

06 Best technology



We aim to be the leading telco in all markets through the best network and IT excellence, with digital at the core.

Capitals impacted:



Natural capital



Intellectual capital



Manufactured capital

How the best technology supports our purpose

We invest in the latest technologies and modern digital systems to connect our customers for a better future. Looking beyond pure connectivity, we leverage scaled platforms to drive accessibility and inclusive growth, while our Big Data capabilities help drive intelligent decision-making, solutions and operations. Our IoT technology has contributed to meaningful power consumption savings across our network and will be scaled globally to support energy efficiency.



2021 at a glance

We invested R13.3 billion in infrastructure across the Group, re-investing more than 13.5% of revenue into our network and IT systems to deliver the best experience to our customers. Major network investment programmes included expanding our 4G coverage and increasing network capacity across all our markets. We continued to adopt the latest digital technologies – including AI and IoT – to help reduce costs and increase productivity through smart network planning, deployment and operations. In addition, we continued to increase investment in IT, focusing on enabling faster time to market for our products and services, ensuring availability of our IT systems and improving our digital channels and capabilities. Vodacom has also taken a strategic decision to aggressively pursue network infrastructure sharing across our South African and international markets to ensure effective capital expenditure and avoid duplication of sites, wherever possible.



Established a new sub-Saharan Africa Group technology function.



Our SD-WAN customer base **increased by over 125%**.



Launched South Africa's first mobile 5G network, with 190 sites across the country, as well as our fixed 5G commercial service.



2G coverage **remains steady at 99.9%**, with 3G coverage **increased to 99.9%** and 4G to **more than 97.3%** of South Africa's population.



Added 192 deep rural network sites, connecting **156 communities** previously without any coverage.



In terms of network NPS, Vodacom is the **market leader in the DRC and Tanzania**. We are **second in South Africa, Lesotho and Mozambique**.



3.0% reduction in total GHG emissions.



573 tonnes e-waste recycled.



Over **1 066 tonnes** of batteries rejuvenated and re-introduced across our markets.



75% reduction in network waste.



South Africa

Further extending our best gigabit network with voice and high-speed data coverage



The allocation of temporary spectrum supported network capacity during the year, while also highlighting the urgent need for allocation of high-demand spectrum (HDS) through the ICASA invitation to apply process. We remain supportive of the HDS auction proceeding as soon as possible. We believe that the allocation of HDS is critical to reducing input costs and, by extension, the cost of data. The assignment of additional spectrum is also vital to expanding broadband services and promoting digital inclusion in South Africa.



We concluded an agreement with Cell C to provide 2G, 3G and 4G roaming services to Cell C's postpaid subscriber base. The subscriber migration process is still ongoing.



Our overall mobile network performance improved through our ongoing efforts to modernise our network to support the latest features and capabilities. This was further driven by expanding our 4G+ footprint, where possible, and our investment in our new 5G network.



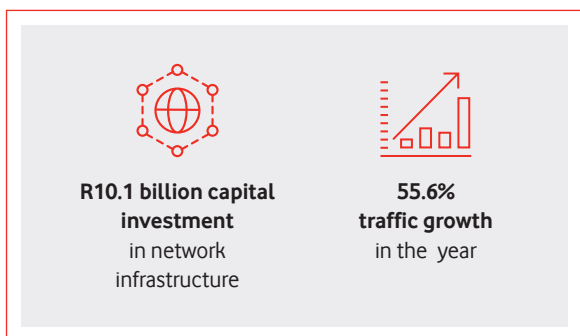
We increased the percentage of base stations with self-provided transmission to 97.51%. A total of 48.6% of sites have fibre and 48.9% have self-provided high-capacity microwave transmission.



We accelerated our fibre footprint during the year – expanding to 146 401 homes and businesses – with new capabilities built into our digital channels to place an order, schedule installations and manage services.



We mitigated some of the negative impact on our consumer and enterprise customers by accelerating the installation of new backup batteries and standby power solutions, and implementing high-security shelters to reduce battery theft and damage. The network availability improvement plan accelerated battery deployment to our base stations and we reached 10 025 sites, as well as 818 first-priority enterprise business unit sites. We installed over 38 000 new lithium-ion batteries and improved security measures at more than 10 025 sites in the network. More broadly, Vodacom has a comprehensive technology resilience programme in place to ensure that critical infrastructure and services are resilient through design.



Reducing our environmental impact and delivering technology efficiencies



We saved close to R700 million in operational expenditure through our technology efficiency programme, which focuses on reducing energy consumption, sourcing alternative renewable energy solutions, optimising site lease and rental renegotiations, increasing network infrastructure sharing and implementing competitive procurement practices.



