

Technology report

Vodacom applies state-of-the-art technology to provide a competitive advantage and deliver value for all our stakeholders, especially our customers and shareholders. The superiority of our technology services and coverage differentiates us in our markets. The increased investment in our mobile and fixed networks, consumer and enterprise services and information technology capabilities has facilitated our strong position.

Our capital investment

This year we made a total capital investment of R12.9 billion translating into a capital intensity of 16.1%. The capital intensity for South Africa was 14.0%, and 22.3% for International. Much of this investment was directed at expanding our network coverage in 2G and 3G across all our markets, and LTE/4G in South Africa and Lesotho. Investment was also applied to improve the customer experience and overall network performance.

What customers think of our mobile network

We measure our customers' perception of our mobile networks relative to the customer perception of our competitors through the Network NPS (net promoter score). At year end South Africa had a lead over its nearest competitor of 29 points on overall Network NPS, a significant lead compared to similar benchmarks in other markets.

Our International networks ranked as follows in their network NPS:

Country	Network quality (NPS score)	Network coverage (NPS score)
 Tanzania	2 nd	2 nd
 DRC	1 st	1 st
 Mozambique	1 st	1 st
 Lesotho	1 st	1 st

Our network coverage and rollout

South Africa

Our 2G network in South Africa now covers 99.9% of the population, the widest network coverage in South Africa. More than 95% of our sites are delivering 3G services and more than 53% are delivering LTE/4G services, covering 98.9% and 58.2% of the population respectively. We added more than 1 790 3G sites and more than 3 400 LTE/4G sites during the year. Our LTE/4G service is available to prepaid and contract customers.

We aggressively moved 2G traffic off our 1 800MHz spectrum and loaded it with LTE/4G services to improve the LTE/4G data experience for our customers. More than 85% of our 3G sites are enabled with 43.2Mbps dual carrier technology that improves performance of our 3G network. We have also rolled out our LTE-Advanced service, with peak speeds exceeding 200Mbps in some tests. The rollout of our LTE-Advanced network has received positive media coverage:

- ➔ Vodacom's LTE-Advance delivers impressive results.
- ➔ Vodacom's LTE-Advance arrives in more areas.
- ➔ Vodacom cracks 170Mbps in Cape Town.

Our ability to roll out LTE-Advance more broadly in South Africa, and to ensure more efficient data services in rural areas, is being constrained due to the lack of adequate spectrum. In most countries where 4G services were launched regulators assigned additional spectrum for the deployment of 4G. This has not been the case in South Africa.

Where economically viable and sensible, we continue to self-build our transmission network to support the radio and fixed network by connecting more base stations with fibre and high-speed microwave transmission. During the year, we increased the percentage of sites with self-provided transmission by more than 8 percentage points to 88.5%.

International

In our markets in the DRC, Lesotho, Mozambique and Tanzania, we now have 6 499 2G sites and 3 916 3G sites. Several of our International operations have tested LTE/4G in the past year, with Lesotho now having a live commercial LTE/4G network. Subsequent to year end Tanzania launched LTE/4G. Our International operating companies continued their RAN renewal programmes. The DRC radio network has been replaced with 4G-ready equipment. Tanzania is currently 97% complete, while Mozambique and Lesotho had been completed in previous years. We continued to expand on the success of the ultra-low cost base station solution (ULCS) in the DRC, South Africa and Lesotho. The concept has also been expanded into Vodafone as a global best practice.

South Africa network performance

We pride ourselves in providing the country's best mobile voice and data services. There are various ways in which we measure network performance, including through internal network generated statistics and independent drive testing or benchmarking of the mobile network operators.

Network statistics show that the call drop rate reduced by 46% over the financial year, the call set up success rate improved by 35%, while network availability improved by 9%. Although there has been an improvement in network availability, as a result of large-scale battery upgrades at our base stations, we still do not meet our internal availability target. Transmission and power failures are the cause of the majority of network downtime.

Monthly drive testing results for data performance on both 3G and LTE/4G indicate that the Vodacom network is superior in terms of download and upload speeds (throughput). On voice-related metrics such as drop call rate (DCR) and call setup success rate (CSSR), the Vodacom network provided the best results consistently month to month, against other mobile networks.

Network resilience

We have a policy of recovering 80% of all traffic within 48 hours during the total loss/destruction of a major mobile telephone exchange (MTX) facility. In South Africa this was achieved by building mobile telephone exchanges into trucks capable of being deployed anywhere in the country in an emergency.

We have conducted a policy compliance review to independently assess whether we are fully compliant with our network resilience policy, and to identify areas for improvement. The MTX resilience review concluded that Vodacom was well prepared on every control required by the policy: the processes and procedures were all set; the roles and responsibilities in case of a disaster were clearly described and documented; and end-to-end tests performed proved that the recovery strategy can recover a site within the recovery time objective.

In our International markets we have improved resilience of the network significantly over the past few years, but all the operations are not fully compliant with the MTX resilience policy yet. Policy compliance will be achieved by March 2017.

Investing in information technology

We provide innovative services and capabilities that are aligned to our customers' needs, and we integrate the latest technology to provide pioneering solutions that are highly flexible and scalable, while driving efficiencies and reducing overall costs.

Several years ago South Africa started the transformation of its customer relationship management (CRM) and billing systems to provide an improved in-store and call centre experience, and to allow for much faster deployment of new products and services.

