GSMA

Driving Digital Transformation of the Economy in South Africa

Opportunities, policy reforms and the role of mobile

November 2024

GSMA
The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events. We invite you to find out more at www.gsma.com
Follow the GSMA on Twitter/X: @GSMA

Through Line Advisors
Through Line Advisors was created in 2022 to bring together a group of expert advisors who – although they come from different fields - are all committed to delivering the highest quality of work for clients. The company includes expertise in economics, finance and strategy across a very wide range of sectors and situations. Everyone who works at Through Line has a single-minded focus on delivering the best possible advice to clients.
Email: info@throughlineadvisors.com
Phone: +44 (0) 203 813 0976

85 Great Portland Street
London W1W 7LT

Authors:
Matthew Harrison-Harvey, Through Line Advisors
Daniel Pate, Through Line Advisors
Gaia Penteriani, Through Line Advisors
Mark Williams, Through Line Advisors
Angela Wamola, Head of Sub-Saharan Africa, GSMA
Caroline Mbugua, HSC, Senior Director, Public Policy and Communications, GSMA
Nomonde Gongxeka-Seopa, Senior Policy Manager, Sub-Saharan Africa, GSMA

Contents

1. Executive Summary

South Africa faces a number of economic and social challenges and has charted a national strategy to support economic growth, economic transformation and poverty reduction. It has identified the digital economy as a key pillar of this national development strategy.

The country has made significant progress in developing the digital economy over recent years. It stands out as being far ahead of most other countries in the region in terms of coverage, adoption and innovation. However, it is falling behind many of its peer group of nations, including the BRICS countries.[1]

Digital Economy

The telecommunications operators are the foundation for the digital economy. Together, they generate around ZAR 200 billion per year in revenue and account for 4-5% of the country's total GDP. They generate 3-4% of the total tax revenues collected by the government and are responsible for about 30 000 jobs. But telecommunications services account for only around one-third of the total digital economy which accounts for 10-15% of total GDP.

Digital plays an even more important role in driving growth in the overall economy. South Africa is a regional hub for investment into new technologies such as cloud computing and artificial intelligence (AI). These technologies are reducing costs and driving productivity growth among South African organisations, including MSMEs that are a critical generators of jobs and wealth.

Digital technologies are having a similar impact on critical sectors of the South African economy such as mining, agriculture, manufacturing and transport.

1 BRICS is a grouping of countries comprising Brazil, Russia, India, China, South Africa, Iran, Egypt, Ethiopia and UAE. In this report, South Africa is benchmarked against the original group of BRICS countries, Brazil, Russia, India and China.

Although the majority of players in the digital economy are from the private sector, government plays an essential role in its future growth. The transition to digital channels for delivering public services is an important driver of digital adoption. Similarly, strengthening the teaching of digital skills at all levels of the education system is essential for the future development of the sector.

The mobile operators are critical players at the heart of the digital economy. They generated ZAR 120 billion in revenue in 2023, 58% of the total telecommunications sector revenue, and invest an average of ZAR 15 billion per year.

On a per capita basis, South African MNOs invest more than operators in other BRICS countries and have achieved almost universal 4G population coverage. However, more investment will be needed to match 5G coverage and rising broadband speeds in other middle-income countries.

Policy Environment

South Africa has a well developed digital policy environment, covering all of the critical aspects of policy that are required to support growth and development of the sector. The National Development Plan (NDP) includes a detailed analysis of the digital sector. More recently, SA Connect, the Presidential Commission on the 4th Industrial Revolution and the Digital Economy Masterplan have all articulated the government's strategy on digital development.

The National Policy on Data and Cloud provide more details on a critical area of digital development while work is underway on refining the government's policy on digital government and digital services.

Strengthening the digital economy

Despite the progress made by South Africa's digital economy, the industry faces some key challenges.

The industry is facing financial pressures arising from the macroeconomic environment and significant costs of meeting obligations imposed on it by policy and regulations. The national strategy for the digital migration and sunsetting of 2G and 3G networks will have major implications for the way in which MNOs are able to access spectrum in future. Uncertainty around this has long-term financial implications and undermines investor confidence in the sector.

The cost of building and operating networks in South Africa remains high, particularly as a result of difficulties in accessing rights of way, the high cost of electricity and the impact of crime on network infrastructure. These all drive up costs which further undermine the financial sustainability of investments.

From the customer perspective, the affordability of devices is a challenge for many, particularly those in low-income households. The cost of these devices is increased by the ad-valorem taxes levied on them when they are imported from overseas. The lack of digital skills among many individuals also acts as a brake on adoption.

Despite the well-developed sector policy environment in South Africa, implementation of government policy and strategy can often lag behind. This creates uncertainty and risk for investors which is adversely affecting sector development. Finally, the sector regulatory framework needs updating to reflect the many developments that have taken place in the market since it was designed. Among other things, it needs to enshrine a balanced and collaborative approach to regulating different types of players in the sector.

It is recommended that the following steps are taken to address these challenges and support investment and growth of South Africa's digital economy.

1. Ensuring that policies and decisions create a sustainable investment environment. They should be based on a consistent approach to the sector, reflecting policy trade-offs and an analysis of the likely impacts.

2. Spectrum policy that promotes investment, including a robust oversight framework to complete the digital migration and a market-led and collaborative approach for sunsetting 2G and 3G networks.

3. Measures to provide more effective deployment, energy supply, and security protection for telecoms networks.

4. Support for digital adoption through revising the tax on imported devices and accelerating digital skills training.

5. Implementation of the Digital Masterplan and other components of the sector policy framework, with a mandate from the President and the Cabinet, and dedicated programme management and resources.

6. Reform of the sector regulatory framework to support growth of the digital economy, including a level playing field and collaborative approach to newer technologies (e.g. Over the Top (OTT) players, low earth orbit (LEO) satellites, AI and cloud computing).

These policy recommendations, if implemented, will accelerate the mobile broadband adoption and close the usage gap among adults by one-third in 2030.

Together, these policy recommendations will prepare South Africa for the future development of the digital economy. It will enhance investment, innovation and growth. It will also promote adoption and usage of digital technologies by South African organisations and individuals.

These measures will promote the overall digital competitiveness of the country and ensure that it is in a position to compete with other middle-income countries around the world.

2. Introduction

2. INTRODUCTION

The African Union Agenda 2063 aspires to achieve an integrated, prosperous, and peaceful Africa, driven by its citizens and recognised as a global powerhouse. This rests on its member countries' commitment to inclusive and sustainable development. It recognises Information and Communications Technologies (ICT) as a key enabler of the broader goal of African nations being better connected and more integrated.

Digital solutions have become a major part of the lives of all South Africans. They present an opportunity for the country to chart a new digitally-driven development path, contributing to South Africa's vision for development premised on resolving the nation's historical 'triple scourge' of poverty, unemployment and inequality.[2] Other countries such as China, India, Malaysia, Kenya, Egypt, Mauritius and many others, have shown that the digital economy is an essential part of a national growth strategy. Many traditional sources of employment may no longer be effective at creating jobs in low and middle-income countries because of automation and the reshoring of global value chains (GVCs). The digital economy offers South Africa a promising pathway to achieve collective prosperity.[3]

The Government of South Africa also recognises that ICT - and the digital economy more broadly – will play a central role in the country's future development. The digital economy is a critical source of comparative advantage for the country. Deeper integration of digital technologies across the economy and society can support the national objectives of economic growth and job creation, addressing the challenges of extremely high levels of inequality.

This report is one of a series published by the GSMA on the digitalisation of African economies.[4] It examines the role of the digital economy in South Africa and explores its role in the country's current and future development. It also examines the mobile industry's role in supporting the digital economy.

The report concludes by focusing on some critical mobile industry policy challenges. If these are not addressed, the industry will not be able to fully support broader and deeper access to digital technologies for all South Africans.

2 Presidential Commission for Fourth Industrial Revolution 2020, page 8.
3 Genesis Analytics. 2021. ICT and Digital Economy Masterplan for South Africa Final draft.
4 GSMA. 2024. Driving digital transformation of African economies.

3. Digital Economy in South Africa and the Role of Mobile

A. OVERVIEW OF THE SOUTH AFRICAN ECONOMY

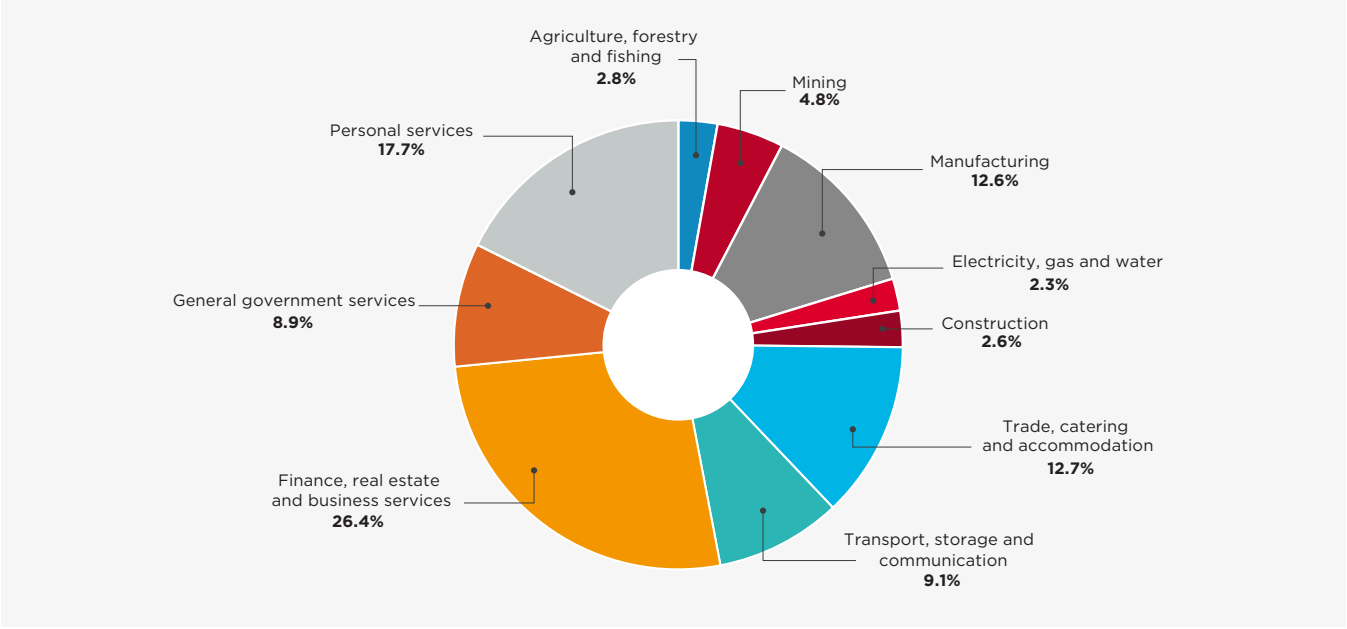
Prior to the first democratic government coming into power in 1994, South Africa's economy was highly concentrated, controlled by large commercial and industrial conglomerates. Since then, successive governments have made concerted efforts to grow the economy, reduce poverty, create new jobs, make the country more competitive and broaden ownership and participation in businesses. Despite these efforts, South Africa has not achieved its long-term growth objectives, partially reflecting lack of policy implementation and inability to address structural issues in the economy.

The government has published several significant policy and strategic initiatives. These include the National Industrial Policy and the Industrial Policy Action Plan (PIAP) published in 2007. The New Growth Path was published in 2010, followed by the NDP in 2012 and initiatives such as Operation Vulindlela structural and economic recovery reforms.[5] These have been the cornerstones of South Africa's long term development strategy for more than a decade. They aim to eradicate poverty, reduce inequality and drive inclusive economic growth by 2030. The NDP and other policies are structured around six pillars that align with the global Sustainable Development Goals (SDGs) and the regional Africa Agenda 2063. They see the country as a rising player within the broader balance of global political and economic power.[6]

Following the direction set by the NDP, the government has maintained its focus on achieving economic transformation and poverty reduction through sustainable economic growth and job creation. The overarching economic strategy has been one of supporting the private sector's growth while also ensuring that the state continues to play an active role in investment, research and development (R&D), job creation and skills.

South Africa's economy has evolved since 1994. Traditionally important sectors, such as mining and agriculture, have declined in relative importance in recent years. They are now small compared with sectors such as finance and business services, but they remain relevant as sources of value-added, jobs and tax revenues (Figure 1).

Figure 1: Sector Contribution to South Africa's Gross Value Added, 2023



Source: StatsSA[7]

5 Operation Vulindlela is a joint initiative of the Presidency and National Treasury to accelerate the implementation of structural reforms and support economic recovery.

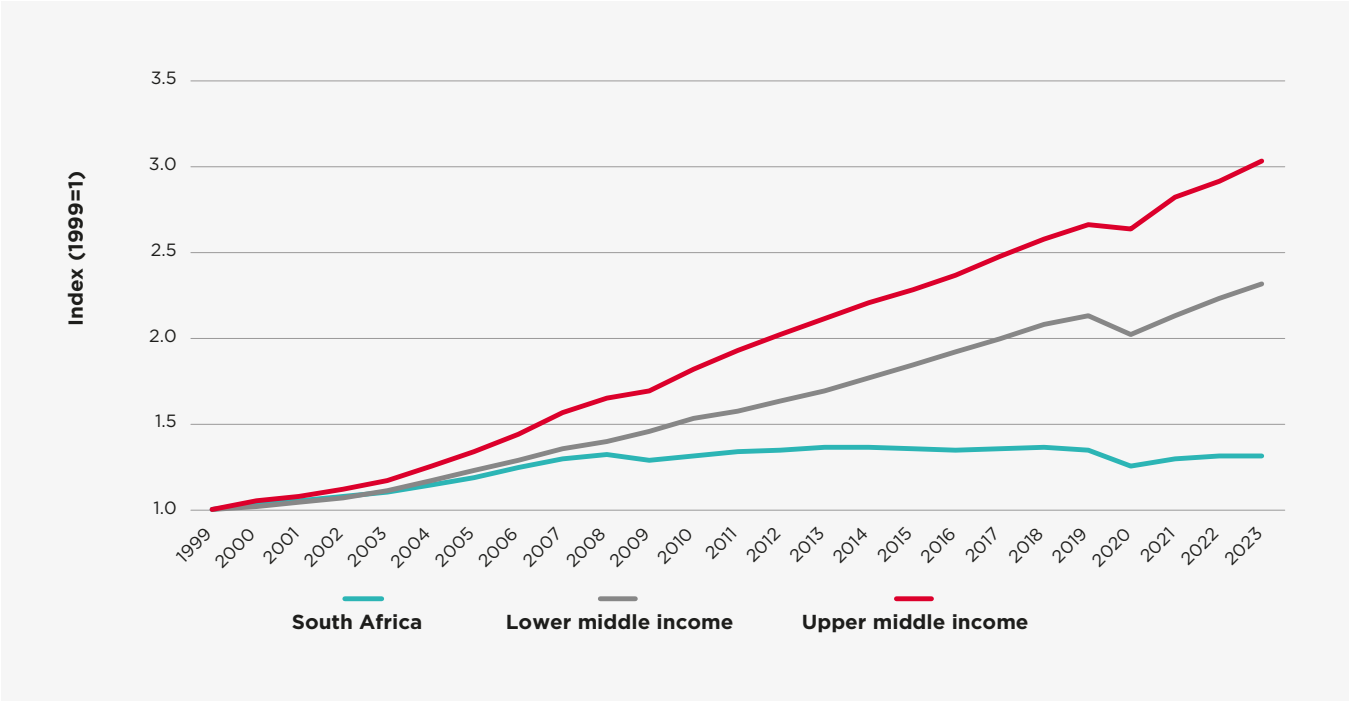
6 National Planning Commission. 15 August 2012. National Development Plan 2030: Our future – make it work.

7 StatsSA. 2024. Gross domestic product Fourth quarter 2023, Table 4.

Despite the reduction in the role of mining in the economy as a whole, commodities remain a significant component of the country's exports. South Africa is a major exporter of gold, platinum, diamonds, iron ore, coal, chromium and manganese. Exports of fuels, metals and minerals have increased significantly over time, accounting for around half of the total gross exports.[8] Mining also provides much needed hard currency, and its contribution to the balance of payments is significant.

GDP per capita in South Africa has grown only slowly over the past 25 years. Real GDP per capita in South Africa grew slowly between 1999 and the global financial crisis in 2008-09. The growth rate was below global averages but the country nevertheless achieved significant progress. In the years since then, real GDP per capita has been stagnant and has even started to decline in recent years (Figure 2).

Figure 2: South Africa GDP per capita, (real terms, index)



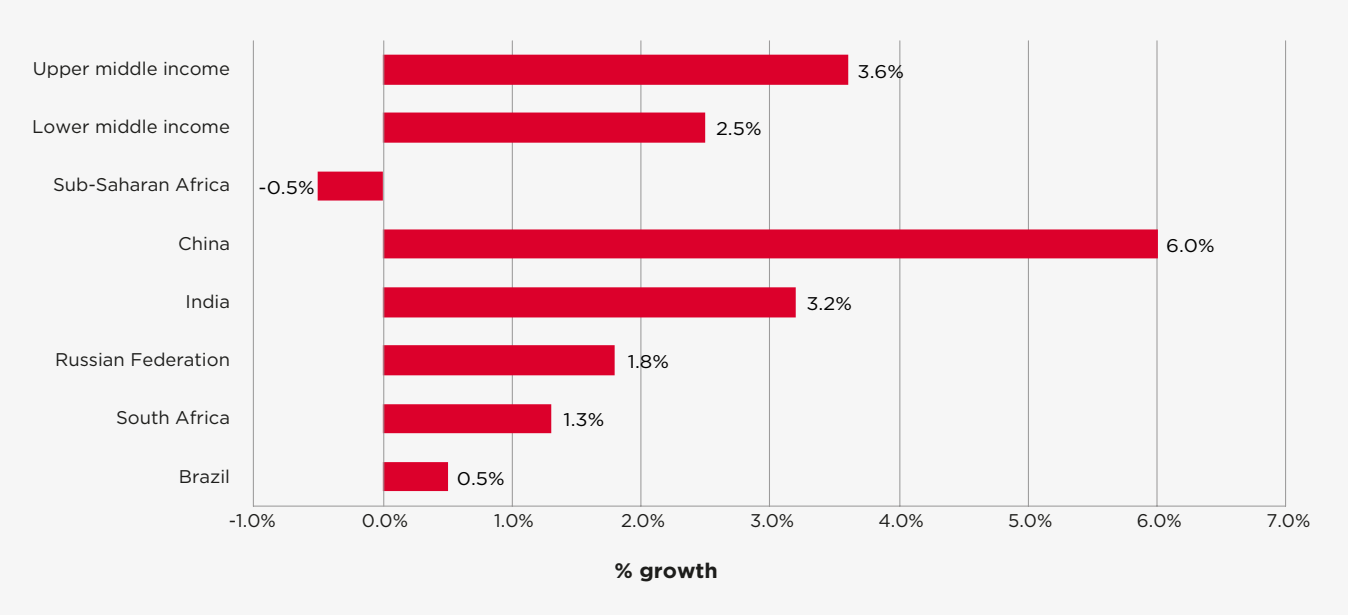
Source: World Bank World Development Indicators

Following the COVID-19 pandemic, South Africa has experienced moderate rates of growth that have returned the economy to its pre-pandemic levels. Employment is now higher than before the pandemic but the rate at which new jobs have been created has not been sufficient to keep up with the growth in the labour force. This has resulted in an increase in the unemployment rate, which stands at 32.9% for the overall population and even higher among young individuals (aged 15-34), at 45.5%.[9] The level of income inequality remains one of the highest in the world.[10]

Despite the recovery from the pandemic, the country faces long-term structural challenges. Low levels of investment, poor performance by state-owned enterprises and low growth over an extended period have resulted in sustained high levels of unemployment and poverty. The country's chronic underperformance is reflected in the low rates of labour productivity growth (Figure 3).

8 World Bank. 2024. Unlocking South Africa's Potential: Leveraging Trade for Inclusive Growth and Resilience, page 2.
9 Data for Q1-2024, Source: StatsSA. 2024. Quarterly Labour Force Survey (QLFS), 1st Quarter 2024.
10 World Bank. South Africa Overview.

Figure 3: Labour productivity growth (GDP per person employed), 2015-21



Source: World Bank[11]

This slow labour productivity growth rate means South Africa has not been able to address some of its fundamental economic challenges. The level of economic output per person employed (i.e. labour productivity) is a fundamental determinant of the overall economic development of the country. In order for countries to grow their economies and address critical social and development challenges such as inequality and poverty, they need to drive increases in labour productivity. Raising the rate of growth of labour productivity is an essential part of the country's national development strategy.

This situation reflects the dual-track economy that is seen in the country. A minority of the population benefits from educational outcomes, employment opportunities and living standards similar to those seen in high-income countries worldwide. This segment of the population typically works in formal companies or other organisations. However, most of the population lives and works in a more informal environment – sometimes referred to as "the township economy". This dual-track economy is also one of the underlying causes of the vast geographical and social disparities in incomes, employment and livelihoods. Most economic activity is concentrated in urban areas of the country while there are very few jobs for people living in rural areas.

A common theme throughout the government's economic strategy documents published since 1994 has been the emphasis on infrastructure. These strategies have highlighted the importance of network industries for increasing productivity, promoting geographical integration and reducing spatial inequalities. Digital infrastructure has played a particularly important role in this overall plan. The growth of electronic communications networks and the extension of broadband services into rural areas has allowed people to become digitally connected, irrespective of where they are located. The adoption of digital services has reduced the cost of doing business and given individuals access to information and learning opportunities which were previously denied to them.

Digitalisation has therefore made an important contribution to the national development strategy in the post-1994 period. Its impact on productivity, job creation and poverty reduction continue to be felt across the country. Looking ahead, this will continue to be the case. The digital economy is likely to become even more important for the country's future economic and social development.

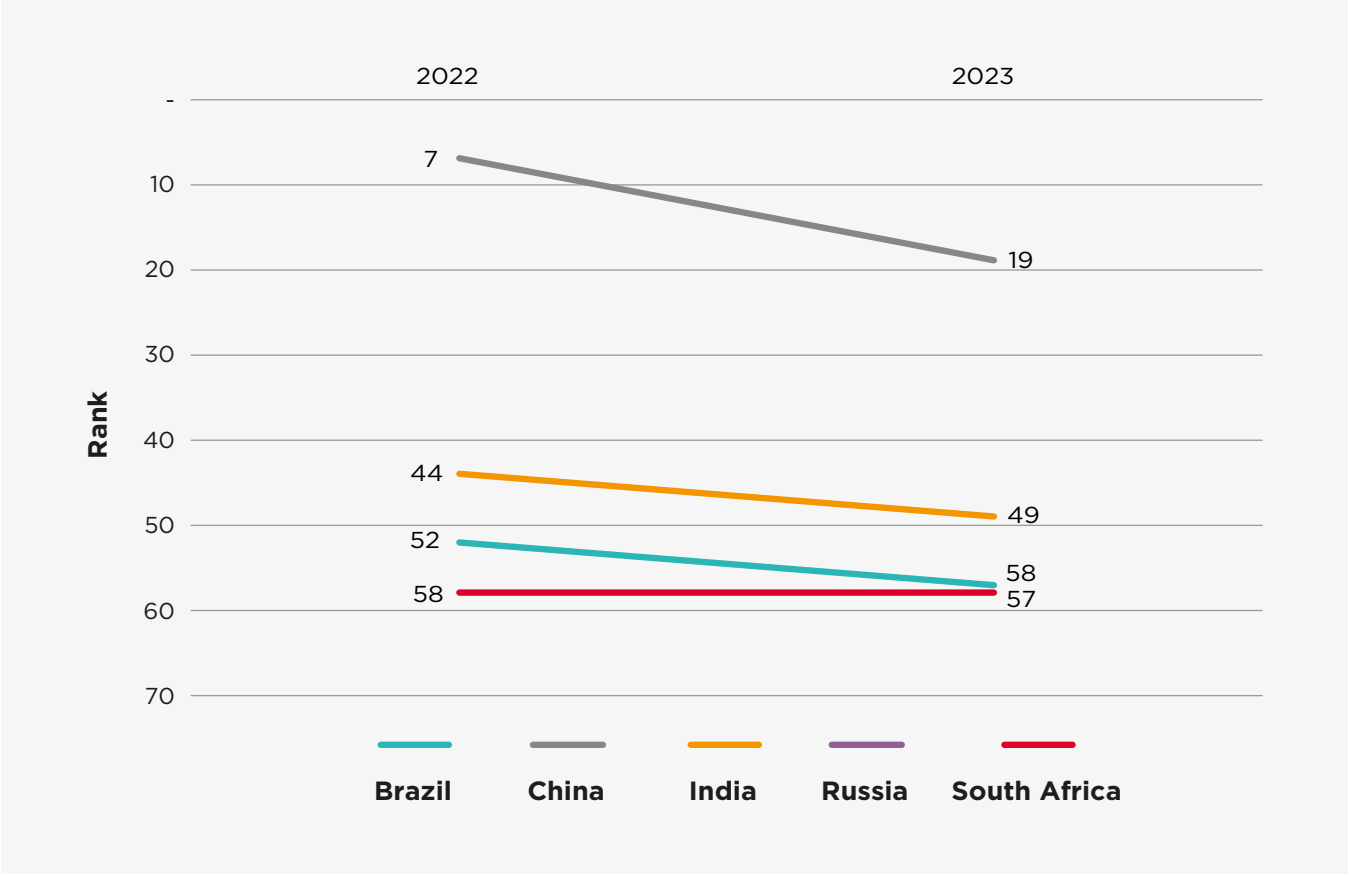
11 World Bank. World Development Indicators.

B. SOUTH AFRICA'S OVERALL DIGITAL COMPETITIVENESS

South Africa has made significant progress in developing the digital economy in recent years. On measures of connectivity, adoption, digital penetration and digital skills, the country stands far ahead of the rest of Sub-Saharan Africa on most measures of digital economy performance. These are discussed in more detail in the sections that follow.

However, its overall digital competitiveness does not compare well to other BRICS countries. Overall digital competitiveness is a measure of how a country is performing on a broad range of metrics reflecting the level of digital development. On such broad measures, South Africa is not performing well compared to BRICS and other middle-income countries. It ranks in the bottom quartile of a list of 64 more advanced countries and at the bottom of the BRICS group of countries, although a recent decline in the ranking of Brazil has placed it just one position above South Africa (Figure 4).

Figure 4: Digital competitiveness ranking of BRICS countries, 2018-23



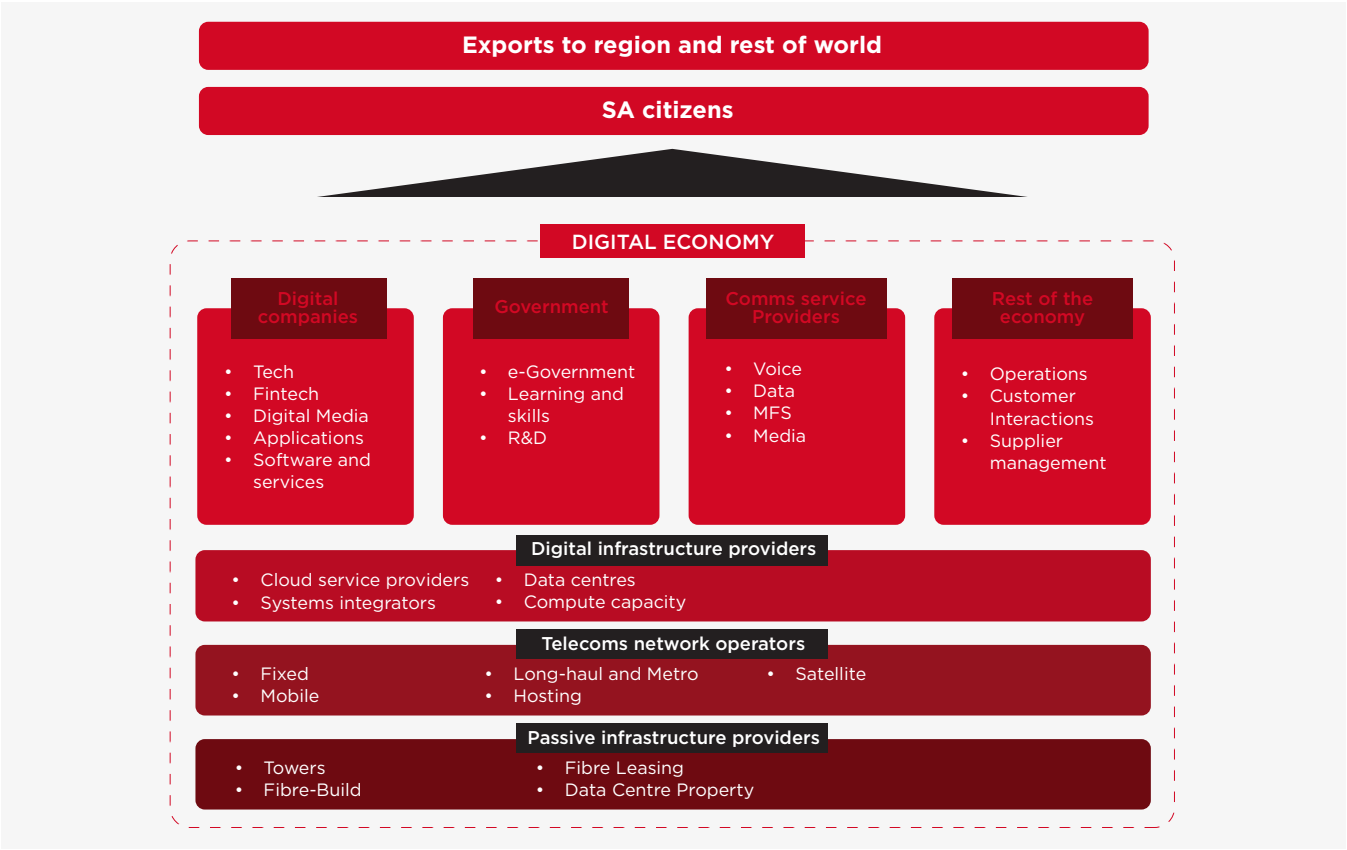
Source: IMD[12]

12 IMD. 2023. World Digital Competitiveness Ranking 2023.

C. THE DIGITAL ECONOMY IN SOUTH AFRICA

The digital economy in South Africa is heterogeneous, ranging from basic infrastructure to advanced technology-based companies. The commercial side of South Africa's digital economy ranges from ICT infrastructure and service providers all the way through to companies that use digital technologies as a primary input into the goods and services that they sell. In addition to the private sector, there are government and other organisations such as universities and research institutions that rely on the digital economy for their activities. There is also a wide range of companies and organisations that use digital technologies as critical inputs in their operations. This ecosystem of companies, national and local governments and other organisations that are directly engaged in the digital economy is illustrated in Figure 5 below.