By building our extensive transmission network building and operating costs are reduced through co-build and swap agreements with third parties, reusing equipment swapped out during upgrades and negotiating more favourable equipment, maintenance and lease pricing.



Through Vodacom's Raptor project, we leverage IoT technology to remotely monitor and manage energy consumption and other parameters. This contributed to between 10% and 20% run-time reduction in air-conditioning in our base station containers. We rolled out this technology to more than half of our South African base stations and will continue with the project during 2021. We are also extending the project to our international markets, starting with Vodacom Mozambique.

Addressing cyber threats to maintain customer security and privacy



Vodacom continues to mature our extensive set of cyber security controls and mechanisms across our markets, with continuous status reviews regarding the adequacy and coverage. Close collaboration between our markets in Africa and Vodafone ensure alignment. These baseline controls ensure that our cyber security posture is enhanced and retained.



To secure our customers' personal information, as well as Vodacom proprietary data, we have several security measures in place, including data loss or leak prevention, data obfuscation and enhanced data encryption. We adhere to local and global protection of personal privacy legislation and have multiple security operation centres and a cyber intelligence centre that monitor potential security breaches 24/7. Vodacom has multiple machine learning solutions across our technology endpoints, which continuously monitor threats and anomalies and automate incident response activities.



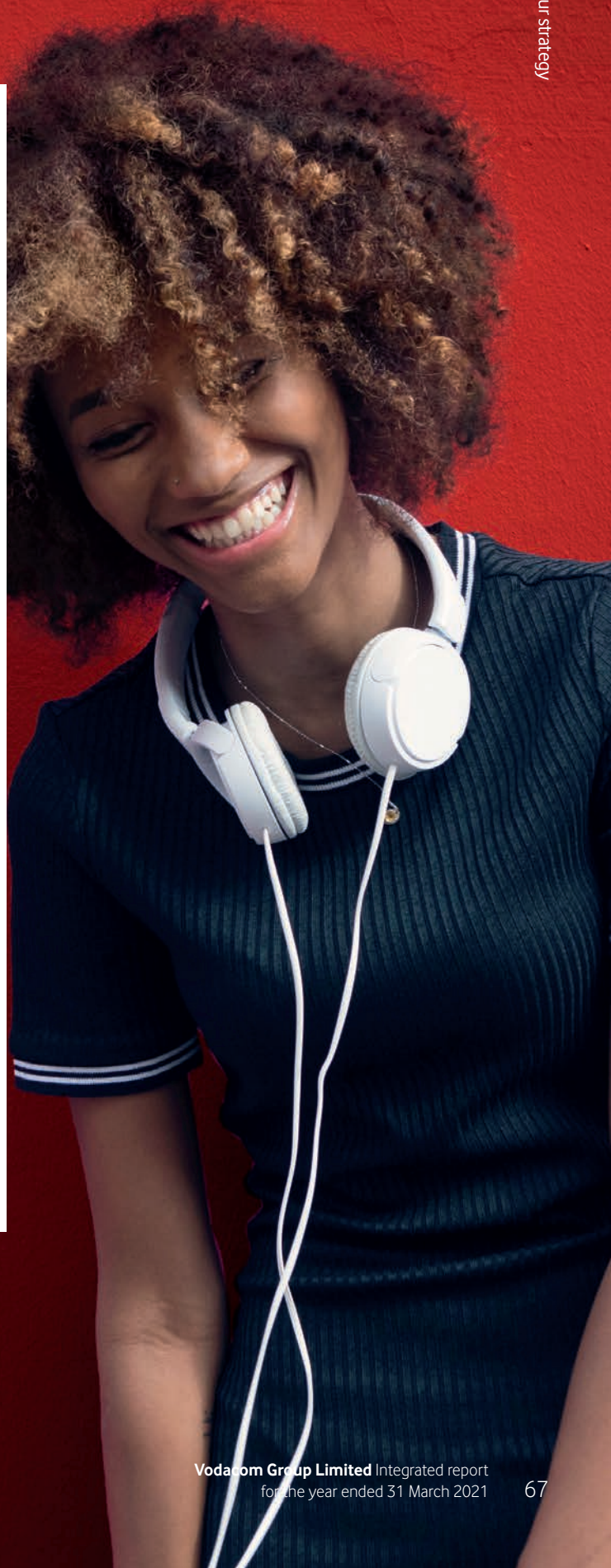
We regularly evaluate our third-party supplier and vendor security to ensure their security measures align with Vodacom's and Vodafone's established standards.

