 2020, new SIM card registration regulations were published, formalising the biometric-only SIM registration requirement; however, the low penetration of national identification numbers across the country has largely impacted on the biometric registration process. The national biometric-based registration of all customers, integrated with the country's National Identification Agency system, resulted in Vodacom Tanzania's barring 2.90-million SIM cards in various phases from January 14, 2020, which has had a profound negative impact on revenue and customer numbers. As at March 31, 2020, 2.50-million Vodacom Tanzania customers were yet to be biometrically registered, with the group awaiting instruction from the TCRA on how to proceed with these customers.

Vodacom expects to recover a significant portion of these customers over the short to medium term. From June 30, 2020, the new regulations also imposed limits on SIM card ownership: an individual is allowed to own and use only one SIM card per mobile network operator for use of voice, SMS and data services, while companies can have 30 SIM cards per mobile network operator. TCRA's approval will be required to exceed the set limits; however, Vodacom Tanzania and other mobile operators are engaging the TCRA to put in place an automated solution that will enable customers to get approval for additional SIM cards.

In Lesotho, the group is continuing engagements with regulators regarding enforcement proceedings by the Lesotho Communications Authority (LCA) pertaining to an alleged breach of Universal Access Fund obligations and an alleged lack of independence of Vodacom Lesotho's external auditors. In December 2019, the LCA issued a notice of enforcement proceedings against Vodacom Lesotho over the alleged non-independence of the company's external auditors. In February 2020, the LCA directed Vodacom Lesotho to show cause why its communications licence should not be withdrawn and, by March 2020, following several engagements with the LCA, Vodacom Lesotho made written representations against the revocation of its licence. The LCA is yet to issue a final decision on the matter.

Meanwhile, in South Africa, the inventor of the Please Call Me service, Kenneth Makate, rejected a R47-million compensation offer, seeking R10-billion for his role in creating the platform. The years-long battle led to a deadlock in the negotiations between Vodacom and Makate, with Makate approaching the courts several times. The parties were ordered by the Constitutional Court in 2016 to enter into good faith negotiations to determine reasonable compensation, the deadlock leading Makate to launch an application in the High Court of South Africa to have the decision of the deadlock breaker reviewed and set aside. Makate also wants Vodacom to disclose the revenue the company has generated from the Please Call Me service since it was launched in March 2001. The Pretoria High Court agreed, and in June 2020, justice Jody Kollapen granted the order, giving Vodacom 21 days to release the financial records and related documents to assist the parties in determining the value of the idea. MyBroadband reported on July 22, 2020, that Vodacom applied for leave to appeal against the ruling that requires the submission of extensive information to Makate.

On August 4, 2020, Vodacom requested to have the order amended – as an appeal may not be possible, owing to its interlocutory nature – to rather provide Makate with only the necessary data Vodacom has in its possession, according to an affidavit by Vodacom's chief officer for legal, compliance and risk Nkateko Nyoka. According to Makate, Vodacom owes him a settlement of R10.20-billion, which excludes accrued interest and all the legal fees incurred since the Constitutional Court judgment. He wants Vodacom to pay him a settlement that takes into account his legal fees and said that his legal team calculated that Please Call Me had earned Vodacom R205-billion in call revenue from 2001 to 2020.

Meanwhile, Vodacom is also facing several hurdles in the DRC, including a new national digital plan introducing changes to the country's ICT

policy framework, customer SIM registration regulations, a proposed new handset tax and the implementation of an outcome of a market review of the retail market for voice and data. The Customs Authority has also instituted a criminal claim against Vodacom Congo for unpaid custom duties on alleged smuggled devices bought by Vodacom Congo from a local supplier that had subsequently closed its business in the DRC. The group has rejected the claim and the investigation is ongoing.

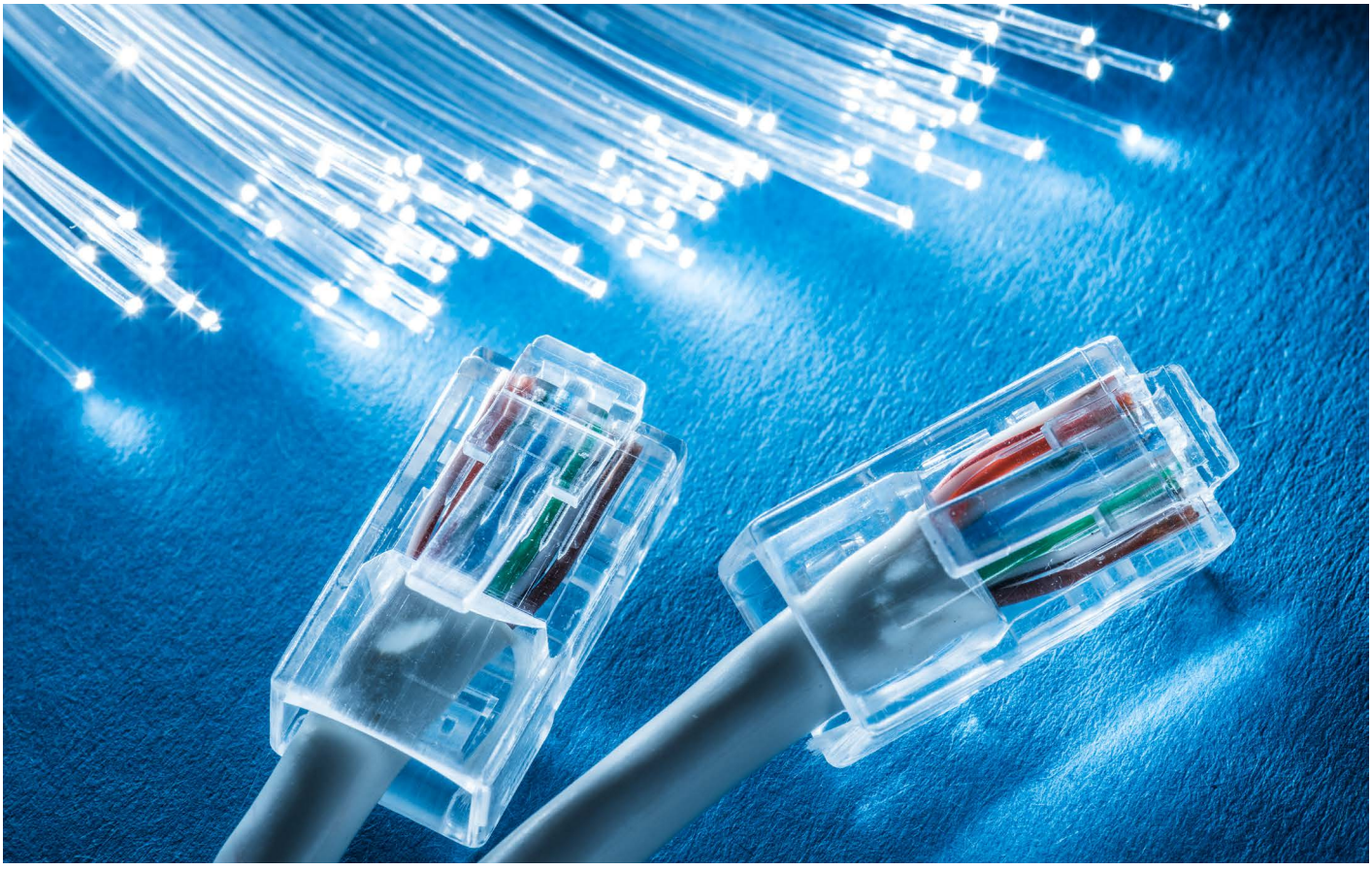
Transformation

In June 2020, Vodacom said it achieved a broad-based black economic empowerment (BBBEE) contributor score of Level 1, as a result of its local subsidiaries accelerating a concerted transformation strategy. The Level 1 achievement came at a direct cost of R1.30-billion to the company.

Vodacom Group subsidiaries, – Vodacom South Africa and Nexio – retained 2019's rating of Level 1, with X-Link improving from Level 2 to Level 1, while IoT.nxt, acquired by Vodacom South Africa in 2019, achieved Level 4 status. Vodacom spent R35.90-billion on BBBEE status companies with Level 4 and above, of which R13-billion was spent on 51% black-owned suppliers and R15-billion on procuring services from 30% black woman-owned suppliers. Vodacom also spent R243-million on supplier development and R407-million on small, medium-sized and microenterprise development across seven provinces. The company invested R363-million in skills development while spending R87.50-million on its mobile education programme, e-school platform, ICT computer centres and training 100 000 teachers in digital literacy.

Meanwhile, in a press release issued on August 19, 2020, Vodacom said that its YeboYethu black economic-empowerment (BEE) scheme had R73-million in unclaimed dividends belonging to more than 12 000 shareholders dating back to 2014. The administrators of the scheme have been unable to pay the dividends, as shareholders have not updated their contact details. Established in 2008, YeboYethu issued 14.40-million YeboYethu Ordinary Shares at R25 each and, as a result of the public offer, about 102 000 qualifying black investors bought a stake in Vodacom South Africa. At the time of implementation, the R7.50-billion Vodacom South Africa BEE transaction was one of the biggest empowerment schemes in the telecommunications industry, resulting in YeboYethu's owning 3.44% of Vodacom South Africa.

Through a new BEE deal concluded in June 2018, YeboYethu now holds a 6.23% stake in Vodacom Group worth R13.40-billion. The scheme has 84 496 shareholders and has paid more than R66-million in dividends to 72 454 shareholders through its service provider Link Investor Services from August 2016 to date.



INDUSTRY TRENDS AND CHALLENGES

By the end of 2019, 5.20-billion people, or 67% of the global population, were subscribed to mobile services worldwide. The GSMA's 'Mobile Economy 2020' report says this is expected to increase by 600-million subscribers – mostly in India, China, Pakistan and Nigeria – to 5.80-billion by 2025, covering 70% of the population.

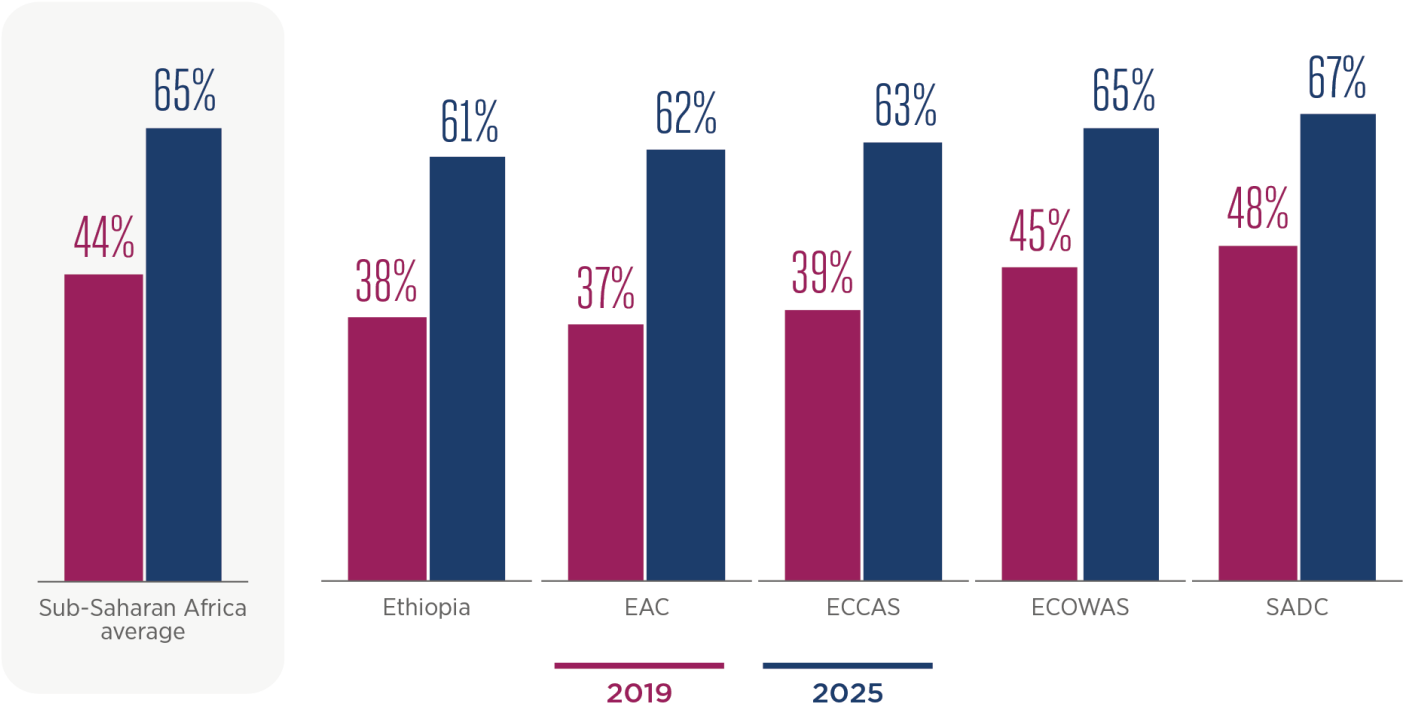
With almost one-billion additional people having been covered by mobile broadband over the past five years and an additional 1.20-billion set to start using mobile Internet by 2025 – bringing the total number of mobile Internet subscribers to five-billion, from the current 3.80-billion – the connectivity gap continues to close.

GSMA Intelligence notes that sub-Saharan Africa will remain the fastest growing region, with a compound annual growth rate of 4.30% and the addition of 137-million subscribers over the period to 2025. At the end of 2019, 477-million people, or 45% of the population, in sub-Saharan Africa subscribed to mobile services.

Over the next five years, the region's mobile market is expected to achieve several important milestones, such as reaching 500-million mobile subscribers in 2021, one-billion mobile connections in 2024 and 50% mobile subscriber penetration by 2025, GSMA regional research director Kenechi Okeleke said during the GMSA Thrive Africa conference in September 2020. Further, sub-Saharan African smartphone connections, currently at 50% of total connections in 2020 (2019: 44%), will reach 678-million subscribers by the end of 2025, accounting for 65% of connections.

Despite this growth, rural connectivity remains a challenge, as full-scale deployment is not economically warranted – despite the social and economic benefits of connectivity for rural areas – owing to the unfavourable costs of, and returns from, providing the underlying infrastructure. Several factors have raised the profile and urgency of this issue over the past year, including political championing, fifth-generation (5G) roll-outs, the rising value of fibre and alternative networks challenging incumbent wholesalers. The onset of the

Smartphones as a percentage of total connections



Source: GSMA, The Mobile Economy sub-Saharan Africa 2020 Report
EAC – East African Community
ECCAS – Economic Community of Central African States
ECOWAS – Economic Community of West African States
SADC – South African Development Community

Departmental merger

The merger of the Department of Telecommunications and Postal Services and the Department of Communications continues. The formation of the Department of Communications and Digital Technologies (DCDT) was mandated by President Cyril Ramaphosa in 2018 and established in 2019. The Presidential Proclamations in the Government Gazette of August 14, 2019, confirmed the transfer of administration, powers and functions to the Minister of Communications, initially functioning with a startup organisational structure until the revised organisational structure is finalised, approved and implemented.

Following this, the department, led by Minister Stella Ndabeni-Abrahams, underwent a restructuring and reconfiguration. In October 2020, the Minister established a joint oversight forum to ensure a smooth merger process.

The new oversight project management office (PMO), which will be chaired by the Minister's office, is responsible for the smooth implementation of the long-awaited merger.

The director-general will be the secretariat of the PMO, which will also comprise the chairpersons, CEOs and CFOs of the affected institutions, along with several selected board members. The implementation timetable is yet to be published.