Figure 5: The digital economy



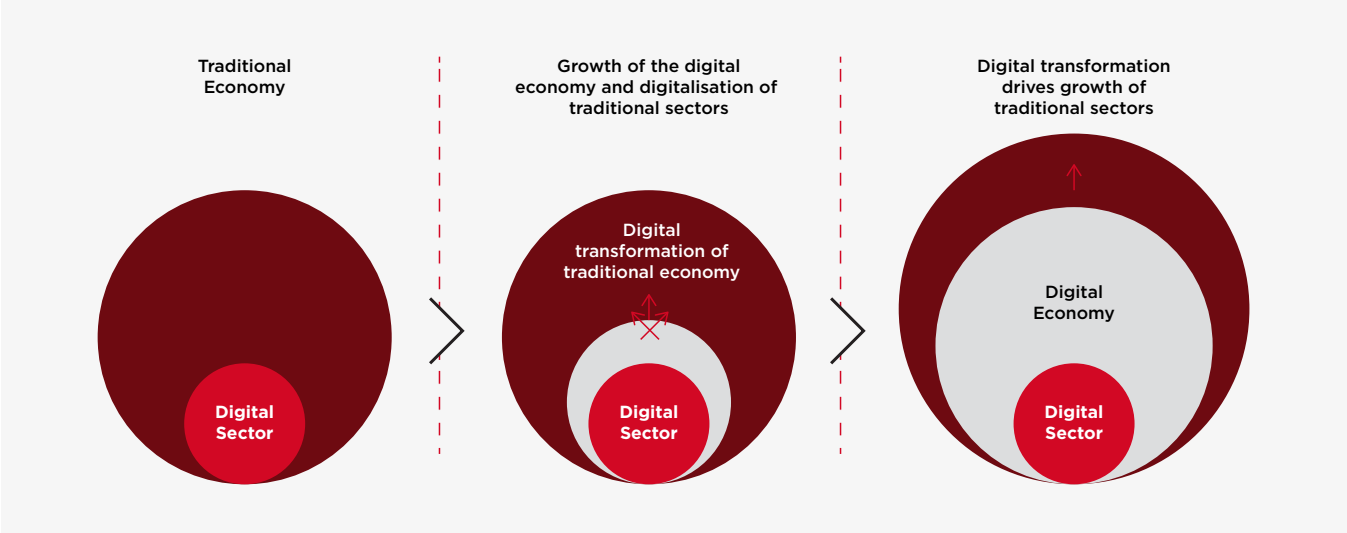
Source: Through Line Advisors

The contribution of the digital economy to the national economy

The digital economy is an important contributor to the country's overall economic output. It is a generator of jobs, a driver of innovation and a contributor to the fiscus. This contribution takes place through multiple channels. Firstly, there is the contribution of companies directly involved in the digital sector, including telecommunications operators and other companies directly involved in the ICT space. The broader digital economy includes companies producing digital goods and services such as tech companies, fintech and digital media companies.

Digitalisation also significantly impacts the traditional economy. It has the potential to create jobs, improve productivity and raise wages in a wide range of organisations, both public and private (Figure 6).

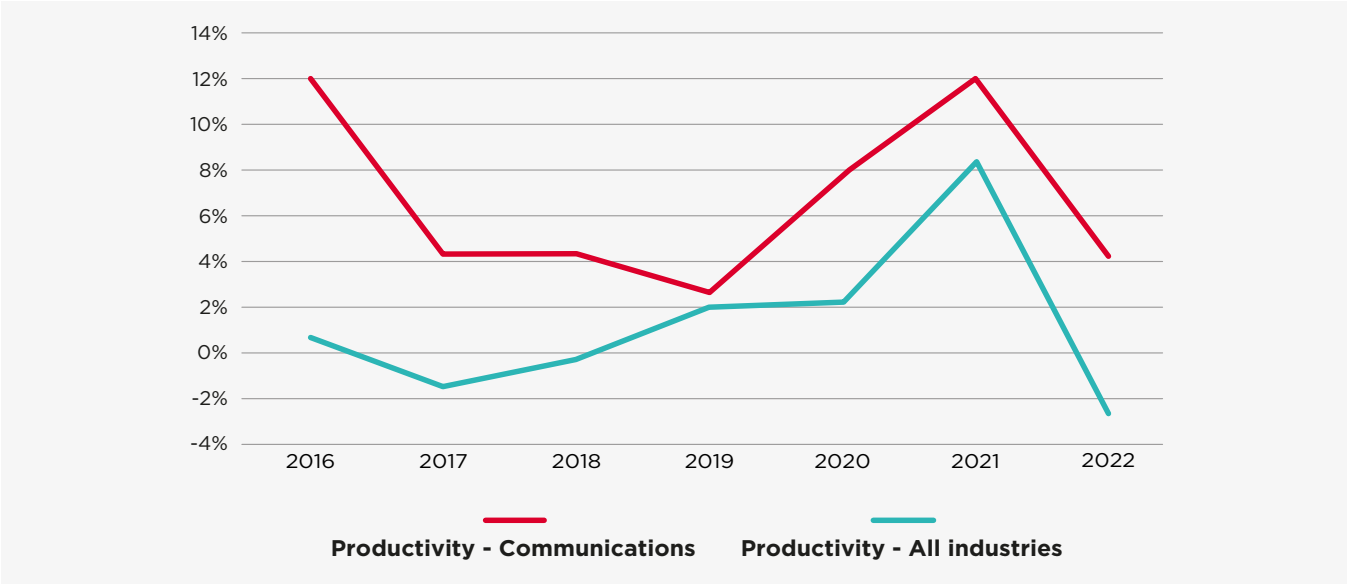
Figure 6: Economic Impact of the digital economy



Source: World Bank[13]

ICT is itself a high productivity sector and this is growing more quickly than the rest of the economy.[14] The productivity of the communications sector in South Africa has consistently grown at a favourable rate in recent years, in contrast to industry overall which has suffered from low average rates of productivity growth (Figure 7).

Figure 7: Productivity growth in communications vs all industries, 2016-2022



Source: Telkom[15]

Mobile electronic communications network and service providers (MNOs) are significant players in the national economy. This is a result of their direct contribution to the country's total GDP. It is also because they indirectly impact on other parts of the economy. They purchase inputs from local suppliers and pay staff salaries which make an additional contribution to the economy. Communications services positively impact the productivity of other sectors which contributes further to the total level of economic activity.

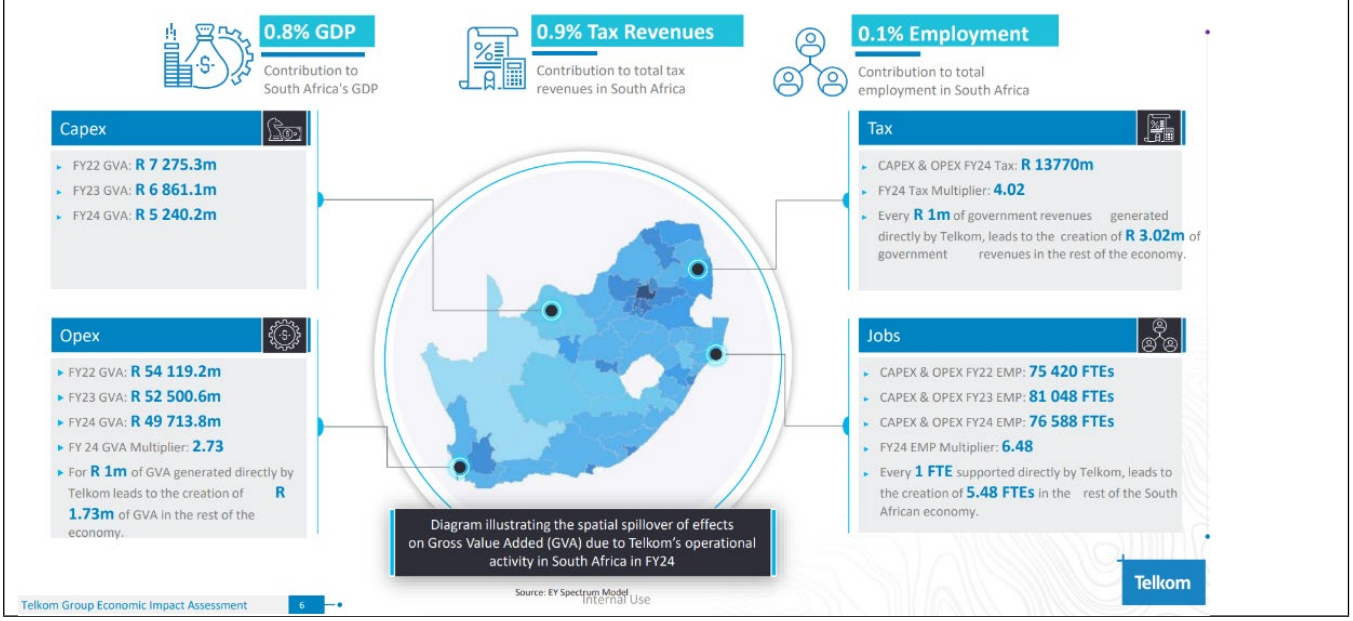
13 World Bank. 2020. Digital Economy for Africa Country Diagnostic Tool and Guidelines for Task Teams.

14 The key role of ICT has long been recognised within South Africa. In 2012, South Africa's 2012 ICT Research, Development and Innovation (RDI) Roadmap noted that "as an industrial sector in its own right, as an enabler of solutions across almost all other domains and through the extensive use of ICT in society, it creates economic and social impact". The following year, a World Bank assessment showed that increased broadband investment of ZAR 865 billion in the subsequent 10 years could create more than 400 000 jobs and add ZAR 130 billion in the GDP of South Africa.

15 Telkom Group. Telkom Group Economic Impact Assessment 2022-2024, 2024, page 4. Data from StatsSA, REMP – Labour (2024).

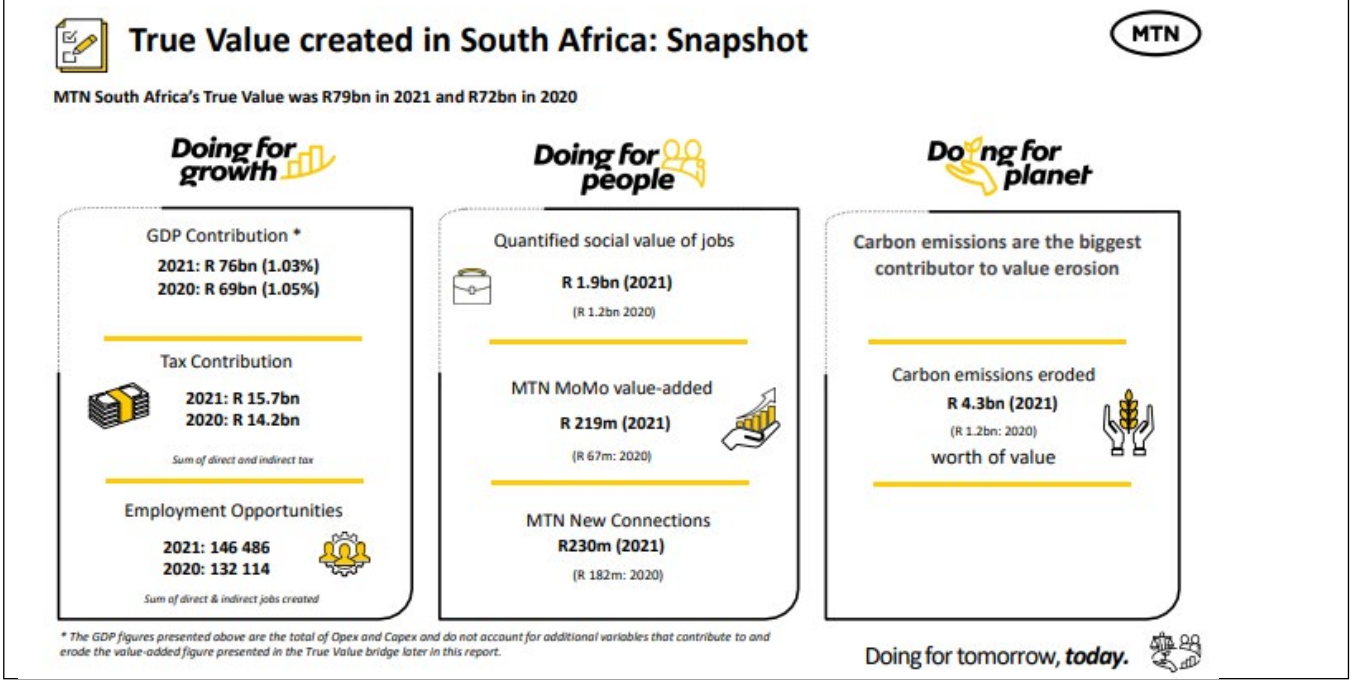
Boxes 1, 2, 3 below show estimates of the contribution that three of the electronic communications service providers – Telkom, MTN, and Vodacom – make to the South African economy.

Box 1: The contribution of the telecoms sector to the South African economy - Telkom



Source: Telkom

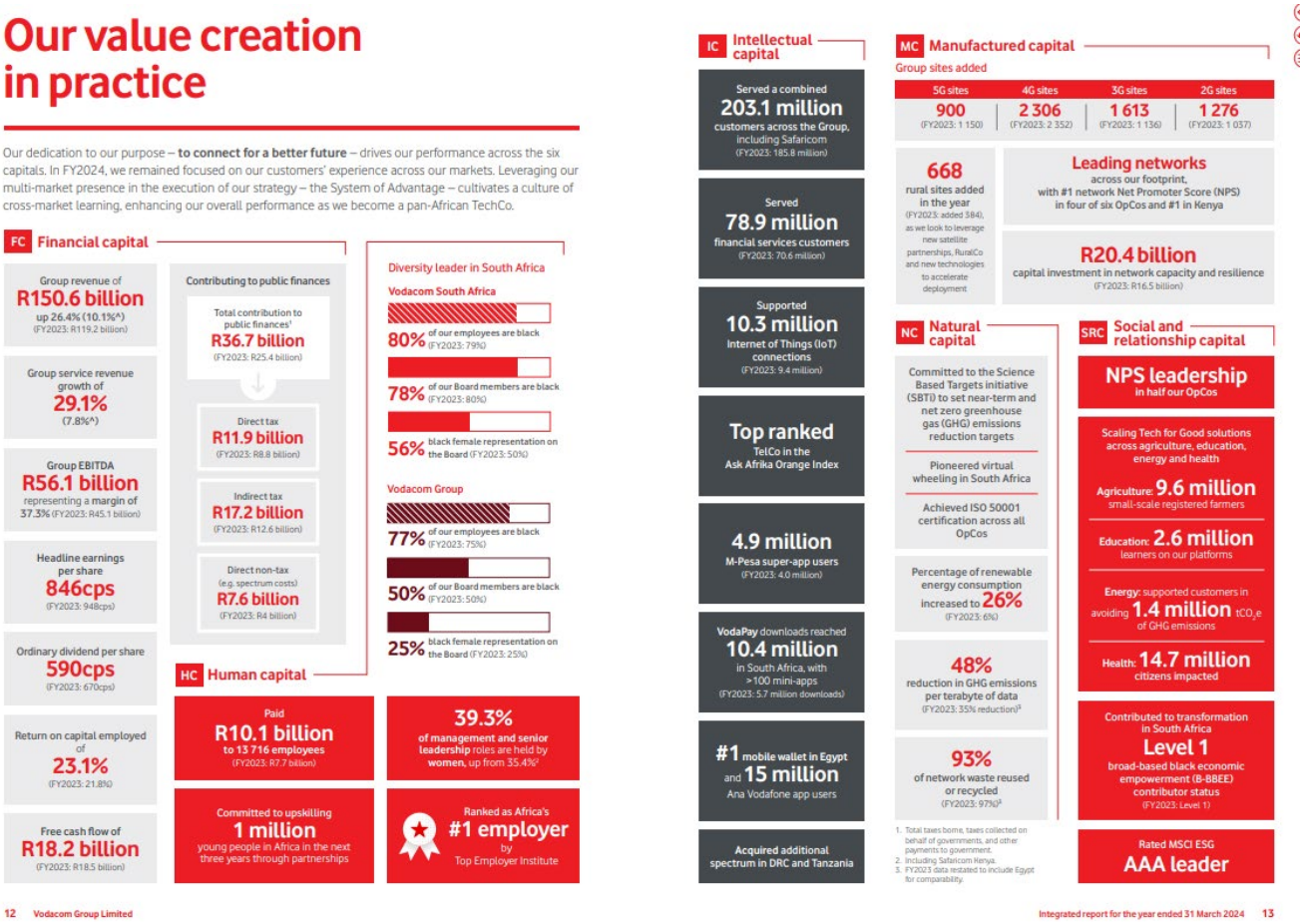
Box 2: The contribution of the telecoms sector to the South African economy - MTN



Source: MTN[16]

16 MTN. MTN South Africa's True Value Assessment, January 2023.

Box 3: The contribution of the telecoms sector to the South African economy - Vodacom



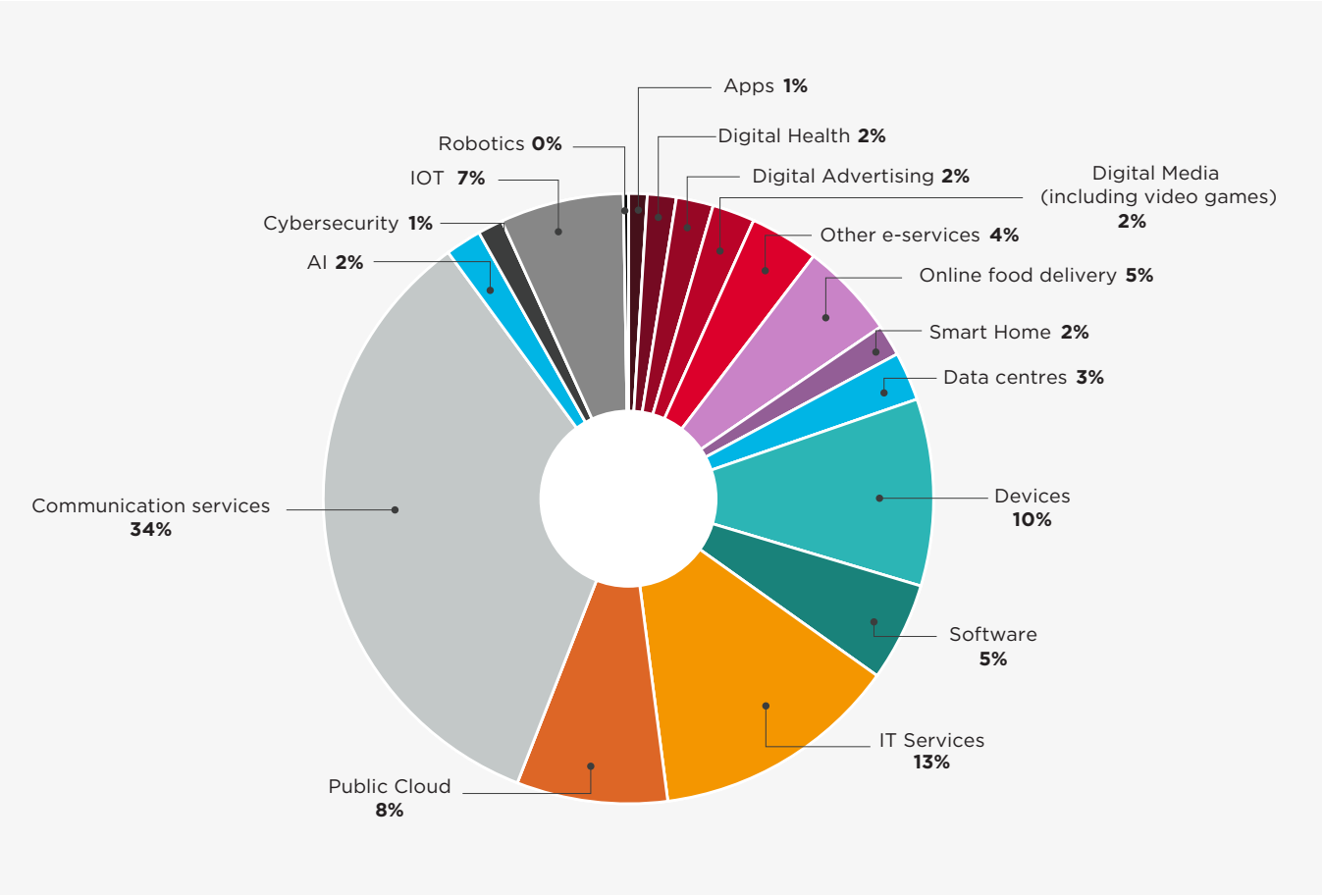
Source: Vodacom Group[17]

Telecommunications operators in South Africa make a significant contribution to the country's GDP. The total revenue generated by telecommunications operators in South Africa was ZAR 208 billion in the 12 months to September 2023.[18] The value added by operators is greater than this because of the indirect contributions through payments to local suppliers and employees. It is estimated that the contribution of the telecommunications sector to South Africa's GDP is ZAR 250 – 330 billion or between 4% and 5% of total GDP.[19] The activities of the operators collectively generate 3-4% of the government's total tax revenues.

The broader digital economy in South Africa is much larger than just the telecommunications operators. The revenue from communication services (i.e. voice and data) as a share of the total revenue generated in the digital economy has been declining over time, although it remains the largest single source of revenue (Figure 8).

17 Vodacom Group Annual Report FY 2024. Note that data is Vodacom Group as a whole, including South Africa.
18 ICASA. 2024. The State of the ICT Sector Report of South Africa.
19 Calculations of value-added provided for Telkom and MTN are used to estimate the total value added by the sector, based on ICASA market data.

Figure 8: Revenue by Market (% of combined revenue), 2024



Source: Statista

The digital economy is a major contributor to the overall national economy. Figure 8 indicates that telecommunications services represent approximately one-third of the total revenue generated by companies operating in the digital economy. This would suggest that the digital economy represents 10-15% of South Africa's total GDP. Other estimates project the size of the overall digital economy to reach 15%-20% of South Africa's total GDP by 2025 and to continue growing over the medium-term.[20]

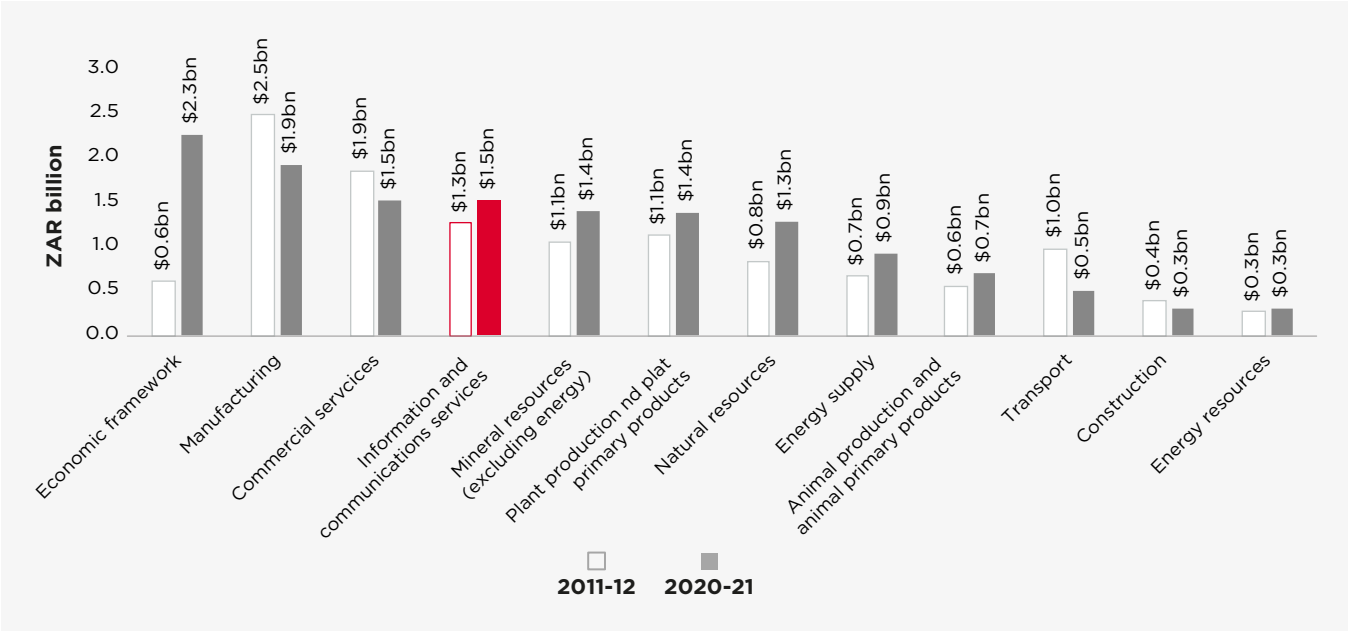
Investment in digital infrastructure and the emergence of new technologies are contributing to the development of the key economic sectors. Adoption of 5G alone is expected to benefit most sectors of the economy, amounting to around 0.37% of GDP in 2030.[21] The wide area coverage enabled by low band 5G will be particularly important in driving the digital transformation of the agricultural and manufacturing sectors through IoT applications such as smart farming solutions, smart factories, smart cities and smart grids.[22] South Africa has some world-leading examples of the deployment and integration of digital technologies into these other sectors.

20 US ITA. 2024. South Africa Digital Economy Overview 2024.
21 GSMA. 2023. Mobile Economy Africa.
22 GSMA. 2023. Socio-Economic Benefits of 5G: The importance of low-band spectrum.

Digital as a driver of innovation

The digital economy is a major source of innovation in South Africa. The sector is a source of R&D and contributes more to R&D expenditure than many other sectors of the economy such as mining, manufacturing and agriculture. This expenditure is growing over time, albeit at a modest pace (Figure 9).

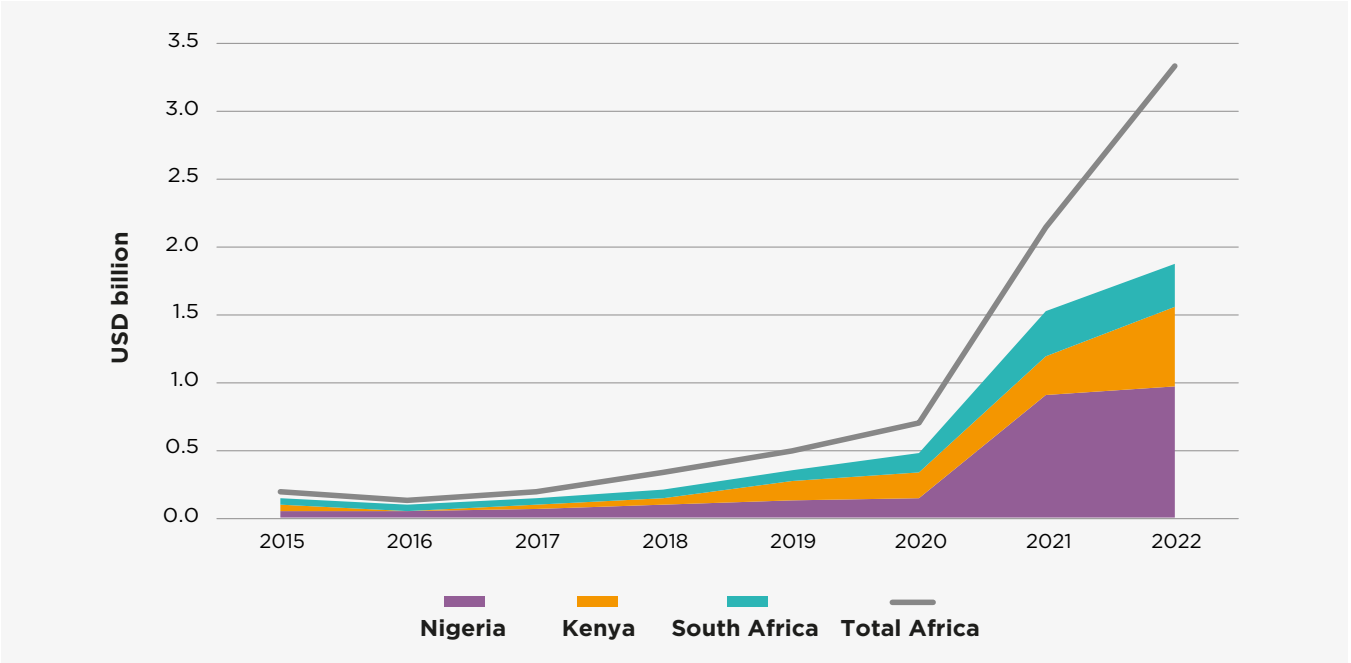
Figure 9: R&D expenditure in South Africa by sector, 2011-12 and 2020-21



Source: NACI[23]

Tech-based business startups are also a key indicator of the dynamism of the digital economy. South Africa was traditionally seen as a one of the regional leaders in this area. The country has historically been in the in the top four countries in Africa for funding of tech startups but the country's leadership position has been challenged in recent years by other countries in the region, particularly Nigeria and Kenya (Figure 10).

Figure 10: Total funding raised by tech startups in Africa, 2015-22



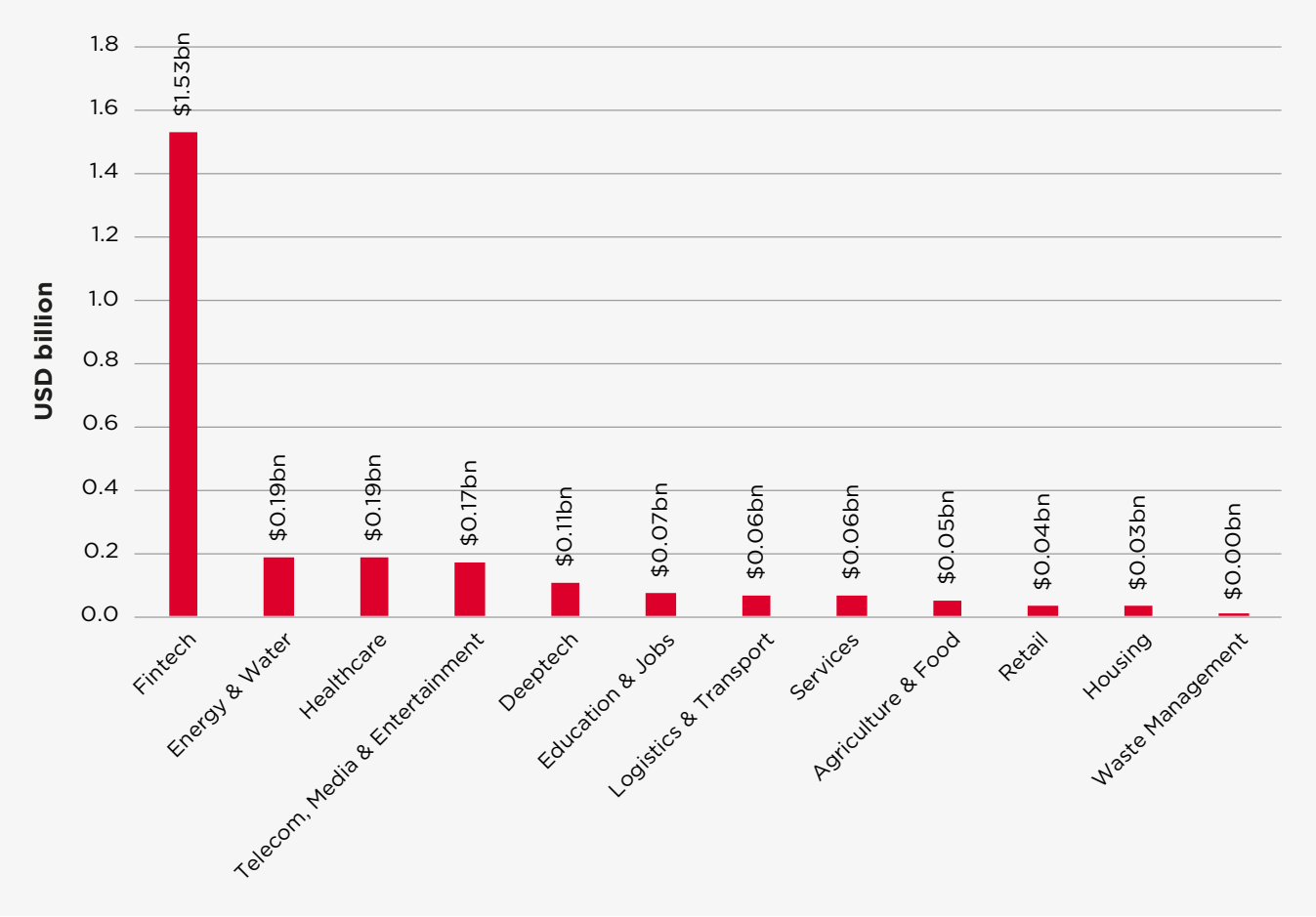
Source: Disrupt Africa

23 NACI. 2023. South African Science, Technology and Innovation Indicators Report 2023.

Across the Africa region, the tech startup field is dominated by fintech. Startup businesses focusing on financial services and related activities using new digital technologies are a major growth area in the region. These fintechs accounted for 51% of the total funding for tech startups in 2022, followed by e-commerce and retail tech businesses areas, accounting for 20% of total funding in the same year.