Extending our capabilities in modern digital IT

- ✓ We entrenched Agile and DevOps practices into our way of working, focusing on faster time to market, improved customer experience and greater stability.

Our cloud journey remains key to our strategy, delivering cost savings and increased efficiencies. We moved selected analytical workloads into the public cloud, enabling delivery of analytics at scale to steer investments into beneficial channels, price plans and devices. At the end of the first year of our AWS cloud programme we created more than 180 AWS workloads, of which over half were cloud-native workloads.
- ✓ By using Big Data and ML in our operational areas, we improved our investments, especially in identifying new network sites and offering ongoing targeted campaigns to meet our customers' needs.

Based on the principle "build once and reuse many times", we deployed an analytical engine that only required configuration for our Shake-Up Summer or ShakeOff2020 Summer campaign. The same capability will be deployed in our African markets to accelerate analytics.
- ✓ TOBi, our chatbot, uses the latest AI technology to provide customers with a conversational experience that can solve queries without human interaction via SMS, WhatsApp, the Vodacom website and the MyVodacom app. TOBi handled up to 20 000 chats per day and over six million interactions during the year, in total. We were one of the first markets in the Vodafone Group to launch a chatbot via interactive voice response, called TOBi Voice, offering assistance to prepaid customers.
- ✓ Vodacom maintained its lead in the IT for Customers independent benchmark exercise conducted by Gartner, which compares IT capabilities across large mobile operators in South Africa. Vodacom increased its lead by more than 100 points and showed significant improvement in the retail channel.
- ✓ To ensure we have the right digital skills, we employed and insourced software engineers while also increasing our focus on training and certifying our technology employees. We insourced an additional 60 software engineers, including 19 candidates from our graduate programme, in the year.





Growing our enterprise technology capabilities and services

- ✓ Vodacom Business has become an AWS Outpost, a fully managed service that extends AWS infrastructure, services, application programming interfaces (APIs) and tools to virtually any data centre or co-location space. More than 80% of our enterprise customers choose a hybrid cloud technology strategy using multi-cloud deployment models for scalability and flexibility in their workloads. Our small and large business clients benefit from a legacy in providing data centre-managed services by Vodacom and AWS.
- ✓ We use Big Data analytics to evaluate all new opportunities in the roll-out of FTTx to ensure high uptake and return on investment.

- ✓ Our partnership with Microsoft and the Department of Education enabled remote learning through our range of connected education solutions and affordable subsidised data.
- ✓ We remained focused on IoT solutions, including smart water meters for municipalities, smart asset management, enterprise applications (such as queue management and learner admissions systems), fleet management, access control and mission-critical communications.
- ✓ We launched a mobile private network proof of value (PoV) with a client in the mining sector. We are also running a PoV for our connected worker solution with our subsidiary IoT.nxt for a client in the chemical and energy sectors.
- ✓ Vodacom is the first telco in Africa to attain MEF 3.0 SD-WAN certification. This enables service and technology providers to validate that their SD-WAN services and products conform to the recently published SD-WAN service attributes and services (MEF 70) standard. This is a valuable reference for our customers in a fast-growing market, with SD-WAN offered by many providers. Only eight companies in the world have been certified.

International

Expanded our best gigabit networks

- ✓ We expanded our network coverage in our international markets. We now have 8 294 2G sites, 6 497 3G sites and 3 744 4G sites across Tanzania, Mozambique, the DRC and Lesotho. We accelerated 4G roll-out by approximately 40%.
- ✓ We are engaging with the regulators in Mozambique, Tanzania and the DRC regarding 5G spectrum. Meanwhile, the international markets are proactively implementing their 5G readiness plans.
- ✗ In the DRC and Lesotho, power failures impacted Vodacom's network availability.
- ✗ In Mozambique, two consecutive cyclones severely impacted network availability. Furthermore, ongoing political instability in the country's Cabo Delgado province impacted planned network maintenance, with security concerns restricting access to infrastructure.
- ✓ We continued to expand our FTTx footprint across our international markets through partnerships. In Kinshasa and other major towns in the DRC, the FTTx cobuild wholesale capacity with Liquid.
- ✓ Vodacom DRC concluded a roaming agreement with Orange.
- ✓ In the DRC and Mozambique, we are trialling alternative network technologies such as the open radio access network to define and build 2G, 3G, 4G and 5G solutions based on general-purpose, vendor-neutral hardware and software-defined technology.
- ✓ We onboarded Lesotho and Mozambique onto the Africa Network Operations Centre shared service, consolidating network operations within the Group across Africa to gain shared services benefits. It focuses on customer-centricity and efficiency in our operations, as well as better network and service quality. We will onboard additional markets during the new financial year.
- ✓ We continued to activate additional submarine cable capacity to meet the increased demand for data and internet across our markets. We also improved network resilience by improving connectivity to data centres and points of presence. We partnered with several global players as part of the 2Africa project – one of the world's largest subsea cable projects that will connect Europe and the Middle East with 21 landings in 16 countries across Africa. The project will go live in 2023/2024.