The department has 11 entities under its portfolio, with renewed focus on embattled parastatals the South African Post Office, the South African Broadcasting Corporation and the Universal Service and Access Agency of South Africa (Usaasa). The business case of the Broadband Infraco and Sentech merger as a State digital infrastructure company has been finalised, with Cabinet and Parliamentary processes and approval pending. The business case for the restructure of Usaasa and the Universal Service and Access Fund as a digital development challenge fund is nearing completion, and consultations with National Treasury are ongoing.

In addition, the matter of corporatising Post Bank as it is unbundled from the Post Office is currently at Cabinet level. To drive digital transformation, the DCDT is establishing a digital services agency, for which the State Information Technology Agency (Sita) has been earmarked. The department is working with Sita to ensure legislation finds expression and is amended.

Source: *Engineering News*, Department of Communications and Digital Technologies

Covid-19 pandemic – and its aftermath – is likely to provide further impetus, as an increase in remote working could precipitate a demographic shift from cities to rural areas.

Meanwhile, the anticipated growth in connectivity means mobile continues to make a significant contribution to the global economy. In 2019, mobile technologies and services generated $4.10-trillion, or 4.70% of gross domestic product (GDP), of economic value globally. This is expected to grow to $5-trillion, or 4.90% of GDP, by 2024 as countries increasingly benefit from the improvements in productivity and efficiency from the increased uptake in mobile services.

Increasingly, South Africa's telecommunication firms are rapidly evolving to offer more service-integrated services in addition to communications as the ever-evolving digital era demands more diversified digital services. They are venturing into financial technology (fintech), information and communication technologies (ICT), the application economy, small business economies, the Internet of Things (IoT) and 5G, besides others, to maintain revenues as trends shift to a fully inclusive customer experience.

EY Africa telecommunications, media and technology leader Abhishek Kapur believes the Covid-19 lockdown period laid bare the legacy business of telecommunications operators, as brick-and-mortar, business-to-consumer stores were forced to close, leaving consumers unable to interact normally with their providers, such as SIM activations and SIM swaps, which left call centres under pressure. He suggested that modern telecommunication groups provide services adjacent to their core offering, including enterprise data analytics, cybersecurity, cloud services, and payment services enabled by blockchain, to stay relevant and profitable, with an opportunity for operators to develop more diversified digital services and increase their revenue streams.

Transformative solutions, underpinned by IoT and new areas such as big data, machine learning, analytics, edge computing and distributed ledger technologies, are enabling operators to deliver value in new areas beyond connectivity that will transform industries, businesses and lives, says the GSMA report. MTN, Telkom and Vodacom have all pursued alternatives to offer more as consumers demand more digital platform businesses, including video, music, applications and gaming, insurance, payments and lending. Vodacom financial and digital services division CEO Mariam Cassim told ITWeb in August 2020 that the telecommunications business boomed with the rise of voice services; however, a few years later, the voice and data markets are reaching saturation levels. Vodacom said it had taken significant steps during the 2020 financial year to further diversify the business as a technology company and not just a telecommunications company.

According to GSMA Intelligence, across the development of new platforms, applications and solutions, there is an incremental $1.10-trillion revenue opportunity that awaits operators by 2025.

COVID-19

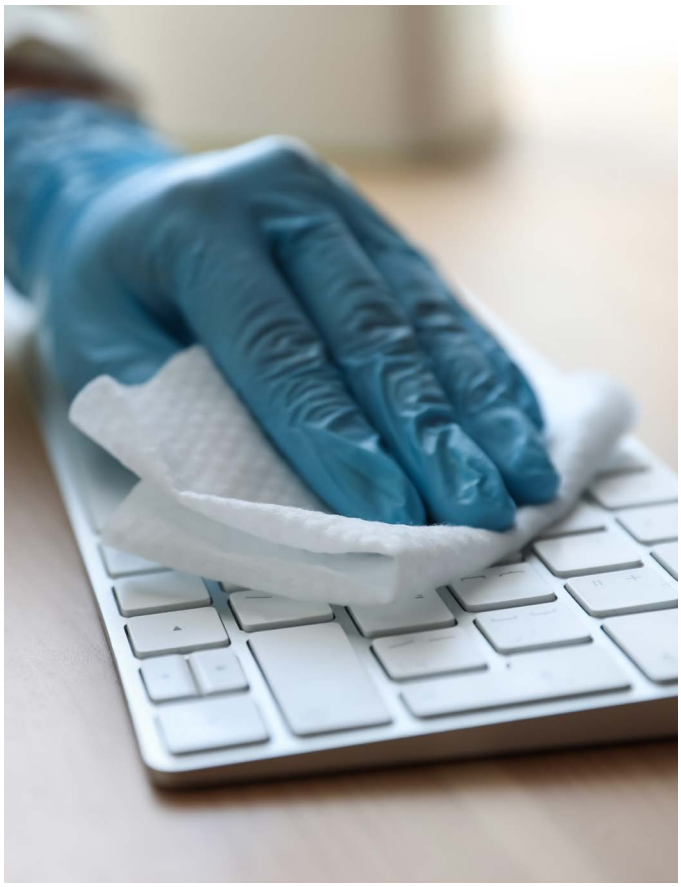
On March 27, 2020, South Africa went into a three-week hard lockdown to manage the local threat of the global Covid-19 pandemic. This was followed by a two-week extension and the subsequent staggered lifting of restrictions in the months that followed. Millions of South Africans had to rely on mobile access for family interactions, socialising, education, entertainment and work, with mobile broadband, fixed-wireless connections and mobile applications the main tools to remain operational and in contact. There were surges across mobile voice, text and data services in download and upload streams, as a result of changing user demands. The Covid-19 pandemic and resulting widespread shift in working and Internet traffic patterns from business to residential locations have thrust communications and the resiliency of telecommunications networks to the fore.

In particular, the sharp increases in mobile data traffic and a heavier reliance on mobile connectivity in sub-Saharan Africa, relative to other regions, reflect low fixed-broadband penetration in residential locations. While multinational professional services network Deloitte points out that network traffic growth, particularly data, has been rising exponentially over the past few years, some operators have reported almost 50% growth in mobile data traffic and more than 200% growth in fixed-data traffic during the lockdown period.

During South Africa's initial lockdown period, from late March through April 2020, the double-digit increase in data traffic was driven by growth in paid traffic for businesses, as employees worked from home and entertained through streaming and other data services. The higher data consumption was also attributed to increased zero-rated traffic for education, government and health portals.

During a presentation on its financial year-end results to March 31, 2020, Vodacom reported an initial increase in data traffic of up to 40%, while MTN South Africa's data traffic in the six months to June 2020 increased by 77%. Further, prior to the lockdown, traffic typically peaked during certain hours of the day; however, the networks started experiencing sustained peak traffic patterns for almost the entire day during the restrictions. As a result, investments were directed to network upgrades to expand capacity and shift it towards the newly created hotspots in residential areas, while large international content providers, such as Netflix, YouTube and Facebook, reduced the resolution of video content to help ease the burden on networks worldwide during the crisis.

Despite the surge in data traffic, operators reported that their networks remained resilient throughout the lockdown, reflecting the considerable investment in network infrastructure. In April 2020, Vodacom said it would spend more than R500-million



within two months to add network capacity and increase network resilience during the National State of Disaster. MTN spent R10.10-billion on its networks during the six months to June 2020, also focusing on capacity and resilience. MTN Group outgoing CEO and president Rob Shuter expects total capital expenditure (capex) for the 2020 financial year to reach R22-billion. Telkom said its scalable network and sufficient redundancy managed the surge in fixed and mobile network traffic for its telecommunications services. It enhanced its broadband-led propositions across customer segments, leveraging its existing copper network, where it launched broadband on copper services and used spare capacity ports. Digital platforms were scaled up as stores were closed, with the group launching a business e-commerce platform.

The constraints of Covid-19 have delayed the pace of rolling out sites; however, relief spectrum released by the Independent Communications Authority of South Africa (Icasa) enabled the operators to alleviate some of the pressure in some areas of the networks. Icasa, on April 17, assigned temporary spectrum to 17 of the 35 applicants that complied with the provision of their temporary spectrum invitation. Icasa invited operators to apply for temporary radio-frequency spectrum assignments in the 700 MHz, 800 MHz, 2 300 MHz, 2 600 MHz and 3 500 MHz bands to unlock connectivity for all during South Africa's National State of Disaster period.

Battery theft remains a significant challenge for operators

Theft and vandalism continue to cost network providers hundreds of millions of rands every year. In March 2020, *Engineering News* reported that MTN and Vodacom made strides in the war against persistent battery theft at its base stations, with several arrests and battery recoveries. In 2019, the duo raised the alarm over the accelerating battery theft and vandalism at cellphone towers across the country, which had reached crisis point by the end of the year, with losses amounting to hundreds of millions of rands and the permanent shutdown of dozens of sites, as well as extensive disruptions to network provision impacting on telecommunications quality. MTN warned at the time that the cost to the industry had reached an unsustainable tipping point, where the damage to towers and infrastructure far exceeded the cost of repairing and replacing batteries and equipment. The severity of the damage to cell towers forced MTN to permanently close 53 base stations, while its peer, Vodacom, spent millions of rands more to replace its batteries with expensive, more secure lithium-ion alternatives to limit the mass scale of the theft.

Vodacom reported a 35% year-on-year increase in battery theft at its base stations in 2019, with an average of 600 incidents a month at sites that were impacted on by theft or damage. Vodacom reported losing between R120-million and R130-million a year to vandalism and theft. Vodacom group chief technology officer Andries Delport said at a media roundtable in August 2019 that between 1 500 and 2 000 batteries a month were being stolen, while Vodacom innovation head Jannie van Zyl added that the group lost 25 000 batteries in 2019. Vodacom Gauteng executive head of operations Perumal Moodley said in a statement in August 2020 that Vodacom base stations in Soweto, Gauteng, are increasingly being targeted for theft and vandalism by organised crime syndicates, with more than one-hundred cases of vandalism reported in the area since the start of 2020. *Engineering News* reported in May 2020 that Vodacom was testing a new model to secure its sites by forging partnerships with members of the community, who will be recruited, trained and accredited to work with the police, serving as monitoring personnel.

MTN said in a statement released on February 18, 2020, that its efforts to increase security measures and introduce high-tech solutions and on-the-ground strategies to prevent battery theft and vandalism at cell tower base stations had started to see success, with as many as 143 batteries, worth R1.20-million, recovered in January 2020. About 700 batteries were stolen from MTN stations in January 2020 during 122 incidents. Cable theft also increased in December 2019 and January 2020, with 109 incidents reported in January.

In November 2019, the winners of MTN's latest edition of TADHackJHB developed a cell tower protection application (app) aimed at mitigating the growing crisis of vandalism and battery theft at telecommunications base stations. The CharOn solution enables individuals to report suspicious activity within the vicinity of the cell towers, with the app notifying authorities, should enough data of the same case be reported.

Source: Vodacom integrated annual report 2020, MTN, *Engineering News*, Vodacom press

Telkom, MTN and Vodacom each received 40 MHz in the in-demand 700 MHz and 800 MHz bands. In the 2 300 MHz band, Telkom was temporarily assigned 20 MHz, adding to the 60 MHz it already has in this band, while Vodacom was temporarily assigned 20 MHz. MTN and Vodacom were assigned 50 MHz each in the 2 600 MHz band, Telkom received 40 MHz, and Rain received 30 MHz in addition to its 20 MHz. In the 3 500 MHz band, where there is only 116 MHz available, Telkom was temporarily assigned 12 MHz out of the 32 MHz for which it applied, adding to the company's currently assigned 28 MHz. Vodacom was temporarily assigned the 50 MHz for which it applied, while MTN has been temporarily assigned 50 MHz out of the 70 MHz for which it applied. Liquid Telecom was assigned 4 MHz, adding to its 56 MHz in this band.

The temporary spectrum came with obligations such as the zero-rating of all Department of Health-identified Covid-19 sites. The emergency spectrum was initially due to be returned no later than three months after the country's lifting of the State of Disaster; however, Icasa, in October 2020, released the invitations to apply for permanent spectrum, which outlined that operators could keep the temporary spectrum until the auction process takes place in March 2021.

Meanwhile, a GSMA Intelligence report on sub-Saharan Africa for the first quarter of 2020 shows that Covid-19 will have a mixed impact on the revenue outlook, noting that the increased data use, owing to physical distancing measures, such as working from home and virtual schooling, may support data revenue growth in subsequent quarters.

However, mobile money revenue growth will likely stagnate as operators reduce transaction fees to promote less use of cash.

Following the peak impact of Covid-19-related restrictions in April 2020, MTN said it is encouraged by the sequential recovery in key voice, data and fintech, as restrictions were gradually eased. Month-on-month trends indicate some recovery in voice revenue, which increased by 5.90% in June 2020, compared with the levels in April 2020.

Spectrum Lots and Reserve Prices				
Lot numbers	**Lot category**	**Lot size**	**Number of lots available**	**Reserve price per lot**
1–4	700 MHz	2 × 5 MHz	4	R526 615 392.49
5–8	800 MHz	2 × 5 MHz	4	R752 307 703.55
9	800 MHz	2 × 10 MHz	1	R1 155 174 976.66
10–24	2 600 MHz	1 × 10 MHz	14	R97 843 320.52
25	3 500 MHz	1 × 2 MHz	1	R9 818 987.30
26–33	3 500 MHz	1 × 10 MHz	8	R75 606 202.22
34	3 500 MHz	1 × 4 MHz	1	R19 637 974.60

Source: Icasa. Address by the Icasa chairperson on the announcement of invitations to apply for high-demand spectrum and Woan, September 30, 2020

SPECTRUM CRUNCH

South Africa's telecommunications companies are awaiting the allocation of the high-demand spectrum required to further communications technology development in the country. Icasa plans to auction the long-awaited high-demand spectrum in March 2021 after issuing invitations to apply (ITAs) for spectrum in October 2020.

Excluding the emergency spectrum issued in April 2020, this will be the first time in ten years that telecommunications companies will gain access to the in-demand spectrum required to deploy next-generation technologies. The last time significant blocks of high-demand spectrum were issued by Icasa was in 2005, with the release of the 2.1 GHz band for the roll-out of third-generation (3G) networks by Vodacom and MTN. Cell C was allocated spectrum in 2011.

Icasa originally issued an ITA for high-demand spectrum in 2016, but withdrew it after being sued by then-Telecommunications and Postal Services Minister Siyabonga Cwele, who had accused Icasa of issuing the ITA prematurely and precipitously, without the existence of the requisite preceding regulatory steps. In 2018, Icasa agreed to withdraw the ITA. The stalled process of assigning more spectrum has forced operators to either partner with rivals through roaming agreements or memorandums of understanding, or refarm current 3G spectrum to facilitate the roll-out of fourth-generation (4G) services to consumers. As a result, investment that could have been made in providing affordable access to customers was diverted to servicing technical issues, and operators had to densify their networks by building a large number of base stations to compensate for the inadequate spectrum. In December 2019, MTN South Africa CEO Godfrey Motsa said the group invested more than R50-billion over the past five years to compensate for a lack of spectrum, while Vodacom CEO Shameel Joosub said that a lack of access to spectrum is the reason the cost of data and to communicate remain costly.

As Icasa prepares to auction the high-demand spectrum in March 2021, connecting rural and semi-rural areas to the mobile Internet remains a challenge. Business Day in November quoted Icasa as saying that less than 70% of the country has access to mobile broadband services, despite MTN and Vodacom's coverage of 96% of the population with 4G. Icasa notes that SMS text messaging and voice remain the main form of communication for many South Africans. The authority aims to correct this inequality during the upcoming spectrum auction by prioritising rural and underserviced areas, in addition to ensuring universal service and access to affordable and secure broadband services by all South Africans.