South Africa has historically been the regional hub for fintech startups and development, accounting for 40% of all fintech revenue in Africa.[24] Since 2019, USD 1.5 billion of funding has been raised by fintech businesses in South Africa, 61% of the total (Figure 11). In South Africa, the sector continues to grow rapidly and it is estimated that annual revenue from fintech companies will reach USD 434 million (approx. ZAR 8.2 billion) by 2024, primarily driven by growth in businesses in digital payments, digital assets and related services.[25]

Figure 11: Total South Africa tech startup funding, 2019-24

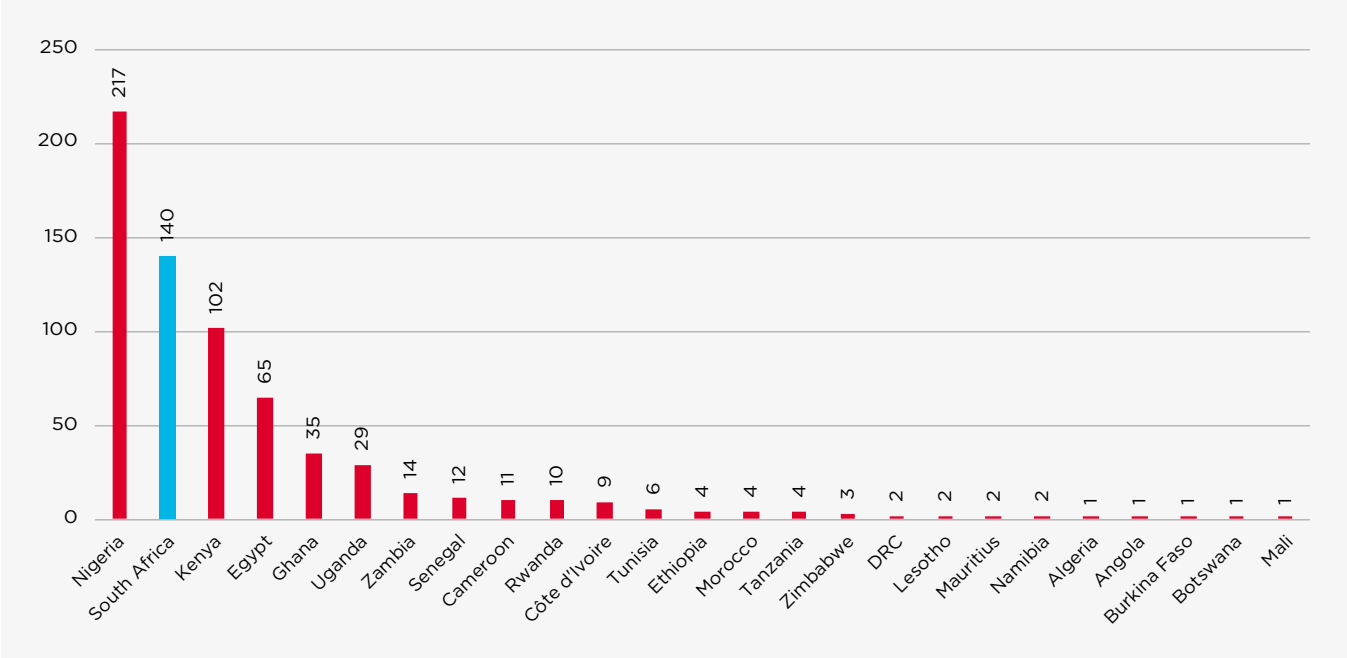


Source: Africa: The Big Deal

South Africa remains one of the top three countries in Africa for fintech startups. In 2023, 21% of the fintech startups in Africa were in South Africa compared with 32% and 15% in Nigeria and Kenya, respectively (Figure 12). In the case of Nigeria, the number of fintechs launching there is partly reflective of the size of the country. However, Kenya has a population of 54 million which is slightly smaller than South Africa and a GDP per capita that is only one-third. The fintech ecosystem there is driven by the entrepreneurial culture and a regulatory environment that supports innovation.

24 BDO. June 2024. Financial Services Technology Unlocked potential Fintech in Africa.
25 Naspers. 2024. Our Digital Horizon, The Economic Opportunity of Digital Platforms in South Africa.

Figure 12: Number of African fintech startups by country, 2023



Source: Disrupt Africa[26]

26 Disrupt Africa. 2024. Finnovating for Africa: Reimagining the African financial services landscape 2023.

Box 4 highlights some leading examples of fintechs in South Africa.

Box 4: Examples of leading fintech investments in South Africa

MTN's fintech services include MoMo payments, small to medium enterprise financial solutions, international remittances, point of sale payments, and funeral cover. During the 1st half of FY2024, fintech service revenue increased by 59.1%.[27]

Telkom provides financial solutions, including Lend, which provides quick and seamless access to funding (ZAR 20 000 to ZAR 5 million) enabling small businesses to grow and upscale, and Telkom Pay mPOS for retail point of sale payments, and device insurance.[28]

Vodacom's VodaPay enables customers to access a range of lending, insurance, and payment products and services alongside purchasing airtime and paying bills through the VodaPay app. In FY2024, registered users grew 79.4% to 5.8 million. Examples of VodaPay and other Vodacom financial services include:

- Airtime Advance facilitated 1.7 billion airtime advances to almost 11 million customers, to the value of ZAR 12.7 billion. Airtime Advance represented 45.7% of total Vodacom prepaid recharges during the year.
- Providing 10 000 merchants with digital and physical payment processing services, more than ZAR 7.2 billion in payments annually.
- Provided VodaSure life cover, funeral cover and various short-term insurances through VodaPay app with ~2.7 million policies downloaded in FY2024.[29]

Yoco [30] provides business tools and financial services that work for entrepreneurs. Over 200 000 small businesses are using Yoco's card machines and online payments with over USD 2 billion processed per year. At least 80% of these small businesses had never accepted card payments before. Yoco employs over 300 people.

Precium[31] is a South African payment platform, purpose-built for enterprises operating in Africa. Founded to tackle the significant fragmentation and failure rates in the local payments industry, Precium helps businesses optimise payment performance and automate financial operations through its modular (API and cloud-based) payment platform. Its clients achieve up to 12 ppt higher success rates, 15%+ higher conversion rates and can reduce costs by 25%.

This innovation in the digital economy is disrupting existing industries and benefitting consumers. Rapid innovation is impacting traditional business models through increased competition around price and service innovation. This has a direct benefit to the economy and to citizens. Research in South Africa indicates that fintech companies offering financial services via digital channels have a wide range of positive impacts on consumers, including increased financial inclusion, increased choice, more innovation and more competition.[32]

27 MTN Group H1 FY24 Results.
28 Information provided by Telkom to authors.
29 Vodacom Group Limited. 2024. Integrated Report for the year ended 31 March 2024, page 84.
30 www.yoco.com
31 www.precium.com
32 Cele, S.K. & Mlitwa, N.W. 2024. Fintechs in South Africa: Impact on regulation, incumbents and consumers. South African Journal of Information Management 26(1)

The government has recognised the important role that digital channels have played in expanding access to financial services. The government has stated that "the advent of digital channels has contributed to widening access to the sector and improving the efficiency of financial service provisioning."[33] By 2021, 97% of adult South Africans were using some form of formal financial service, compared with 64% in 2009.[34] Part of this increased level of financial inclusion is accounted for by the impact of fintech companies competing with the incumbent financial services providers.

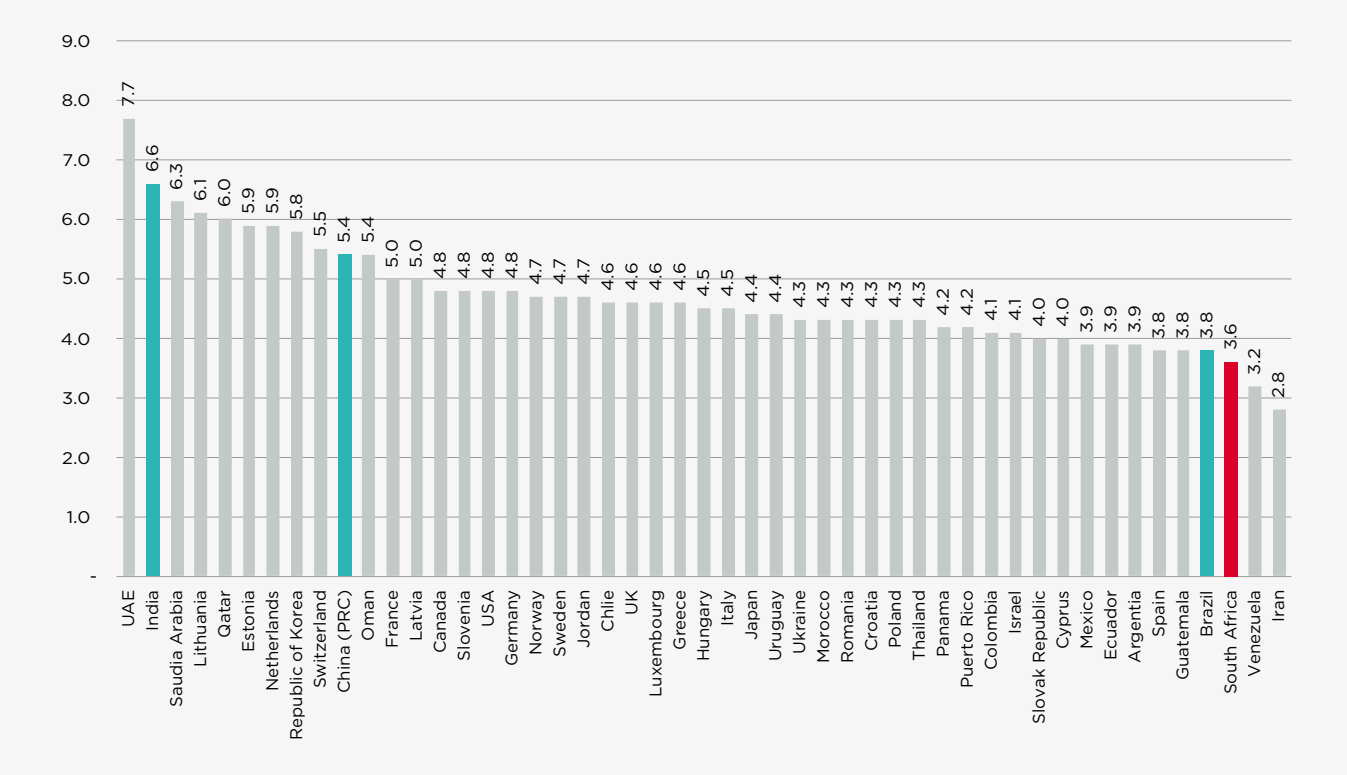
Fintechs in South Africa face several challenges. One of these is trying to enter a financial services market that is already much more mature than in other African countries and in which the traditional players have well-established market positions and their own digital channels. The experience of fintechs in other regions shows that their lower cost base and ability to innovate means that they can build market share in the retail financial services space. However, in South Africa, there may also be opportunities in other segments of the market such as regulatory compliance, forex and other back-end services.

Another challenging area that faces fintechs is financial services regulation. Traditional approaches to regulation can create challenges for fintechs attempting to enter the sector. Many countries worldwide have proactively addressed this by adapting regulatory rules to support the growth of fintechs. The government in South Africa has also made some efforts to create an environment that would facilitate the growth of fintechs. The Financial Sector Conduct Authority (FSCA), for example, has investigated the role of fintech digital platforms and examined the regulatory implications.[35] It has also looked at the role of open-data in encouraging competition in financial services – including by fintechs – and has published a series of recommendations.[36] Efforts in other countries to support the fintech ecosystem have included regulatory sandboxes, adapting licensing requirements to support Micro, Small and Medium Enterprises MSMEs and adapting Know Your Customers (KYC), and grey listing and anti-money laundering rules to fit fintech business models.[37]

Despite the success in some areas of the tech startups, South Africa has struggled to encourage the growth of entrepreneurs more generally. It ranks low compared to other countries in the extent to which the environment supports entrepreneurs (Figure 13). The country is strongest in areas, such as ease of market entry, physical infrastructure and access to commercial and professional infrastructure. However, it needs to perform better in the areas of access to finance and government policy.

33 Financial Services Conduct Authority. 2018. Financial Inclusion Strategy.
34 National Treasury. November 2023. An Inclusive Financial Sector for All, page 11.
35 FSCA. 2021. Fintech Digital Platforms – an investigation into fintech digital platform activity in South Africa and the Regulatory Implications.
36 FSCA. March 2024. Open Finance – FSCA Policy Recommendations.
37 McKinsey & Company. August 2022. Fintech in Africa: The end of the beginning.

Figure 13: National Entrepreneurial Context Index, 2023



Source: Global Entrepreneurship Research Association[38]

*no data available for Russia for the year of the publication

The digital economy is creating more entrepreneurial activity than other sectors. In contrast to other sectors, South Africa is succeeding in creating new businesses in the digital economy. The volume and value of digital tech startups has grown rapidly in recent years with a strong focus on fintech but also including a broad range of activities across different sectors of the economy. This has been achieved despite high barriers to entry in many markets arising from strong incumbent market positions and tight financial regulation. This demonstrates both the role of the digital economy currently and also its potential to drive economic growth and job creation in the country as a whole.

Entrepreneurial activity in the ICT sector is growing. The proportion of entrepreneurial activity taking place in the sector rose from 1.0% in 2015 to 3.2% in 2021. This now puts South Africa above the regional average and among countries with average incomes below USD 20 000 per year but it is below the overall global average.

Digitalisation is also a source of innovation and entrepreneurial activity in other sectors. Importantly, although a much greater proportion of entrepreneurial activity is taking place in other sectors, many of those activities will be part of the wider digital economy. For example, in 2021, 56.7% of entrepreneurial activity took place in the wholesale/retail sector but a significant proportion of this is digitally-enabled. On-line retail startups, for example, are clearly part of the digital economy.

A centre of expertise in new digital technologies

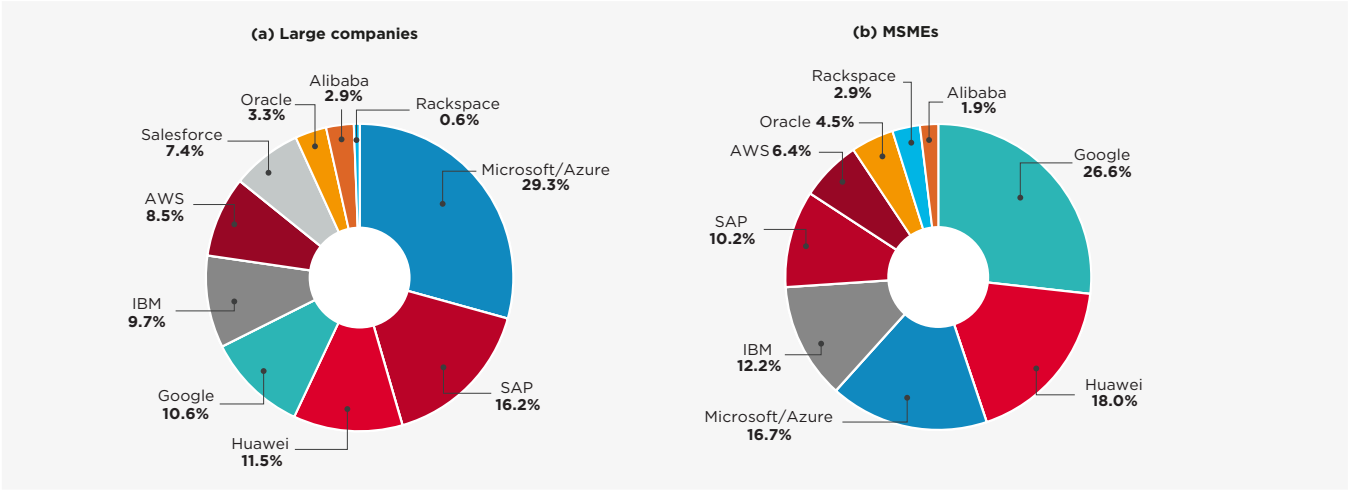
The rapid growth of new areas of digital technology such as cloud services and AI has created opportunities for investment in South Africa. Several of the world's leading tech companies have a significant presence in South Africa and have invested into infrastructure and services. They have also created new jobs and stimulated interest in education and training in areas such as software development, computational science and related engineering fields.

Huawei and Microsoft launched cloud services in the region in 2019. Other market leaders in cloud

38 Global Entrepreneurship Research Association. 2024. GEM 2023/2024 Global Report: 25 Years and Growing.

services include IBM, Oracle and VMWare. Local resellers and managed service providers include Gijima, BCX, Altron, SITA, Vodacom, MTN and Vox. The key players in the data centre market are Teraco (now Digital Reality), Africa Data Centres, Vantage, NTT, Digital Parks, MTN and BCX. Telkom's Cybernest was launched in 2009 and was subsequently merged into BCX (Figure 14).

Figure 14: Spending on cloud services in South Africa, 2023



Source: Intelligent CIO Africa[39]

The result of this investment is rapid adoption of cloud computing services. In a recent survey of companies and other organisations, over 40% of respondents had already moved over half of their workloads, apps and services to the cloud. Of the remaining organisations, nearly half planned to migrate their services fully in the future.[40] This trend is reflected in the rapid growth of the cloud market in South Africa that has taken place over recent years and is expected to continue into the medium-term (Box 5).

Box 5: Case studies of data centre, cloud, hosting and managed services in South Africa

MTN provides ICT converged managed services enterprise solutions in the South African market. Demand for its services is growing, with revenues increasing by 15.9% in FY2023.[41]

Vodacom provides enterprise solutions such as cloud, hosting and managed security. It has a strategic partnership with Microsoft to support large enterprises, SMEs, government and universities in the country. This strategy is supported by 24 owned and leased data centres, with 10 MW of capacity. Growing demand resulted in 78% of enterprise customers using these services with a 30.7% revenue increase in FY2024.[42]

BCX, a subsidiary of the Telkom Group, is one of Africa's largest systems integrators and digital transformation partners providing IoT (integrated with AI technologies), cloud services, Threat Defence Centre data security and data centre hosting for customers in sectors including commerce, fintech, mining, and manufacturing. It has partnerships with 48 technology providers, including its Oracle Platinum Partner status and Gold Status Partnership with Microsoft.

NTT Data opened its Johannesburg 1 Data Centre in October 2022. This provides a capacity of 12MW covering 6 000m^2 of IT space and is part of the company's global data centres programme to meet increasing demand for security, cloud, and business continuity management.

The cloud business model is a driver of digitalisation that will have a sustained positive impact on

39 www.intelligentcio.com
40 Arun Shankar. 2 August 2023. Cloud adoption trends in South Africa.
41 MTN Group. 2024. MTN Group Limited Integrated Report for the year ended 31 December 2023, page 77.
42 Vodacom Group Limited. 2024. Integrated Report for the year ended 31 March 2024, page 74.

the economy of South Africa. The cloud services model provides access to advanced IT services at lower cost than traditional methods, thereby enhancing productivity and supporting innovation. The impact of cloud services for other business is particularly important for MSMEs. It is estimated that cloud adoption could create ZAR 185 billion in value for South African businesses by 2030. Of this, 60% is derived through productivity gains.[43]

Impact of digitalisation on mining

Mining remains an important sector of South Africa's economy. It makes up 4.8% of total value-added and is a major driver of jobs, tax revenue and exports. Increasing the performance of the mining industry will therefore have a significant impact on the overall economy.[44]

Digital technologies can be used throughout the production process to improve the productivity and safety of mines. At one end, the application of advanced mapping and sensing technologies can improve the identification and evaluation of deposits. They are applied throughout the extraction process and also further downstream in areas such as transport logistics, safety and health. In addition to the physical processes of mineral extraction, digital technologies can also be applied to monitor environmental impacts within the mines and in surrounding areas.

There are many examples of practical applications of digital technologies in the mining industry that can have positive impacts on both business performance and human welfare. Networks of Internet of Things (IoT) devices can be used within mines to improve safety through monitoring air quality and tracking structural stability. Outside of the mines themselves, such networks can be deployed to monitor environmental impacts such as water and air quality.[45]

The advantage of digital technologies in mining operations has been seen globally and advancement

43 AWS, Access Partnership. November 2023. Economic impact of cloud adoption for SMMEs, including startups, in South Africa.
44 McKinsey & Co. 2015. How digital innovation can improve mining productivity.
45 Moshood Onifade et al. August 2023. Challenges and applications of digital technology in the mineral industry; Resources Policy Volume 85, Part B.

in this area has begun to be built into explicit company goals. PWC's 2022 Global CEO survey reported that 49% of top executives at global mining and metals companies included automation and digitalization goals in their long-term strategy.[46]

As part of its Digital Acceleration Index research, BCG found that mining companies that successfully digitalised experienced significant gains in productivity and safety, and reductions in cost. Metal production increased by 3-5%, asset lives increased 8-10% and fuel costs reduced by 5-10%. Large improvements were seen in emissions which reduced 15-30%, overhead cost which reduced by approx. 30% and injuries, which reduced by 5-12%. Large improvements were also seen in procurement, contract costs, role filling and other areas.[47]

One major benefit from digitalization comes from the ability to automate tasks, including those that are dangerous for people to undertake. Robots can handle toxic substances more safely than humans or they can be programmed to perform tasks that may harm workers such as blasting, digging, welding and painting. Autonomous machines can be used to explore dangerous areas and remove employees from dangerous working conditions,[48] as well as handling more mundane tasks such as transportation. Major mining operators have been implementing autonomous machines in various contexts. For instance, BHP has implemented autonomous trucks across its various operations, as well as beginning to use autonomous drilling.[49] Rio Tinto has also been implementing autonomous haul trucks, as well as the world's first fully autonomous water trucks. Vale has begun using autonomous excavators and various other forms of autonomous equipment.[50]

Another major use of digitalisation is for predictive maintenance. Mining equipment is expensive, and equipment downtime can be costly for operations. Predicting faults before they become severe can extend the life of assets as well as preventing costly equipment downtime. In one example, the international gold miner Barrick applies IoT linked sensors and equipment across its mines to monitor its equipment. It stated that "A single early fault detection for one piece of equipment alone saved the company US$600,000."[51] Rio Tinto has also implemented similar systems in many of its mining operations.

The importance of the mining industry in South Africa means that companies have used digital technologies across a wide range of their operations to increase productivity, reduce leakage and monitor environmental impacts (Box 6).

46 PWC Canada. Digital Transformation in the Mining Industry.
47 BCG. Racing Toward a Digital Future in Metals and Mining.
48 Identec Solutions. Mine Technology: Unlocking the Power for Increasing Miner Safety.
49 www.bhp.com
50 Tawanda Zvarivadza, et. al. 7 May 2024. On the impact of Industrial Internet of Things (IIoT) - mining sector perspectives, International Journal of Mining, Reclamation and Environment, pages 20-21.
51 Aveva Group Plc. 2021. Barrick Gold: Turning data into gold.

Box 6: Digital technologies in the South African mining industry

MTN Smart Mining

MTN, in partnership with Huawei, provides advanced 5G solution to ensure guaranteed connectivity within mines and plant areas, including Minetec Smart Mining, Canyon Coal's Phalanndwa Colliery, Nkwe Platinum and South Africa Zijin Platinum. MTN is working with partners to deploy applications including PDS (proximity detection system), vehicle detection, tracking system and wireless video surveillance.[52]

Telkom (BCX) enterprise solutions with Assore mining

BCX's collaboration with Assore, a mining company, on a five-year digital transformation strategy focused on cloud infrastructure. BCX facilitated the migration of Assore's critical applications to Oracle Cloud Infrastructure, resulting in improved scalability, enhanced performance, and reduced capital expenditure on hardware.

Vodacom (IoT.nxt) coal supply chain automation system with Eskom

Eskom awarded a tender, earlier this year, to install IoT.nxt's system for tracking coal movement from mines to Eskom power stations (via conveyor belts directly to power plants, coal delivered via rail, and coal delivered using trucks). It allowed the operator to detect deviations from the planned routes and other related problems, thereby improving efficiency and performance.[53]

Impact of digitalisation on trade in digitally-delivered services

Trade in services is a key area of economic growth for many countries although South Africa has not performed as well in this area as other countries. Globally, trade in services accounts for 50% of the total value-added by trade and many such service exports are delivered digitally. South Africa has lagged behind the global rate of growth in trade in services, with the value of its trade as a share of GDP declining from 8.5% in 2011 to 5.2% in 2021.[54]

However, the rate of growth in South Africa's trade in digitally delivered services has exceeded that of many other countries. Global trade in digitally delivered services grew by an average rate of 8.1% per year between 2005 and 2022 – faster than trade in goods and other (non-digitally delivered) services. By 2022, digitally delivered services represented 54% of total global services exports.[55] In 2022, digitally delivered service exports from South Africa were worth almost USD 6 billion, approximately 60% higher than in 2015 and close to 20% of the total for the whole of Africa.[56]

Adoption of new technologies is an important enabler of growth in trade in both goods and services. Promoting the growth of export industries requires a mix of policies that complement a country's natural comparative advantages. These include the development of skills and training, investing in trade infrastructure and logistics services, improved governance and better regulation. ICT is becoming increasingly integral to all these efforts. Exporting even basic commodities requires connectivity through the production and supply chain.

52 MTN Business article "The new world of mining".
53 MyBroadband. IoT.nxt's big deal to give Eskom coal thieves a nasty surprise.
54 World Bank. 2024. Unlocking South Africa's Potential: Leveraging Trade for Inclusive Growth and Resilience.
55 World Bank, World Trade Organisation. 2023. Trade in Services for Development.
56 WTO, IMF. 2023. Digital Trade for Development.

As exports become more complex and higher value, the cross-border supply chains that drive demand for them are made up of networks of companies working closely together. In order for this process to operate effectively, more advanced ICT services are required so that data can flow in a more integrated way between entities in the supply chain. By improving the quality and availability of ICT services, South Africa can continue to enhance its participation in these supply chains and thereby grow the value of its exports.[57]

There are a range of different policies that can be implemented to support growth in digitally-enabled trade. These include development of ICT infrastructure, support to innovation and business startups and skills development. On the regulatory side, issues such as business registration, competition policy, intellectual property protection and data protection all have an impact on the development of digital trade. Regulation of cross border data flows needs to be carefully considered and localisation requirements set to the minimum necessary to achieve essential policy objectives in ways that minimise restrictions to trade. The overall economic impact of this could be significant.[58]

Impact of digitalisation on agriculture

Agriculture is an important sector in South Africa, contributing 2.8%[59] to GDP, but involving 16.3% of households[60] and providing 5.6% of all employment.[61] The South African agricultural industry is the most developed and diversified in Africa, however there is still room for significant advances in digitalisation and technology uptake.

Digitalisation can support further diversification of food crop production, as well as improving agricultural productivity. Both of these can be enhanced through information and training tools real time information on weather patterns and precision agriculture delivered with digital tools. Recent progress allows information to be delivered to farmers more effectively using technologies such as drones, data analytics and high-speed communications. This gives farmers access to valuable information in real time which can enhance decision-making and improve agricultural performance. Aerobotics is an example of a company that provides data analytics and machine learning to process aerial imagery from drones and satellites, providing real-time insights on crop performance, pests, plant health and irrigation levels. Their experience indicates that crop yields can be improved by up to 20% over 5 years.[62]

Impact of digitalisation on manufacturing

Manufacturing continues to represent a significant portion of South Africa's total economy. It currently makes up 13% of total GDP, down from 19% in 2000.[63] The long-term downward trend in the contribution of manufacturing to the economy has reversed in the past 3 years with a small growth in its share. The history of a strong manufacturing sector in South Africa and the role of digital technologies in creating new products and improving production process suggests that digitally enabled manufacturing could be a source of future growth for the country.

South African firms are benefitting from Industry 4.0 technologies by adopting advanced digital technologies, such as cloud computing, 3D-printing, big data analytics and AI. Factory automation with cellular IoT technology optimizes manufacturing processes with increased efficiency, fewer human errors, increased reliability and safety and reduced wastage and downtime. Expanded manufacturing capabilities can lead to greater integration into GVCs and further increases in outputs,

57 World Bank. 2020. World Development Report 2020, Figure O.4.
58 WTO, IMF. 2023. Digital Trade for Development.
59 StatsSA. 2024. Gross domestic product Fourth quarter 2023, Table 4.
60 Statista. 2023. Share of households involved in agricultural activities in South Africa in 2022, by province.
61 StatsSA. 2024. Quartely Labour Force Survey Q1 2024.
62 www.aerobotics.com
63 StatsSA. 2024. Gross Domestic Product Fourth Quarter 2023. World Bank World Development Indicators.

reduced concentration in products and markets and enhanced links to specialised markets.[64] Across a wide range of sectors, implementing Industry 4.0 technologies has been shown to achieve 30-50% reductions in machine downtime, 10-30% increases in throughput, 15-30% improvements in labour productivity and an 85% improvement in the accuracy of forecasting.[65] The application of IoT devices in the manufacturing context alone could increase manufacturing productivity by 10-25% and value added by 20%.[66]

One example of this is the joint award by the CSIR and the Department of Science and Technology (DST) to develop an advanced 3D printer for metal components for the commercial aerospace manufacturing sector. The system can also be used to produce parts for the power generation, automotive tooling, defence and manufacturing sectors. It can achieve production speeds of up to 10 times faster than those currently available from commercial laser melting machines.[67] Another example is NTT Data, which provides end-to-end Business Integration solutions to South African pharmaceutical manufacturing companies, providing monitoring and reporting together with pro-active maintenance and fault resolution.[68]

Impact of digitalisation on transport and logistics

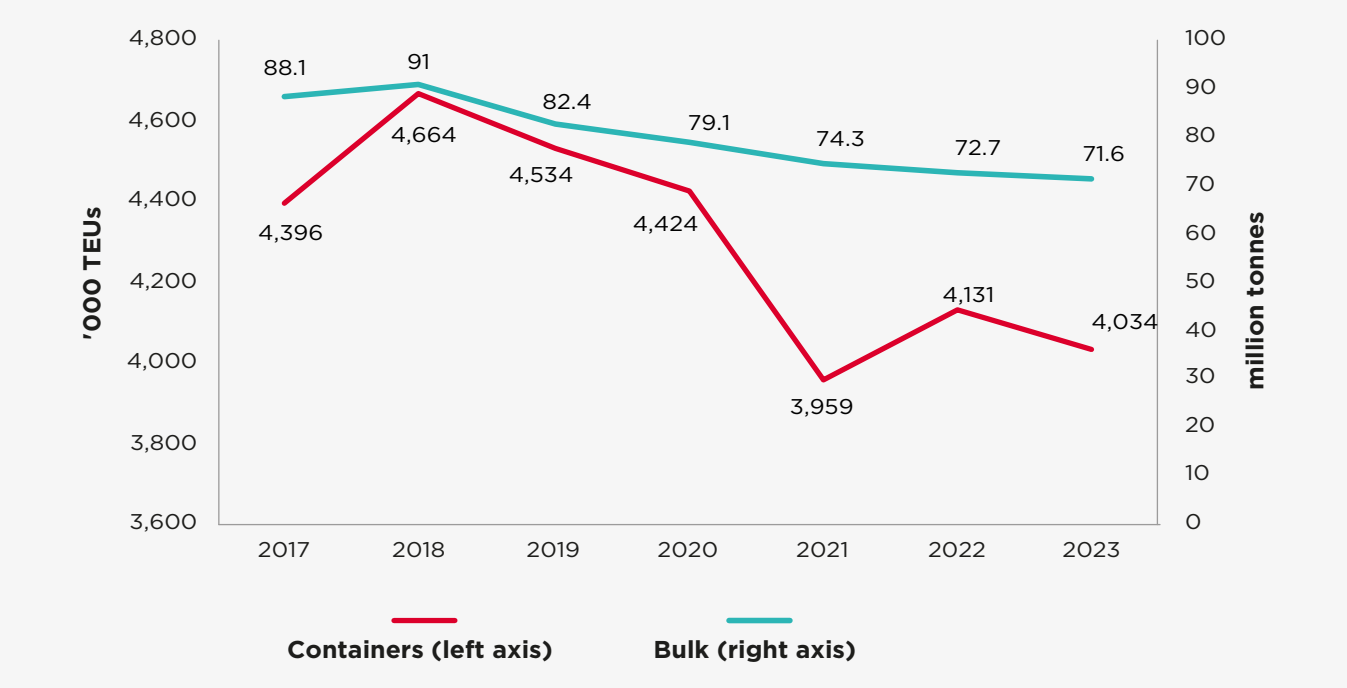
Trade in goods will be a key part of potential future economic growth in South Africa. The establishment of the African Continental Free Trade Area (AfCFTA) will be a driver of growth in the region as a whole and for South Africa. South African ports are essential gateways for goods flowing in and out of the country and the wider SADC region. The performance of the country's transport and logistics networks, including the ports, are therefore a key factor in the extent to which trade will contribute to the country's growth and development.