Strengthening our digital IT capabilities

- ✓ We implemented agile and scaled agile framework (SAFe) practices across our markets to ensure customer-focused delivery. SAFe is the world's leading framework for scaling agile across the enterprise and is designed to help businesses continuously deliver value.
- ✓ Our international markets embarked on a cloud transformation journey in line with Vodafone's strategy. We focused on building foundational capabilities and skills during the year, with Vodacom South Africa providing guidance.
- ✓ Across the markets, over 60 processes were automated in the past year, saving over 50 000 person-hours.

Shared capabilities and platforms

- ✓ We are rolling out IT shared services across our markets to optimise cost, operational efficiency and speed to market, and increase revenue. We are currently standardising on shared platforms, infrastructure and processes.
- ✓ We launched a new programme, called Ubuntu, as a platform-driven approach based on a common digital experience layer that will manage the user experience across channels, devices and touch points throughout the customer journey and across markets. The first project is to roll out the MyVodacom app across markets with pre-identified standardised customer journeys.
- ✓ Leveraging off the existing lifestyle platforms we offer in South Africa, we launched our digital services offering, comprising video, gaming and music. We plan to include lifestyle platforms across our markets in future, leveraging centralised skills and standardised platforms.
- ✗ Unfortunately, during the year, our Project Loon collaboration with Alphabet, the parent company of Google, was discontinued. This project comprised a fleet of balloons to provide internet services to remote regions in East Africa, and we piloted this service in Mozambique. We remain committed to the acceleration of rural coverage, and continue to explore alternate options.

Financial platforms updated (M-Pesa and Alipay)

- ✓ Leveraging our landmark agreement with Alipay, we intend to launch our lifestyle super-app VodaPay in the coming financial year. Also, we invested into our M-Pesa platform, where through our strategic M-Pesa Africa hub we are scaling our consumer and merchant solutions. As we enrich our skill set to drive our techco strategic journey, we accelerated the hiring of 60 software engineers in the year.
- ✓ The launch of the credit management system in Mozambique and Tanzania enabled multiple financial service providers to launch credit products for our consumer and merchant base. The first banks are live in beta in both markets.
- ✓ The development and integration of the open API platform in Ghana and Tanzania enabled domestic and international merchants to integrate and accept payments with little support. Features include collections, reversals, foreign settlement, hosted checkout and Azure ML log files.
- ✓ The consumer smartphone app was rolled out in Tanzania and Mozambique and launched in beta in the DRC, adding a new user experience, size and start-up optimisation. The new user interface UX and service builder allows markets to develop apps for local partners. It has reduced app start-up time to three seconds, improved app ratings by 4.2 and attracted almost 40 000 additional customers in one month. We added three new mini app services.
- ✓ Our anti-money laundering programme is live in all markets.

How the best technology supports the system of advantage

Our ultimate ambition is to connect our customers for a better future. We invest significantly in the latest gigabit network technology and digital IT systems, while also expanding our network coverage across our markets and driving our rural coverage acceleration programme to promote digital inclusion in communities. We aim to build an open ecosystem to ensure we create a futureproof, flexible modern digital IT architecture for a superior customer experience, enabling exponential growth through scalable platform ecosystems. Vodacom is proud to be pioneering low-cost network technology on the continent through various partnerships – such as AST SpaceMobile and 2Africa – to connect more people in an increasingly digital world.



Vodacom
Vision
2025

Vodacom's new technology 2025 strategy looks beyond pure connectivity by leveraging scaled platforms to drive revenue growth. To deliver on this ambition, we are:

- Building new capabilities and developing new skills through insourcing and reskilling;
- Enabling the evolution of mobile and fixed network access, transport network simplification and telco cloud, with a specific focus on making the network smarter through automation and AI;
- Developing new capabilities across our network and IT platforms, including increased accessibility to Big Data and ML capabilities;
- Embedding security and privacy in our projects, products and services throughout their life cycle;
- Increasing the speed of delivery and leveraging economies of scale to reduce our cost of delivery; and
- Evolving our financial services platforms through the introduction of the Alipay platform into South Africa and the evolution of the M-Pesa platform to M-Pesa 2.0 targeted at both consumers and merchants.