Business Day said that the mobile operators have argued that a lack of spectrum and the high cost of constructing base stations made it challenging to deploy networks in rural regions, with Icasa acknowledging that lower population density and use volumes means that the cost of infrastructure is spread over lower volumes, meaning that the cost is not feasible.

The ITA includes obligations to deploy networks in rural areas, with access to suitable spectrum enabling operators to cover larger distances, particularly in less populated and open areas, at lower cost.

The ITAs for the permanent assignment of the required spectrum for the Wireless Open Access Network (Woan) and the International Mobile Telecommunications (IMT) were published on October 2, 2020. The closing date for the ITA for IMT spectrum is December 28, 2020, and March 30, 2021 for the Woan ITA.

The two ITAs were developed in line with the Department of Communications and Digital Technologies' (DCDT's) Policy on High Demand Spectrum and Policy Direction on the Licensing of the Woan, both published by Minister Stella Ndabeni-Abrahams in July 2019, and take into account Icasa's Information Memorandum for IMT spectrum assignment, published in November 2019.

These policies require Icasa to assign the high-demand spectrum to the Woan and the remaining spectrum to other electronic communications network licensees simultaneously. The Woan, the establishment of which is expected to open the market to more operators across South Africa, was first envisaged in the 2016 ICT

White Paper. The authority plans to make available 406 MHz of spectrum for the provision of mobile broadband services in South Africa.

According to Icasa, the Woan will be assigned 1 × 20 MHz in the IMT700 band, 1 × 30 MHz in IMT2600 and 1 × 30 MHz in IMT3500. A 2018 Council for Scientific and Industrial Research study, commissioned by Cwele, recommended that the Woan be allocated spectrum, based on an assumed 20% market share, of 2 × 25 MHz blocks in the 800 MHz band, 2 × 20 MHz blocks in the 2.6 GHz band and 25 MHz, also in the 2.6 GHz band. The IMT2300 band has been excluded from the licensing process until a feasibility study and the migration of the fixed services are completed.

Various empowerment obligations are to be imposed on the successful bidders during the auction process, including a requirement to support mobile virtual network operators and for

Telkom withdraws one portion of court case against spectrum allocations

In December 2020, Telkom approached the courts to have Independent Communications Authority of South Africa's (Icasa's) spectrum licensing process suspended on the basis that the respective invitations to apply (ITAs) for the International Mobile Telecommunications (IMT) spectrum and the Wireless Open Access Network (Woan) were fundamentally flawed.

Part A of Telkom's application was meant to compel Icasa to inform all parties who may have an interest in applying for spectrum licences of Telkom's application.

Telkom's founding affidavit tabled at the Pretoria High Court indicates that interested parties should be notified to ensure that they are afforded an opportunity to be heard in parts B and C of the proceedings should they elect to participate.

In Part B of the three-fold application, Telkom is seeking an order interdicting the completion of the spectrum assignment process contemplated in the two ITAs pending the outcome of Part C, which seeks to review and set aside the authority's decisions to publish the two ITAs.

Telkom withdrew Part A of its court application against Icasa in January 2021, which compels the authority to inform all potential parties interested in the spectrum auction of the proceedings.

Despite Telkom's continuation of Part B and Part C of its application, Icasa has said that it remains committed to advance this licensing process to its completion for the benefit of all South Africans, in particular, consumers of electronic communication services, by March 2021.

"Our efforts are geared towards licensing the high demand spectrum through an auction by no later than end of March 2021. We have adequately consulted relevant stakeholders and the public throughout this process and cannot do so to a point of regulatory paralysis," said Icasa chairperson Dr Keabetswe Modimoeng.

Telkom group executive for regulatory affairs Siyabonga Mahlangu said in the founding affidavit that Icasa made a "fundamental flaw" by including the 700 MHz and 800 MHz frequency bands, which are not available for use and are not likely to be available for use for a long period after the auction.

Television broadcasters are using those frequencies, and there is no formally committed date to which the frequencies will become available for use.

"While the process of migrating the broadcasting services from the 700 MHz and 800 MHz has begun, it has not yet been finalised and it remains unclear when it will be finalised," he explained, noting that the decision to include the 700 MHz and 800 MHz frequencies in the auction process is unlawful as Icasa has no power or authority to assign and therefore license radio frequency spectrum, which is not yet available for use by any licensee that may succeed in the auction process.

Mahlangu argued that the date of availability of spectrum also has an influence on the economic value of spectrum.

"There is therefore a risk of overbidding if the spectrum is freed and cleaned later than anticipated and underbidding if the spectrum is freed and cleaned earlier and a bidder loses out by undervaluing the spectrum."

Telkom further argues that the decision to proceed with the auction of the 700 MHz and 800 MHz bands under the current terms and conditions specified in the Auction ITA is severely prejudicial to smaller players such as Telkom as it will likely entrench the dominance of Vodacom and MTN in the market.

Further, Telkom and any other bidder that may be successful in bidding for the 700 MHz and 800 MHz bands will have to commit capital that will be locked into the payment of these bands while not being able to generate a return thereon.

Telkom is an obvious contender for portions of the frequencies in the 700 MHz and 800 MHz bands. Access to these bands of spectrum would enable Telkom to meaningfully compete in the market for the provision of mobile communication services, and especially in the mobile data services market.

Cell C, Rain, Vodacom, Telkom, Liquid Telecoms and MTN have submitted applications in response to the ITAs, which closed in December.

Source: *Engineering News*

successful bidders to support the Woan through the procurement of a minimum 30% national capacity, along with several various underserviced area coverage obligations within five years. The Ministerial policy outlined that at least 70% of the Woan's equity must be held by South Africans and the entity must comply with the black economic-empowerment rules set out in the Electronic Communication Act.

Ndabeni-Abrahams said government was set on the Woan as a means of promoting healthy competition, as there were more than 400 players that hold electronic communications network service licences but which could not access spectrum, owing to its scarcity. According to ITWeb, in August 2020, she added that the deployment of a Woan would encourage licensees to work together as far as it is practicable.

While government is adamant on establishing a Woan, the feasibility of such a model in South Africa continues to be questioned. The GSMA previously cautioned about the implementation of a Woan model, as it did not deliver on promises to provide better coverage, more competition or lower prices for consumers, and most Woans failed to get off the ground. Industrial Development Corporation senior research and consulting manager Sabelo Dlamini told ITWeb in August 2020 that the model had failed in several countries, and that revenues from the spectrum alone would not be able to sustain the Woan. Further, there is a need for buy-in from industry players to develop long-term agreements with the entity to be successful.

Meanwhile, some spectrum bands, such as the 700 MHz to 800 MHz blocks, will not be fully available until South Africa's ongoing digital terrestrial television migration process, originally set for 2015, is completed. This is now expected to be completed by December 2021 after several years of delays.

MOBILE BROADBAND

South African consumers are becoming increasingly connected through smartphones and other personal devices, are spending more time on social media platforms and are more frequently engaging in e-commerce transactions and digital financial services. While features phones were widespread across South Africa ten years ago, smartphones and smart devices are rapidly becoming a staple in the country, with a 91.20% smartphone penetration in 2019.

Deloitte's Global Mobile Survey 2019, published in March 2020, shows that South Africa's levels of smartphone use are similar to the ownership rates in more developed markets in Europe. While laptops remain popular, its ownership levels are below that of rates in Europe, reflecting comparatively lower purchasing power, and there is potential to leapfrog this technology using ever-evolving, powerful smartphones.

According to social media firms We Are Social and Hootsuite, by January 2020, South Africa had 103.50-million mobile phone connections and a mobile subscription penetration rate of 176%. Of these, 36.54-million were Internet users at a 62% penetration rate, the bulk of whom (34.93-million) are mobile Internet users spending an average of four hours and 13 minutes a day using the Internet on mobile devices.

The 'Digital 2020 Report', published by We Are Social and Hootsuite in January, showed that mobile phones accounted for 73.40% of the various devices' web traffic as at December 2019, followed by laptops and desktops at 24.50%, tablet computers at 2.10% and other devices at 0.03%.

Despite government's decision to ban online shopping for all but essential purchases under Level 5 Lockdown in April, e-commerce activity increased significantly, with large numbers of consumers making online purchases for the first time. The '2020 South African Digital Customer Experience Report', published by Rogerwilco, ovatoyou and Julia Ahlfeldt in June 2020, shows that Covid-19 accelerated South Africa's use of the Internet to find information and engage with brands.

An update to We Are Social and Hootsuite's 'Global Digital 2020 Report' in July reveals that 34% of the Internet users who bought something online did so through a mobile device. Hootsuite notes that 51% of all consumer e-commerce transactions in South Africa were conducted on a mobile device, in line with the global average.

Further, 46% of Internet users expect to use mobile payment services more frequently and 55% expect to shop more online after the Covid-19 restrictions, well above the worldwide average of 49%.

Further, Icasa notes that South Africa's mobile broadband speeds ranking of 60 was second among its Brics – Brazil, Russia, India, China and South Africa – peers, measuring download speeds of 31.36 Mb/s and upload speeds of 9.41 Mb/s in 2019, surpassed only by China at a ranking of six. Similarly, South Africa's mobile broadband speeds benchmarked well among its neighbouring countries, including Namibia at a ranking of 119, Mozambique with a ranking of 90 and Botswana, which ranked 121.

Data Costs

South Africa's data prices have steadily declined since nationwide social media campaign #datamustfall protests in 2016 and the subsequent investigations by Icasa and the Competition Commission into the high prices. Icasa's 2020 'State of the ICT Sector Report in South Africa' shows that prepaid data bundle sizes ranging from 100 MB to 20 480 MB cost between R29 and R1 010.

30-day prepaid data prices

Data bundle (MB)	Price range	
	Lowest price	Highest price
100 MB	R29	R29.25
250 MB	R39.50	R63
300 MB	R60	R60
500 MB	R69.60	R100
600 MB	R99	R99
750 MB	R100	R120
1 024 MB	R100	R149
1 536 MB	R149	R189
2 048 MB	R140	R249
2 560 MB	R249	R249
3 072 MB	R201	R299
4 608 MB	R299	R299
5 120 MB	R301	R405
6 144 MB	R399	R399
6 656 MB	R399	R399
10 240 MB	R499	R605
20 480 MB	R799	R1 010

Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020', Electronic Communications Questionnaire 2020

The post-paid data bundle pricing ranges from R40 on the lower range for 1 GB to R2 099 on the upper range for 200 GB.

Post-paid data prices

Data bundle	Price range per gigabyte	
	Lowest price	Highest price
1 GB	R40	R79
2 GB	R60	R110
3 GB	R149	R171
4 GB	R100	R100
5 GB	R199	R221
6 GB	R129	R129
10 GB	R200	R332
14 GB	R259	R259
20 GB	R355	R504
30 GB	R605	R699
50 GB	R907	R999
100 GB	R1 210	R1 699
200 GB	R2 099	R2 099

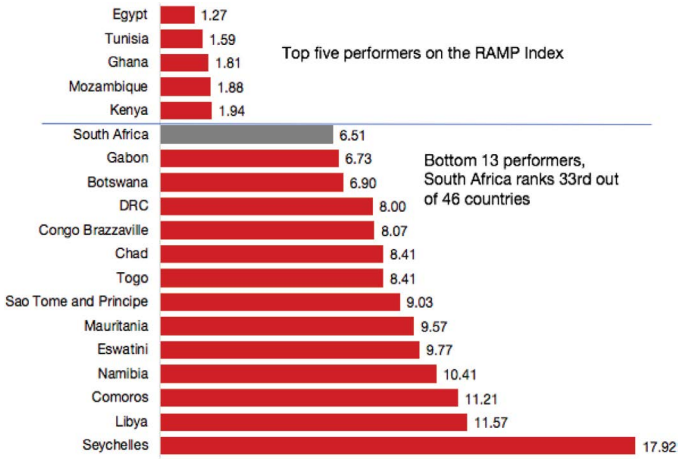
Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020', Electronic Communications Questionnaire 2020

Icasa noted that the price range per minute for prepaid voice is from R0.66 to R2 and between R1.52 and R2.77 for post-paid, while the prices of local SMSes range between R0.15 and R0.52 for prepaid and R0.50 and R0.80 for post-paid.

Research ICT Africa's Retail African Mobile Pricing, or Ramp, Index shows that South Africa still performs poorly among other African countries, ranking 33 out of 46 countries in terms of data per GB costs in the first quarter of 2020.

Research ICT Africa, in a Policy Brief published in June 2020, points out that the price paid for the telecommunications licence,

Data cost per 1 GB for the top and bottom performers



Source: Research ICT Africa, Policy Brief 2, June 2020, ICT Africa Ramp Index 2020 Q1 to Q2

spectrum fees, corporate tax, the physical terrain, local input costs, complementary infrastructure that may require construction to facilitate roll-out, currency volatility and duties on imports, together with licence requirements, such as universal services obligations, all affect the cost of data. The firm states in the report that only proper costing studies can determine the differential impact of these costs.

The report further notes that South Africa has the highest levels of Internet penetration, at 53%, when compared with its sub-Saharan African peers, and quality-of-service studies have revealed that South African mobile operators MTN and Vodacom have the highest broadband quality levels.

Icasa says in the report that the main barriers to online access remain the high data costs, a lack of Internet-enabled devices and digital literacy. Government is taking steps to lower the cost to communicate in South Africa, and various entities, including Icasa and the Competition Commission, are undertaking programmes and inquiries to establish ways of lowering costs to the consumer, as well as improving competition in the telecommunications sector. Published in April 2019, Icasa's End-User and Subscriber Service Charter Regulations put an end to automatic out-of-bundle billing and enabled users to roll over unused data. The Competition Commission initiated a data services market inquiry in 2017 to examine the data pricing structure in South Africa, following a public outcry from South African consumers on the price of data in the country. Icasa also published its initial analysis on the Mobile Broadband Services Market Inquiry in November 2019.

Data Inquiry

The Competition Commission's data services market inquiry was launched in August 2017 at the request of the then Economic Development Minister Ebrahim Patel. The inquiry investigated the factors of the markets and value chains causing the high prices for data services and made recommendations to lower prices.

The final findings and recommendations report, published on December 2, 2019, revealed that South Africa's data prices were higher than those of its neighbouring countries, as well as its peers in the Brics bloc, with prices generally more expensive. During a media briefing in December 2019 outlining the report recommendations, Competition Commission commissioner Tembinkosi Bonakele said that there was scope to reduce prices by 30% to 50%.

Based on an analysis of the market and a variety of submissions, the report found that the combination of a highly concentrated market and a duopoly of the two leading operators resulted in excessively high data prices, and that price-based competition in the mobile markets was inadequate, with the retail mobile market remaining stubbornly concentrated. Further, network operators Vodacom and MTN were charging more for data in South Africa than in the other countries where they operated, a finding that the operators argued did not take into account the cost and quality differences across countries, including spectrum allocations, that may lead to the differences in pricing. They have also argued that the comparisons involve headline 30-day tariffs and that effective prices, which include promotions, short-validity bundles and free data, are a better basis for comparison.

Findings

The retail pricing structure of mobile data was found to be biased against the poor and lacking transparency, with an assessment of all mobile operators' headline retail prices demonstrating that consumers of small data bundles pay inexplicably more on a per-megabyte/-gigabyte basis, Competition Commission chief economist James Hodge said during a media briefing in December 2019.