South Africa has eight commercial seaports whhich are controlled by the National Ports Authority, a division of Transnet. The Port of Durban handles around 60% of total container traffic and serves the SADC region, as well as South Africa. The Port of Cape Town ranks second in the country in terms of container volumes and handles the majority of the country's fruit exports.[69] Other ports such as Ngqura, Saldanha and Port Elizabeth handle large amounts of bulk cargo and vehicles.

The country has experienced significant problems in port performance in recent years. There has been a long-term decline in the volume of containers handled by them as well as recent problems associated with specific events such as bad weather. This has resulted in South Africa falling in world rankings of container port performance. In 2022, Durban was ranked 341st out of 348 ports in the world and Cape Town was ranked 344th. These fell further in 2024 to 399 and 405, respectively. Notably, in 2024, Cape Town was the worst performing port in the entire global performance index.[70]

64 World Bank. 2020. World Development report 2020.
65 McKinsey & Co. Capturing the True Value of Industry Four Point Zero.
66 European Parliament Member's Research Service. September 2015. Industry 4.0: Digitalisation for Productivity and Growth.
67 CSIR. Project Aeroswift helps unlock the growth potential of additive manufacturing in South Africa.
68 Information provided by NTT Data.
69 Transnet. 2024. Port Statistics 2023; United States Department of Agriculture Foreign Agriculture Service, Port challenges cause ships and export opportunities to pass South Africa.
70 World Bank Group. 2024. The Container Port Performance Index 2023.

Figure 15: Transnet cargo volumes, 2017-23



Source: Transnet[71]

The economic impact of this decline in performance is very significant. The backlog of containers waiting to leave ports results in the spoilage of agricultural products which imposes costs on South African businesses. During the 2021-22 season, for example, delays at the Port of Cape Town cost the South African fruit industry an estimated ZAR 2.5 billion. This is illustrative of a much wider problem that affects any businesses exporting or importing products that are time-sensitive.

Improving the performance of South African ports will require a large-scale investment programme and performance improvement. Digital technologies are a critical component of this programme. These are far-reaching and will support a complete transformation in the way that ports function. They include, robotics, process automation, decision-making automation and process monitoring.

Process automation allows port operators to integrate pricing, schedules, bookings, and provides visibility to stakeholders in real-time. The Internet of Things (IoT) is also changing how ports operate significantly. They allow goods to be tracked and monitored on a global basis. They also interface with the port automation process to further improve performance. An example of this is "geofencing" which involves setting virtual geographic boundaries around port facilities. When automatic ship tracking or RFID identifiers in containers pass through one of these boundaries, it triggers a notification that terminal operators and cargo owners can use to plan their operations and improve efficiency.

Impact of digitalisation on MSMEs

MSMEs are an important part of South Africa economy. There are about 4 million businesses in total that fall into this category and, together, they generate a total estimated turnover of ZAR 5.29 trillion. Of this, ZAR 3 trillion (56%) is contributed by formal MSMEs and 2.3 trillion (44%) is contributed by informal businesses. MSMEs are concentrated in and around towns and cities and a large majority of the revenue generated by them is in urban and semi-urban areas. Businesses based in rural areas account for only around 5% of the total revenue generated by MSMEs, nationwide.[72]

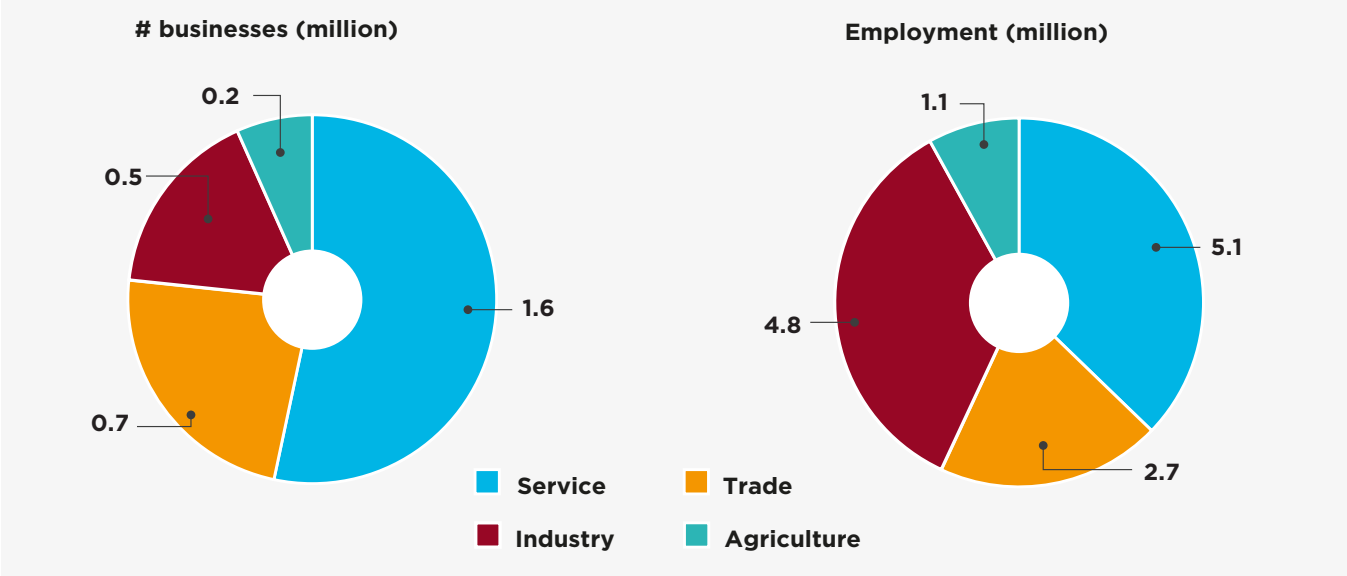
71 Transnet Port Terminals. 2023. Reinvent for Growth.

72 Finmark Trust. 2024. FinScope MSME Survey South Africa 2024, page 9.

MSMEs are a major source of employment for South Africans. They employ approximately 13.4 million people[73], around 80% of the total workforce in South Africa. Many of these jobs are permanent, even in informal businesses. It is estimated that 36% of informal businesses create permanent employment for others.[74]

MSMEs and the jobs associated with them are concentrated in the services and trade sectors. Only 7% of the businesses and 8% of the jobs are in agriculture.

Figure 16: MSME composition by sector, 2024



Source: Finmark Trust

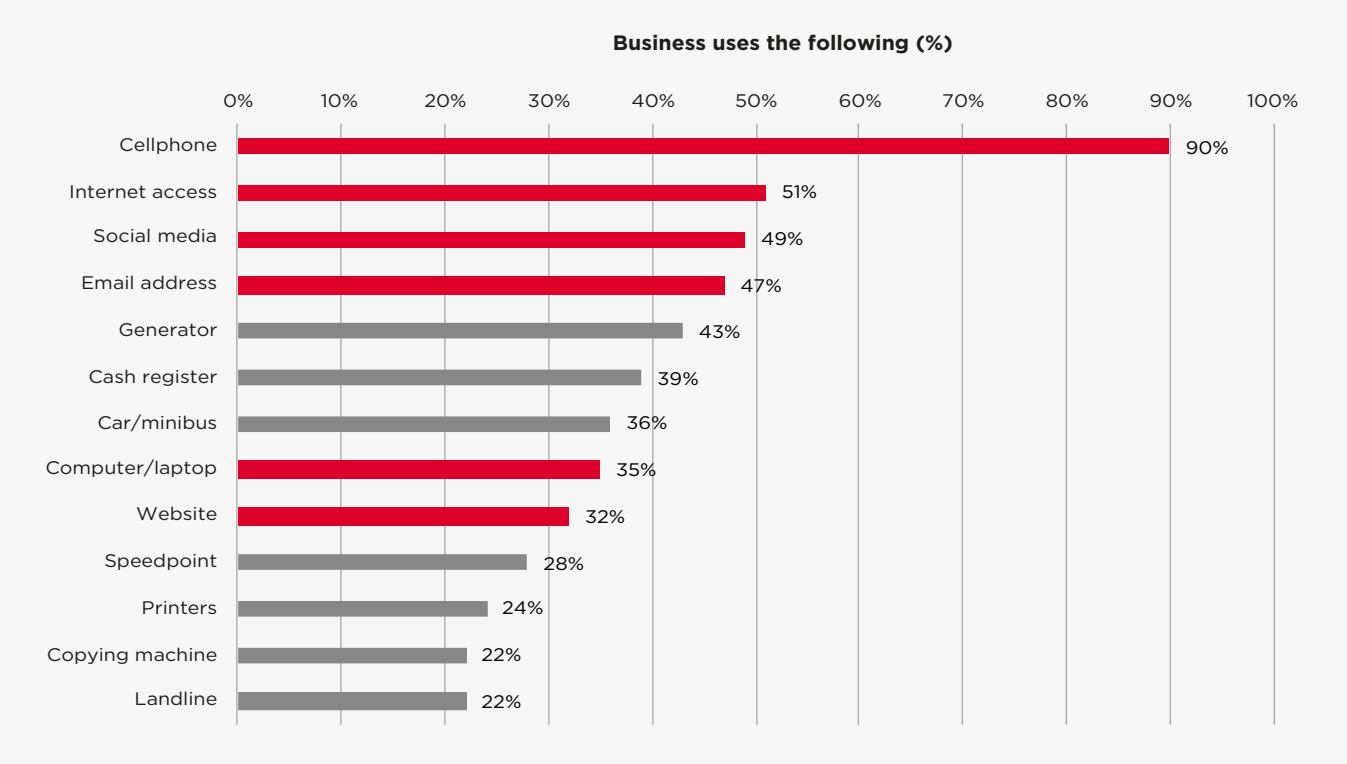
Although MSME owners typically want to expand their businesses, they face many challenges. The key differences between those that have been able to scale up vs those that have not is the knowledge about how to do it, and the resources and skills needed to expand their geographical footprint. The barriers to formalisation are primarily the perception of limited benefits compared with the costs of doing so. Conversely, when owners of small businesses conclude that the benefits of formalisation outweigh the costs, they have an incentive to change the status of their business. Survey evidence from South Africa indicates that informal businesses would consider registration with the government if it allowed them to grow through getting more customers (53% of respondents), benefiting from government incentives (26%), being able to borrow money (24%) and doing business with larger companies (24%).

Access to finance for the business is one key challenge to growth. A survey of MSMEs found that 86% of MSMEs are informal and, of these, 79% have never borrowed any money and only 2% of informal businesses had borrowed money for their businesses in the past 12 months.[75,76] They typically do not have any form of business insurance and their status as informal businesses makes it difficult to access customers via traditional distribution channels.

Many MSMEs in South Africa already use digital technologies for some aspects of their business. Surveys indicate that around half of them report using email, internet and social media as part of their business and 26% of them use computers to keep financial records (Figure 17).

73 This includes full-time, part-time and seasonal employment.
74 IFC. 2020. The MSME Voice Growing South Africa's Small Business Sector, page 26.
75 The IFC estimated in 2020 that there was a USD 30 billion gap between the supply and demand for MSME financing in South Africa.
76 IFC. 2020. The MSME Voice Growing South Africa's Small Business Sector, page 10.

Figure 17: Proportion of South African MSMEs using different types of technology



Source: Finmark Trust

The provision of financial and business support services via digital channels is one way in which MSMEs can be supported to grow and to evolve into formal businesses. Currently, cash is still the predominant mechanism for making and receiving payments among MSMEs - 94% of them use it in their businesses. However, digital financial services are well established, even among very small businesses, with 79% using them on a regular basis, an increase of 19% since 2020. Similarly, the use of digital media by MSMEs is also increasing, rising from 35% in 2020 to 55% in 2024.[77]

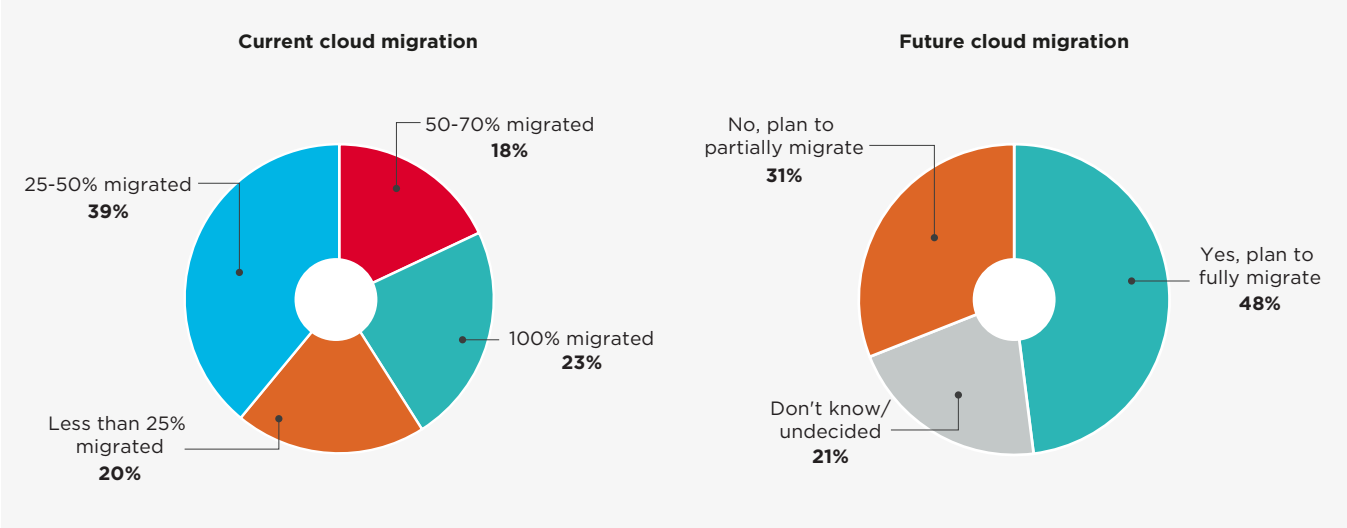
More advanced digital services could have further positive impacts on MSMEs. Cloud services, for example, allow businesses to reduce the costs of IT and switch from a capex-based model to a pay-as-you-go model. This reduces costs, particularly for small businesses. It also increases productivity because these MSMEs would get access to advanced software and computing resources which they would not otherwise be able to afford. Cloud migration reduces average IT spend per user by 27.4% compared with IT infrastructure that is maintained on the premises. MSMEs are also able to access tools, resources and ways of collaborating which they would never be able to afford on a standalone basis. This allows them to accelerate product development and allow geographically distributed teams.

Businesses are aware of the potential impact of cloud services on their business performance. As a result, South African MSMEs are adopting cloud services at a rapid rate. Demand is increasing at an annual rate of 27% and is expected to reach ZAR 79.7 billion by 2027.[78]

77 Finmark Trust. 2024. FinScope MSME Survey South Africa 2024, page 36.

78 AWS & Access Partnership. 2023. Economic impact of cloud adoption for SMMEs, including startups, in South Africa, page 10.

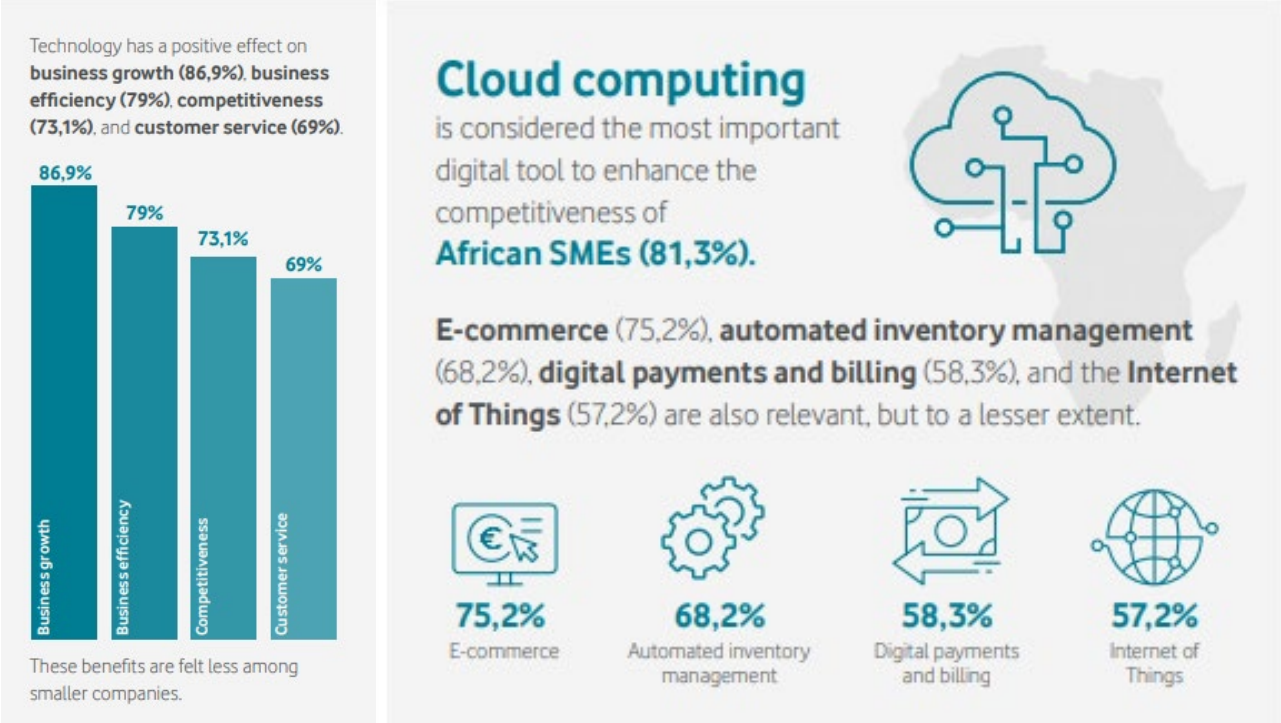
Figure 18: Current and future cloud migration among organisations in South Africa, 2023



Source: Intelligent CIO Africa

A survey by Vodacom found cloud computing is considered the most important digital tool for African SMEs. This was followed by e-commerce, automated inventory management and digital payments and billing. A very high proportion of SMEs found that new technologies have a positive impact on their growth, efficiency, competitiveness and customer service (Figure 19).

Figure 19: SME survey responses



Source: Vodacom Group[79]

South African mobile operators are playing an active role in promoting the use of digital technologies by MSMEs. They are partnering with them to help them utilise digital services and to grow their businesses (Box 7).

79 Vodacom Group. 2024. Levelling the SME playing field: Enabling success and scale through technology.

Box 7: MSME digital development programmes

Telkom's Yep online market provides small businesses with a free storefront, enabling over 400 000 businesses to establish an online footprint and reach more customers. Yep helps small businesses boost their visibility and engage effectively with their audience. It also offers a complimentary online health check to assess digital performance and identify areas for growth.

Vodacom's V-Hub is a free advice platform that entrepreneurs can use to grow their small businesses. This online resource portal was designed in collaboration with industry experts to provide actionable advice that helps MSMEs.

- Vodacom Business customers can request free one-on-one advice, over the phone, from a local specialist. These specialists have expertise from IT decision-making to tech set-up and troubleshooting.
- Any SME owner can access the V-Hub digital Knowledge Centre via Vodacom's website. The Knowledge Centre is broken up into various topic categories, including financial and business tips, as well as advice around cybersecurity and data analytics best practices. Across these categories, the platform houses various helpful articles, videos and webinars.[80]

The Data and Cloud Policy published by the government has provided a clear indication that the government recognises this as an important driver of growth in the sector. This has been reinforced by government statements about new technologies.[81] South Africa is not alone in this. Other countries, including those in the BRICS group, are seeking to take leadership in this area.[82]

Digital government

South Africa has been a leader in the design and implementation of e-government. The Presidential Commission 4IR report recommended prioritising the digitalisation of government and public services and this has been implemented through the National E-Government Strategy and Roadmap 2030 (Table 1).[83]

80 Information provided by Telkom and Vodacom.
81 DCDT. 7 October 2024. Speech by the Minister Solly Malatsi (MP), at the Southern Africa Telecommunication Networks and Applications Conference in Mpumalanga Province.
82 See for example, the G20 Ministerial Declaration: 13 September 2024.
83 Department of Telecommunications and Postal Services. 2017. National e-Government Strategy and Roadmap.

Table 1: Examples of e-government initiatives in South Africa

Example	Summary
E-Government Portal	The National e-Government Portal currently allows access to 134 e-Services ranging from applications for ID and passport, tax filings, education applications and results, social welfare benefits, driving license applications, and company registrations.
Taxation **Social welfare payments**	This has resulted in efficiency improvements and increased access to services. For example: • The South African Revenue Service (SARS) reports that 89.4% of taxpayers used digital services and 77.9% of total value of taxpayer payments was made through electronic payments in Tax Year 2023.[84] • The South African Social Security Agency (SASSA) introduced a digitally administered Covid-19 SRD Grant to benefit more than 8.5 million people between May 2020 to March 2023.[85]
Healthcare	South Africa's public digital health platform provides health administrators, managers, workers, and patients with a unified system managing data repositories, data analytics, and communication services. MomConnect is a free interactive SMS- and WhatsApp-based messaging platform, integrated with the National Health Information System, providing pregnant women with information throughout the pregnancy stages and providing important data to the health system staff. Almost 5 million mothers utilising public antenatal services have registered on the MomConnect platform since its launch in 2014.[86] During the Covid-19 pandemic, Vodacom partnered with the Department of Health to accelerate vaccine roll-out through mVacciNation, a technology platform that manages vaccination appointments and stock readiness.[87]
Smart Cities & Municipalities	In June 2024, MTN Business announced that it had secured a project from the National Treasury regarding the implementation of smart infrastructure for water and energy systems across 257 municipalities. NTT Data have partnered with the City of Cape Town on IoT solutions, including: • Transportation - by deploying its IoT solutions at minibus taxi ranks to monitor passenger numbers and behaviour, cut down on crime, and optimise traffic flow through the facilities and on the city streets. • Energy & water consumption monitor provides early warning and alert management on consumption levels.[88]
Distribution of vouchers/ payments	The Department of Agriculture, Land Reform and Rural Development partnered with Mezzanine to distribute 52 900 vouchers, valued at ZAR 744 million during FY24.

South Africa's progress has been recognised in international rankings. South Africa has improved its ranking In the United Nations e-Government Index (EGDI) of 2024 from 65 in 2022 to 40 in 2024, out of 193 countries, and is now part of the very high EGDI group.[89]

The global experience of e-government design and implementation provides insights that can show the extent to which the delivery of public service could be improved in South Africa through the use of digital technologies. It also provides examples of different models of implementation that could inform how South Africa moves forward in this area. Box 8 summarises one such experience from India, which is now recognised by international organisations such as G20 and ITU as influential digital programme for other countries.

84 SARS. 2023. Tax Statistics 2023 Highlights.
85 SASSA. 2023. Annual Report 2022/23 Foreword by the Minister, pages 8-9.
86 Department of Health (www.health.gov.za/momconnect)
87 London Evening Standard. 13 August 2021. The digital infrastructure which has supported nine million Covid-19 vaccinations in South Africa.
88 Information provided by NTT Data.
89 United Nations Department of Economic and Social Affairs. 2024. E-Government Survey 2024 Accelerating Digital Transformation for Sustainable Development.

Box 8: Digital India and Digital Public Infrastructure[90]

India has had some notable achievements in driving increased digital adoption and deployment of e-government infrastructure through its Digital India strategy and Digital Public Infrastructure programme since 2015.

The Digital India strategy launched by Prime Minister Modi, who recently stated that "we have not just seen telecom as a means of connectivity but as a medium of equity and opportunity. "The approach has four pillars:

- Cost of devices should be low
- Digital connectivity should reach every corner of the country
- Data should be accessible to everyone
- Digital first

This has been implemented through a coordinated Digital India strategy and Digital Public Infrastructure programme, including the following achievements to date:

Mobile telecoms adoption	• 1.2 billion mobile phone users, 950 million internet users. • Almost every district is connected to 5G services, and is the second largest 5G market in the world. • Data costs have come down significantly to ground 12 cents per GB with average consumption of 30 GB per month.

Infrastructure – Spectrum & National Broadband Mission	• Department of Telecommunications (DoT) published the National Frequency Allocation Plan 2022 to provide new frequency bands for 5G services for Digital India, followed by the 5G spectrum auction in April 2022.
	• The Telecommunications Regulatory Authority (TRAI) issued 6G spectrum allocation frequency recommendations in 2023 and in 2024 it made recommendations to the DoT on infrastructure sharing and spectrum policy to support the Digital India objectives.
	• The National Broadband Mission (NBM) was established under the DoT with the objective to provide broadband for all villages, increasing connectivity from 50% in 2020 to 93% by March 2023.
	• The key initiatives under the NBM include:
	  • Reforms to Right of Way (RoW) policies in 2016, 2021, and 2022 and In-building Access By Laws 2022 across States, including fees.
	  • A single platform for applying RoW permissions was launched in 2022 across 36 States and Central Government Ministries.[91]
	  • A national telecommunications network map and planning platform.

Device manufacturing	• Since 2014, there has been an increase from 2 to over 200 in the number of mobile device manufacturing units in India. • Reliance Jio has a featurephone priced at USD 12.
Digital identity	• "Aadhaar" provides an online-based digital identity which had reached 1.3 billion people by September 2023. • There are an average of 10 million eKYC transactions per day.
Digital payments and commerce	• The establishment of a Unified Payment Infrastructure (UPI), with over 350 million unique users and over 50 million merchants. • 16 billion transactions are processed every month. • It is India's largest digital payment network (62% of transactions in FY2022-23) and world's fifth largest digital payment network by volume. It handles more than 40% of world's digital real time transactions.

90 Sources: Prime Minister Modi's address at the inauguration of ITU- World Telecommunication Standardization Assembly October 2024; Report of India's G20 Task Force on Digital Public Infrastructure released; G20 UNDP DPI Playbook 2023; Press Release: Press Information Bureau; National Broadband Mission Presentation June 2023; Department of Telecommunications National Frequency Allocation Plan 2022; Digital India Programme: A Journey Of Transformation - Forbes India; ITU WTSA 2024 closing press release.

91 www.gatishaktisanchar.gov.in

Digital government portal	• MyGov's UMANG app provides more than 50 million users with access to over 1 700 government services. DPI direct payments has saved the government USD 41 billion.
Digital health	• Aarogya Setu mobile application, together with the Co-Win Mobile App, was launched during the COVID-19 pandemic. As of November 2023, over 2.2 billion vaccinations and over 1.1 billion registrations had been administered. • Ayushman Bharat Digital Mission (ADBM) has facilitated easier access to medical consultations and health information management through telemedicine services and digital health records, lower medication costs due to the availability of generic drugs and reduced physical visits to healthcare facilities. It has generated 620 million accounts and linked approximately 390 million health records. • e-hospital simplifies healthcare access for over 380 million registered patients. • eSanjeevani, National Telemedicine Service, has facilitated over 241 million patient treatments across 122 699 health & wellness centres through 15 460 hubs and 372 online outpatient departments. It has provided more than 100 million teleconsultations, benefiting primarily women and older people.
Digital agriculture	• The eNAM agriculture platform operates across 23 states and 4 Union Territories, facilitating access for traders, farmers, commission agents, and service providers, totalling 18 million participants as of May 2024.
Digital skills and inclusion	• The Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) is the world's largest digital literacy drive, equipping rural communities with essential digital skills like e-commerce, finance, and cyber-security. Under the scheme, 438 570 training centres in India have certified 47 million trainees. • The SWAYAM platform offers online courses designed and delivered by eminent faculties from institutes of eminence and reputes in India. The platform has helped students from rural India learn from leading faculty members from different institutions nationally. • Gender inclusion programs, including 40% of Science, Technology, Engineering and Mathematics (STEM) education participants are women, the Bank Sakhi payment platform and the Mahila e-Haat online marketing platform.
Data Protection and Cyber Security Regulations	• The government is building public trust through the Digital Personal Data Protection Act 2023 and National Cyber Security Strategy 2020. These are implemented by the national data protection and cyber security bodies.

The share of the digital economy in India's total economic activity grew from 5.4% in 2014 to 8.5% in 2019. The value of this contribution has grown at an annual rate of more than 15%, accounting for over USD 225 billion in FY22.

During its G20 Presidency in 2023, India promoted Digital Public Infrastructure as a key economic and development programme for other countries. A UNDP and G20 Digital Public Infrastructure Playbook was published, outlining 3 key pillars with recommended approaches:

- Open and Interoperable Technology which is scalable and secure
- Robust and transparent governance and regulations, building public trust
- Resilient, inclusive, and sustainable local ecosystems for market innovation and service delivery

Following the Digital India programme, the ITU World Telecommunications Standardisation Assembly 2024 approved a resolution to develop technical requirements for digital public infrastructure.