The new CRM system (internally known as customer 3D) was developed in two phases. The first phase focusing on postpaid and the second phase on hybrid and prepaid customers. Both these builds have been completed, and the migration of customers onto the new CRM and billing platform has started. To date close to 1 million customers have been migrated onto the new platform, with the remaining customers to be migrated over the next 12 to 18 months.

We have also planned the transformation of our International markets' information technology estate, and will continue to roll this out over the following few years.

MyVodacom App

With the increased adoption of smartphones, we introduced more smart services through our website and the MyVodacom app, enriching these channels to improve customer engagement and experience. Our online shop and MyVodacom app allows for increased flexibility as always-connected customer-managed online channels and have been enhanced by "on-device" transaction functionality such as bundle purchases.

Growing M-Pesa in our International markets

M-Pesa (our mobile phone-based money transfer, financing and micro-financing service) continues to grow strongly, with continued demand for the service in our International markets. We have invested in migrating successfully from the legacy M-Pesa platforms to the new 'G2' Vodafone Group Mobile Financial Services Platform. The G2 platform offers improved stability, availability and performance in comparison to the legacy platforms. The DRC has already seamlessly migrated to the new G2 platform, and in the near future we plan to migrate Tanzania and Mozambique.

Technology report continued

Enterprise customers

Through our enterprise technology team, we develop and strengthen our capabilities in rolling out and supporting services both for blue-chip customers and for small and medium enterprises (SMEs). With the provision of broadband services over five access types (LTE, fibre, wireless, satellite and ADSL), the continued rollout of fibre to the home and business, and the launch of OneNet Business in early 2016, we have set the stage to provide SMEs with a truly integrated communications service.

The ongoing expansion of our cloud service offering provides solutions for both large enterprise and SME customers. During this year, we introduced a hosted virtual private cloud solution, delivering an option to customers requiring a dedicated cloud environment.

To further enhance the overall customer experience, we have developed the capabilities necessary to launch electronic billing presentment analytics (eBPA), enabling customers to easily view their billing information, draw reports and analyse their bills.

Cost efficiencies

The technology group continuously focuses on being cost efficient, with a specific focus on managing capital and operating costs relating to energy, leases and rentals, transmission rental costs, and maintenance. Our technology efficiency programme (TEP) delivered on its cost savings objectives, keeping technology operating costs as a percentage of service revenue at 8.6% in South Africa. The programme also achieved capex savings by driving more equipment standardisation, network sharing, and procurement benefits.

South Africa is very active in network sharing with other mobile network operators and third parties. We share approximately 74% of our shareable sites with other network operators and third parties. Our International markets also engage in site sharing to varying degrees.

Health and safety

We value the health and safety of staff, contractors and the public at large. We have implemented strict health and safety policies and practices that are embedded in the day-to-day activities of our staff and contractors; transgression of our health and safety practices results in severe sanctions. All staff must adhere to our Absolute Rules of Safety, and all contractors are bound contractually to adhere to our health and safety standards.

Despite our efforts to keep everyone safe, this year the technology group in South Africa suffered three fatalities in one motor vehicle accident, which claimed the lives of a contractor and two members of the public. Road accidents remain our biggest safety risk, with 68% of all incidents being road-related. During the year we revised our occupational driving standard to focus on daily pre-trip inspections, mandatory driver training, trip planning, live vehicle tracking and monitoring, and the use of fit-for-purpose vehicles.

We have also launched Road Guardian, our improved fleet management solution. The system is now installed in all Vodacom vehicles with some fitted with a full solution consisting of on-board cameras and telematics, and some fitted with telematics only. We have established a monitoring bureau to monitor driver and vehicle behaviour.

Spectrum

Spectrum is a valuable resource, enabling us to offer both voice and data services to our customers. We are strongly committed to investing in infrastructure in South Africa and our International markets as a means of providing broadband data services to the community and ensuring the corresponding contribution towards economic development. Unfortunately without additional spectrum, we will not be able to deliver on the ambitious broadband performance targets set out in the South Africa Broadband Policy (South Africa Connect).

While spectrum re-farming has served us well in the past, we expect to experience incremental difficulty in future, especially given that 2G migration to more spectral-efficient technologies (in this case 3G and 4G), is progressing relatively slowly due to the large Vodacom customer base still on 2G. In comparison to other mobile operators in South Africa, Vodacom still has a spectrum share that is not proportional to its market share. Low-band spectrum for coverage (700/800MHz) and high-band spectrum for capacity (2 600MHz) is required to improve mobile data services, but thus far the Regulator has not progressed in assigning spectrum for mobile use in these bands.

Technology governance

The King Report on Corporate Governance is a ground-breaking code of corporate governance in South Africa issued by the King Committee on Corporate Governance. King III introduced principles and recommendations of IT governance. Vodacom has adopted a technology governance framework that outlines the decision makers, and their accountabilities and responsibilities, as well as the processes, structures and underlying policies, controls and standards that support this framework. Each one of the areas can be linked to the principles and recommendations of King III of 2009.

Vodacom International connectivity

Vodacom's pan-African Network (PAN) provides international connectivity to markets where we provide services, such as voice and data roaming, VPN services, IP transit and SDH services. We have continued to experience substantial growth in demand for data services, and have made significant investments in upgrading our submarine cable capacity and our global Points of Presence (PoP). Our international network spans 27 countries in Africa. A number of countries also offer an in-country network.