Further, South Africa's post-paid packages, while still high, are better priced than prepaid offers, indicating a potential structural problem with retail prices in South Africa. The findings contradicted the viewpoint of Icasa, with Vodacom highlighting the authority's conclusion, drawn from its analysis of international mobile data prices, that South Africa's prices are neither extremely high nor very low in relation to similar countries in terms of size and level of development.

The operators also insisted that the Competition Commission's report does not fully account for the impact of the long-standing issue of limited spectrum, which is hampering operators' expansion plans and ability to deploy newer technologies, which they argue is, in turn, preventing them from lowering data costs. In response to the release of the Competition Commission's findings and recommendations report, Vodacom CEO Shameel Joosub said in December 2019 that there was a significant difference in opinion regarding the impact of the continuous delays in allocating available spectrum, with the Competition Commission downplaying the role of spectrum in reducing data prices. The operators have long held that the lack of spectrum release over the past decade has hampered efforts to reduce costs, as increased investments were required to deploy sufficient infrastructure to meet the rising data demand.

The findings in the retail market also point to potential challenges in the wholesale market, where roaming arrangements and terms have been unfavourable and have constrained price competition. The wholesale market has failed to provide wholesale network access for the purpose of retail competition in the form of mobile virtual network operators. The inquiry also found that addressing the fixed-line supply gap – the backbone in the supply of household and business access – would be critical to the provision of alternative data services such as WiFi.

Recommendations

The Competition Commission identified a series of final immediate and intermediate recommendations to address the high cost of data across the value chain and provide relief for low-income users. Vodacom and MTN are required to reduce their tariff levels and align their headline prepaid sub-500-MB, 30-day prices with those of similar post-paid packages, failing which the Competition Commission will pursue prosecution for excessive pricing.

The report directed the operators to reduce data prices, particularly for the monthly bundles, and to address the structure of data pricing, including reducing the cost per MB for smaller sub-1 GB bundles relative to the 1 GB price. In addition, operators are required to deliver on other pro-poor measures, including lifeline packages of daily free data and the zero-rating of public benefit organisations and educational institutions. The Competition Commission gave operators a three-month deadline, extended by one month, to agree to several recommendations outlined in the 'Final findings and recommendations of the data services market inquiry' report, released in December 2019.

Agreements

During March and April 2020, Vodacom, MTN, Telkom and Cell C all signed agreements with the Competition Commission, subsequently formalised with the Competition Tribunal, to implement the recommendations. All the operators zero-rated public benefit organisations and provided data lifelines through their various platforms.

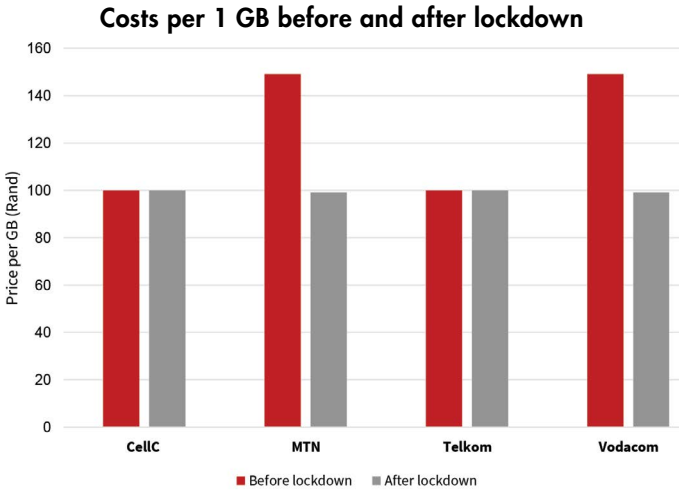
MTN already brought the effective rate of data on its network down by 76% from February 2017 to February 2020, MTN South Africa CEO Godfrey Motsa said during a webcast to media on March 20, 2020, while Vodacom said that it had reduced the effective price of data by 50% since March 2016. MTN agreed to reduce the price of its 30-day sub-1 GB prepaid data packages, with the 1 GB monthly bundle reduced by 33% to R99, with smaller-sized bundles reduced by 25% to 50%.

Vodacom agreed to reduce the headline data prices of its 30-day 1 GB bundles by 34%, from R149 to R99, on all channels and provided significant discounts on all 30-day bundles. It also agreed to reduce its prepaid data prices by 40% and allow for digital inclusion over the next two years in a range of initiatives CEO Shameel Joosub said in a statement in March 2020 would result in savings for customers of about R2.70-billion.

Meanwhile, Telkom agreed to a significant reduction of wholesale broadband access costs to remove excessive pricing concerns in respect of Internet protocol Connect concerns raised in the data services market inquiry report.

Cell C also signed a memorandum of agreement to improve access to data and increase pricing transparency for consumers, offer free lifeline packages, free SMSes and free basic Internet access. The agreements were welcomed by Trade and Industry Minister Ebrahim Patel, Icasa and the Department of Communications and Digital Technologies.

Research ICT Africa noted in June 2020 that the agreements coincided with the start of South Africa's lockdown on March 27, which assisted users in managing the increased home use. This was bolstered by the operators' obligations to zero-rate public and educational services.



Source: Research ICT Africa, Policy Brief 2, June 2020, ICT Africa Ramp Index 2020 Q1 to Q2

FIXED-LINE BROADBAND

The growth of the mobile sector for voice and data services was, in part, accelerated by the poor historical availability and level of service of fixed-line networks. Digital subscriber line (DSL) connectivity, a predecessor to fibre, was once the dominant form of fixed-line broadband; however, it has major reliability issues, while fibre has emerged as one of the fastest and most reliable of these technologies.

Despite both being required to be physically trenched to the customer, giving rise to convenience of mobile broadband, there remains a need for fixed-broadband to bridge South Africa's digital divide.

According to Icasa's 'The State of the ICT Sector Report in South Africa 2020', total fixed-broadband subscriptions decreased by 19.60% in 2019, mostly as a result of significant decrease in DSL Internet subscriptions, which declined by 42.80%. Fibre-to-the-home/building (FTTH/B) Internet subscriptions increased by 28.80% during the same period.

Over a five-year period, fixed-broadband subscriptions increased 29.40%, while FTTH/B Internet subscriptions surged by 168.20%. South Africa's fixed-broadband subscriptions were about 3.10-million in 2019, with DSL Internet comprising 1.40-million, fibre-based Internet 1.60-million and other fixed- (wired-) broadband subscriptions 24 000.

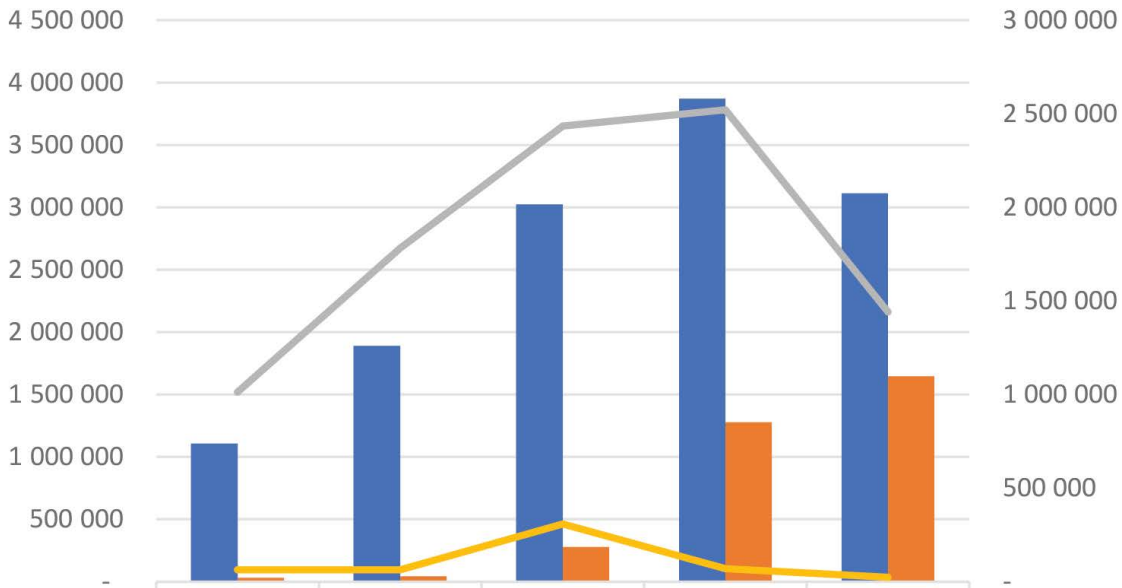
Th report further notes that South Africa's fixed-broadband had download speeds of 26.87 Mb/s and upload speeds of 19.12 Mb/s in 2019, ranking the lowest among the Brics countries, but the highest when compared with neighbouring countries.

Broadband market intelligence solutions provider Point Topic's residential broadband tariffs report, published in July 2020, shows that, in the second quarter of 2020, South Africa's entry-level broadband was the third-cheapest out of 83 countries, behind only Hong Kong and Belarus.

However, MyBroadband reported in July that, for median and average broadband prices, South Africa ranked 62, which resulted in the country having the second-most unequal broadband pricing structures in the world.

Telkom's asymmetric DSL (ADSL), once a staple for connecting to the Internet, was overshadowed by the emergence of fibre in 2014, when Vumatel launched its FTTH, starting what was dubbed a fibre revolution in South Africa. Many other fibre network

Fixed broadband subscriptions as at September 30, 2019



	2015	2016	2017	2018	2019
Fixed broadband subscriptions	1 109 055	1 890 832	3 023 349	3 869 934	3 112 717
Fibre-to-the-home/building Internet subscriptions	31 843	44 895	280 097	1 278 728	1 647 419
DSL Internet subscriptions	1 012 996	1 781 519	2 434 555	2 521 013	1 441 292
Other fixed (wired)-broadband subscriptions	64 216	64 418	308 697	70 193	24 006

Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020', Electronic Communications Questionnaire 2019

operators, such as Frogfoot, Dark Fibre Africa (DFA) and Octotel, as well as mobile operators Vodacom and MTN, followed suite shortly thereafter, leaving Telkom on the back foot as households and businesses replaced their ADSL lines for FTTH and FTTB. Improvements in mobile technologies, which made it possible to offer fast and affordable fixed-wireless broadband access, emerged as another big competitor to ADSL. Telkom moved many of its ADSL subscribers to its new fixed long term evolution (LTE) products in many areas, leading to a further decline in the use of copper lines.

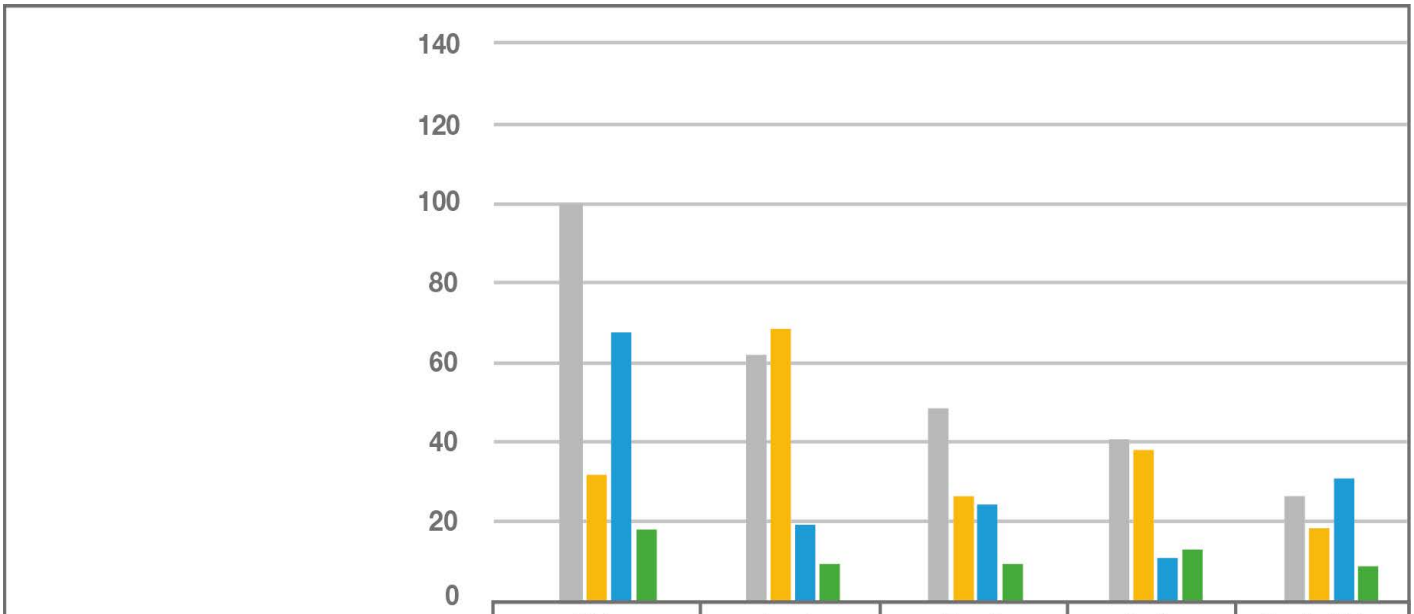
In June 2020, MyBroadband reported that Telkom experienced its biggest fixed-line decline in history during the year ended March 31, 2020. In 1993, Telkom had 3.45-million fixed-line subscribers, peaking at 5.49-million in 2000 before it started to decline, with 2.26-million in March 2019 and 1.60-million in March 2020. Telkom's lost fixed-line subscribers was attributed to competition from mobile services, copper theft and tough economic conditions.

Telkom CEO Sipho Maseko said in May 2019 that the operator planned to stop providing copper-based services by 2024, and, while the Covid-19 pandemic and subsequent lockdown slowed its plan to decommission its copper network, it would continue its decommissioning strategy in locations where copper was not economically viable. Openserve is halting support and maintenance of all the copper network infrastructure in some areas already covered by its fibre network.

While Telkom was able to increase the number of active fibre connections, it was not enough to counteract the substantial loss of its overall fixed-line subscribers. However, despite its drastic decline in overall fixed-line subscriber numbers, Maseko said Telkom has improved its FTTH connectivity rate from to 38.40% to 48.20%. FTTB increased 26% and fibre-to-the-base-station increased by 9.80% to 7 704 base stations as mobile operators expand their networks, Telkom said in its annual results to March 2020.

Telkom said in June 2020 that it had a national fibre network of about 164 000 km, with more than 2.40-million homes with fibre to the cabinet and passing 455 600 homes with fibre. However, MyBroadband also reported in June, following Telkom's results presentation for the year ended March 31, 2020, that Telkom had nearly halved its spending on fibre expansion through its network wholesale division Openserve during the financial year to March 2020, with capital expenditure on fibre of R703-million, 42.20% less than the R1.20-billion in the 2019

South Africa's speed benchmarked against its Brics peers in 2019



	China	Russia	Brazil	India	South Africa
Fixed broadband download speed (Mbps)	99.49	62.68	49.96	41.48	26.87
Fixed broadband upload speed (Mbps)	32.63	68.90	27.17	38.84	19.12
Mobile download speed (Mbps)	68.21	20.43	24.45	11.58	31.36
Mobile upload speed (Mbps)	19.04	9.79	9.12	13.50	9.41

Source: Icasa, 'The State of the ICT Sector Report in South Africa 2020', Ookla, Speedtest Intelligence 2019

IP Connect pricing concerns:

In April, Telkom reached an agreement with the Competition Commission to significantly reduce its wholesale and broadband access costs to remove the excessive pricing concerns raised in the data services market inquiry report published in December 2019. One of the findings was that there was a case, at face value, of excessive pricing against Telkom's wholesale division Openserve with regard to IP Connect, a wholesale product used by Internet service providers (ISPs) to connect fibre and asymmetric digital subscriber clients.