Digital literacy and skills

A major driver of the ability of a country to grow its digital economy is the level of digital literacy and skills in its population. The IFC estimates that over 230 million jobs in Sub-Saharan Africa will require digital skills by 2030, resulting in almost 650 million training opportunities. An estimated USD 130 billion opportunity exists to provide digital skills across the region until 2030.[92] It is estimated that, in South Africa, advances in digitisation, machine learning and automation could result in a net increase in the number of jobs of 1.2 million. Alongside this, the impact of technology developments could triple South Africa's productivity growth, more than double growth in per capita income, and add more than a percentage point to its real GDP growth rate over the next decade.[93]

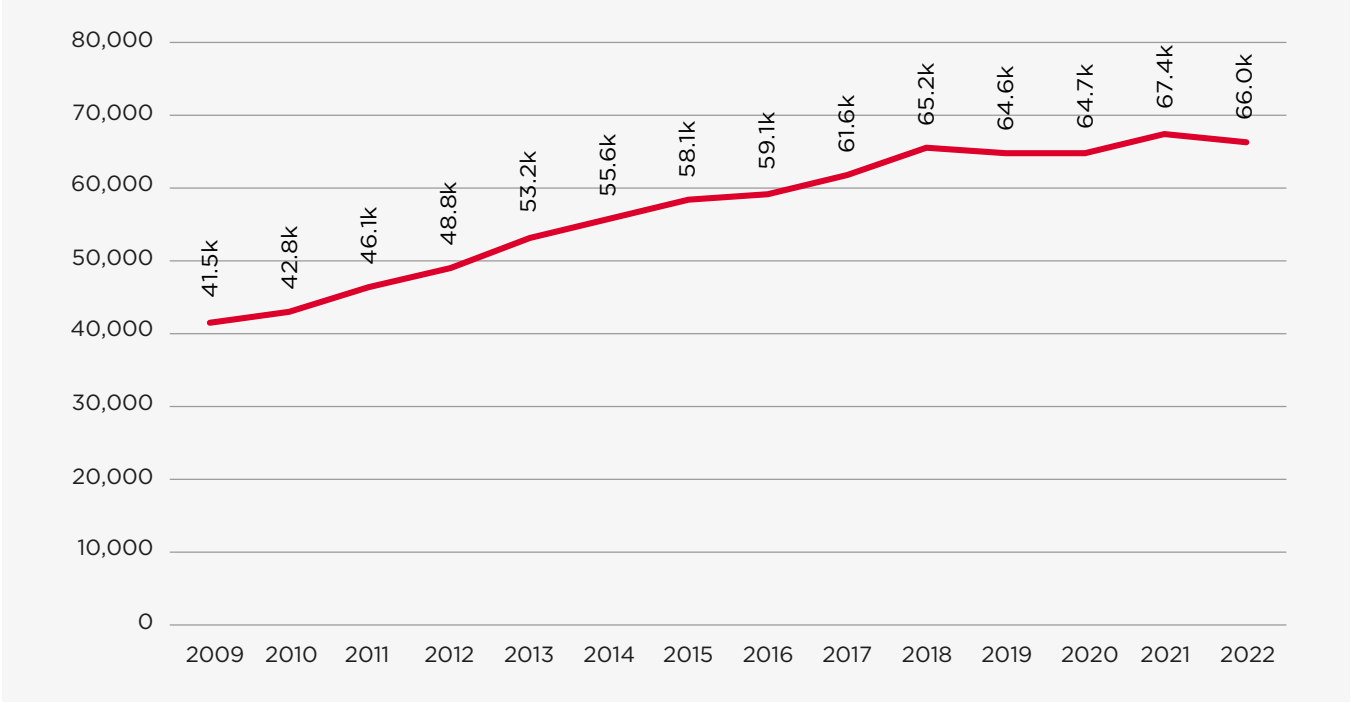
South Africa has low levels of basic literacy, compared with many other middle-income countries. Compared with many international benchmarks, South Africa has low levels of basic literacy, with 81% of grade 4 children being unable to reach the lowest benchmark of reading comprehension.[94] South Africa's performance was worse than all the other countries in the Progress in International Reading Literacy Study, including Egypt, Jordan, Brazil and Russia.[95,96]

South Africa faces challenges in improving the level of digital literacy. The poor performance of the country in foundational literacy[97] and numeracy skills, the shortage in the supply of teachers with training in ICT, limited access to online and technology-based learnings materials and devices in school, restricted access to high-speed internet at home and unreliable power supplies are all challenges that the country faces in trying to improve the level of digital literacy.[98]

The future growth of the digital economy will depend on the supply of more advanced digital and other science skills. The number of people graduating from universities in South Africa in Science, Engineering and Technology (SET) fields has increased steadily at about 4% per year reaching 66 000 in 2022 (Figure 20).

92 IFC. 2019. Digital Skills in Sub-Saharan Africa Spotlight on Ghana.
93 McKinsey. Future of Work in South Africa.
94 Department of Basic Education. 2023. PIRLS 2021: South African Preliminary Highlights Report.
95 Vodacom Group. Connected Education: How digital technologies can transform education in Sub-Saharan Africa.
96 57 countries took part in the Progress in International Reading Literacy Study, but South Africa was the only representative from Sub-Saharan Africa. Department of Basic Education. 2023. PIRLS 2021: South African Preliminary Highlights Report.
97 It is noted that South Africa has 12 official languages.
98 IFC. 2019. Digital Skills in Sub-Saharan Africa Spotlight on Ghana, pages 31-35; Vodacom Group. Connected Education: How digital technologies can transform education in Sub-Saharan Africa.

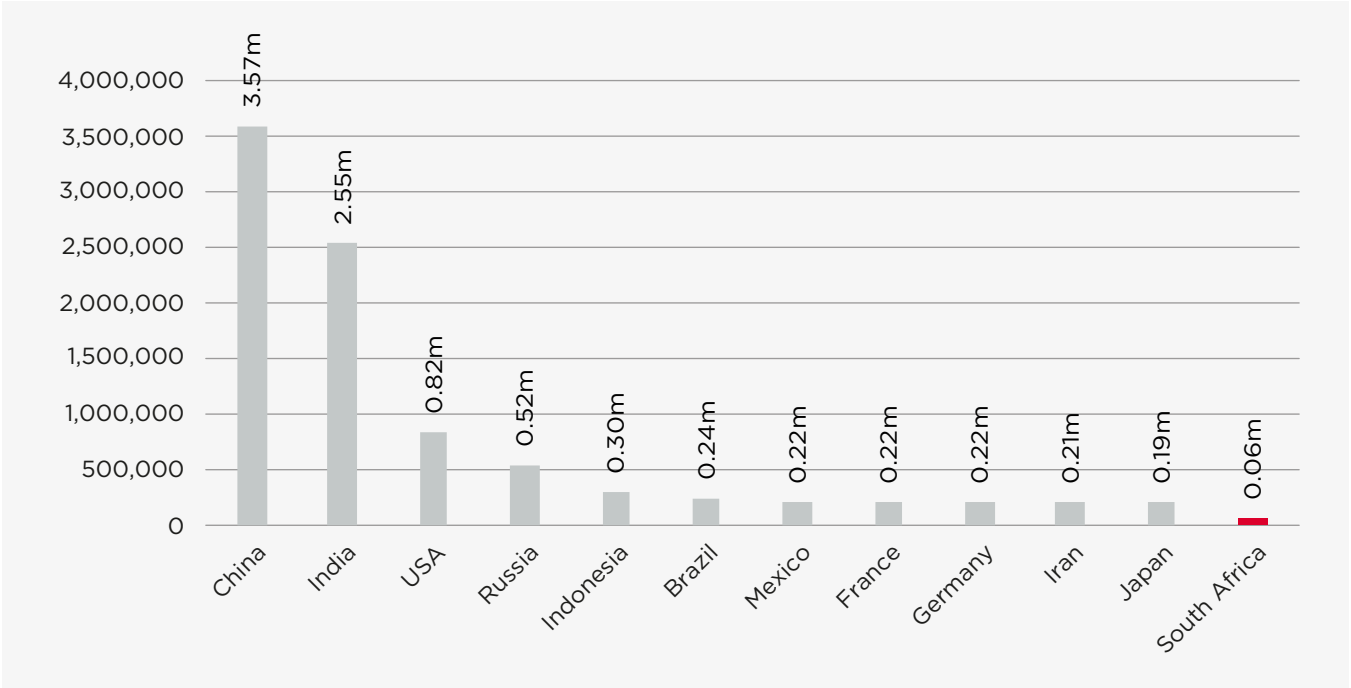
Figure 20: Number of people graduating from South AFrican universities in SET fields, 2009-22



Source: Department of Higher Education and Training (DHET)[99]

Despite this growth in the number of people graduating in SET/STEM fields in South Africa, the total numbers remain far below that in other BRICS countries and in the leading countries in this field. When compared to population size, South Africa also compares poorly with BRICS and other middle-income countries (with the exception of Brazil which produces approximately the same number of STEM graduates per thousand population as South Africa) (Figure 21, Figure 22).

Figure 21: Cross-country comparison of the number of people graduating in STEM fields, 2020

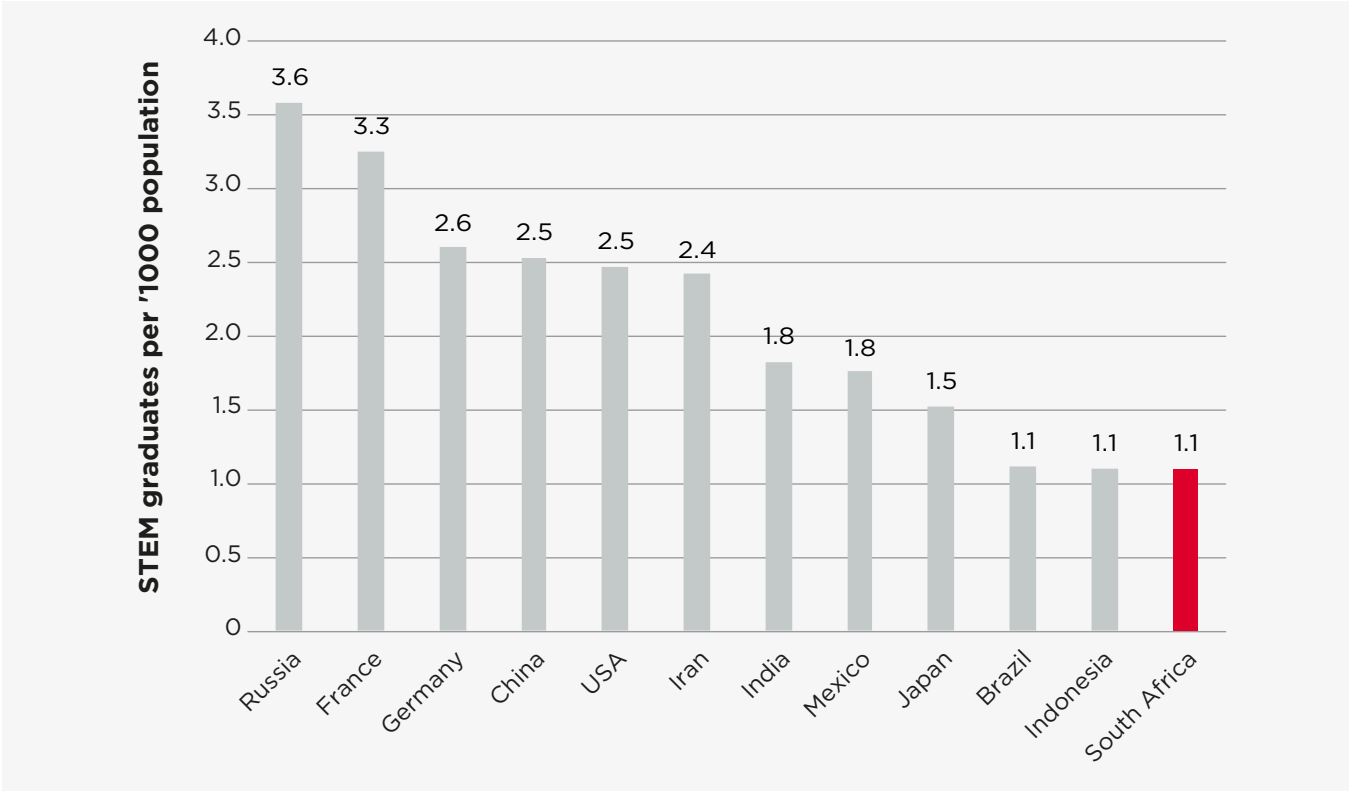


Source: College of Science, Engineering and Technology (CSET)[100], DHET

99 Government of South Africa, DHET. 2024. Statistics on post-school education and training in South Africa.

100 CSET, Brendan Oliss, Cole McFaul, and Jaret C. Riddick. 2023. The Global Distribution of STEM Graduates: Which Countries Lead the Way?

Figure 22: Number of people graduating in STEM fields per 1000 population, 2020



Source: CSET[101], Department of Higher Education and Training, Government of South Africa

Addressing the shortage of students graduating in STEM fields and with advanced digital skills will be a key challenge for the country in attempting to grow the digital economy. Recent research outlined in Box 9 summarises some of the lessons from the Covid-19 pandemic on the use of digital technology for on-line training.

101 CSET, Brendan Oliss, Cole McFaul, and Jaret C. Riddick. 2023. The Global Distribution of STEM Graduates: Which Countries Lead the Way?

Box 9: On-line training and education – lessons from the COVID-19 pandemic[102]

The COVID-19 pandemic lockdowns became a catalyst for the use of digital and online platforms for education. This showed the potential for the use of digital technologies for learning and skills development but it also highlighted the challenges, particularly in the uneven levels of access to digital technologies.

The digital divide in South Africa, between rich and poor and between urban and rural translated into very unequal rates of access to education during the pandemic. For example, a survey of university students conducted in 2022 found that:

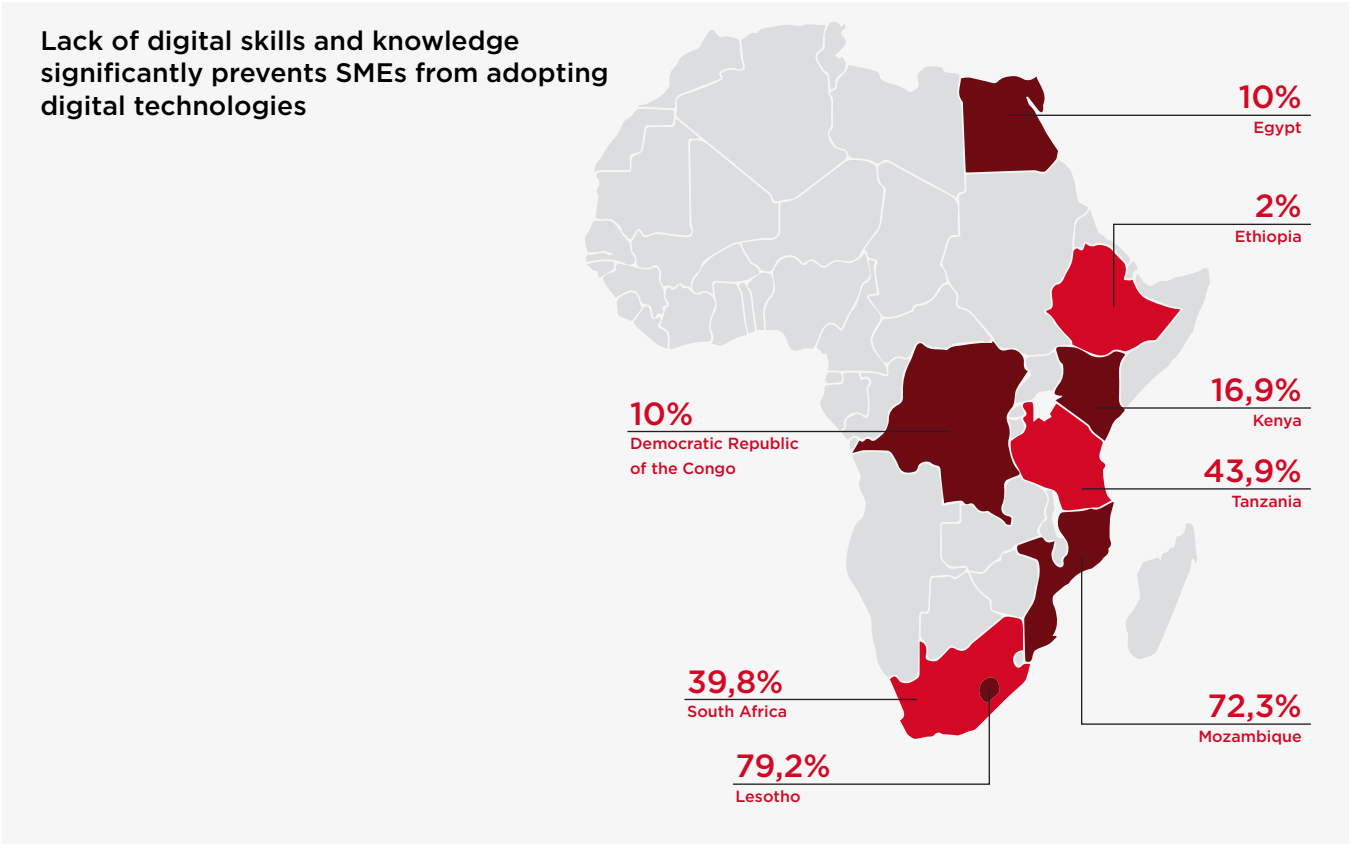
- 78% of the students live in rural areas and the majority of them lacked access to basic digital tools and skills.
- The main challenges cited were the lack of network and connectivity (67%), high data cost (52%), no access to the internet (29%) and no access to a device (7%).
- Online lessons were conducted through Moodle, however 16% said they could not use it. Other platforms used include WhatsApp (73%), Zoom (2%), emails (18%), and Google and Microsoft platforms (6%).
- Improvements to enable online learning include free or low-cost internet (58%), digital literacy training for both students (34%) and academics (33%), devices (18%), downloadable content (25%) and creating an online space for students (18%).

This experience showed that digital technologies are a vital part of the educational delivery system in South Africa. But their use needs to be considered carefully and, in particular, it must not exacerbate already wide disparities between different groups of the population.

A lack of digital literacy is a particular problem for MSMEs. A lack of digital skills was an important barrier to adopting new technology for almost 40% of South African MSMEs. Although this was lower than some other countries in Sub-Saharan Africa, it indicates that the issue is an important one for a country like South Africa where the development of MSMEs is seen as an important priority (Figure 23).

102 Avashni Reddy Moonasamy, Gedala Mulliah Naidoo. 2022. Digital Learning: Challenges experienced by South African university students' during the COVID-19 pandemic.

Figure 23: The impact of digital skills on technology adoption



Source: Vodacom[103]

The growth of the digital economy requires the population to have a broad range of ICT and STEM skills. Adoption of digital services requires basic levels of digital education. These levels are usually achieved in school through the integration of ICT learning into the educational curriculum. The private sector also has a role in upskilling consumers to use more advanced digital services through online and other forms of skills training. Business people, entrepreneurs and other professionals who work in or lead organisations that adopt digital technologies need to be digitally literate and able to use digital technologies as part of their businesses. Individuals who are developing new digital products and services typically require at least an undergraduate level education in a STEM subject.

Training in digital skills is delivered by a heterogeneous group of organisations, including both public and private entities. Basic skills are typically delivered through the state education system. More advanced skills are provided at university or other institutions of advanced learning. However, a lot of IT education and training is delivered by the private sector. Technical skills are developed through IT training courses, apprenticeships and other forms of professional development.

The overall programme of digital training and skills development needs to be thought of as a partnership between public and private sector. This should be designed and delivered in a coordinated way that ensures that the right distribution of skills is achieved within the population. Table 2 and Figure 24 summarise some of the public and private programmes that are currently taking place in South Africa.

103 Vodacom Group. 2024. Levelling the SME playing field: Enabling success and scale through technology.

Table 2: Digital skills and training programmes in South Africa

Programme/strategy	Description
Department of Communications and Digital Technologies (DCDT) Implementation Programme for National Digital Future and Skills Strategy 2021 – 2025	This sets out the government programme and 2025 targets, including all grade 1 – 9 students to have digital skills in the curriculum, a 30% increase in graduates from digital skills programmes, a 60% increase in access to internet, connectivity, and education facilities 2 million citizens to receive digital literacy training and 500 000 young people completed public employment and youth service programme.[104] The DCDT Annual Report 2022-2023[105] reported continued implementation of the programme, notably partnering with NEMISA on Ya Rona Digital "Digital Skills Massification Drive" which has rolled out basic digital literacy training in the North-West, KZN, Limpopo and Free State provinces and trained over 20 000 citizens (with Eastern Cape underway and all other provinces to be implemented).[106] SA Connect supports the implementation of the National Digital and Future Skills Strategy by deployment of ICT infrastructure. As of March 2024, it had achieved a coverage of 361 000 households enabled by 2502 Wi-Fi.[107] In March 2024, DCDT established the Digital Skills Forum to provide guidance and oversight on implementation of the National Digital Skills Programme.[108]
Digital Skills for Decent Jobs for Youth Programme	A joint programme developed by DCDT in collaboration with the International Telecommunication Union (ITU), International Labour Organisation (ILO) and the Nations Development Program (UNDP) to enable more young people in South Africa to access decent jobs in the digital economy, including training of trainers, curricula development and rollout to at least 50 000 youth across the country between 2021 and 2024.[109]
GIZ digital skills for young women	Since 2020, GIZ South Africa has partnered with DCDT to provide a 12-month digital entrepreneur learnership provide for young women who are not in education or training (NEET).[110]
Vodacom	Vodacom has over 1.4 million registered learners on its e-School platform (a zero-rated online education portal for Grade R-12 learners), 25 Schools of Excellence which have renovated water and sanitation facilities, ICT equipment and mobile libraries, a virtual classroom and receive coding and robotics training. 10 Youth Academies and more than 2,500 schools have also been provided with IT equipment.[111] Vodacom's Code Like a Girl programme develops coding skills for high school girls aged 14-18 years and encourages them to pursue a career in STEM fields. 5-day courses are available in person at Vodacom School of Excellences and virtually. At the end of the course, each girl can develop her own website and present her work to the rest of the coding class.[112]

104 DCDT. 2021. Implementation Programme Guide For the National Digital and Future Skills Strategy of South Africa 2021-2025.
105 DCDT. 2023. Annual Report 2022/2023.
106 DCDT. 2024. Speech by the Minister Communications and Digital Technologies, Mondli Gungubele (MP), during the Launch of the National Digital Skills Forum.
107 ibid
108 SAnews. 4 March 2024. Another step forward for digital skills building in SA.
109 DCDT, ILO, UNDP. Digital Skills for Decent Jobs for Youth not in Employment Education or Training South Africa.
110 GIZ. 2020. South Africa: Digital Skills 4 Jobs and Income.
111 Vodacom Group Limited. 2024. Integrated Report for the year ended 31 March 2024, page 92.
112 www.vodacom.com

MTN	MTN Data-Smart is a digital literacy programme based on the Mobile Internet Skills Training Toolkit of the GSMA, meant to improve people's awareness of mobile internet and applications. The toolkit is a set of free resources to teach people the basic skills they need to access and use mobile internet. All the training provided incurs zero data cost to consumers and customers are further incentivised to complete the training with free data upon completion of the programme. The MTN Skills Academy provides access to digital and financial skills training, including coding, web development, digital marketing and data analytics. It also offers comprehensive career guidance; and Coursera, an online learning provider, to deliver training in basic, intermediate and advanced technology and business skills. MTN Skills Academy aligns with broader national development goals by creating a pool of skilled individuals ready to contribute to the digital economy. This, in turn, has the potential to attract investment, drive innovation, and position South Africa as a competitive player in the global digital landscape. MTN, also, provides MTN Online school for grades R – 12, zero-rated for MTN customers.[113]
Telkom	Telkom, in its Economic Impact Assessment 2022 -2024, reported that it had contributed ZAR 64 million to improving education skills, training and innovation including its lightbulb education platform, 30 100 lives improved by digital literacy, 1 million teachers trained and 1 934 unemployed youth received ICT training.[114]
Cell C	Cell C is prioritising education as a societal imperative. This includes the rollout of Digital Labs, ensuring students across the country have equitable access to technology resources.[115]
Microsoft 4 Afrika	Combines in-classroom trainings with virtual classrooms, real-world learning experiences and online academies that teach digital skills in a digital way. The programs include internships with tech startups, online IT training lessons, and app development workshops.[116] This year Microsoft announced a 10-year investment programme. This includes a skills development initiative, estimated to be ZAR 347 million, which will focus on providing intensive training to young black South Africans through a 8 – 12 month certification courses and learnerships which will see about 1 000 beneficiaries accredited with certifications in emerging technologies such as AI and data analytics.[117]
UNISA online learning	Deviare is an online learning platform adopted by the University of South Africa (UNISA) that provides teachers with the digital capabilities and the confidence they need to facilitate learning in a conventional classroom or remotely.[118]
Foondamate	FoondaMate is a fast-growing, always-on, and highly relatable study aid for middle and high school students in South Africa and other countries. Students can ask their AI-enabled study buddy questions on WhatsApp and Messenger and receive conversational replies that help them with their schoolwork.[119]

113 Inside Education article 21 October 2021.
114 Telkom SA SOC Ltd. Economic Impact Assessment 2022 – 2024.
115 Cell C partners with Sedibeng Municipality, April 2024
116 IFC. 2019. Digital Skills in Sub-Saharan Africa Spotlight on Ghana, page 150.
117 DTIC. 2024. Government and Microsoft Agree to a R1.3 Billion Landmark Investment to Empower Black-Owned Businesses and Young Black South Africans in 4IR Technologies.
118 www.unisa-online.deviare.africa
119 news24. 28 June 2021. We tried the high school WhatsApp bot that solves maths problems and sends past exam papers – fast.

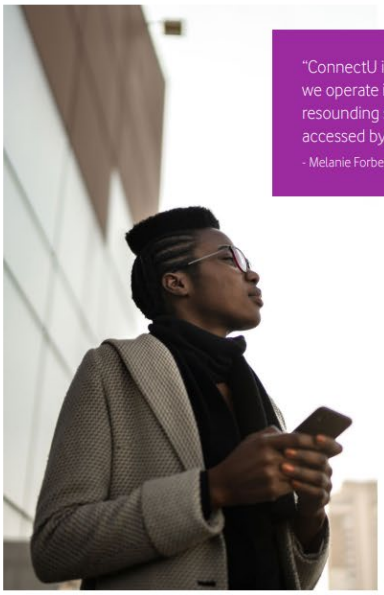
Figure 24: Case study: ConnectU

Case study

ConnectU: Free access to information on jobs, health, and skills for Vodacom subscribers in South Africa

Vodacom recognises the need for access to crucial information for those who need it to improve their lives but cannot afford data. In South Africa, the mobile operator offers a wide range of zero-rated online resources on health, education and upskilling, entertainment, and online job opportunities. They also provide access to cheaper voice and data offers in underserved communities for their subscribers through a platform called ConnectU. Since its launch in April 2020, the site has received over 15.5 million unique visitors and averages five million subscribers a month, all seeking different services.

- Job seekers can search for work opportunities, while those who want to polish their skills or acquire new ones have access to over 700 free online courses offered in partnership with Udemy, a popular global learning platform. ConnectU's job portal has enabled 3.1 million people to access seven different job search websites for free, with over a third of users being in the lowest income bracket. Vodafone internal data shows that accessing online job boards on ConnectU can reduce the time it takes to get a job by seven months compared to offline alternatives.



"ConnectU is our social compact to drive meaningful change in the society we operate in. In May 2021 we launched our Jobseekers campaign to resounding success, with around 180,000 unique visits to the Jobs page accessed by over 400,000 customers during the campaign."

- Melanie Forbes, Managing Executive Consumer Marketing & Insights, Vodacom

- Under the health section, parents and caregivers have access to resources on how to take care of themselves, their newborns, or children. Additional health-related content, such as articles, videos, and tutorials, is available through a mobile-optimised website. Mum & Baby is available in English, Zulu, Sesotho, Xhosa, and Afrikaans. The service has helped over 1.8 million parents and caregivers to take positive actions to improve their children's health since its launch in 2017.
- The Vodacom e-School solution allows learners to access curriculum-aligned content and enables educators to access learning materials on their smartphones with no data charges. There are currently over one million users on the platform.
- The Safety and Security section within the platform allows customers to claim two free SMSs that can be used in an emergency and free location triangulation service through a partnership with What3Words.* In addition, it offers free calls to the Gender Based Violence Call Centre and access to information from its website.

vodacom

Source: GSMA
*What3words is a geocode system designed to identify any location.
Source: ConnectU Team, Vodacom
https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/09/GSMA_MobileEconomy2020_SSA_Eng.pdf

Source: Vodacom[120]

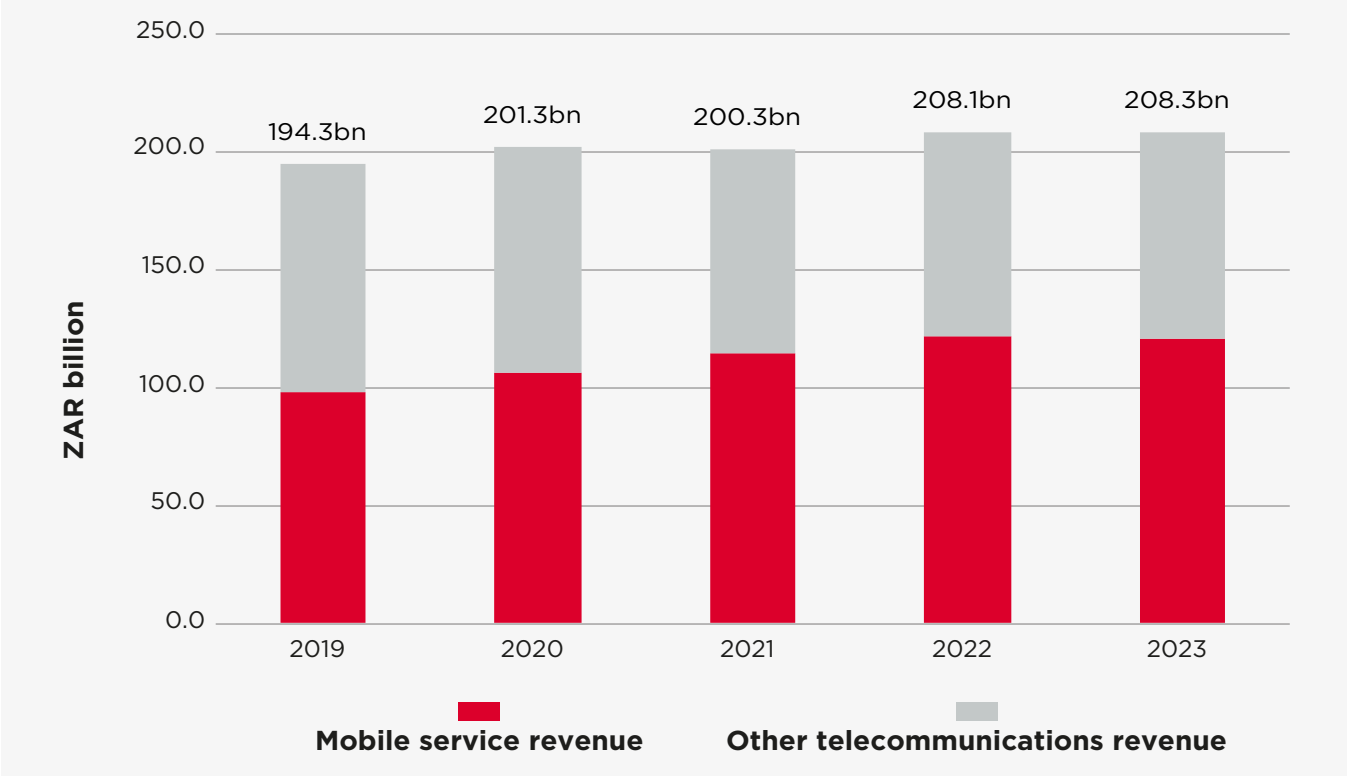
120 Vodacom, 2022, A lifeline, not a luxury: Accelerating 4G access in Sub-Saharan Africa

D. THE ROLE OF MOBILE IN THE DIGITAL ECONOMY

Overview of the mobile sector in South Africa

The total annual revenue generated by telecommunications operators South Africa amounted to ZAR 208 billion in 2023. There has been slow nominal growth in total sector revenues of around 1.8% per year although this represents a decline in real terms. Mobile revenues have been growing faster than the industry total, at around 5.2% per year (Figure 25). This reflects the predominance of mobile as the primary means of access to the internet for most South Africans.

Figure 25: Total telecommunications sector revenue, 2019-23

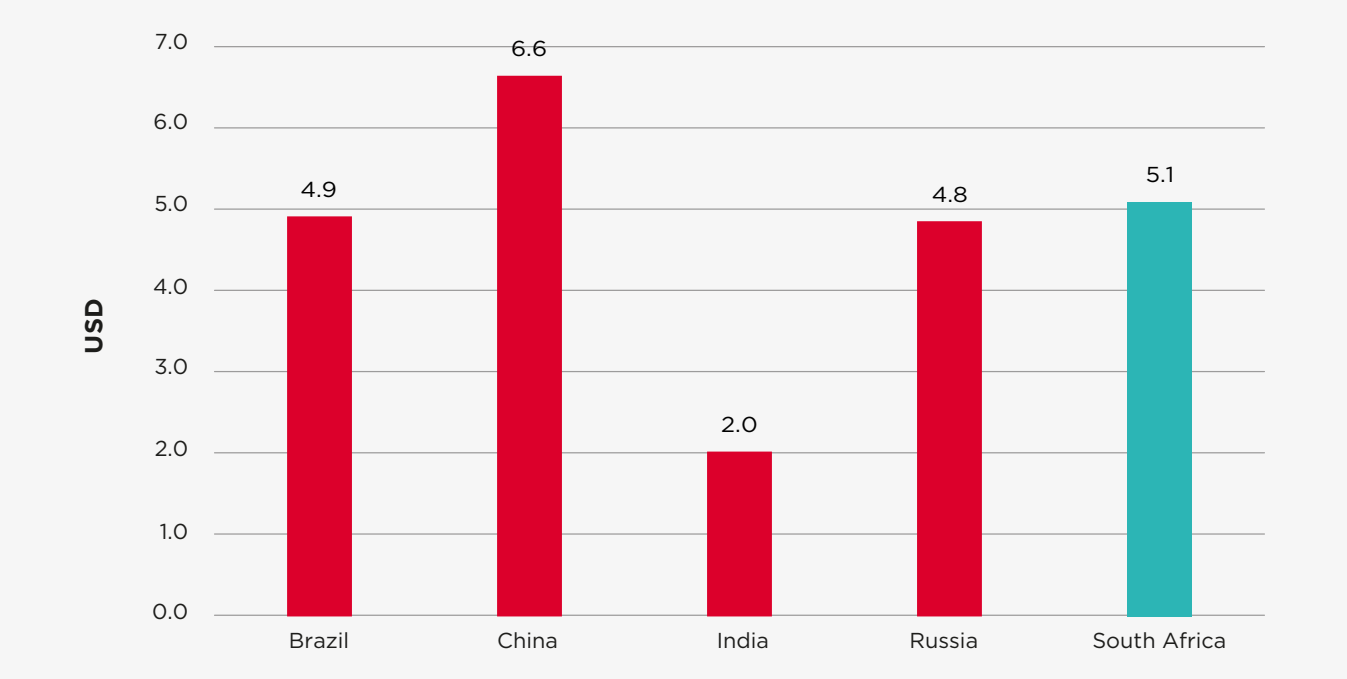


Source: ICASA[121]

South African MNOs generate an Average Revenue Per User (ARPU) of around USD 5 per month which is in line with Brazil and Russia, significantly lower than China but higher than India (Figure 26).

121 ICASA. 2024. The State of the ICT Sector Report.

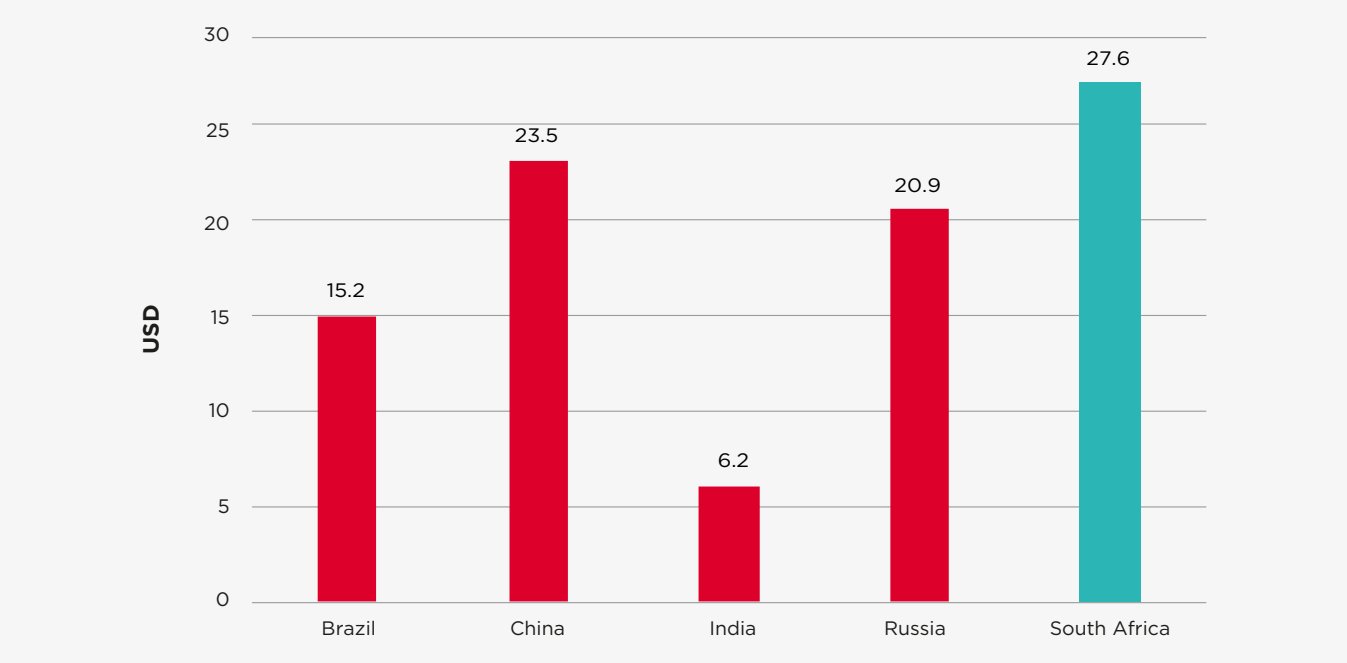
Figure 26: Monthly ARPUs, 2023



Source: GSMA

South African MNOs are major investors in the country in physical infrastructure. Capital investment by MNOs is USD 28 per capita which is the highest in the BRICS countries (Figure 27).[122]

Figure 27: Capex per capita, 2023

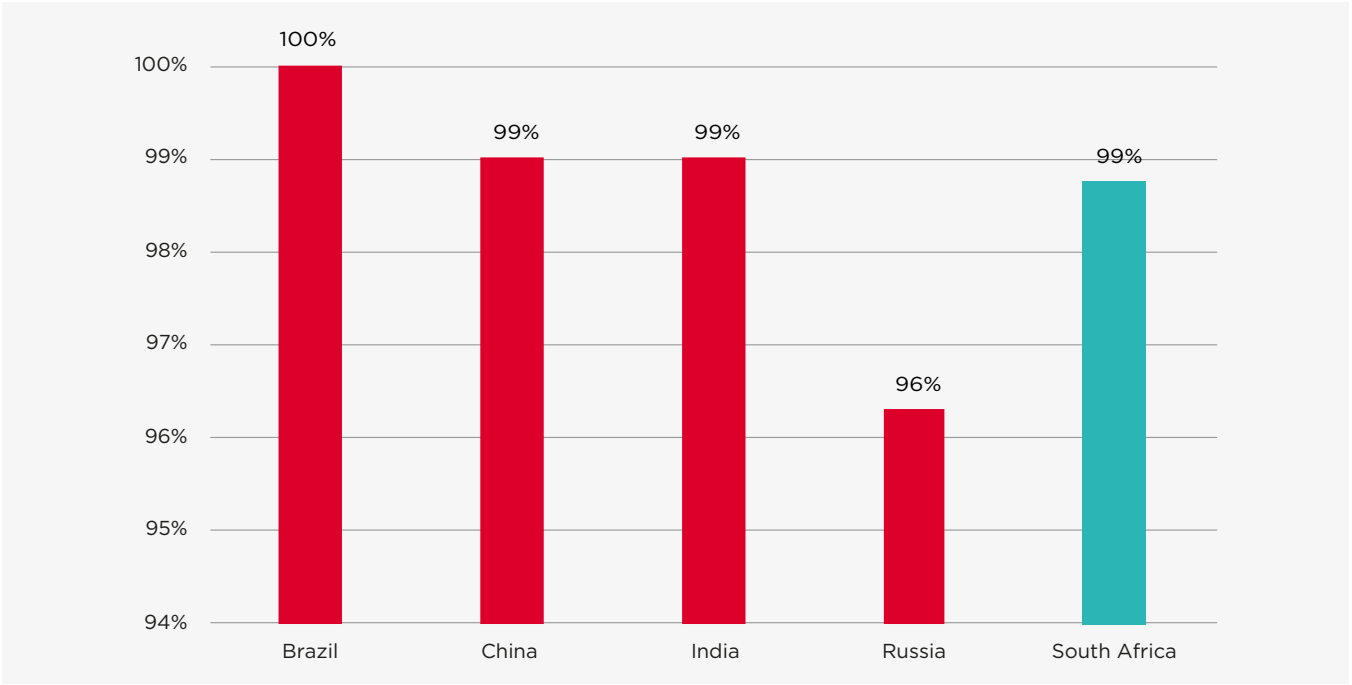


Source: GSMA

Despite this relatively high level of capex by MNOs, it has not yet translated into similar levels of broadband coverage. Although 4G population coverage is almost universal, 5G coverage is well below other BRICS countries (Figure 28, Figure 29).

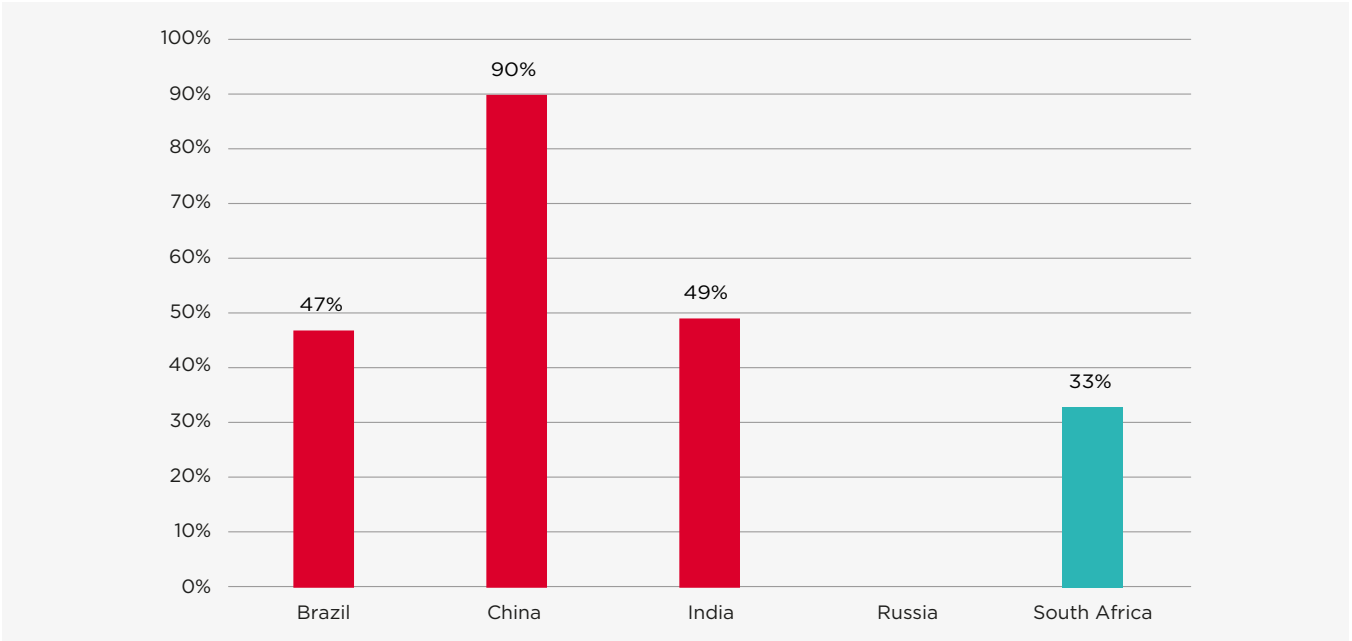
122 Ratio of annual MNO capital expenditure to total population.

Figure 28: 4G Population coverage, 2023



Source: GSMA

Figure 29: 5G Population coverage, 2023



Source: GSMA

Note: Data for 5G coverage in Russia not available

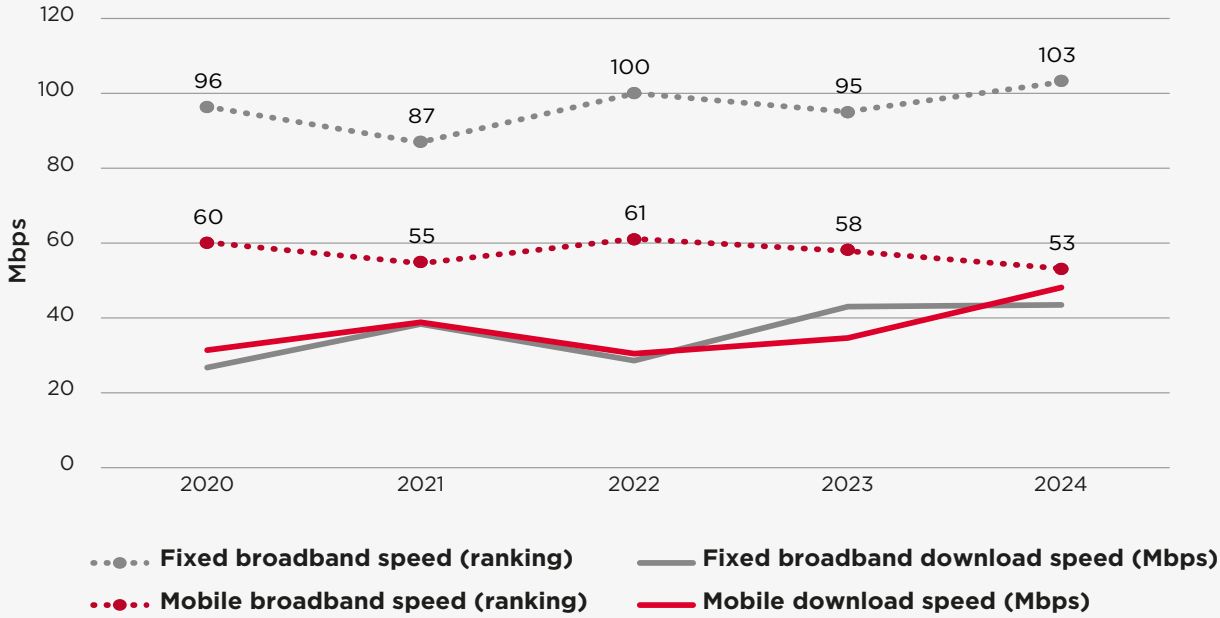
Continued extensive investment into 5G networks will be required, despite ongoing pressures on revenue. The capex required for continued extension of 5G networks will be very significant and will continue for many years to come as 5G network coverage expands and the current generation of 5G network technology is replaced by the standalone evolution. MNOs will be required to continue committing significant amounts of their revenue to this process of network development. Globally, MNOs are expected to spend 14-19% of their revenue on capital expenditure. MNOs in South Africa

typically spend at least as much as this on capex as a share of revenue.[123] This continual expenditure on network extension and strengthening is a key feature of the mobile industry. These levels of capital expenditure are needed to compete, even while the businesses are facing continual pressure to deliver better services at lower prices.

Network quality and performance

Broadband speeds in South Africa have been improving over time. Average download speeds have increased for both fixed and mobile networks in South Africa over the past 5 years. There has been an 11-12% per year increase in speeds for both types of network over the period. However, network performance has improved globally at the same time so South Africa's position, relative to other countries, has changed. South Africa improved its position in the global ranking for mobile speeds by 12%, moving from 60th position in 2020 to 53rd position in 2024. It's comparative performance for fixed, on the other hand, has moved in the opposite direction. It is much lower down the global rankings at around 100th position – on average - and this has got worse in recent years with the country moving from 96th position in 2020 to 103rd position in 2024 (Figure 30).

Figure 30: South AFrica broadband download speeds and global ranking, 2020-24

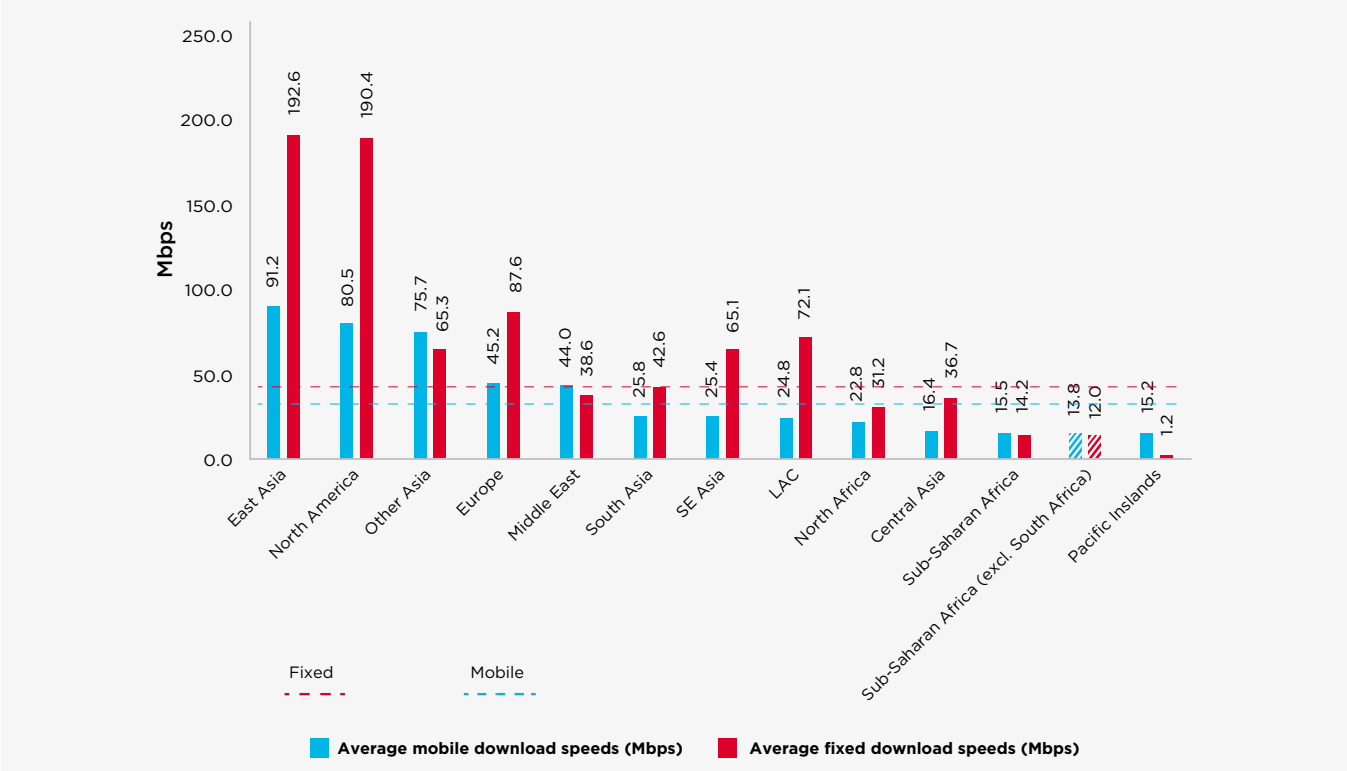


Source: ICASA, based on Ookla data[124]

Based on a global regional comparison, download speeds in South Africa for both fixed and mobile are comparable with South Asia, Southeast Asia, Latin America and Caribbean. However, they are far below the speeds experienced by customers in Europe, East Asia and North America (Figure 31).

123 GSMA Intelligence. 2023. The spend of an era: mobile capex to reach $1.5 trillion for 2023–2030.
124 ICASA. 2024. The State of the ICT Sector Report.

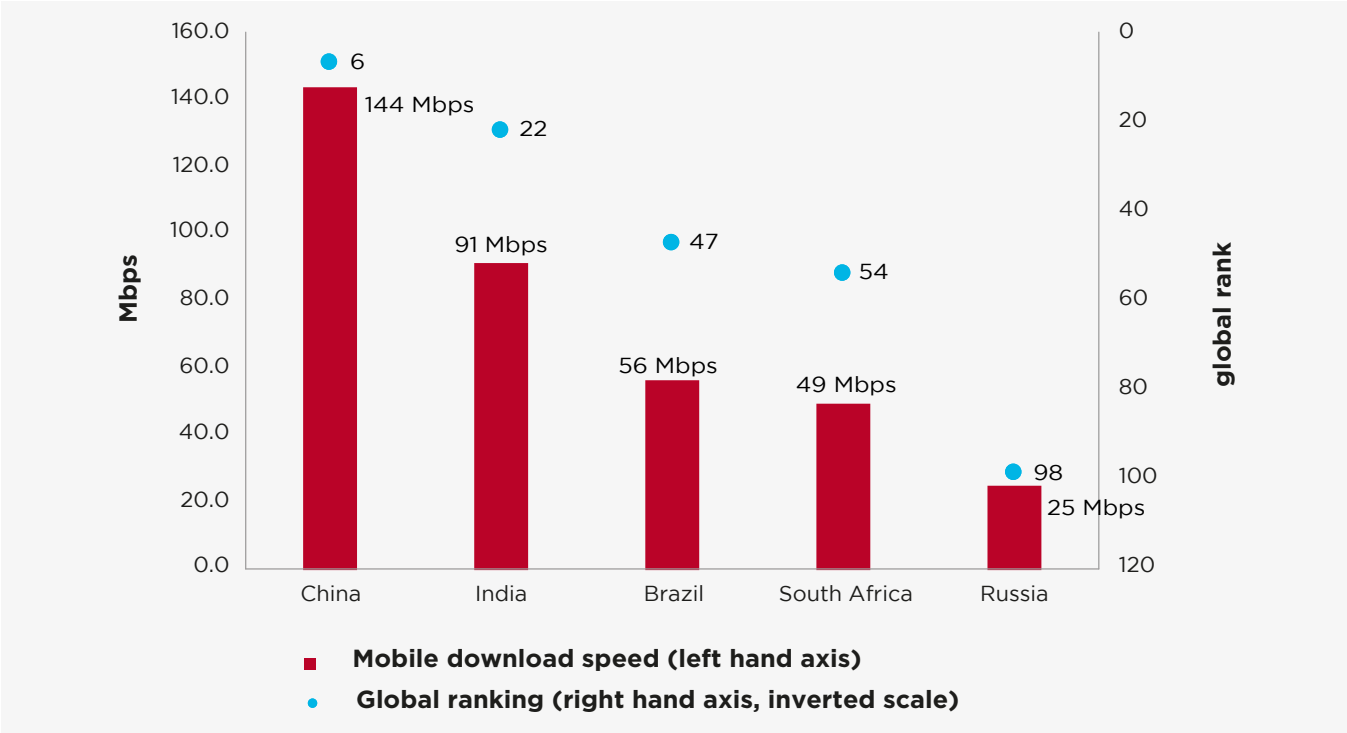
Figure 31: Average download speeds by region, Jan 2023



Source: Ookla

Compared with the BRICS countries, South Africa performs better than Russia on mobile network performance but below China, India and Brazil. Mobile download speeds in South Africa were, on average, one third of those in China over the 12 months to August 2024 (Figure 32).

Figure 32: BRICS average mobile broadband download speed and global ranking, 2023-24



Source: Ookla

Adoption and access to mobile in South Africa

Mobile technology is extremely widely used in South Africa. More than 95% of households have access to either a mobile or a fixed line with a very large majority of them owning a mobile phone.[125] In 2024, approximately 45.3 million people were connected to the internet, which represents an increase of 20 million in 11 years – an average annual growth rate of 5.6%. Around 79% of people used mobile devices to connect to the internet in 2022 and this number is continuing to rise.[126]

The internet usage gap in South Africa has fallen. The growth in mobile internet adoption in South Africa means that the gap between those who currently use the internet and those who live within range of the mobile broadband networks but do not yet use it has reduced. However, a significant gap remains. The primary determinant of this gap is affordability and demand. The price of devices remains a problem for many low-income households and this is creating a significant barrier to adoption for the final 20% of the population. For some people, lack of digital skills and know-how also remains a barrier to adoption.

Affordability of smartphone devices is a barrier to further digital adoption. Although the majority of South Africans use the internet, only 44% of them owned a smartphone in 2023.[127] The cost of purchasing them is a key barrier to further effective access to the internet for many South Africans. Improving the affordability of smartphones is therefore one of the key programmes of the DCDT Digital Masterplan, including the establishment of a device recycling and refurbishing centre for second-hand devices. MNOs have several programmes underway to improve the affordability and access to smartphones (Table 3).

125 ICASA
126 Statista
127 MTN Group Limited. 2024. Sustainability Report for the year ended 31 December 2023.

Table 3: Handset affordability programmes

MTN	MTN partnered with the FoneYam device financing programme in 2023, with MTN capturing 37% of device sales through the FoneYam initiative at Pep (a South African retailer). FoneYam introduces flexible financing options tailored to the needs of low-income consumers ranging from instalment payments spread over flexible periods, with minimal or no interest, making devices more accessible without imposing a significant financial burden on consumers. MTN also provides device financing through Pay Joy.
Telkom	Telkom, to make 4G more affordable for low-income users, subsidises select pre-paid handsets. The subsidy amounted to ZAR 207 million in FY2024. Telkom will soon be launching a prepaid android device for ZAR 299 (once-off, including a 1.5GB WhatsApp bundle) in November 2024.
Vodacom	Vodacom invested more than ZAR 250 million in prepaid 4G devices. In addition, Vodacom is planning to launch a 4G cloud smart feature phone for less than USD 15 in FY2025.

Tax is also a significant contributor to the price that consumers pay for smartphones. All mobile phone devices imported into the country attract an ad-valorem tax of 9% in addition to VAT of 15%. On 4G and 5G-enabled devices, this can account for a significant increase in the cost of the device. The rationale for applying an ad-valorem tax is that devices are “luxury” items. This is clearly no longer the case for a product which is an essential part of daily life for virtually all South Africans.

The government has plans to sunset the older mobile network technologies which will free up spectrum resources which could be used for other purposes. It will also allow MNOs to reduce costs through no longer having to support higher cost mobile broadband technologies. The success of the plans to sunset 3G networks will depend on the extent to which citizens have access to 4G and 5G devices. Until a large majority of people have access to them, it will be difficult to sunset the 3G networks without significant disruption. By eliminating the ad-valorem tax on device imports, the government would support increased adoption of newer devices.

4. The Digital Economy Policy Environment

4. THE DIGITAL ECONOMY POLICY ENVIRONMENT

The South African government has been clear for many years that the digital economy is a key part of its overall development strategy. Digital technologies feature prominently in the plans, strategies and policies that have been developed by the government over the past 10 years. These include the National Development Plan (Vision 2030), SA Connect (2013), Presidential Commission on the Fourth Industrial Revolution (2019), the Digital Economy Masterplan (2021), the National Digital Skills and Futures Strategy 2021 – 2024, and the National Policy on Data and Cloud 2024. Policy development in the sector continues with the recent release for consultation of the Draft Digital Government Policy Framework and the Draft Determination and Directive of Digital Services.

The digital economy has also been a central part of the government's plans for recovery from the COVID-19 pandemic. In 2020, the government published a plan for re-establishing growth in the economy. Communications and the digital economy were identified as critical components of this plan.

"Communications and the digital economy cut across all economic activity. They contribute to lowering businesses costs, enable better government service provision, increase productivity, encourage innovation, reduce unemployment, and provide the poor with access to productive opportunities. Given the potential that communications and the digital economy have on the goal of unlocking inclusive growth, they will be among the key enablers of South Africa's economic reconstruction and recovery."[128]

SA Connect

SA Connect is the national broadband policy, launched in 2013 with the objective of ensuring that all South Africans have access to high-speed broadband. It covered infrastructure deployment, affordability, regulation, e-government and positioned ICT as a driver of economic growth and development.

SA Connect is being implemented in two phases. Under Phase 1 of SA Connect, 970 government facilities were connected to the internet. Phase 2 was approved the Cabinet in 2022. The primary objective of this phase is to achieve 100% broadband access for all communities and government facilities by 2026. The plan for achieving this is through three channels:

- SITA to connect at a minimum of 10Mbps a total of 14 742 government sites
- MNOs to connect 18 502 schools, 1764 hospitals, 3967 clinics, 567 SAPS offices and 8241 Traditional and Tribal Authority Centres
- Broadband Infraco and SENTECH to connect 5 830 208 households via shared facilities and other technologies[129]

Presidential Commission on the Fourth Industrial Revolution, 2019

The Presidential Commission on the Fourth Industrial Revolution (PC4IR), established and chaired by the President of South Africa, was tasked with proposing the country's overarching strategy for the Fourth Industrial Revolution as well as making recommendations regarding the institutional frameworks and roles of various sectors of society within the broad plan. The PC4IR made 7 key recommendations:

- Invest In Human Capacity related to 4IR
- Build Infrastructure and owning some significant 4IR infrastructure, such as hyperscale data centres, fibre-optic network and undersea cables
- Create Platforms for Citizen Participation

128 Government of South Africa. 2020. The South African Economic Reconstruction and Recovery Plan, page 30.
129 DCDT website.

- Establish a creative AI, Big Data Analytics, Blockchain, and Cybersecurity
- Own government strategic data and secure Citizens' Data
- Incentivise Future Industries and Applications of 4IR Technologies
- Update Regulation

Digital Economy Masterplan, 2021[130]

The Digital Economy Masterplan outlines an objective in which digital technologies create opportunities and drive inclusion and employment opportunities. The Masterplan projects significant contribution of digital to inclusive growth:

- At least ZAR 200 billion of value, or 4.5% of GDP, to the economy each year
- Creation of at least 1 million new jobs over the next 10 years
- Re- and up-skilling opportunities to at least 500 000 South African over the next five years and supporting opportunity for 2.8 million MSMEs

The Masterplan identifies opportunities for South Africa to leverage digital technologies in all sectors. For example, in manufacturing, South Africa could achieve gains from focusing on electronic goods. South Africa is a net importer of electronics to varying stages of manufacturing complexity. In 2018, the country exported electronics to the value of USD 1.67 billion (1.35% of total exports) but imported USD 8.16 billion (7.8% of total imports), from relatively simple insulated electrical wires to complex transmission apparatus for radio, telephone and TV.

The Masterplan, identifies 4 areas of economic opportunity in the digital economy for South Africa:

- Physical technology production: Sensors and smart devices, Smart meters, grids, utilities and renewable solutions, Additive material manufacturing, Electric vehicles, Satellite and drone technology
- Transformative tech applications like robotics, drones and blockchain in agriculture, mining, financial services, healthcare, education.
- Digital platforms: Task Matching Platforms, Transport and Delivery Services Platforms, Food Delivery Platforms, Tourism Platform, Job Matching and E-commerce Platforms
- Digitally traded services: Digital contact centres, Shared services, Reshoring work, Personalised and social services, Government citizen services

It further identifies five critical enablers for digital economy development:

- Digital inclusion
- Skills for work
- Responsive governance
- Innovation and competitiveness
- Government digitization

130 Genesis Analytics. 2021. ICT and Digital Economy Masterplan for South Africa Final draft.

National Digital Skills and Futures Strategy[131]

The strategy, prepared by DCDT in 2020, sets out a series of initiatives to develop the capacities of South Africans to meet the challenges arising from the increasing deployment and adoption of digital technologies in economy and society. Recognising that these technologies are having a substantial impact on the world of work, on schooling, education and research, individuals and communities. The strategy has eight elements:

- Digital foundations: Basic and intermediate digital skills
- Digital futures and mastery
- Skills for Industry 4.0 and the world of work
- Creating Society 4.0 and addressing the digital skills divide
- Building digital skills awareness
- Research and monitoring on digital skills
- Co-ordination across government, industry, labour and other stakeholder groups
- Funding for digital skills

National Policy on Data and Cloud

The National Policy on Data and Cloud was approved in March 2024.[132] It articulates the government's approach and guidelines for the collection, storage, use, and sharing of data. It sees a range of benefits arising from its implementing of a data and cloud policy:

- Enhanced data security through the establishment of data protection protocols as required by the Protection of Personal Information Act, 2013 (POPIA)
- Digital transformation, promoting the use of technology in different sectors to increase productivity and efficiency
- Improved public service delivery through the use of cloud-based solutions, which will help government departments offer better services to citizens and businesses
- Economic growth, enabling more businesses to leverage technology, which will lead to increased job creation and economic growth
- Enhanced collaboration among government departments, private entities, and research institutions, fostering the exchange of knowledge, data, and expertise

131 DCDT. 2020. National Digital and Future Skills Strategy South Africa.
132 Government of South Africa. 2024. National Policy on Data and Cloud 2024.