Openserve will now introduce a new wholesale product suite to replace IP Connect, with the structure and proposed initial pricing of the new offering reducing wholesale charges to ISPs for fibre broadband wholesale customers. The new offering, which is structured as an aggregated end-to-end solution, will enable ISPs to manage their costs and compare the Openserve fixed broadband prices with the prices of other wholesale broadband providers more easily. The effective price reductions for wholesale broadband fibre infrastructure to ISPs should result in lower prices to consumers and even small businesses, which are increasingly reliant on fibre networks to run their businesses, said Competition Commissioner Tembinkosi Bonakele. While Telkom was not cited in the inquiry report as having high data prices on the mobile front, the inquiry proposed industry-wide measures to improve transparency to consumers over the effective price per megabyte.

Source: *Engineering News*, Telkom, Competition Commission

financial year. In March 2020, FTTX Council Africa CEO Juanita Clark calculated that 1.75-million homes and businesses had been passed with fibre, of which 656 600 premises had an active connection.

At least 25 operators are active in South Africa's FTTH market, including DFA, FibreCo Telecommunications, Frogfoot, MetroFibre, Octotel, Seacom and Vumatel. Two of the country's biggest fibre players, DFA and Vumatel – owned by Remgro through Community Investment Ventures Holdings (CIVH), boast a 29 300 km fibre network that passes 690 000 premises and connects 11 500 mobile base stations and 240 000 homes and businesses. Business Day quoted Vumatel CEO Dietlof Mare in August 2020 as saying that since 2014, the company had connected almost 800 000 sites. In April 2020, Vumatel and SA Digital Villages (SADV) also announced plans to operate as a single entity following the transfer of the SADV wholesale fibre assets to Vumatel.

Tech Central in February 2020 reported that Vox more than doubled its planned roll out of fibre broadband infrastructure through subsidiary Frogfoot and is now aiming for as many as 400 000 homes passed in the next few years, well above the previous target of 140 000.

According to Business Day, Seacom holds about 25% of the wholesale fibre market locally. In 2017, it bought FibreCo, which has a fibre infrastructure network in Johannesburg, Cape Town, Bloemfontein, Durban, Port Elizabeth and East London. In December 2019, Link Africa acquired additional nationwide fibre-optic network infrastructure from Internet Solutions, giving it more than 400 points of presence across South Africa. According to Tech Central, the transaction extends Link Africa's fibre network reach to 8 500 km.

South African mobile network operators Cell C, MTN and Vodacom are also active in the FTTH market. Vodacom more than doubled its total number of homes and businesses connected, to 61 427, during the year ended March 2020, with its own fibre passing 104 000 homes and businesses. Cell C has said it is expanding its C-Fibre FTTH offering, while MTN launched its FTTH offering in September 2018.

Meanwhile, fixed-line broadband will remain critical to growth and development of the information and communication technology sector. The University of Cape Town (UCT) noted in a study, 'Narrowing the digital divide: the role of complementarities between fixed and mobile data in South Africa', published in March 2019, that mobile services have capacity constraints and high prices per gigabyte, while fixed-line broadband has significantly lower prices per unit, and is often uncapped or unlimited, delivering higher use per connection. The university's research shows that if fixed-line coverage was expanded to the entire population and computers were available to all, fixed-line broadband penetration would increase by 9.60 percentage points, while mobile broadband penetration would increase by half of a percentage point. Authors of the study, UCT economist Ryan Hawthorne and associate Professor Lukasz Grzybowski, in a November 2019 statement, contend that an Internet connection at work or school would add an additional 5.70 percentage points to fixed-line broadband penetration, and three percentage points to mobile broadband penetration. The research findings suggest that interventions in mobile data services is not enough to expand access to broadband and that, with fixed and mobile complementing one another, greater fixed-line broadband adoption will lead to greater mobile data adoption and vice versa.

Herotel reaches 100k fixed broadband customer mark

Fibre and fixed wireless broadband provider newcomer Herotel reached the milestone of 100 000 fixed broadband subscribers on its fibre and fixed wireless networks in December 2020.

The group, which was started in 2014, has deployed its own fibre networks, targeting nonmetropolitan, underserviced areas across South Africa and introducing uncapped, unshaped and unthrottled broadband at a low price, while integrating about 39 owner-operated businesses it has acquired over the past four years.

"By hitting the magical 100 000 customer mark on our own network, we can officially say that Herotel is the third-biggest player in the South African fixed broadband market, deploying networks beyond the traditional fixed line footprint," Herotel CEO Van Zyl Botha says.

Source: *Engineering News*

FIFTH-GENERATION

There have been a number of 5G launches in major markets worldwide in 2020, with mobile 5G now commercially available from 87 operators in 39 markets and another 84 operators announcing plans to launch commercial 5G services as at June 2020. The 'Annual Internet Report' published by multinational Cisco in March 2020 shows that 5G technologies are set to support more than 10% of mobile connections globally as Internet connectivity rises over the next three years.

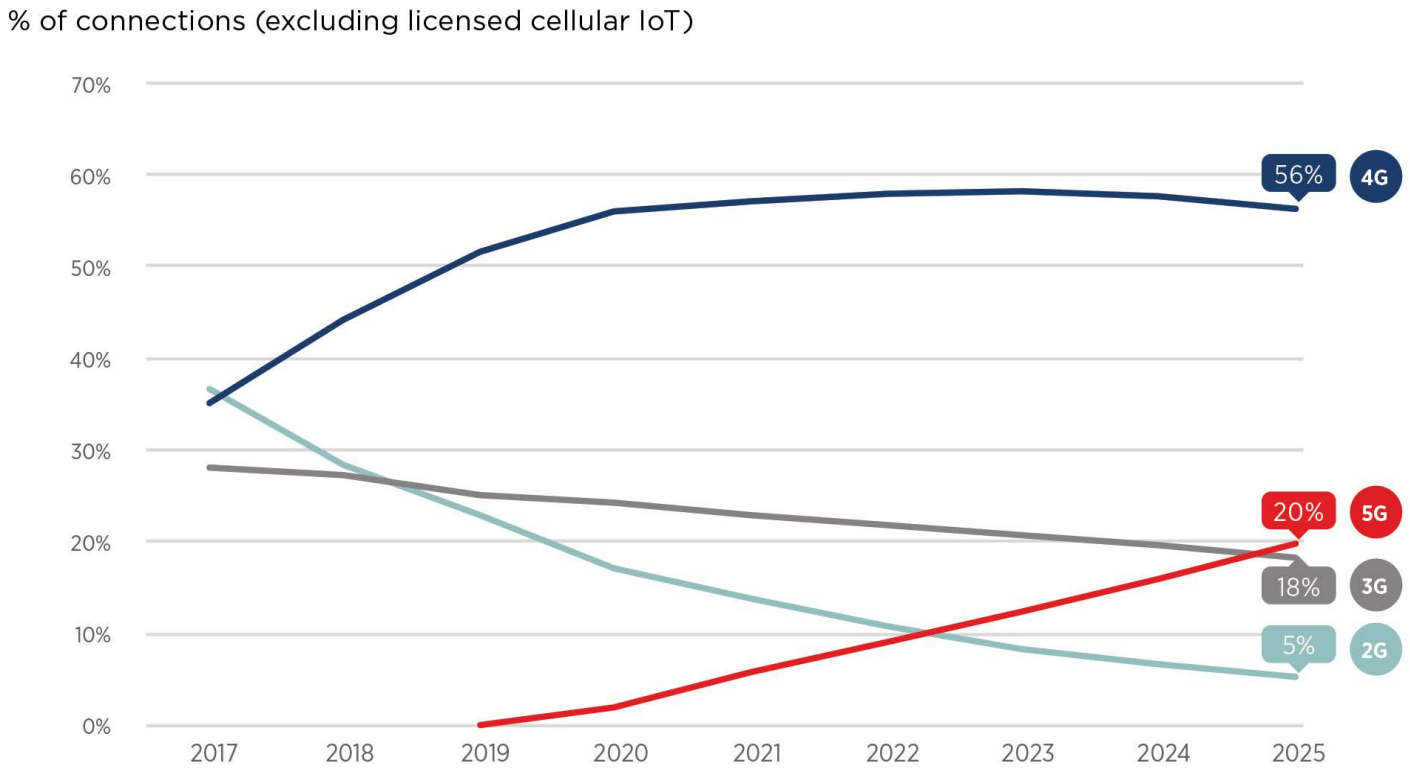
Global 5G connections will account for 10.60% of total mobile connections by 2023, from a base of zero in 2018. By 2023, GSMA expects 5G to have one-billion connections, overtaking 2G connections, and growing to 1.80-billion in 2025, overtaking 3G.

By 2025, 5G will account for 20% of global connections, with uptake particularly strong across more developed markets in Asia, North America and Europe. From 2020 to 2025, operators are expected to invest about $1.10-trillion worldwide in mobile capital expenditure, 80% of which will be in 5G networks.

The Internet of Things (IoT) will be an integral part of the 5G era, with the number of connections more than doubling to almost 25-billion from 2019 to 2025 and global IoT revenue more than tripling to $1.10-trillion. GSMA's 'The Mobile Economy 2020 Report' noted that, based on the 4G experience and the underlying challenges of data costs and digital literacy, consumer 5G uptake is expected to be slow, and 5G will co-exist with other generations of technologies until 2025.

According to Cisco's 'Annual Internet Report', the average 5G speed will be 575 Mb/s – 13 times faster than the average mobile connection – allowing for fibre-like speeds using the mobile network. Compared with 4G technologies, which has latencies of between 20 ms and 30 ms, 5G networks can support latencies as low as 1 ms and can provide much more capacity for data, using spectrum much more efficiently. Huawei Carrier CTO Paul Scanlan said during the 2020 GSMA LTE Summit, held in July 2020, that the true benefit of 5G, however, was not in the selling of network licences, but in the economic enabling factor that the latest-generation technology represents such as productivity benefits and new jobs creation in the information economy. This technology is widely expected to unlock the potential of the Fourth Industrial Revolution and will be the cornerstone upon which a country's relative competitiveness is built, said information and communication technology firm Ericsson president and CEO Börje Ekholm during the Ericsson Unboxed Office virtual conference in May 2020. However, the next three years will determine the 5G business landscape, with operators experimenting with 5G use cases. Further, the rapid deployment of 5G technologies could enable countries to rebuild faster after the economic devastation of Covid-19-linked lockdowns.

Fifth-generation technologies start to make a mark in 2020



Source: GSMA Intelligence, 'The Mobile Economy 2020'

In South Africa, Rain launched the country's first commercial 5G network in partnership with China's Huawei Technologies in 2019. Vodacom and MTN have been running pilot projects of the superfast next-generation technology, subsequently launching their initial networks, taking advantage of the temporary allocation of spectrum to ramp up the roll-out of 5G networks. On May 4, 2020, Vodacom switched on its 5G mobile network in three cities – Johannesburg, Pretoria and Cape Town – with 20 live 5G sites, 18 of which are in Gauteng and two in Cape Town, and further roll outs are planned to other parts of the country.

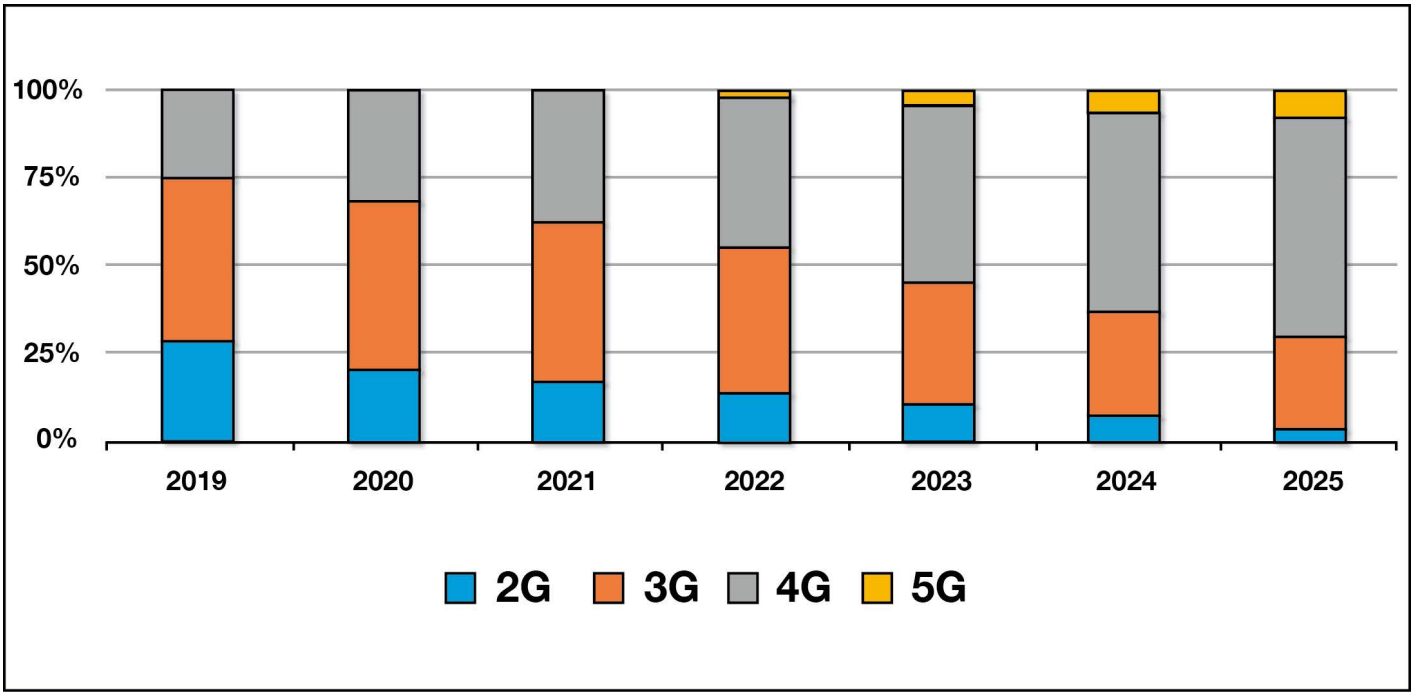
Vodacom was recently assigned temporary spectrum by Icasa for the duration of the national State of Disaster, including 1 x 50 MHz in the 3.5 GHz band, which has been used to fast-track the launch. Vodacom and Liquid Telecom also concluded managed network services and national roaming agreements for a national 5G network in December 2019, giving Vodacom access to a wholesale 5G network that Liquid Telecom South Africa is building using its stock of 3.5 GHz spectrum. Liquid owns the parts of the spectrum that formerly belonged to converged communications network operator Neotel, which Liquid acquired and merged with during a R6.50-billion deal completed in 2017, and is allowing for mobile network operators to have open access to the new network.

MTN entered into an agreement with Swedish ICT giant Ericsson to build its new 5G core mobile and radio network and launched its own 5G network in June 2020. The dynamic spectrum-sharing model used to launch 5G enables it to continue with services even after the expiry of temporary spectrum rights in some of the bands.

In February 2020, Liquid Telecom South Africa partnered with Internet Solutions to provide wholesale 5G connectivity targeted at delivering enterprise services to their existing and potential new customer bases. Following this, in July 2020, Rain and Huawei launched a commercial standalone 5G network in Cape Town, believed to be one of the first in Africa. It is built on Rain's own sites to enhance the company's fixed-wireless broadband service experience in Sea Point, Claremont, Goodwood, Bellville, Durbanville and Cape Town's City Centre.