Table 4: Summary of policy proposals under the National Policy on Data and Cloud, 2024

Pillar	Policy proposals
Digital infrastructure	• Digital infrastructure connectivity must be provided on a universal access service basis and facilitated by both government and private infrastructure providers on a non-discriminatory basis. • Government data shall be stored in a unified cloud-enabled datacentre, enabling data-sharing, interoperable systems, scalability, and cost-optimization. This infrastructure shall include redundancies in designated locations to meet business continuity requirements, ensuring consistent and reliable access to critical data. • SITA shall be the responsible authority for sourcing data infrastructure and cloud services from industry providers for the government. SITA shall develop and monitor service level agreements to guarantee consistent, reliable, and secure data and cloud services. Additionally, SITA will monitor access to government data through the Minimum Information Security Standards (MISS) and drive the implementation of the government's e-Strategy. • Government departments and entities shall prioritize cloud services as the primary option for new ICT procurement. • Data centre operators shall ensure the provision of their own electricity and water supply as backup for their energy and cooling requirements.
Access to Data and Cloud Services	• All government data in digital format must be classified into the following categories: public/open data, confidential/sensitive data, secret, and top secret. • Access to data should not expire, and all data classified as public or open must remain accessible. • The public will enjoy on-demand access to data stored in the cloud. • The private sector shall make data available for development purposes in accordance with applicable data protection legislation. • Regulations to promote digital inclusion must consider social obligations, including providing free data for indigent persons and households.
Creating a Digital Trust Environment	• The government and private sector shall take appropriate security measures and adhere to South African data protection laws and protocols in the provision of data and cloud services. • The government, along with data and cloud service providers, must ensure robust data and cloud security measures are in place to mitigate cyber-attacks and data privacy violations, including establishing the necessary protocols. • All public bodies responsible for the protection of personal and government data shall conduct awareness campaigns to educate the public on the protection of personal data, privacy and security.
Cross-Border Data Transfers and Data Sovereignty	• The processing of national data, including cross-border data-sharing, shall comply with South African data protection and security laws and policies.
Skills and Capacity Development	• The government and private sector shall ensure the provision of skills and capacity development programs to equip individuals and organizations with the necessary knowledge and expertise for cloud-based technologies & applications. • The private sector is encouraged to support and provide advisory and technical assistance, including best practices, training, and technical support.
Competition	• Government must encourage more investment in data centre and cloud services.
R&D	• South Africa must continue to encourage investment in R&D.
Governance & Institutional Mechanisms	• Government and relevant regulators must develop specific regulatory frameworks, guidelines, norms and standards in support of this policy.

Draft Digital Government Policy Framework

On 20 September 2024, the government published a draft policy framework on digital government for consultation. This framework included international comparisons, good practice and standards, institutional arrangements, legislative framework, procurement, funding, identify management and a range of other areas.

Draft determination and directive on digital services

On 20 September 2024, the government also issued the draft determination and directive on digital services for consultation. The objective of this is to define norms and standards digital services within the public service and to direct departments on implementation.

5. Strengthening South Africa's Digital Economy

A. CHALLENGES FACING THE DIGITAL ECONOMY IN SOUTH AFRICA

The digital economy in South Africa is a significant contributor to the country's economic performance and is already a source of jobs, investment and tax revenue. Digital is also a critical part of the government's development strategy, as articulated in a range of national policy and strategy documents. The current role and future importance of the digital economy to South Africa's future is therefore well understood.

Compared with BRICS or other middle-income countries, it is clear that South Africa faces a number of key challenges in developing its digital economy. Even in the context of Sub-Saharan Africa, there are indications that South Africa may be losing its position as regional leader in some areas of digital development. The success of Kenya and Nigeria in attracting investment into tech startups is a forward-looking indicator of the dynamism and potential future growth of the digital economy in those countries. If these challenges are not addressed, South Africa will continue to fall behind its global peer group of countries.

5.A.1 The sustainability of investment into digital infrastructure

The South African economy has grown at only a modest pace over the past decade. GDP growth has averaged only 0.8% per year over the period 2012-24.[133] This is not sufficient to achieve the objectives of economic transformation and poverty reduction.

Macroeconomic conditions in South Africa make it difficult for companies to invest and expand at the rate that they need to. Rising interest rates have increased the effective cost of capital, making it more expensive to fund large capital projects. The long-term weakness of the South African Rand has effectively increased the cost of purchasing network and other types of equipment from international suppliers. Geopolitical tensions are also continuing to impact global supply chains, creating uncertainty in the availability and supply of network equipment.

Many countries in Sub-Saharan Africa face similar challenges. In many respects, South Africa has suffered less from difficult macroeconomic conditions than countries such as Nigeria. However, when compared against countries such as India and China, the macroeconomic conditions in South Africa make it challenging as an investment destination for global capital investment.

The difficult macroeconomic environment and the impact of technology and market changes mean that revenues generated by the industry are under sustained pressure. This arises from constraints on household budgets due to inflation and other spending priorities. It is also the result of downward pressure on prices arising from competition between MNOs, MVNOs[134], and the loss of revenue to other competing services that use mobile broadband. These OTT services are competing with MNOs in areas in which they have historically generated revenues such as voice calls and messaging services. The result is that mobile voice revenues have declined by around 5% per year and are expected to continue falling over the medium term.[135]

These combined financial pressures are causing a squeeze on profitability at a time when the government and ICASA have been increasing the level of regulatory requirements on the industry, ranging from large MNOs to MSMEs. The most significant of these is imposition of the social obligations on the industry following the high demand spectrum auction. The provision of digital connectivity through the mechanism of the social obligations is a key part of government policy. It supports the overall national objectives of reducing inequality and creating jobs, particularly in underserved areas.

133 National Treasury Republic of South Africa. 2024. 2024 Budget Review Economic Outlook, page 11.

134 South Africa has seen an increase in MVNOs, noting that High Demand Spectrum Auction rules prescribe that electronic communication network licensees have 3 years to provide access to at least 3 MVNOs. MVNOs in South Africa include Mr Price Mobile, Me&You, Trace Mobile, Standard Bank Mobile, PnP Mobile, Boxercom, TFG Connect, Uconnect Mobile; Purple Mobile, Capitec Connect, FNB Connect, Shoprite Knect Mobile, Melon Mobile, Afrihost, Clientele Mobile, Hello Mobile, Smart Mobile (Source: Tech Central, MVNOs in South Africa, 11 January 2024)

135 ITWeb. 3 October 2023. OTT services, load-shedding decimate voice calls.

The process through which the details of the new social obligations introduced with the auction of high demand spectrum in 2022 by ICASA were determined has created uncertainty among market players. These new social obligations entail the rollout of connectivity across a broad spectrum of Public Service Institutions (PSI) such as schools, libraries health institutions and Traditional Authority Offices. There was limited detailed information available on these obligations prior to the auction and the cost of complying with them is higher than was anticipated by the industry. This demonstrates the importance of ensuring that regulatory and policy decisions balance the complex impacts of proposed decisions, and the requirement for cooperation and collaboration between MNOs, ICASA, and government. This is necessary to ensure success and sustainability of such obligations and programmes.

The social obligations imposed on licensees following the spectrum auction are in addition to the existing Universal Service Obligations that were already borne by licensed operators (Box 10).

Box 10: Universal Service Obligations[136]

Universal Service Obligations (USOs) are placed on South African telecom operators by ICASA to ensure that telecommunications services can be accessible to all, regardless of location or economic status.

For example, since 2009, MTN has invested ZAR 183.1 million to help schools. This includes schools for children with special educational needs, impacting the lives of around 20 000 learners in the country. This includes providing the mandated ICT computing equipment, assistive technology, internet access, hardware and software products that have been developed for learners with disabilities. It also goes beyond the USO requirements by the refurbishing of classrooms into dedicated ICT labs for the benefit of the school and its learners. This includes painting, new ceilings, flooring, burglar bars, security gate, alarm system and height adjustable chairs and desks.

Today, 92% of schools for children with special educational needs (and 78% of all schools) are connected. This achievement is as a result of the USO programme, various initiatives by the Department of Basic Education, and MNOs.

5.A.2 The role of spectrum in supporting investment into digital infrastructure and services

Spectrum policy is critical to the development of the mobile sector and its contribution to the country's development. A number of strategy reviews relating to spectrum policy and regulation are currently being undertaken by the DCDT[137] and ICASA.[138] Two important spectrum issues for the government and ICASA to work together with the sector are a) digital migration and b) the sunsetting of the 2G and 3G networks.

5.A.2.1 Digital Migration

Delays in the digital migration are limiting access to spectrum which could be used to support growth in the digital economy. This will release spectrum through the transition from analogue to digital television. It has been underway since 2006 when the government committed to an ITU deadline of June 2015. However, due to various political, technical, and legal delays, this deadline was not met, leading to multiple missed milestones over the years.

In 2022, the country made substantial progress but is not yet completed. The switch-off of analogue signals in some regions, particularly Gauteng, remains incomplete due to legal challenges and logistical hurdles. In March 2022, South Africa conducted the first spectrum auction in over a decade, assigning long-awaited high-demand spectrum, including the 700 MHz, 800 MHz, and

136 Caj News Africa. 20 September 2024. Opinion turning industry obligations into value added practical efforts.

137 These include the recent Next-Generation Radio Frequency Spectrum Policy for Economic Development and new policy directions to enable investment in broadband infrastructure and services that were recently announced as being prepared by DCDT.

138 These include ICASA's long-term spectrum outlook inquiry and the Draft International Mobile Telecommunications (IMT) Roadmap 2024.

2600 MHz bands, to MNOs. Although the 2022 spectrum auction was a positive step, the prolonged digital migration delays have hindered the country's overall progress in mobile broadband expansion by restricting access to sub-1 GHz spectrum. Easing these restrictions would enhance 4G and 5G deployments and benefit digital inclusion in both rural and urban areas.

The DCDT Minister listed completing digital migration as a priority in the budget vote speech in July 2024. It was stated that he would "convene a series of stakeholder engagements with all key role players to assess readiness towards the scheduled analogue switch off deadline. Our final determination must strike the right balance between the urgency to meet overdue deadlines and the potential risks the sector faces."[139] Successful completion of the digital migration would be a significant step forward for the sector and the country as a whole.

5.A.2.2 2G & 3G Network Sunsetting

The government has been seeking to work with ICASA and MNOs on the sunsetting of 2G and 3G networks for some time. The latest preliminary dates proposed by the DCDT in the Next-Generation Radio Frequency Spectrum Policy for Economic Development published in May 2024 are as follows:

- The prohibition of type approval of 2G and 3G only devices – 30 September 2024
- Prohibition of activation of 2G and 3G only devices on networks - 31 December 2024
- Commencement for the shutdown of 2G and 3G services - 01 June 2025
- Total shutdown of 2G and 3G networks - 31 December 2027

These dates and the process for sunsetting 2G and 3G networks will be confirmed by ICASA and are subject to it conducting an economic and regulatory impact assessment.[140] The date for the first step – prohibition of type approval for 2G and 3G devices is now past and it is understood that the DCDT and ICASA are consulting stakeholders on this schedule.

Table 5 summarises a recent GSMA report on considerations for undertaking 2G and 3G network sunsetting in Sub-Saharan Africa.

Table 5: GSMA – 2G and 3G Network sunsetting in sub-Saharan Africa[141]

Reasons for 2G and 3G network sunsetting	• Refarming spectrum for 4G and 5G upgrades, and in the process increase the efficient use of spectrum resources to meet growing demand for mobile broadband and machine to machine (M2M) IoT services. • Optimises network operations, with potential opex savings from fewer network maintenance contracts with network vendors. • Improves energy efficiency in the network (legacy networks are less energy efficient on a per-gigabyte basis) amid rising energy costs. • Realises capex savings from retiring 2G and 3G networks, which are nearing end of life and require a capex refresh. • Rationalises device portfolios and simplify tariff structures. • Minimises risks associated with the slowing improvements to and maintenance of legacy equipment, some of which is due to lose support within a few years.

139 IT Web. 26 August 2022. Digital migration delays impact SA's ICT development; GSMA. 2022. Digital Switchover in Sub-Saharan Africa; DCDT Minister budget vote speech. 15 July 2024.
140 DCDT. 2024. Next-Generation Radio Frequency Spectrum Policy For Economic Development.
141 GSMA. 2023. Technology Neutrality and Legacy Network Sunsets - The Evolution of Connectivity in Africa.

Important considerations when setting sunsetting plan	• On average, it takes 2–4 years between sunset announcement and actual network switch-off. The transition from legacy networks needs to take place in a manner that is efficient and causes the least amount of disruption. • Shutting down 2G and 3G legacy networks with many subscribers still connected to them risks exacerbating the digital divide. • Ensuring universal 4G/5G coverage is an important prerequisite for legacy network sunsets. Where there are restrictions or onerous conditions for spectrum assignment and refarming current spectrum resources, delays in expanding 4G and 5G coverage are inevitable. • Legacy networks, particularly 2G, were primarily designed for voice services and still account for most voice traffic in Africa. Progress in investment and adoption of IP voice communication VoLTE and 5G Voice Over New Radio over 4G and 5G networks is required. • Affordability of 4G and 5G devices is challenging. Many consumers are still using a 3G smartphone or a feature phone. ARPU in Africa averages just over USD 3, compared to a global average of USD 8. The median affordability of an entry-level internet device in Sub-Saharan Africa is 30% of monthly income (almost twice the global median). For the poorest 40%, this is almost 70% of monthly income. • Overall traffic is decreasing much faster on 3G than 2G networks, as 3G users are generally more likely to upgrade to 4G than 2G users. Spectrum used for 3G can be refarmed for 5G, particularly in 2100 MHz band. • Non 4G and 5G M2M IoT services are predominantly based on 2G rather than 3G network and will require long-term support. • 2G devices have longer battery lives, which is necessary for rural areas with unreliable or unavailable electricity.
Recommendations	• Sunset decision should be guided by the overarching principles of inclusion and minimising service disruption for consumers and businesses. Stakeholder engagement is essential to ensure that different perspectives have been taken into consideration, and (where necessary) mitigation plans have been formulated to support vulnerable users and communities. • Enable refarming of spectrum, contiguous for operators to use it optimally when refarming from legacy networks to 4G and 5G services. • Create a conducive environment to support investment in 4G and 5G networks to enable transition from legacy networks. For example, the level of charges for spectrum use and associated red tape can discourage more efficient use of spectrum, reduce the funds available to invest in 4G and 5G services, and ultimately delay the delivery of the benefits of those technologies for users. • Use policy levers to improve the outlook for key considerations around legacy network sunsets. For example, eliminating taxes on 4G and VoLTE-enabled devices to increase affordability of devices. • Develop a roadmap for essential network preparation requirements, including 4G coverage expansion, VoLTE deployment and roaming agreements. This should align with local market realities and serve as a guide for the timescale of the legacy network sunset. • Consider both push and pull incentives for service upgrades for the most reluctant customers. For example, legacy device trade-in offers and seamless 4G SIM swap arrangements. • Define and communicate plans to support users who may be affected by technology upgrades and legacy network sunsets.

The Association of Comms and Technology (ACT) recently published a report proposing core principles and recommendations for DCDT and ICASA to consider in the determining the 2G and 3G network sunset strategy and implementation plan for South Africa (Figure 2: South Africa GDP per capita, (real terms, index)).

Table 6: Act – 2G and 3G Network Sunset[142]

Core principles	• Consider every single user, industry and consumer to ensure they have prospects of connectivity. • Switching off the 2G and 3G networks should have minimal impact on the costs of both end-users and network operators. • Every step of the switch-off process is made transparent with ongoing engagement with all stakeholders.
Recommendations	• Market-led and collaborative strategy: Sunset of 2G and 3G should be mostly market-led. However, enforcing the migration requires a collaborative strategy, following a step-by-step approach that is measured, and eventually the success of the strategy must inform the sunset dates. • Prohibit the importation of 2G and 3G devices: The first step identified is to deal with the importation of 2G and 3G devices. Department Trade, Industry and Competition (DTIC) will need to ban all importation of these devices, and the Regulator should not authorise any new type approvals of these devices. • Retail circulation: Through coordination with the DTIC, DCDT and ICASA, and before the public notice and transition date, 2G and 3G devices must be removed from the wholesale and retail distribution chain, and the sale of 2G and 3G devices should be prohibited. Further, all consumer protection bodies should be on the look-out and to prevent any heavy discounting of 2G and 3G devices. • Tax of smartphone: Revisit tax policy in terms of premium taxation on importation of smartphones. This is to ensure that smart devices using 4G and 5G are no longer taxed as luxury items. Instead, government should consider incentivising smartphone devices, which will in turn promote interconnectivity and the migration from 2G devices. • Collaboration: Despite the promising futures of 4G and 5G for national development, it is crucial that the transition to these new networks be carried out in a co-operative way. Collaboration between the mobile industry and the government will enable the best possible outcome in the shift to enhance broadband connectivity, expanding access to the advantages of digital services for more people and advancing South Africa towards a future that is inclusive of a digital society. • Using Universal Service Access Funds (USAF): Identifying projects jointly with the DCDT, ICASA and USAASA that can be funded with USAF can unlock low-hanging opportunities to digital inclusion through the 2G and 3G sunsetting programme. This must be accompanied by interventions that remove the obstacles preventing South Africa from achieving universal digital inclusion, so that all South Africans have access to economic opportunities in the digital economy. • Subsidies: Ensure that government introduces a form of subsidies to assist indigent individuals to adopt smartphones, such as subsidised entry-level LTE/4G devices, which meet minimum performance criteria. • Digital literacy: Through NEMISA and social society organisations, assist the elderly and the low skilled in digital skills training as well as in local digital startups and small businesses that create a viable, innovative 4G and 5G ecosystem that can support a digitalised environment in South Africa. This should include training the youth in basic support and maintenance of smartphones. • Device manufactures: Engage smartphone manufacturers as a key partner in obtaining affordable and unique devices that advance digital inclusion. This includes collaboration with manufacturers to find 4G gadget components that are more reasonably priced, making them a wiser long-term investment than older phones. • Public notice, roadshows, and public campaigns: Communication and timely engagement of the public about the changes will be crucial; communication should take place across multiple media platforms. Communication can also take the shape of roadshows and public campaigns that promote new services and raise knowledge of the shutdown while still dealing with previous fake news on 5G and distrust of new technologies. Initiatives to inform consumers about the advantages of 4G/5G over 2G/3G are needed. To get support from the public, such efforts could be led by the DCDT.

142 ACT. 2024. Migration to a 4G and 5G Digital Society - A proposed approach to switching off South Africa's 2G and 3G networks.

Recommendations	• Roaming from neighbouring countries: Engaging neighbouring states on the change in roaming environment is essential. This will also be important to deal with the black market where devices are flowing from neighbouring states. • Promote digital public platforms: Integrating e-gov into smartphone platforms specifically for people in remote areas where government services are not easily accessible is an additional possibility. It is crucial that there is good communication between the public and the government for the successful implementation of e-government strategies. • Rollout and promote new plans and services: Network operators will need to promote and introduce new plans and services where subscribers are offered discounted plans to switch to new services. • Ensure simultaneous switch-off of 2G and 3G of all networks: To prevent customers from switching service providers, and so giving operators the chance to postpone a switch-off, operators must perform a simultaneous switch-down.

These principles and recommendations are also relevant to other spectrum policy issues currently being considered by the DCDT and ICASA. These include issues such as spectrum assignment, spectrum licensing terms and obligations, spectrum refarming, and spectrum sharing. It is essential that decisions on these issues are subject to a comprehensive industry consultation and an evidence-based impact assessment. This will help to ensure efficient spectrum assignment in a way that will create a more sustainable investment environment for the sector to encourage continued investment in connectivity and service innovation and will deliver public benefits and broad-based economic growth.[143]

5.A.3 The cost of building and operating electronic communications networks

Telecommunications networks require continual investment to expand and update them for the latest technology. MNOs and other players spend large amounts of money on network investment. In parallel with this, the cost of operating the networks is a key driver of business performance and financial sustainability. Telecommunications businesses in South Africa face a number of serious challenges in this area arising from difficulties in building new network infrastructure and inflated operating costs.

5.A.3.1 Infrastructure construction procedures

The sector requires continued large-scale investment into infrastructure throughout the country. This includes mobile sites, fibre-optic cables, LEO satellite for underserved areas, datacentres and a wide range of other types of network equipment and facilities. The cost of both capex and opex is elevated in South Africa as a result of the operating environment. This begins with obtaining construction permits from local authorities and the conditions that are attached to those permits.

The lack of uniformity in the process and costs for obtaining wayleaves and other permits from local authorities is a challenge for all operators trying to build network infrastructure. This is a problem common to many countries. Some have attempted to address it through legislation at the national level but this can be difficult if the constitutional arrangements do not allow for national legislation to bind local authorities in these areas – as is the case in South Africa. There could be learnings from India, where it established the NBM to coordinate mobile and fibre broadband infrastructure deployment across public and private land and buildings countrywide, including regulations setting processes and fees and a central ROW process and approvals portal (see Box 8).

Standard by-laws have been approved by government.[144] Industry stakeholders worked with the government to develop standard by-laws that attempt to harmonise the process through which operators interact with lower levels of government regarding the construction of network

143 Further details on the GSMA position on 5G Spectrum are available in: GSMA. 2022. 5G Spectrum GSMA Public Policy Position.
144 Department of Co-operative Governance. 2023. Standard Draft By-Laws for Deployment of Electronic Communications Facilities, Government Gazette No. 48113, page 3.

infrastructure. They provide a standardised framework through which industry operators interact with local authorities. However, they are designed to work on a voluntarily basis with municipalities opting to adhere to them. This has resulted in limited take-up since they were approved.

Progress in adopting the standard draft by-laws faces some challenges. Many municipalities are either unaware of the legislation or not fully cognisant of how their communities would benefit from enhanced infrastructure deployment. To address this, a project is currently underway to support municipalities by offering training and awareness of the importance of digital infrastructure deployment and the ways in which the by-laws could facilitate it (Box 11).

Box 11: Supporting municipalities in the implementation of the standard by-laws[145]

This year, the DCDT launched the Broadband and Digital Skills for Municipalities in partnership with the South African Local Government Association (SALGA) and the British High Commission.

This pilot project is implemented by MANTO consultancy and commenced in August 2024. The objective is to empower municipalities to support the deployment of broadband infrastructure as a means of improving connectivity and enhancing service delivery.

The project will train 120 political and administrative leaders from three provinces: Limpopo, North-West and Eastern Cape. These leaders include mayors, MMCs of Finance, LED and Community Service, Municipal managers, the head of IT, CFO and heads of infrastructure.

The training focuses on the benefits of broadband and the ways in which broadband availability and adoption can be promoted. The project is aiming to increase awareness among local leaders, increase the capacity of local administrations to plan for broadband deployment and to increase the level of adoption of the standard By-Laws for Wayleave Approval.

Ultimately, the objective is to encourage broadband adoption as a means of improving lives and enhancing local service delivery.

Some insights are already available from the project. There is a strong need for a more expansive programme of awareness raising among leaders at the municipal level. There are significant gaps in the understanding of the benefits that broadband adoption could bring to local communities and the steps that authorities could take to encourage it.

This is a welcome initiative and the results and learnings from the pilot could be used to design similar training required for other digital programmes to be implemented across national, city, and municipality administrations.

Other measures have also been taken in order to improve the pace of communications infrastructure deployment and to reduce the negative impacts on local communities. To this end, some authorities have attempted to harmonise network construction and minimise disruption to the public through a "dig-once" policy. Although well-intentioned, and potentially beneficial to operators, in practice this can delay network construction.

The government has also issued a policy to support the accelerated deployment of electronic communications network infrastructure.[146] This is intended to improve the process by which operators get access to private land for the purposes of building network facilities. It attempts to balance the interests of both operators and landowners and define a transparent and orderly process. ICASA is currently developing regulations as part of the implementation of the policy.

145 Stakeholder interview.

146 DCDT. 2023. National Policy on Rapid Deployment of Electronic Communications Networks and Facilities, Government Gazette No. 48346, page 3.

Despite these attempts to improve the processes required for building network infrastructure, significant challenges remain for network builders. Land and property owners are able to change fees at short notice with few constraints. They are also able to introduce new processes which can significantly delay the building of new network infrastructure.

The government is a major landowner in South Africa and controls a large amount of land and property. This land and property could be used for constructing networks, particularly in rural areas and along major transport routes. If access to this land and property could be facilitated, network development would be accelerated.

A further challenge for operators developing new network infrastructure relates to the costs associated with business forums requiring firms trying to construct facilities to work with them and to pay a fee to be able to complete infrastructure projects. The problem of local business forums, commonly referred to as "construction mafia", has been widely reported and is serving to increase the costs of infrastructure deployment across multiple sectors.[147]

5.A.3.2 Energy supply

The sector is dependent on the country's electric power supply. The inconsistency of electric power resulting from loadshedding has compelled the MNOs, along with other network operators, to invest in equipment for self-provision through alternative energy sources such as generators, backup batteries and solar panels. ACT estimates that the total expenditure on alternative energy sources undertaken by its six members[148] was ZAR 4.0 billion in 2023 compared to ZAR 1.9 billion in 2021.[149] Box 12 provides more details on the expenditure undertaken by MTN and Vodacom in this area.

Box 12: Examples of the financial impact and MNO mitigation plans of load shedding	
MTN	Loadshedding hours have increased year on year from 867 hours in 2020 to 6 962 hours in 2023, with a notable reduction to 1653 hours as of June 2024. MTN have spent ZAR 4.5 billion budget directed towards resilience initiatives from 2020 to June 2024. This includes 21 500 batteries, 900 static & mobile generators, 5 100 high efficiency rectifiers, and related security measures.[150]
Vodacom	In Financial Year 2023 alone, Vodacom South Africa spent more than ZAR 4 billion on backup power solutions and ZAR 300 million on operational costs such as diesel for generators. In Financial Year 2024, Vodacom reported electricity prices to have increased by 19%. Vodacom's grid availability decreased by an estimated 23.5% between 2021 and 2023, Vodacom have invested ZAR 5 billion over five years in batteries alone and invested in energy efficiency programme to support class-leading resilience which enabled Vodacom's network availability to only decrease by 2.29% during the same period.[151]

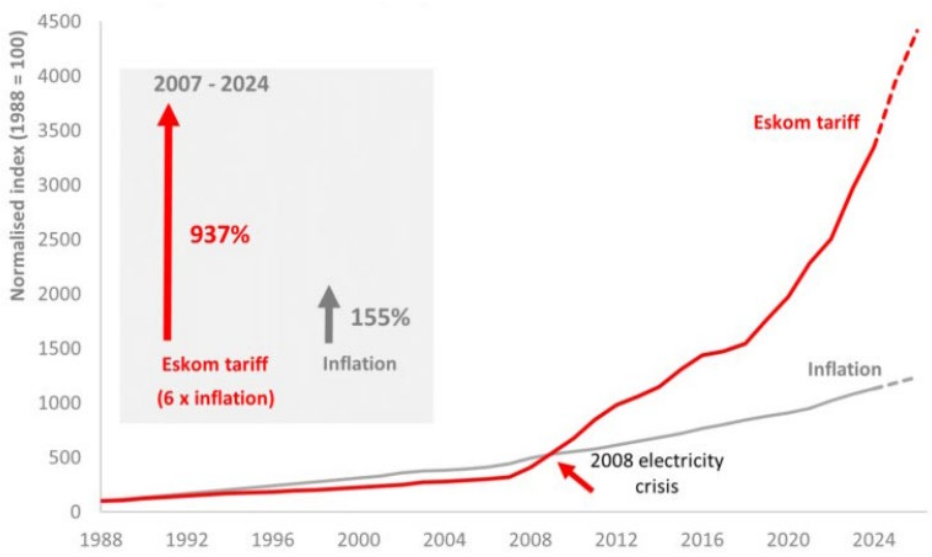
Difficulties arising from load-shedding compound the challenges facing network operators in meeting coverage and public investment targets set by the government. More remote rural areas are challenging to provide coverage in, even when there are reliable power supplies. Load-shedding has increased the costs of providing this coverage, making it even more difficult to sustain commercially.

Aside from load-shedding, the cost of grid electricity has been rising in South Africa for an extended period of time. These rises have been well ahead of inflation since around 2008 when the

147 My Broadband. 4 August 2023. Death threats for fighting construction mafias.
148 Cell C, Liquid, MTN, Rain, Telkom, and Vodacom
149 ACT. 2024. Report Towards Sustainable Energy Provision for Telecommunication Networks.
150 MTN Presentation to the Inquiry on the effects of load shedding and regulatory relief measures, 12 June 2024
151 Vodacom Group Limited. Integrated Report for the year ended 31 March 2024, page 74.

crisis in electricity supply prompted tariff hikes by Eskom (Figure 33). This sustained upward trend in the price of electricity has increased the cost pressures on the mobile operators. Vodacom, for example, reported a 19% increase in the cost of electricity during FY 2023-24.[152]

Figure 33: Eskom average tariffs vs inflation (CPI), 1988-2024



Source: PowerOptimal[153]

Recently, there has been progress in alleviating the problems of electricity supply. Progress in addressing South Africa's energy challenges is being made through the Presidential Energy Action Plan (EAP) and with the reforms to be implemented under the Electricity Regulation Amendment Act 2024. This includes the establishment of a competitive electricity market and the introduction of more significant penalties to protect electricity infrastructure.[154]

Box 13. Reforms under the Electricity Regulation Amendment Act 2024

- Establishment of an independent Transmission System Operator SOC Ltd (TSO) within 5 years to provide an open market platform that allows for competitive, wholesale, or retail buying and selling of electricity. In the interim, the National Transmission Company of South Africa is to act as the TSO.
- Provides for market operation as a new activity to be licensed by the National Energy Regulator of South Africa (NERSA).
- Requires NERSA to develop of a market code that will establish rules to govern the future competitive market, including: principles for the setting or approval of prices, ensure a level playing field for operators, and access to transmission and distribution power system must be objective, transparent and non-discriminatory. As it does so, the regulator may consider factors such as security of supply, the diversity of supply and the promotion of renewable energy.
- NERSA when regulating prices must enable an efficient licensee to recover the full cost of the licensed activity, must allow for a reasonable return proportionate to the risk of the licensed activity, and may provide for incentives for continued improvement of technical and economic efficiency.
- Reinforces the protection of public infrastructure by providing for fines of up to ZAR 1 million or five years in prison – or both – for persons who, among other offences, damage, remove or destroy any transmission, distribution or reticulation cable, equipment or infrastructure; and penalties for persons who unlawfully receive such cables, equipment or infrastructure face fines of up to ZAR 5 million or 10 years in prison, or both.

These reforms are welcomed and are a precedent for other important national infrastructure in the country.

152 Vodacom Group Limited. Integrated Report for the year ended 31 March 2024, page 74.
153 PowerOptimal. 2024. 2024 update: Eskom tariff increases vs inflation since 1988 (with projections to 2026).
154 Office of President of Republic of South Africa press release dated 19 August 2024.