Meanwhile, a draft law that enables government to build 5G masts on any property is drawing strong criticism. In July 2020, the Department of Communications and Digital Technologies published an invitation to provide written comments on a proposed policy and policy direction on the rapid deployment of electronic communications networks and facilities. ITWeb reported that the proposed policy, which enabled electronic communications network service licensees to erect 5G towers on private property, might infringe on South Africans' constitutional rights. The proposed policy gives mobile networks and other licensees the right to select, enter and use public or private land for the deployment of their network infrastructure. Civic organisation DearSA MD Rob Hutchinson told ITWeb in August 2020 that the policy placed a responsibility on the owners of the property and the owners must exercise due care and diligence to avoid damaging the electronic communications networks or facilities deployed on their property, as they would be held liable. The proposed law also suggests that no access fee can be charged by the owner, unless intrusive electronic communications networks or facilities, such as masts, are installed.

5G connection growth in South Africa



Source: GSMA Intelligence Brief, Mobile World Live

INTERNATIONAL CONNECTIVITY

The undersea cable sector is experiencing a resurgence driven by demand for fast data transfers used for streaming movies and social messaging. Telecommunications market research and consulting firm Telegeography said in October 2019 that, unlike previous submarine cable construction booms, content providers, such as Amazon, Google, Facebook and Microsoft, were taking a more active role, with Bloomberg reporting that these technology giants are behind about 80% of the recent investment in transatlantic cables.

Among the 54 African countries recognised by the United Nations, 38 countries have coast lines, of which 37 have at least one submarine cable landing. The exception is Eritrea. By the end of 2019, 11 countries had only one subsea cable, ten countries had two subsea cables, six had three subsea cables and ten had more than three.

South Africa is connected to the rest of the world by various broadband cable systems, with more planned over the next few years. The country's existing cables include the West Africa Cable System (Wacs), the South Atlantic Telecommunications Cable no 3 (SAT-3)/West African Submarine Cable (WASC) and South Africa Far East (SAFE) Cable landing on the West Coast; and Seacom, the Eastern Africa Submarine Cable System (EASSy), SAFE and the Melting Pot Indianoceanic Submarine System (Metiss) landing on the East Coast.

Cable landing stations in South Africa:

There are two cable landing stations on the East Coast:

- Mtunzini landing (Telkom) for the South Africa Far East cable (2002), Seacom (2009) and the Eastern Africa Submarine Cable System (2010) and Mtunzini landing (Liquid Telecom) for Seacom (2009).
- Amanzimtoti landing (Liquid Telecom) for the Melting Pot Indianoceanic Submarine System (2019), Pakistan & East Africa Connecting Europe Cable (2021) and Indian Ocean Exchange Cable (2022) are expected to land on the East Coast of South Africa.

There are two cable landing stations on the West Coast:

- Melkbosstrand landing (Telkom) for the South Atlantic Telecommunications Cable No 3/West African Submarine Cable (2002) and the South Africa Far East cable (2002), Equiano (under construction).
- Yzerfontein landing (Telkom) for the West Africa Cable System (2011).

Source: Submarine Networks. Cable Landing Stations in South Africa

Google's imminent Equiano cable will land at the Melkbosstrand cable landing station, on the south-west coast of South Africa, in a partnership with Telkom.

2AFRICA

Announced in May 2020, 2Africa will be one of the biggest subsea projects in the world, connecting 23 countries in Africa, the Middle East and Europe when it becomes operational in 2023/24. At 37 000-km-long, the fully funded 2Africa will interconnect Europe, eastward through Egypt, the Middle East (Saudi Arabia) and through 21 landings in 16 countries in Africa.

It will deliver more than the current total combined capacity of all subsea cables serving Africa, with a design capacity of up to 180 Tb/s on key parts of the system. China Mobile International, Facebook, MTN GlobalConnect, Orange, stc, Telecom Egypt, Vodafone and WIOCC signed a memorandum of understanding in 2018 to build the project, and appointed Alcatel Submarine Networks (ASN) to build the cable using a new technology, Sapitial Division Multiplexing 1 from ASN, which will allow for the deployment of up to 16 fibre pairs.

The 2Africa parties and Airtel have signed an agreement with Telecom Egypt to provide a completely new crossing linking the Red Sea and the Mediterranean, the first in more than a decade. The cable will incorporate optical switching technology to allow for the flexible management of bandwidth, while cable burial depth has been increased by 50%, compared with older systems. The cable's routing will also avoid locations of known subsea disturbance. According to Bloomberg, the project will cost just under $1-billion.

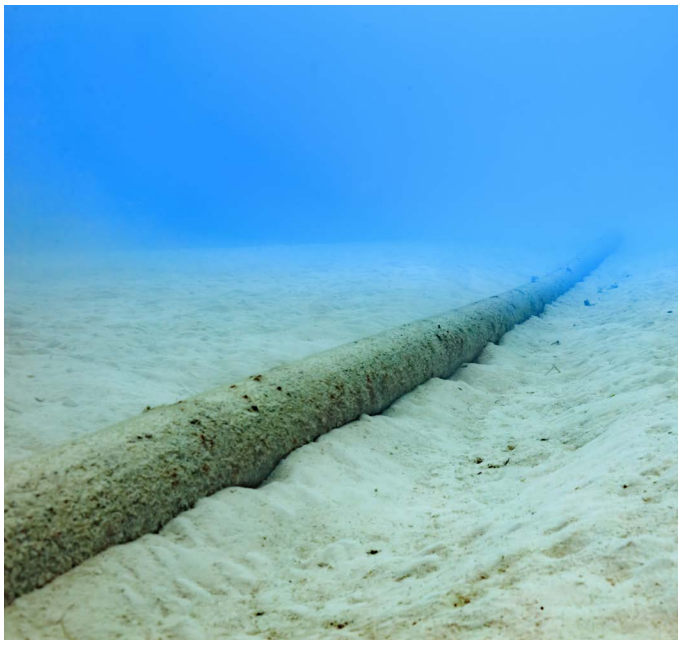
ACE

The Africa Coast to Europe (ACE) undersea cable is a 17 000-km-long optical-fibre submarine cable system that serves 24 countries and stretches from France along Africa's west coast to South Africa. Launched in December 2012, the system has a design capacity of 12.80 Tb/s and is managed by a consortium of 19 members. The ACE cable connects more than 400-million people, either directly for coastal countries or through land links for landlocked countries such as Mali and Niger. ACE is alsvo the first international submarine cable to land in Equatorial Guinea, Gambia, Guinea, Liberia, Mauritania, São Tomé and Príncipe and Sierra Leone.

EASSy

The 90% African-owned EASSy is a 10 000 km submarine cable system along the east coast of Africa, with nine landing stations: Sudan, Djibouti, Somalia, Kenya, Tanzania, the Comoros, Madagascar, Mozambique and South Africa. It provides a backhaul system for at least 12 landlocked countries, allowing for wide coverage in the East Africa region, and links South Africa to Sudan through landing points in Mozambique, Madagascar, the Comoros, Tanzania, Kenya, Somalia and Djibouti.

The system is owned and operated by a group of 16 African (92%) and international (8%) telecommunications operators and service providers. EASSy serves sub-Saharan Africa with a more than 10 Tb/s, two fibre-pair configuration and is the first to deliver direct connectivity between East Africa and Europe and North America.



EQUIANO

US multinational conglomerate Alphabet's Google is preparing to build a subsea cable that will connect South Africa to Portugal and branch out across the west coast of Africa. The first phase of the fully funded private Equiano cable project is expected to be completed in 2021.

The first branch is expected to land in Nigeria, with nine branching units along the route that can be used to extend connectivity to other African countries at a later stage. A contract to build the Equiano cable with Alcatel Submarine Networks was signed in the fourth quarter of 2018. Submarine Networks reported in April 2020 that Google selected Telkom South Africa to land the cable system at the Melkbosstrand cable landing station, in South Africa, which currently houses SAT-3/WASC and SAFE submarine cable systems. SAT-2, which was decommissioned in 2013, was previously housed in the station, with the Equiano cable set to follow the former cables landing route.

Loon project

Telecommunications giant Vodacom will use Alphabet subsidiary Loon's balloon-powered Internet solution to expand its network in Mozambique. As part of a new agreement announced in May 2020, Vodacom will leverage Loon's network of floating cell phone towers operating 20 km above earth to provide service to unserved and underserved parts of the country, including the Cabo Delgado and Niassa provinces.

The Loon solution will provide a fourth-generation (4G) service that supports data, voice, SMS and unstructured supplementary service data. Loon and Vodacom have been working collaboratively with Mozambican communications and aviation regulators, including Autoridade Reguladora das Comunicações de Moçambique and the Institute for Civil Aviation of Mozambique, to obtain the necessary approvals to allow for service in Mozambique. The duo received approvals in May 2020 to start importing and installing the required ground infrastructure for Loon's balloons to operate in the stratosphere above the country and for Loon to provide service over the Vodacom network. During 2020, Loon and Vodacom will continue installing terrestrial infrastructure, which will serve as the physical connection point for Loon's balloons to Vodacom's Internet and core network, while Loon will start flying balloons above Mozambique to learn the stratospheric wind patterns on which the balloons must navigate to remain above the service area. Further, network integration testing is ongoing.

Meanwhile, Telkom Kenya and Loon started deploying the latter's technology to customers from July 2020. In one field testing session in late June 2020, Loon and Telkom registered an uplink speed of 4.74 Mb/s, a downlink speed of 18.9 Mb/s and latency of 19 ms. In this and subsequent testing, the service was used for applications such as email, web browsing, data calls, including WhatsApp, video calls and YouTube. The service will initially cover a region spanning nearly 50 000 km^2, including the areas of Iten, Eldoret, Baringo, Nakuru, Kakamega, Kisumu, Kisii, Bomet, Kericho and Narok.

In December 2019, Reuters reported that Loon agreed to an airspace deal with Uganda for an Internet balloon service. The deal grants Loon overflight rights crucial to its plans to provide floating balloon-enabled Internet services in neighbouring Kenya.

Source: Telkom Kenya, Vodacom, Loon, Reuters

Besides landing at Melkbosstrand, as well as Lagos, in Nigeria, and Lisbon, in Portugal, Google's Equiano cable system will also land in St Helena, the Canary Islands and the Democratic Republic of Congo (DRC).

Google has signed agreements with the St Helena government and the Cabildo de Tenerife (Canary Islands) to connect St Helena and the Canary Islands to the Equiano subsea cable project.

Further, Google selected Liquid Telecom as Equiano's landing partner in the DRC, where Liquid Telecom applied for and obtained a licence from the Congolese Postal and Telecommunications Regulatory Authority to build a subsea cable landing station.

Equiano cable is the third private international subsea cable after Dunant and Curie, and is Google's fourteenth subsea cable investment globally. In line with Google's tendency to name all private subsea cables after historical luminaries, Equiano was named after eighteenth-century Nigerian-born writer and abolitionist Olaudah Equiano, who was enslaved as a boy.

METISS

Metiss is a 3 200 km fibre cable system connecting Mauritius to South Africa, with branching units to Reunion Island and Madagascar.

Liquid Telecom South Africa inaugurated the cable landing station at Pipeline Beach in Amanzimtoti, KwaZulu-Natal, in early December 2019.

Liquid Telecom South Africa will provide fibre backhaul to extend the Metiss cable system to Teraco's data centre. The cable system, which has a design capacity of 24 Tb/s, is expected to be completed and operational by July 2020.

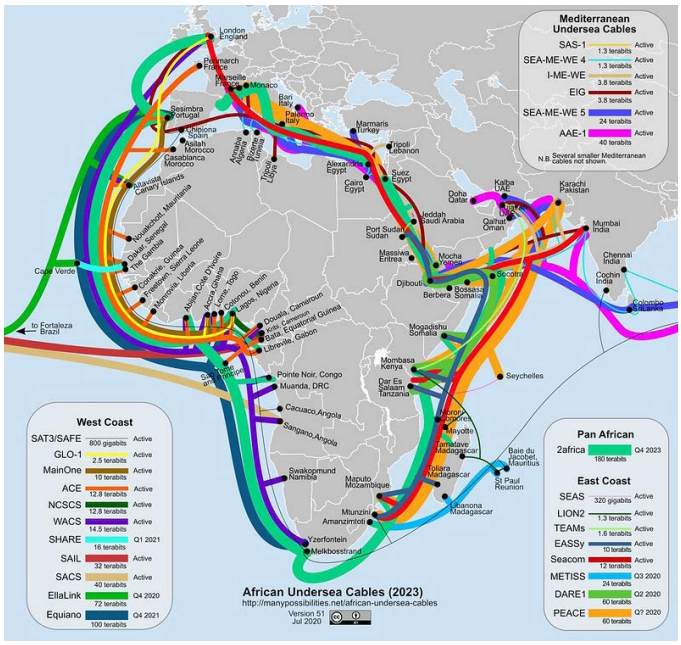
PEACE

The privately owned Pakistan East Africa Cable Express (Peace) is a 15 000-km-long, 16 Tb/s fibre pair cable system to be built in two phases.

Phase 1 will link France to Pakistan through a landing point in the City of Marseille, in France, using the Europe-Asia route and extending to Mombasa, in Kenya, through a short Indian Ocean route. It will be expanded to South Africa through the PEACE South extension under Phase 2.

PCCW Global and PEACE Cable International Network announced in January 2020 that they will cooperate on the PEACE South extension.

African Undersea Cables



Source: Manypossibilities.net

The cable, expected to be ready for service in the second quarter of 2021, will be deployed by Huawei Marine Networks, while a contract for the cable manufacturing has been awarded to Hengtong Marine. Orange will supply and operate the cable landing station in Marseille.

SACS

The South Atlantic Cable System (SACS) is a submarine cable system connecting Sangano, in Angola, and Fortaleza, in Brazil – the world's first submarine cable system crossing the South Atlantic.

Owned by Angola Cables, a joint venture of five Angolan operators Angola Telecom (51%), Unitel (31%), MSTelcom (9%), Movicel (6%) and Startel (3%), the SACS cable comprises four fibre pairs with an initial design capacity of 40 Tb/s. The 6 000-km-long undersea cable has been operational since 2018.

SAEx1

The South Atlantic Express (SAEx1) is a 25 000 km subsea cable network connecting South Africa directly to the US, with landings in Cape Town, South Africa; Fortaleza, in Brazil; and Virginia Beach, in the US, with branches to Namibia and St Helena. It will connect to the Indian Ocean Rim market through a second phase from South Africa to India and Malaysia through the South Asia Express (SAEx2). It is expected to be completed by the second half of 2021.

SAT-3/WASC/SAFE

The SAT-3/WASC, is a 13 000 km submarine cable connecting South Africa to Europe through West Africa. The cable, which has been in service since 2001, has landings in Spain, Portugal, South Africa, Senegal, Côte d'Ivoire, Ghana, Benin, Nigeria, Cameroon, Gabon and Angola.

The SACS was the initial undersea cable that linked South Africa to Portugal. The preceding cable, SAT-2, operated from 1993 to 2013 as a replacement for SAT-1, which was built in the 1960s.

The SAT-3/WASC interconnects with the SAFE cable system at the Melkbosstrand cable landing station, in South Africa, forming a cable link commonly known as SAT-3/WASC/SAFE. SAFE runs to Penang, in Malaysia, and provides redundancy for other cables linking Africa to the Middle East and the Far East, with landing points in Reunion Island, Mauritius and India.

On January 16, 2020, the SAT-3 cable experienced a break off the shore of the DRC. It was repaired a month later by cable ship *Leon Thevenin*. The break coincided with another on a segment of the Wacs. This had resulted in South African Internet users experiencing reduced international browsing speed and impacted on international voice calling and mobile roaming.