The mobile sector is working pro-actively and collaboratively with government, regulators, Eskom, and other parties on innovative and commercially sustainable solutions to support the objectives of the Electricity Regulation Amendment Act, and to meet the sector's energy requirements. An example of this is Vodacom's "Virtual Wheeling Agreement", agreed with ESKOM in 2023. It enables Vodacom to secure electricity from Independent Power Producers (IPPs) under the same terms and conditions as its agreement with Eskom. In the first phase, this will result in 30% of Vodacom's power requirements being provided by renewable sources and will contribute to their objective of obtaining all electricity from renewable energy sources by 2025.[155] Providing financial incentives and/or reducing regulatory burdens to enable investment in such innovative renewable energy programmes will further support the acceleration of the objectives of the Electricity Regulation Amendment Act 2024.

The Electricity Regulation Amendment Act also provides an opportunity for the government and regulators to adopt measures that will further support the mobile sector's energy requirements, whilst moving towards a greener sector. ACT recently published a report providing recommendations on such measures that they would like the government and regulators to consider (Box 14).

Box 14: ACT recommendations on energy provision for telecoms networks[156]

- A diesel rebate tax relief incentive for MNOs, who have been forced to reallocate their annual expenditure to address load shedding and further impacted by the high cost of diesel, to ensure continued communications for both social cohesion and commercial activity.
- Provide regulatory relief that allows MNOs to temporarily increase their network capacity through the provision of temporary spectrum, similar to measures taken during the COVID-19 period.
- Review anti-competitive regulations related to load shedding, enabling MNOs to collaborate in using common power sources and sharing security at co-located sites.
- Reduce the regulatory burden for licensees, particularly for regulations whose compliance depends on a consistent power supply for optimal network connectivity.
- Ensure that the most critical telecommunications infrastructure is exempted from load shedding whenever possible.
- Declare key telecommunications infrastructure as critical infrastructure and imposing more severe sentences for crimes committed against this infrastructure.

5.A.3.3 Infrastructure theft and vandalism

High rates of theft and vandalism of telecoms network infrastructure are also raising costs and affecting network performance. Intentional network damage has increased significantly during the past few years as criminal syndicates seek to steal batteries and generators housed in base stations. This requires network infrastructure providers to invest in additional security including the replacement of equipment. Vodacom reports an annual loss of around ZAR 100 million due to theft and vandalism. MTN and Telkom reported losses of ZAR 33 million and ZAR 19 million respectively in 2023.[157] These problems are experienced throughout the country in both urban and rural areas and further constrain operators' ability to expand coverage and improve quality of service.

The industry has formed a joint body to coordinate action against damage to networks arising from crime, the Communications Risk Information Centre (COMRIC). This is one of a number of initiatives that have been taken at national and local levels to mitigate the impact of crime on the country's communications networks (Box 15).

155 Vodacom Group Limited. Integrated Report for the year ended 31 March 2024, page 74; Vodacom. 2023. Vodacom and Eskom sign historic agreement to address the energy supply gap in South Africa.
156 ACT. Towards Sustainable Energy Provision for Telecommunication Networks.
157 MyBroadband. Vodacom's R100 million per year theft and vandalism bill.

Box 15: Initiatives to address infrastructure crime-related costs

The industry is working in partnership with the government and law-enforcement agencies to mitigate the financial and operational problems for the networks that are the result of criminal damage, including theft, damage, vandalism and sabotage.

COMRiC is an industry body that was formed to elevate the need for collaboration in the sector to address collectively crime, strategic risks and security issues affecting the sector. Other actions taken include:

- Task teams have been created together with law enforcement officials to focus and have disruptive operations targeting known and identified hotspots.
- Structures such as the Non-Ferrous Crime Combating Committee coordinate efforts at the national and provincial structures of the South African Police Service. Efforts have also been made to address cross-border operations where some of the stolen infrastructure (e.g. tower batteries) are transported across national borders for resale in other countries.
- Industry entities deploy physical and technology related security measures to monitor and gather any intelligence that could assist with arrests and prosecution of criminals.
- Collaboration with Community Policing Forums supports local efforts to reduce crime.[158]
- Awareness campaigns are conducted to educate the public about the infrastructure and the impact that vandalism and theft of the infrastructure has on individuals, society and the economy.

Pieces are in place that can be used to address the impact of criminal acts on telecommunications infrastructure:

- The Criminal Matters Amendment Act specifically addresses infrastructure theft
- The Second Hand Goods Act regulates dealers in second hand goods including metals
- Criminal Procedure Act amendments has extended jurisdiction for infrastructure crime.

Looking ahead, a redoubling of efforts in this area will be needed if the impact of crime on communications networks and – by extension – the digital economy more broadly are to be mitigated. The legislative framework does support efforts to reduce crime in this area and the collaboration between industry and law-enforcement agencies provides an example of how the situation could be improved.

More focus is needed across government and the wider ecosystem of players in the digital infrastructure industry to ensure that criminal damage is reduced in the future.

5.A.4 Improving device affordability and digital skills

The very high levels of unemployment in South Africa together with stagnant economic growth mean that household expenditure is constrained. This is reflected in the flat revenues for the MNOs in recent years and the difficulties that many companies in the digital sector have had in attracting new customers and increasing sales. In addition to this, household budget pressures have led to price-sensitive customers switching to MVNOs and lower-cost means to communicate with high rates of adoption of OTT services. This is putting further pressure on MNOs and other network services providers.

Tax is also a significant contributor to the price that consumers pay for smartphones. The ad-valorem tax on mobile devices when they are imported into the country raises retail prices and creates a barrier to smartphone adoption, particularly among low-income households. Removing this import duty would feed through into lower prices and boost adoption.

The government has identified digital skills as a priority area but the performance of the country in developing them has lagged. Lack of knowledge and understanding of digital technologies is a barrier to adoption for many people in the country. Such lack of training and awareness affects the sector from the basic levels through to higher levels of science and technology. The further growth and development of the digital economy in South Africa will depend on the ability of the country to build digital skills on a broader and deeper basis than has historically been the case.

158 MyBroadband. Good news about mobile networks in South Africa.

5.A.5 Implementing the Digital Masterplan and other policies

The government has articulated ambitious objectives and detailed implementation plans in relation to the digital economy. Most recently, the PC4IR identified significant and far-reaching measures that the government intended to make in order to increase investment and deepen the role of digital technologies in the national economy. The Data and Cloud Policy is similarly ambitious.

In practice, there has been limited progress on implementing many of these policies and the country has failed to move forward at the rate that it could have done, had the requisite steps been taken. For example, the PC4IR recommendations on "Build Infrastructure" and "Update Regulations", and the Digital Masterplan recommendations on infrastructure (with the notable exception of high-demand spectrum auction) and affordable devices programmes have not moved forward at the pace that is needed (Figure 34).

Figure 34: Evaluation of the implementation of the Digital Economy Masterplan

The ICT & Digital Economy Masterplan

Digital inclusion matters: outcomes, actions and timeframes

No.	Item	Recommendation	Status
	Universal coverage of broadband internet at minimum at 10 mb per second and a cost of R399 per month	• Expedite spectrum auctioning	1 year
		• Provide a clear direction regarding the establishment of the WOAN and how the allocation of spectrum will work	1 year
		• Improve the national backbone (backhaul) infrastructure to cover remote areas	3 years
		• Remove the administrative burden of obtaining wayleaves	1 year
		• Provide subsidies to private sector to make last-mile connections to homes and communities	5 years
	Affordable smart devices that allow for streaming content and making transactions in the digital economy	• Establish a device recycling and refurbishing centre for second-hand devices	3 years
		• Upgrade shared public facilities to provide smart device and broadband connectivity access	1 year
		• Utilise and scale up existing incentive packages for the ICT industry that will encourage manufacturing of electronics	3 years
	Local and relevant content is available that benefits and appeals to all users	• Establish the Digital Development Challenge Fund (DDCF) and define the scope of the DDCF to include applications for developing ecosystem	1 year
		• Provide more and better targeted funding for research into the National Language Processing (NLP)	1 year
		• Create new training data through the translation of publicly accessible government documents and services	3 years
		• Support the coordination in the transition and language research and services ecosystem	1 year
	The infrastructure supports to the rollout of emerging technologies	• Create incentives and an enabling environment for the establishment and expansion for data centres and cloud adoption in South Africa	3 years

Association of Comms & Technology

Source: ACT

This lack of progress is slowing down the development of the digital economy in South Africa. Government policies do provide an indication of the direction of travel that it wishes to take. This is useful to investors and players in the sector. However, the lack of concrete action on the part of public stakeholders undermines the credibility of government in this area. It makes it more difficult for stakeholders to make investment decisions and, ultimately, slows down growth.

An example of delays in policy implementation is the previous lengthy delays with the assignment of high demand spectrum. This was finally addressed with the auction in 2022 and has since resulted in operators providing 4G services and now 5G services that are comparable with other countries on the African continent and globally. The DCDT Next Generation Spectrum Policy of June 2024, issued prior to this year's general election, has been cited as not being fully consulted upon with stakeholders and contains area of concern to existing spectrum licensees. Stakeholders have emphasised the importance of the future DCDT policy directions and ICASA's long term spectrum management plans to ensure efficient spectrum use being in line with international standards. This will support long term investment, healthy competition, continued innovation, and will maximise the economic and societal benefits of mobile and digital services.[159]

159 GSMA. 2024. Mobile-Spectrum-Licensing-Best-Practice and Spectrum Policy Trends 2024.

Other examples are the recent amendment bills to the Electronic Communications Act in 2018 (subsequently withdrawn) and in 2023, on which progress has been slow. For reasons outlined, this report recommends that the Act needs to be modernised, however the amendments should be subject to an evidence-based impact assessment and full consultation prior to submission to Parliament. This will help to ensure that there is sector-wide support of the proposed amendments, avoiding the situation faced in recent amendment bills which have either been withdrawn, delayed, or have faced legal challenge.

Improved coordination and collaboration between the DCDT, other government departments, ICASA and the industry is required. This is necessary to ensure that evidence-based policies and regulations are developed through consultation, are clearly targeted to the country's objectives, create sustainable investment conditions and are implemented effectively.

Further, DCDT and ICASA must be strengthened with the required skills and resources to exercise their respective mandates as sector policymaker and independent regulator. This includes the organisation tasked with coordinating the implementation of the digital Masterplan and relevant digital programmes. Some countries have established such an agency in the Office of the Presidency (e.g. Ghana, Zambia) or provided a clear mandate to the sector minister (e.g. India, Kenya, Nigeria) to coordinate across of government authorities.

5.A.6 Reform regulatory framework to enable digital economy

The continual and rapid evolution of technology and business models means that the regulation of the sector also needs to continually change to ensure that it reflects current market realities. Many other countries are moving forward on this, evolving their regulatory frameworks to both reflect the way the market is changing and also to support further digitalisation of the economy.

The electronic communications regulatory framework is now over 20 years old.[160] Since it came into force, the market has changed out of all recognition. Data has long overtaken voice as the primary driver of digitalisation and digital transformation has progressed throughout the economy. The ECA and the associated regulatory framework require updating to support the sector and the growth of the digital economy in South Africa.

Key areas that require reform include:

- Licensing, spectrum and regulatory framework which provides certainty to existing licensees to enable continued investment and innovation to achieve digital socio-economic objectives.
- Licensing and regulatory "level playing field" framework for electronic communications application services, including OTTs, and emerging electronic communications infrastructure, such as Low Earth Orbit (LEO) satellites.
- Regulatory framework for digital identification and adoption of new technologies, such as AI and quantum computing.
- Competition and market regulatory framework, adopting pro-competitive and evidence-based regulation, removing unnecessary regulatory barriers and non-proportional regulation, and promotes market consolidation which enables enhanced investment and synergies to deliver better outcomes for the country.
- Ensuring ICASA's independence as a regulator and that it is provided with required capacity and capabilities to fulfil its mandate.

160 This regulatory framework includes the Broadcasting Act 1999, ICASA Act 2000, Electronic Communications and Transactions Act 2002, Registration of Interception of Communication Act 2002, and Electronic Communications Act 2005.

An update of the regulatory framework that governs the digital economy is an opportunity to address the policy issues that arise from the entry of new technologies and new business models into the market. The financial impact of OTT services on infrastructure-based network operators is well understood. The increased competition and innovation that has come from the entry of OTT players into the market has benefited customers in the form of new services and lower prices. Similarly, the suite of communications services provided by new networks such as LEO satellites is directly competing with traditional network operators, both fixed and mobile.

These developments also have implications for the extent to which network operators are able to continue investing in expanding and updating networks. When combined with the difficult operating environment for network infrastructure, the future levels of industry capex are likely to be threatened.

The modernisation of the regulatory framework is an opportunity to create a level playing field for all players competing in the sector and contributing to South Africa's digital economy. It also provides an opportunity to review the financial sustainability of the industry in the context of increasing cost pressures and social obligations. If the regulatory framework can be used to encourage collaboration between all players in the electronic communications services ecosystem, then the benefits would be felt in the form of more investment into network infrastructure and greater service innovation for customers.

Collaboration and partnership between different players in the digital ecosystem will be essential if the future financial sustainability of the industry is to be assured. A good example of the type of commercial partnership by telecoms and OTT companies - with the support of government and regulators - that can be achieved at the infrastructure and service level is the 45 000 km long 2Africa subsea cable project. This connects Europe (eastward via Egypt), Asia (via Saudi Arabia) and Africa. MTN, Vodacom (through its shareholder Vodafone Group) and Meta are founding partners.

Regulation will need to continue to adapt to new technologies as they evolve. AI is one rapidly evolving technology that is already having implications for regulatory authorities around the world. Some examples of the implications of this are summarised in the GSMA's Responsible AI (RAI) Maturity Roadmap [161] and the G20 AI Principles and programmes undertaken during Brazil's G20 Presidency this year.

161 GSMA. 2024. GSMA launches maturity roadmap as telecoms industry leads the way in the deployment of responsible AI.

Box 16: Extract from Brazilian G20 Presidency supported by UNESCO: Recommendations on Enabling resources for the development, deployment, and use of AI for good and for all[162]

1) Promote international collaboration and multistakeholder partnership

Enhancing exchanges on policies with a view to fostering interoperable frameworks to promote the safe, secure, and trustworthy development and deployment of AI systems in an ethical and responsible way. These frameworks should promote economic growth, technological cooperation and development, as well as safeguard human rights, fundamental freedoms, inclusiveness, equity and accessibility. They should also enhance social welfare, facilitating interoperable approaches to AI to reduce inequalities and foster inclusive sustainable development. This can help to effectively address the challenges and mitigate the risks related to it, including those related to personal data protection, privacy, consumer protection and data governance, placing AI at the service of individuals, economies, societies and the planet.

2) Enhance AI enabling environments and capability building

Strengthening AI enabling environments and enhancing AI capabilities through investments in technology and corresponding infrastructure, as well as in education and upskilling initiatives. Special emphasis should be placed on fostering collaboration with and providing targeted support to low- and middle-income countries and communities, to bridge digital divides, enhance AI-related resources, and improve the countries capacity to determine their own digital and AI future. Promoting cooperation at all levels of AI developments can help spur innovation and foster resilient AI ecosystems globally.

3) Develop governance frameworks and policies

Developing and implementing agile innovation-friendly and forward-looking governance frameworks and policies that promote digital and AI empowerment.

5.A.7 Other policy challenges arising from digitalisation

Digitalisation brings many benefits but also **raises new and important public policy issues which governments, industry, and non-government organisations must work together on to protect citizens' interests and the planet** as part of digital government and digitalisation programmes. Two of these relate to cyber security and the environmental impact of digitalisation.

Cyber security and data protection - in 2023, the African Union Convention on Cybersecurity and Personal Data Protection (Malabo Convention) entered into force. It criminalises a broad range of cyber activities, including hacking, cyber fraud, and identity theft. It also establishes procedures for investigating and prosecuting cybercrime, including international cooperation between African countries. South Africa has led the way Protection of Personal Information and Cybercrime legislation, and MNOs have robust programmes in place.

Environmental impact including circular economy to address e-waste – Mobile operators have commenced climate change programmes. For example:

- MTN aim to achieve net zero emissions by 2040 and achieve a 47% average reduction in absolute emissions (tCO2e) for scope 1, 2 and 3 by 2030;
- Telkom are committed to becoming Carbon Neutral by 2035 and to achieve Net Zero Emissions by 2040; and
- Vodacom aim to achieve net zero GHG emissions from our operations (scope 1 and 2) by 2035, in line with a science-based pathway to limit global warming to 1.5°C by 2100). [163]

162 G20 Brasil 2024 Digital Economy Working Group. 2024. G20 Maceió Ministerial Declaration on Digital Inclusion for All.

163 MTN. 15 February 2021. MTN commits to net zero emissions by 2040 to contribute to a sustainable future; Telkom SA SOC Ltd. 2023. Climate Change Policy Statement; Vodacom Group Limited. Integrated Report for the year ended 31 March 2024, page 105.

A critical part of this is to address e-waste. 50 million metric tonnes (Mt) of e-waste is generated globally per year, and Africa generates 2.9 million Mt of e-waste annually, with only 1% formally collected and recycled. Many governments are introducing e-waste legislation and regulations and are establishing programmes with industry and non-government organisations to enhance collection and recycling of e-waste. Examples in South Africa include:

Box 17: E-waste programmes	
Telkom	Telkom increased our e-waste recycling from 5,427 tonnes in FY2023 to 6 458 tonnes in FY2024. This was mainly due to ongoing decommissioning of legacy equipment. E-waste is a source of income for waste collectors and handlers. Telkom sell cabling to a leading e-waste recycling organisation, which processes the cabling using environmentally and socially responsible techniques that do not use chemicals or burning. This sensitive, labour-intensive process provides employment and empowerment for an Eastern Cape rural community through Telkom's Thembani project. 22 families rely on this project as their sole source of income. Telkom also sell copper recovered from the recycling process on local and international markets. Telkom launched a Device Trade-in Programme in November 2022. The programme promotes sustainable reuse and recycling of technological devices, and also involves educating customers about repair warranties and extended warranties on certain devices to extend lifetime of device use.
Vodacom	Vodacom's electronic waste goals are to reuse, resell or recycle 100% of our network waste by 2025. Programmes include: • recycle obsolete equipment responsibly using approved recycling agencies; • use certified local service providers to dispose of our telecommunication equipment when the useful life is exhausted; • Obsolete batteries, classified as hazardous waste, go to a licensed facility for incineration; • RedLovesGreen campaign encourages customers to return their devices to be repaired, refurbished, resold or sent for recycling (depending on model and condition); • Encourage customers to consider buying second-life devices. Refurbished devices are either repackaged, certified Good as New and sold with a six-month warranty or donated to a Vodacom-supported school; • Eco Rating labelling on devices helps customers make more conscious and sustainable purchase; and • Use Eco-SIM, which is half-sized SIM card made of recycled plastic, and move to e-sim.[164]

164 Stakeholder interviews. Vodacom Group Limited. 2024. Integrated Report for the year ended 31 March 2024, page 107.

B. POLICY RECOMMENDATIONS

Core policy recommendations

To realise the full potential of digital economy in South Africa, this report identifies 6 core policy recommendations:

Policy area	Recommendation
1. Sustainable investment policies and decisions	**Measures to enable a sustainable investment environment and reduce regulatory constraints on digital and tech sector companies should be included in the proposed new policy directions** that the Minister of Communications and Digital Technologies recently announced.165 These proposed policy directions, and the 2025-2030 strategy reviews currently being undertaken by the DCDT and ICASA, need to be focused on enabling sustainable investment conditions, promoting innovation and adoption of new digital technologies, and achieving the country's digital socio-economic objectives. **They must involve evidence-based socio-economic impact assessments to determine how they will impact all stakeholders,** including government, businesses (including MNOs, MVNOs and MSMEs), labour, civil society and other aspects of the economy. This should include an evaluation of how the existing macro-economic conditions will impact the proposed strategy. The development of such policies and decisions should: • Be anchored in a common vision to ensure that they are coherent across multiple sectors • Be consistent and aligned across all policies and decisions • Articulate the trade-offs inherent in the policy • Have longevity and should not change with changes in political leadership Investors are attracted to long term policy certainty, which allows them to understand the risks associated with the investment and to put in place interventions to mitigate the risks. By adopting this approach to developing policy and guidelines, the government will deliver sector stability, policy and regulatory certainty and will create an environment that attracts long-term investment. This approach also should apply to the other recommendations in this report, including spectrum policy, national infrastructure, implementation of the Digital Masterplan, device affordability and skills development and modernising the regulatory framework.
2. Spectrum policy decisions which promote investment to enable digital objectives	**DCDT's new spectrum policy, ICASA's long term spectrum outlook and ICASA's future IMT spectrum roadmap must ensure efficient spectrum assignment and must take a balanced approach to setting the terms of such assignments** (notably fees and social obligations). This includes: • Establishing a robust oversight framework involving DCDT, ICASA, MNOs and broadcasters to complete the digital migration process. • Implementing a market-led and collaborative strategy for the sunset of 2G and 3G networks using the ACT's core principles and recommendations as framework. A similar approach should apply to all decisions on spectrum assignment, spectrum fees and obligations, spectrum refarming, and spectrum sharing. By doing so, the government will create a more sustainable investment environment for the sector and will encourage continued investment in connectivity and service innovation.

165 DCDT. 2024. Minister Solly Malatsi on making broadband connectivity South Africa's top empowerment goal.

ICASA should issue the rapid deployment regulations (currently under consultation). This will provide more harmonised and efficient processes for access to all public and private land across all municipalities.

As part of these rapid deployment regulations, ICASA should develop harmonised and efficient administrative processes, including cost-based fees for wayleaves and site rentals.166 This needs to be done in conjunction with the National Planning Commission, SALGA, and other relevant government agencies with the relevant constitutional and legal mandate.

Subject to learnings from the Broadband and Digital Skills for Municipalities Pilot, a programme of support in this area should be deployed across all local government administration.

The government and regulators should work with the sector to evaluate and adopt the **measures proposed by ACT to further support the mobile sector's energy requirements.** These are focused on delivering reliable and high quality connectivity for telecoms and digital services whilst moving to a greener sector.

3. Measures to provide more effective deployment, energy supply, and protection to electronic communications networks

They include:

- Ensuring most critical telecoms infrastructure is exempted from load shedding whenever possible.
- Providing a diesel rebate tax relief
- Reducing regulatory burdens for licensees especially where compliance depends on consistent power supply for optimal network connectivity
- Providing incentives for investment in innovative renewable energy programmes to support the objectives of the Electricity Regulation Amendment Act 2024.

Critical infrastructure status should be adopted for the telecommunications sector to address the increasing impact of vandalism and theft. Stronger penalties and prison sentences are needed to deter criminals who damage telecommunications infrastructure and those who purchase stolen infrastructure. Such provisions in the Electricity Regulation Amendment Act 2024 should be adopted for the telecommunications sector.

Continued cooperation between the Communications Risk Information Centre (COMRIC), police and national security agencies is also needed to support effective enforcement of the legal framework.

It is also recommended that, as South Africa prepares to take that the G20 Presidency, the learnings from India's Digital Public Infrastructure and its broader Digital India programme are evaluated to understand how they can be utilised for South Africa's digital infrastructure deployment where relevant.

166 Werksmans Attorneys. 18 September 2024. Is Government Moving in the Same Direction: Will Rapid Deployment of Electronic Communications Networks Facilities Be Realised Soon?

4. Progress digital adoption through increasing device affordability and digital skills	**Accelerate the Digital Masterplan programme for affordable smart devices.** This should include: • Revisit the taxes applied to imports of smartphones. This is to ensure that devices using 4G and 5G are no longer taxed as luxury items. • Establish a device recycling and refurbishing centres for second-hand devices. • Utilise and scale up existing incentive packages for the ICT industry that will encourage manufacturing of electronics and devices in South Africa. **Progress the National Digital and Future Skills Strategy of the National Skills programme.** The new DCDT Digital Skills Forum should be used to promote public-private partnerships, coordination, and oversight of the implementation of digital skills development programmes. These should target people working in government and MSMEs, youth, women, and people who are low skilled or otherwise disadvantaged. Such programmes should ensure they incorporate the learnings from established programmes from government, NEMISA, MNOs, and other organisations
5. Implement Digital Masterplan and other policies	**As DCDT updates the Digital Masterplan, it is important that progress is made on implementing current programmes** such as infrastructure, digital government, digital skills, device affordability, and reforms to enable investment and remove regulatory barriers. The government should ensure that there are the required resources and capacity in the Digital Masterplan programme management office. There should also be a clear mandate from the Presidency and the cabinet, government departments, ICASA, and other regulatory authorities to enable effective implementation and coordination of the Digital Masterplan and other relevant programmes. It is also recommended that the learnings from India's Digital Public Infrastructure and its broader Digital India programme are integrated into the implementation of South Africa's Digital Masterplan and other policies.

6. Reform regulatory framework to enable digital economy	As recommended by PC4IR, **the Electronic Communications Act (ECA) and supporting legislation should be reformed to enable digital economy**. Key areas include: • The licensing, spectrum and regulatory framework which provides certainty to existing licensees to enable continued investment and innovation to achieve digital socio-economic objectives. • The licensing and regulatory "level playing field" framework for electronic communications application services, such as OTTs, and emerging electronic communications infrastructure, such as LEO satellites. • The regulatory framework for digital identification and adoption of new technologies, including AI and quantum computing. • The competition and market regulatory framework, adopting pro-competitive and evidence-based regulation, removing unnecessary regulatory barriers and non-proportional regulation. This should promote market consultation which will support enhanced investment and synergies to deliver better outcomes for the country. • Ensuring ICASA's independence as a regulator and providing it with required capacity and capabilities to fulfil its mandate. **Such reforms should be subject to an evidence-based impact assessment and full consultation prior to submission of an amendment bill to Parliament to ensure that there is sector-wide support of the proposed reforms.** **With regard to OTT**, this proposed assessment and consultation to modernise the ECA and other relevant legislation is an opportunity to create a level playing field for all players competing in the sector. It can also support an enabling framework for commercial collaboration between all players in the digital economy, promoting investment into network infrastructure and service innovation. **With regard to AI**, it is recommended that the country benefits from the learnings from the G20 AI Principles and programmes undertaken during Brazil's recent G20 Presidency, and also the GSMA's Responsible AI (RAI) Maturity Roadmap.

These policy recommendations, if adopted, will make a significant contribution to growing the digital economy in South Africa. Underpinned by ubiquitous and affordable mobile broadband, it will continue to be a major contributor to economic transformation and shared prosperity in South Africa. These could also inform South Africa's preparation for the G20 Presidency, an important opportunity to shape global digital policy and promote South Africa as a country to partner with and invest in.

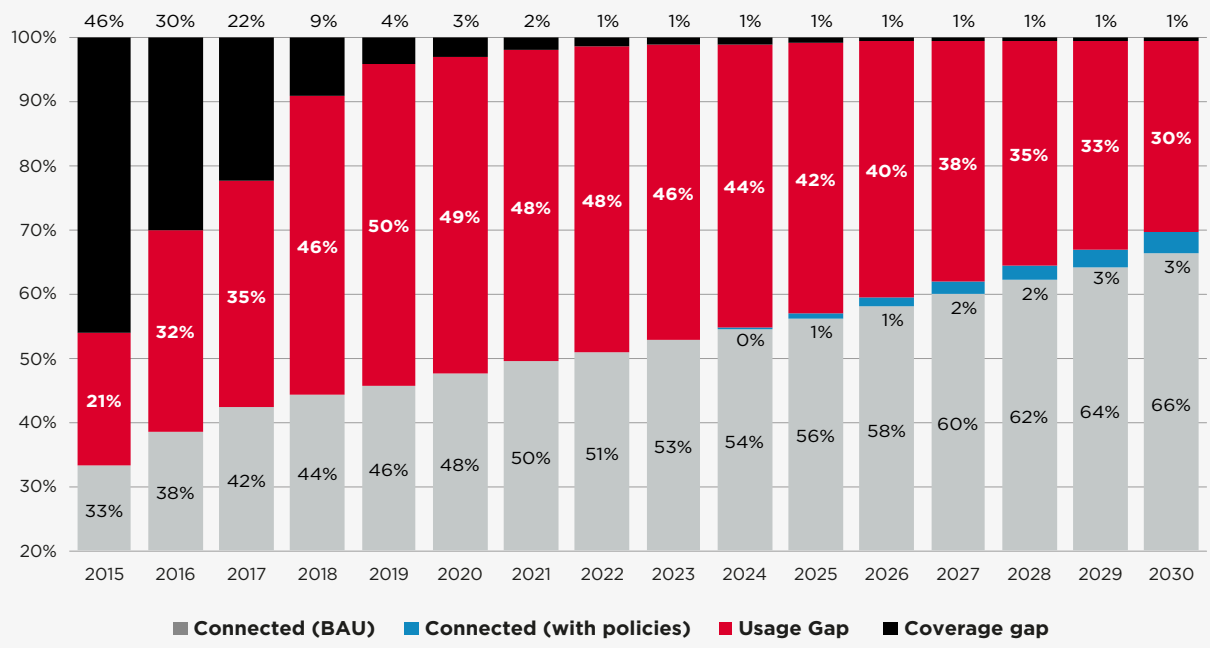
Impact of the policy recommendations

The policy recommendations outlined above will support competition and financial sustainability in the mobile sector both in the short and the medium-term. This will ensure that the digital economy continues to make a major contribution to South Africa's growth and development.

All of the policy recommendations will serve to boost digital adoption and accelerate digital transformation in the country. Some of the recommendations will have a direct impact on digital adoption through stimulating demand and increasing affordability. These will serve to close the usage gap in South Africa over the medium-term. In particular, policy recommendations under 3 will reduce operating costs for the MNOs in South Africa which will ultimately feed through into lower prices and greater affordability. Policy recommendations under 4 will also increase affordability – by removing the ad-valorem tax on devices, handset retail prices will be reduced and this will feed through into faster rates of adoption of 4G and 5G. The policy recommendation on digital skills will also increase demand for digital and increase adoption.

Together, these policy recommendations – if implemented – will accelerate the adoption of mobile broadband and thereby close the usage gap by 3 percentage points by 2030.[167] This amounts to reducing the usage gap among adults by approximately one-third.

Figure 35: Evolution of the Usage Gap in South Africa (% of total population), 2014-30



Source: GSMA

Note that the percentage connected is calculated as the number of unique mobile internet users in South Africa, divided by the total population. The usage gap is the percentage of the total population who have mobile internet coverage but are not using the internet.[168]

167 Three effects are estimated: (1) The impact of removing the 9% ad-valorem tax on smartphones. This is calculated as described in the methodology report: GSMA, Driving digital transformation of African economies: Evidence and methodology document, May 2024. (2) The impact of halving the costs associated with alternative energy provision and losses through theft and vandalism. The impact assumes an 85% cost pass-through, as described in Driving digital transformation of African economies: GSMA, Evidence and methodology document, May 2024. (3) The impact of increasing digital skills. This is estimated to increase the rate of adoption of mobile internet by 15%, based on: GSMA, Mobile Internet Skills Training Toolkit: Tigo Rwanda Pilot Evaluation, December 2017; GSMA, Mobile Internet Skills Training Toolkit: Banglalink Pilot Evaluation, May 2019; GSMA and MTN, MTN Data Smart: Increasing mobile internet access and use through digital skills training, 2021.

168 The GSMA estimates that 53% of the total population were "Connected", i.e. were unique users of mobile internet services in 2023. This is equivalent to 74% of the adult (aged 15 and over) population.

GSMA

GSMA Head Office
One Angel Lane
London, U.K.
EC4R 3AB
United Kingdom
Tel: +44 (0)20 7356 0600
Fax: +44 (0)20 7356 0601