SEACOM

Seacom is a 17 000 km submarine cable connecting Africa to Europe and the Asia-Pacific region through landing points in France, Djibouti, Kenya, Tanzania, Mozambique, South Africa and India, with partner network landing points in Namibia, Angola, the DRC, Nigeria, Ghana and Portugal.

The Seacom cable system, which has been in service since 2009, was upgraded from its launch capacity of 1.28 Tb/s to 1.50 Tb/s capacity in 2018, with plans to again upgrade its subsea cable systems' lit capacity to 3 Tb/s in 2020.

WACS

The Wacs is an ultrahigh-capacity, four-fibre pair, 16 000-km-long cable system linking Europe, West Africa and South Africa. The cable system, a collaboration between 18 international telecommunications carriers, connects 15 terminal stations, starting in Yzerfontein, in South Africa's Western Cape province, and ending in London, in the UK. Launched in 2012 with a design capacity of 5.12 Tb/s, it was upgraded to 14.50 Tb/s in 2015.

There was a break in the WACS cable off the shore of Angola on January 16, 2020. The cable repair vessel *Leon Thevinin* was deployed to fix the cable break, sailing on January 22 and reaching the site on January 28, with connectivity restored by February 8. The WACS break was one of the unprecedented simultaneous outages of two Atlantic Ocean-based submarine cable systems, the other being the SAT3/WASC cable system. A second break along a portion of the WACS cable system occurred on March 27, 2020, and was repaired by April 4.

SATELLITE CONNECTIVITY

About 8 700 objects have been launched into space since the start of the Space Age, of which more than 2 000 are actively operating satellites orbiting the Earth. The megaconstellations of orbiting broadband stations will potentially add more than 16 000 more individual satellites over the next few years.

Deloitte's 'Technology, Media and Telecommunications (TMT) Predictions 2020' report forecasts that, by the end of 2020, there will be more than 1 000 satellites in low-Earth orbit (LEO) aiming to offer global broadband Internet, up from about 200 at the end of 2019. Prior to the bankruptcy of OneWeb, 68 satellites were placed in LEO in the first quarter of 2020, while Starlink placed 240 satellites in LEO in the first quarter, with expectations that it will have about 780 new satellites in orbit in 2020.

New launch services and heightened competition have resulted in lower satellite launch and construction costs. From 1970 to 2000, the average cost of launching an object into orbit was about $18 500/kg. Deloitte said that new launch providers have enabled companies to launch a kilogram into orbit for about $2 720, or about 85% less. The weight of satellites has also reduced significantly: the original Iridium satellites launched in the late 1990s weighed 689 kg each, while today's Starlink satellites, for example, weigh just 227 kg.

As demand for connectivity increases, many satellite broadband companies have marketed their ability to bring broadband Internet to rural areas and other locations with poor or no service. A GSMA report, 'Closing the Coverage Gap', published in July 2019, estimated that, as of 2018, 750-million people were completely uncovered by mobile broadband networks.

A World Bank working group study, 'The Broadband for All Report', released in October 2019, indicates that African countries will need to bring about 1.10-billion more people online, with the working-age population in Africa expected to increase by about 450-million people from 2015 to 2035.

Local networks powered by a satellite backbone are emerging as a cheaper alternative to building expensive cable and antenna-based networks in remote regions. According to MyBroadband, South

SpaceX CEO Elon Musk's $10-billion Starlink project

Low-latency, broadband Internet system Starlink sent 60 satellites into space on board one of aerospace company SpaceX's Falcon 9 rockets during February 2020. More than 300 Starlink broadband satellites have already been sent into orbit using SpaceX rockets, to be tested in a lower orbit, after which the satellites will be raised to a 550 km operational orbit and, subsequently, beam Internet services to any spot on Earth.

World Wide Worx MD Arthur Goldstuck told Business Day in February 2020 that the Starlink network would dwarf any service currently offered by satellite, with the economies of scale likely resulting in a huge reduction in the cost of typical satellite broadband services. This means that satellite connectivity could begin to compete with terrestrial connectivity, particularly in remote and rural areas that are poorly served by fibre or mobile broadband networks.

While Starlink's Internet services would probably still be too expensive for individuals in underserviced and remote areas, it represented an opportunity for service providers to contract capacity and retransmit it in remote areas using a bandwidth reseller model, said Goldstuck. Starlink will eventually become a constellation of 12 000 satellites that will form part of a new-generation low-Earth orbit space communication network, which will provide continuous, global coverage.

This Starlink constellation will have 66 satellites stationed per orbital plane, communicating with one another through four intersatellite laser links, which are then linked down to Earth using communication stations. Using a simulation of the network, it is estimated that a New York-to-London link will have a round-trip latency of 46 ms, compared with the current undersea cable networks' 76 ms. SpaceX said in February 2020 that users would need a $200 receiver the size of a pizza box to use Starlink.

Source: Business Day

African Internet service providers Vox and MorClick reported in June 2020 that satellite-based Internet services would start competing with fibre and mobile broadband over the next few years.

While most of South Africa's highly populated areas access the Internet through fixed-line connectivity or mobile data coverage, remote areas with fewer inhabitants do not offer sufficient returns to justify investment in fibre and base station infrastructure, which means they have weak or no data signal. Satellite-based broadband is one of the few alternative options available to users in these areas.

Meanwhile, data throughput worldwide, particularly for satellite connectivity operating in spectrum in the Ka-band, has improved over the past few years. MorClick told MyBroadband in June that, while older satellite technologies had operated in the lower frequency ranges of between 12 GHz and 18 GHz, Ka-band uses frequencies in the 26.5 GHz to 40 GHz range.

Prospective satellite operator MzansiSat is working with various investors and stakeholders to make the widespread connection of South Africa a reality, with COO Victor Stephanopoli saying, in a statement in March 2020, that the company is aiming to launch its satellite in the near future. By 2025, the company wants to provide national Internet connectivity with a price per gigabyte of mobile data below R25.

In September 2020, Eutelsat Communications and Paratus signed a multiyear distribution agreement to bring high-quality network connectivity to South Africa using high throughput satellite Eutelsat Konnect. The service, launched at the beginning of September 2020, offers packages of 10 Mb/s, 20 Mb/s and 30 Mb/s for businesses operating in the farming, game farms and small- and medium-sized enterprise segment, as well as for consumers working at home, home schooling and general Internet use.

Launched in 2017, EutelSat's Konnect delivers high-speed Internet coverage to 650-million people in rural and urban areas across 22 countries, with speeds of up to 20 Mb/s and has total coverage in South Africa. The Konnect Africa broadband venture, established by Eutelsat Communications, launched new-generation services in Benin, Cameroon, Kenya, Lesotho, Nigeria, South Africa, Swaziland, Tanzania and Uganda in 2017.

Further, Spacecom provides satellite coverage for South Africa using the AMOS-7 and newly launched all-digital AMOS-17 satellites.

Meanwhile, Starlink is set to enter service in the US and Canada by the end of 2020, with a near-global roll-out expected in 2021. The service is also expected to become available in South Africa in the future; however, there are no set plans in place as yet.

POLICY AND REGULATORY DEVELOPMENTS

CALL TERMINATION REGULATIONS

The Independent Communications Authority of South Africa's (Icasa's) Call Termination Regulations (CTR) came into effect on October 1, 2018, establishing a three-year glide path for operators to reduce the rates that they pay each other to terminate voice calls made by a subscriber of one service provider to a subscriber of another service provider. The final 2018 CTR follows the completion of a review of the 2014 CTR and is the culmination of an extensive consultative process that started in 2017.

The regulations, replacing the 2014 CTR, aim to further reduce the cost to communicate and enhance competition in the telecommunications industry.

The amendments have resulted in operators with more than a 20% share of total minutes terminated in the wholesale voice market reducing the charges for call termination at a fixed location to 9c from October 2018, 7c from October 2019 and 6c from October 2020. Call termination charges from mobile locations were lowered to 12c from October 2018, 10c from October 2019 and 9c from October 2020.

Smaller operators with 20% or less share of total minutes terminated in the wholesale voice market were required to reduce their fixed location charges to 10c from October 2018, 8c from October 2019 and 6c from October 2020. Charges for terminating a call at a mobile location were reduced to 18c from October 2018, 16c from October 2019 and 13c from October 2020.

END-USER AND SUBSCRIBER SERVICE CHARTER REGULATIONS

Icasa's End-User and Subscriber Service Charter Regulations (EUSSCR) came into effect in February 2019, introducing four key proconsumer interventions, including use notifications, optional out-of-bundle (OOB) billing, the roll-over of data and the transfer of data. Amendments to the charter regulations were first published in August 2017 to reinforce new minimum standards for the provision of data, SMSes and voice services, and data expiry and OOB services.

Licensees are required to send use-depletion notifications to consumers when their use is at 50%, 80% and 100% depletion levels. Licensees are also required to provide consumers with an option to opt-out of use-depletion notifications for voice, SMS and data services.

The regulations do not allow for licensees to charge consumers OOB rates for data when their data has run out without the consumers' specific prior consent; licensees are also required to provide an option for consumers to roll over unused data, as well as an option for consumers to transfer data to other users on the same network.

The May 2018 gazette of the regulations stipulated a one-month grace period for mobile operators to implement the new minimum standards. However, Cell C secured a suspension of the June 8, 2018 deadline, after applying for an urgent interdict at the High Court to procure a reasonable timeline for implementation of the

Fixed call termination rates		
Period	**Regulated rate**	**Allowed asymmetry**
October 1, 2017, to September 30, 2018	R0.10	R0.12
October 1, 2018, to September 30, 2019	R0.09	R0.10
October 1, 2019, to September 30, 2020	R0.07	R0.08
October 1, 2020, to September 30, 2021	R0.06	R0.06
Mobile call termination rates		
Period	**Regulated rate**	**Allowed asymmetry**
October 1, 2017, to September 30, 2018	R0.13	R0.19
October 1, 2018, to September 30, 2019	R0.12	R0.18
October 1, 2019, to September 30, 2020	R0.10	R0.16
October 1, 2020, to September 30, 2021	R0.09	R0.13

Source: Icasa Call Termination Regulations

regulations and requesting a six-month extension to comply. The full implementation of the necessary, complex changes across the entire product suite, intensive development and numerous system changes, along with the rigorous testing required, would take at least six months, the operator said at the time.

Icasa had initially refused the requested extensions in the interest of the public, with initial plans in place to defend the court application; however, in November 2018, Cell C and MTN South Africa reached an agreement with Icasa for a new implementation date of February 28, 2019. The implementation of certain aspects of the regulations were delayed by the authority until April 12, 2019, to give licensees sufficient time to configure their systems and processes. The remaining provisions came into force on March 1, 2019, including those related to the transfer and roll-over of unused data and the prohibition on defaulting of an end-user onto OOB charges upon the depletion of data bundles.

Meanwhile, Icasa is investigating whether the amended EUSSCR are being adhered to, with plans to conduct a regulatory impact assessment (RIA) on the back of growing concerns from consumers that some of the requirements of the regulations are not being properly implemented by licensees. The general concerns pertained to the data expiry rules, OOB rates and rules, as well as OOB voice and SMS rules applied by operators, Icasa noted in December 2019, when it announced its intention to undertake the RIA. The authority also intends evaluating the impact – financial and nonfinancial – of the amendment of the regulations on licensees and end-users. The deadline for written representations from stakeholders closed on February 2020, with the final RIA report to be published in 2020.

ICT SECTOR CODE

In May 2015, the then Department of Telecommunications and Postal Services established a Broad-based Black Economic Empowerment (BBBEE) ICT Sector Council to develop, review and publish an amended BBBEE ICT Sector Code. The amended version of the 2012 ICT Sector Code for BBBEE was published in November 2016, setting a black ownership target of 30% for the ICT sector. The code also requires that 5% of ICT companies' net after-tax profit be spent on enterprise development initiatives to develop black-owned ICT enterprises and that a further 1.50% be invested in socioeconomic development programmes.

The BBBEE ICT Sector Council was mandated to monitor the implementation of the BBBEE ICT Sector Code and report on progress to Communications and Digital Technologies Minister Stella Ndabeni-Abrahams, President Cyril Ramaphosa's Advisory Council on BEE, as well as Trade, Industry and Competition Minister Ebrahim Patel and BBBEE commissioner Zodwa Ntuli.

In 2020, Icasa published the draft regulations on ownership and control in the communications sector, following the release of its position paper in February 2019 and a discussion document on equity ownership in 2017. The draft regulations, which were issued for public comment until April 3, 2020, extended to May 4, propose to set new BBBEE ownership requirements in addition to the targets that apply under the ICT Sector Code for BBBEE.

These include conditions such as a requirement for all existing licensees to comply with the mandatory equity ownership requirements of 30% equity ownership by black people and attain Level 4 BBBEE status within 24 months of the promulgation of the regulations. It also directs penalties of up to R5-million or 10% of the licensees' annual turnover where a licensee fails to maintain the mandatory minimum requirement.

These developments followed what Icasa described as "an alarming trend" during the 2014/15 financial year, which resulted in applications for transfer of control and ownership diminishing levels of equity ownership by historically disadvantaged groups (HDGs). In 2017, Icasa's discussion document on equity ownership by HDG's found that about 53% of individual electronic communications service and individual electronic communications network service licensees had less than 30% HDG equity ownership.

Icasa said in a presentation to Parliament on September 4, 2020, that it decided to no longer approve licence transfer applications that led to less than 30% equity ownership by HDGs in licensees. The final regulations are scheduled to be published during the 2020/21 financial year.

IMT ROADMAP

Icasa published its final International Mobile Telecommunications (IMT) Roadmap in November 2019. This followed submissions from, as well as public hearings with, stakeholders after the initial report was published in March 2019.

Icasa aims to ensure spectrum efficiency, unlock the universal availability of broadband services and establish a vibrant and competitive telecommunications industry.

The roadmap provides a detailed analysis of the prospective IMT radio frequency bands and outlines the alternative options for using the bands.

According to the authority, potential IMT2020 services and applications can be grouped into three different classes – enhanced mobile broadband, through the combination of evolving fourth-generation (4G) services and fifth-generation (5G) technologies; massive machine type communications, including the Internet-of-Things; and ultra-reliable and low-latency communications.

The roadmap highlighted that IMT2020 networks are being designed to be more reliable and have very low latencies, which could make them suitable for applications such as connected and driverless cars and smart manufacturing.

As these services have different requirements in terms of speed, coverage and reliability, different network solutions and different deployment models, an appropriate network infrastructure and access to different spectrum bands are required.

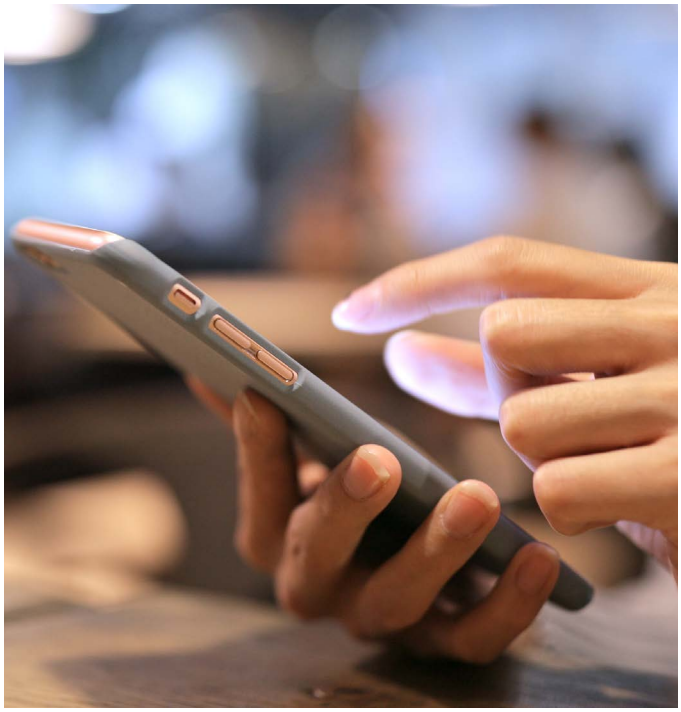
NUMBER PORTABILITY REGULATIONS

The final new Number Portability Regulations were published in October 2018, replacing the regulations of 2005, to enable customers to port their number between cellular networks Vodacom, MTN, Cell C and Telkom, thereby boosting competition in the telecommunications sector.

In 2016, Icasa, aware of some irregularities and challenges in the implementation of the Number Portability Act, published a notice to conduct an inquiry into number portability for public comment. The authority conducted public hearings into the Act in 2017 and amended it in 2018.

Geographic number portability, or fixed-line number portability, had been introduced in 2010, enabling individual consumers and businesses to port their landline numbers regardless of location. The regulations also extended porting to the nongeographic 086 and 087 number ranges that are largely used by corporate customers and call centres.

In April 2019, Cell C approached the courts for a review of certain aspects of the amended numbering portability regulations, as some of the provisions harmed its ability to port mobile numbers away from Vodacom and MTN. Cell C's move was criticised by the Internet Service Providers Association, which contends that this has delayed the implementation of the new regulations. The



authority maintains there is nothing in the Act that prevents it from implementing certain portions of the regulations such as the nongeographic number porting.

In 2010, the Number Portability Company was established by Vodacom, MTN, Cell C, Telkom and Liquid Telecom to administer and track all porting processes. According to the company, from November 2006 to August 2020, nearly 13-million mobile numbers, averaging 75 613 a month, had been successfully ported, including port-back and port-on numbers. From April 2010 to August 2020, 2.08-million geographic numbers had been successfully ported, with average geographic ports a month of 17 079.

Meanwhile, on March 26, 2020, a temporary ban was placed on mobile number portability. According to Business Insider, in an amendment to South Africa's disaster regulations, acting Communications and Digital Technologies Minister Jackson Mthembu lifted the prohibition in May 2020, noting that it was never clear how stopping porting would directly help combat the spread of Covid-19, which was the stated purpose of the package of measures in which the prohibition directive appeared.

PRIORITY MARKETS

Icasa launched an inquiry into the mobile broadband market in late 2018 as part of its efforts and interventions to reduce the high cost to communicate in the country. It marked the third intervention by the authority following the amendment and final publication of the EUSSCR and the CTR in 2019.

The priority markets inquiry was undertaken in four phases – the market study request for information, the discussion document listing the proposed priority markets, the public hearings and the publication of the findings document.

The inquiry identified broad markets for mobile services, including the retail market for mobile services and the wholesale supply of mobile network services, for prioritisation for a market review.

Separate, but complementary to Icasa's undertakings is the Competition Commission's inquiry into data services. A current memorandum of understanding between the two authorities will allow for Icasa to continue with implementing its policy direction on effective competition in the broadband market, while the Competition Commission focuses on the market inquiry into high data costs.

The latest inquiry into mobile broadband services is to assess the state of competition and determine whether there are markets or segments within the mobile broadband services value chain that may require regulation in the context of a market review in terms of Section 67(4) of the Electronic Communications Act.

In December 2019, Icasa published its discussion document on the mobile broadband services for public comment, seeking input on the preliminary findings of Icasa's definition of relevant mobile broadband services markets and the effectiveness of competition within these relevant markets.

The discussion document, informed by information and data received from licensees, identifies licensees that may have significant market power in the identified markets and proposes procompetitive remedies.

Icasa also believes that the pending licensing of high-demand spectrum will also provide for much-needed relief in reducing the cost of providing broadband services for South Africans.

The Draft Regulations on Mobile Broadband Services Market will be released in 2020 for public consultation and completed by the end of the financial year.

SOUTH AFRICA CONNECT

First announced in 2013, South Africa Connect (SA Connect) is the national broadband policy identified by the South African government to meet the technology goals of the National Development Plan to create an inclusive information society.

The policy aimed to deliver 100% broadband connectivity to government facilities by 2020, broadband access for 90% of the country's population by 2020 and for the entire population by 2030.

In February 2020, the Department of Communications and Digital Technologies (DCDT) oversight deputy director-general Omega Shelembe told the Select Committee on Public Enterprises and Communication that the department completed an infrastructure gap analysis during the first phase of the SA Connect programme to assess the state of infrastructure in the country. The analysis identified which areas need infrastructure, highlighting that rural areas and townships do not have access.

Government facilities, such as those of health and police, were assessed in the gap analysis to determine how far they are from infrastructure, and it was determined that 42 000 government facilities need connectivity.

Owing to the magnitude of the policy, the South African government decided to implement it in two phases, first focusing on the connection of schools, health facilities, government offices, Thusong Centres and post offices in eight rural district municipalities. The policy's roll-out, however, has been plagued by delays attributable mainly to concerns about the policy's procurement model.

In 2017, the DCDT, which was still the Department of Telecommunications and Postal Services at the time, developed a new delivery model for SA Connect, in collaboration with the State Information Technology Agency (Sita) and Broadband Infraco, as well as other State-owned enterprises and private companies, to correct this. This followed the cancellation by Sita of the first tender for a service provider to implement Phase 1, as

SA Connect policy targets

Target	Penetration measure	Baseline (2013)	By 2016	By 2020	By 2030
Broadband access in Mbps user experience	% of population	33.70% Internet access	50% at 5 Mb/s	90% at 5 Mb/s 50% at 100 Mb/s	100% at 10 Mb/s 80% at 100 Mb/s
Schools	% of schools	25% connected	50% at 10 Mb/s	100% at 10 Mb/s 80% at 100 Mb/s	100% at 1 Gb/s
Health facilities	% of health facilities	13% connected	50% at 10 Mb/s	100% at 10 Mb/s 80% at 100 Mb/s	100% at 1 Gb/s
Government facilities	% of government facilities	–	50% at 5 Mb/s	100% at 10 Mb/s	100% at 100 Mb/s

Source: DBSA Request for Proposal 023/2020

Internet economy boom

The 'e-Conomy Africa 2020' report, published by Google and the International Finance Corporation (IFC) in November 2020, estimates that Africa's Internet economy could potentially contribute nearly $180-billion, or 5.20%, to the continent's economy by 2025. By 2050, the contribution to gross domestic product (GDP) could increase to $712-billion.

Africa's Internet GDP (iGDP) was estimated at about 1.10%, or $30-billion, of the continent's GDP in 2012, increasing to $99.70-billion by 2019, before increasing to about $115-billion, or 4.50%, of Africa's $2.554-trillion GDP in 2020, an analysis conducted by Accenture for the report found.

Comparatively, the Internet economy contributed to 9% of GDP in developed economies, such as the US, in 2018.

Africa's potential Internet economy growth is driven by increased access to faster and better-quality Internet connectivity, a rapidly expanding urban population, a growing technology talent pool, a vibrant startup ecosystem and the continent's commitment to creating the world's biggest single market under the African Continental Free Trade Area.

Growth is particularly expected in various subsectors of the African Internet economy, such as e-commerce, e-logistics, edtech, entertainment, financial technology and health technology, and driven by digital startups in Africa.

The report, citing data from Partech Ventures Africa, points out that the continent is home to 700 000 developers and venture capital funding for startups has increased year-on-year over the past five years, with a record $2.02-billion in equity funding raised in 2019.

Source: *Engineering News*

none of the six companies that responded to the bid had met all six technical mandatory requirements to enable them to proceed to the next phase of pricing evaluation. In October 2019, the DCDT told ITWeb that implementation through the new model had started in 2018/19.

The scope for Phase 1, however, was adjusted to connect 970 government facilities, from an initial target of 6 235, owing to budget constraints and, by January 2020, only 630 sites were connected, with the remainder to be connected by the end of the 2019/20 financial year.

To date, the SA Connect Programme has been funded through the medium-term expenditure framework budget. The DCDT had applied for additional funding through the National Treasury's Budget Facility for Infrastructure for Phase 2, which will expand connectivity to about 42 000 identified government facilities countrywide. However, the infrastructure fund recommended that a comprehensive feasibility study be conducted to determine the viability of Phase 2, which the Development Bank of Southern Africa (DBSA) is now facilitating.

The feasibility study is exploring various cost-effective and efficient implementation models, as well as sustainable funding models for Phase 2. In February 2020, DBSA issued a tender to appoint a service provider to undertake the feasibility study. The tender closed in March 2020, and on September 2, ITWeb reported that the DBSA and DCDT had appointed local research firm BMIT.

PROSPECTS

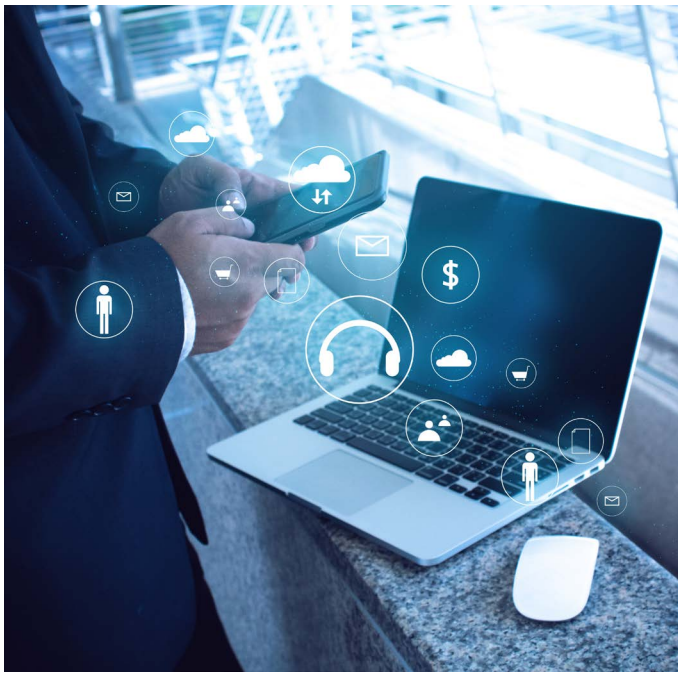
The Cisco 'Annual Internet Report 2020 Highlights Tool', published in February 2020, shows that, by 2023, 66% of the global population will have Internet access and there will be nearly 30-billion devices and connections.

In South Africa, about 42.80-million Internet users (2018: 28-milion) are expected in the next three years, covering 70% of the population, with 45.60-million total mobile users (2018: 43.70-million). By 2023, the country will have 199.30-million networked devices (2018: 143.40-million), representing 3.2 networked devices per capita (2018: 2.5), and 132.30-million (2018: 99.60-million) mobile connected devices, equating to 2.2 mobile connected devices per capita (2018: 1.7). This compares with global predictions of 3.6 networked devices and/or connections per person, and nearly ten devices and connections per household, with 47% of all devices and connections video-capable.

Globally, about 45% of all networked devices will be mobile-connected and 55% will be wired or connected over WiFi; in South Africa, 66% of all networked devices will be mobile-connected by 2023 and 34% will be wired or connected over WiFi.

Smartphones will account for 38% (75.80-million) of all networked devices in South Africa by 2023, compared with 54.50-million in 2018, while personal computers and tablets will account for 12% (23.10-million), compared with 21.40-million in 2018.

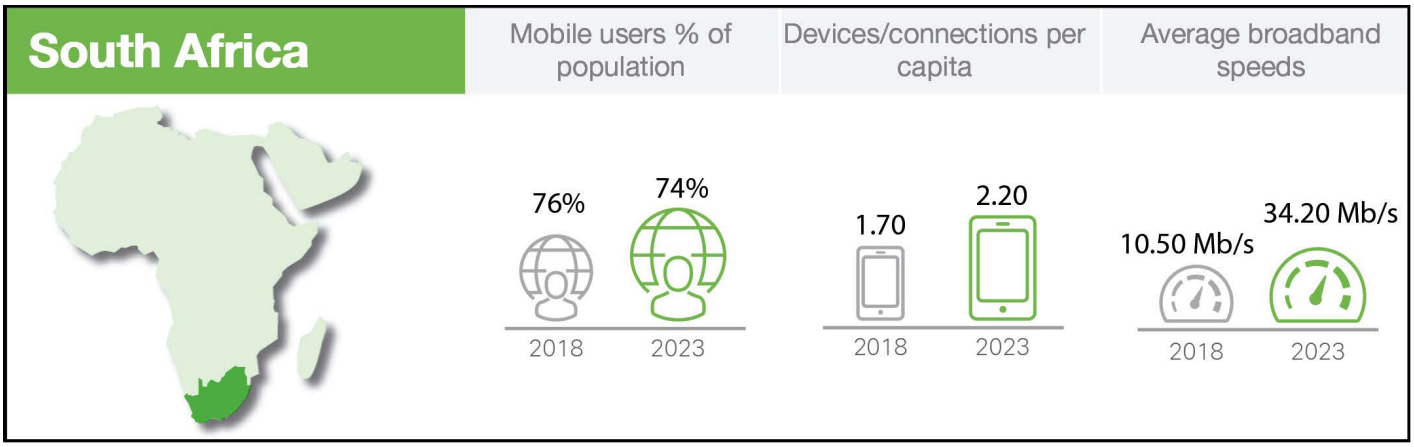
Fourth-generation (4G) connections will grow three-fold in South Africa from 2018 to 2023 as connections reach 38.30% in 2023



(2018: 17.10%) of total mobile connections, while third-generation and lower connections will account for 55.40% (2018: 82.70%) of total mobile connections.

Fifth-generation (5G) technologies are poised to support more than 10.60% of mobile connections globally, from a base of zero in 2018, as Internet connectivity increases, while global low-power wide-area connections will account for 14.40% (2018: 2.50%) of total mobile connections.

South Africa's 2023 Internet growth expectations



Source: Cisco, Annual Internet Report, Highlights Tool

Locally, there will be 5.30-million 5G connections by 2023 – 4% of total mobile connections – and 2.30% (2018: 0.20%) of total mobile connections will be low-power wide-area connections.

With advanced performance capabilities, 5G will deliver more dynamic mobile infrastructures for artificial intelligence and emerging Internet of Things applications.

This includes autonomous cars, smart cities, connected health and immersive video, Cisco senior VP and CTO Roland Acra said in February 2020, noting that the continuous rise in Internet users, devices, connections and more demand on the network was beyond what could have been imagined.

Social networking, video streaming and downloads, business productivity, e-commerce and gaming continue to drive growth of mobile applications in South Africa and globally.

Across Africa, the Broadband Commission for Sustainable Development notes that investment of $9-billion and nearly 220-million new people need to come online by 2021 to meet ambitions of doubling broadband connectivity in Africa from 2016 penetration levels. According to the Broadband Commission's 'Connecting Africa through Broadband' report, published in October 2019, the baseline broadband penetration would have to increase from about 18% in 2016 to 36% by 2021.

The 'Connecting Africa through Broadband Report' indicates that, in addition, 1.10-billion new unique users must be connected to achieve universal, affordable and good-quality broadband Internet access by 2030. An estimated additional $100-billion would be needed to reach this goal over the next decade.

This will also require the deployment of nearly 250 000 new 4G base stations, at least 250 000 km of fibre across the region, satellite deployments, WiFi-based solutions and other innovations to reach about 100-million citizens living in remote rural areas.

Affordability, in terms of devices and data use, will remain a significant challenge inhibiting connectivity, as the combination of expensive entry-level mobile data plans and entry-level devices keep many offline.

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