



Leapfrogging

Mobile phones and broadband—a big leap for Africa

Jakkie Cilliers

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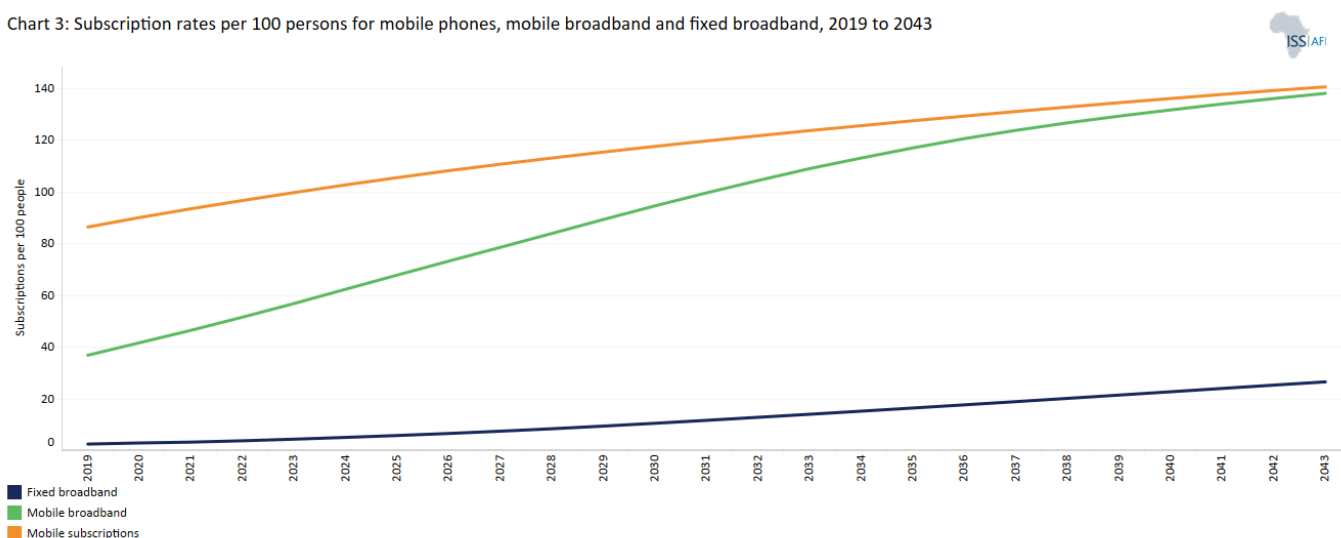
All information and communication technologies (ICT) improvements impact positively on the economy, from more fixed telephones and more mobile phones to better Internet use, fixed broadband and, most positively, access to always-on mobile broadband.

Mobile technology prices dropped by about 40% globally and nearly 60% in Africa in the last five years of the 20th century, as did the demand for costly fixed telephone lines. This led to rapid improvements in the proportion of the population with access to a mobile phone without much additional cost to the consumer. It also allowed governments to focus on other priorities.

In 2000, Nigeria's 122 million inhabitants had little more than 553 000 fixed-line phone connections. This number has roughly doubled since taking the ratio of fixed lines to 100 people to about 0.6. But mobile phone **subscriptions** have gone through the roof, now at 91 per 100 people. If these are smartphones with mobile broadband, users can access digital education and online advisory services in the health and agricultural sectors. Leapfrogging means the democratisation of knowledge.

Chart 3 compares the rate of subscriptions per 100 persons for fixed broadband, mobile broadband and mobile phone subscriptions for African countries and other regions. It shows the extent to which mobile phone subscription rates in Africa have increased rapidly while that for mobile broadband is also improving steeply. While mobile Internet access is expanding rapidly, businesses generally require the speed and reliability of fibre and other broadband lines—areas in which Africa trails significantly but with the potential for rapid increases as household electricity access and internet access through satellites and other large-area coverage expands.

Chart 3: Subscription rates per 100 persons for mobile phones, mobile broadband and fixed broadband, 2019 to 2043



Source: IFS 7.84 initialised from ITU data

Globally, Africa has the lowest **internet penetration** rate, at only 33%, although it is a significant increase from only 7.6% in 2009.

Young Africans in urban areas are well connected, with about 80% owning their mobile phone and most using it daily. While more than half of households in Morocco, Mauritius, South Africa and Seychelles have **Internet access** at home, in Liberia, the DR Congo, Congo, Guinea Bissau and Eritrea, that number is less than 3%. Sub-Saharan Africa still trails the rest of the world in mobile subscriptions, but the gap is much narrower now than when fixed-line technology dominated.

Compared to internet usage, mobile phone penetration is much higher. Although only about half of Africans own a mobile phone, another 15–20% do not have access to one, making the mobile phone access rate about 65–70%. The [paradox of poverty](#) is that more Africans have access to mobile phones than anything else, including electricity or improved sanitation.

The result is that in this domain, mobile telephony, many in Africa and Asia, were able to partially leapfrog expensive and time-consuming technologies and to achieve a degree of catching up with other parts of the world. Moreover, much of the mobile network in Africa was largely built by the private sector, illustrating the potential of markets here to attract foreign investment under the right conditions. The continuation of these investments will shortly enable mobile phone subscription and Internet access rates in sub-Saharan Africa that would have seemed unthinkable a few decades earlier.

Broadband, or high-speed, always-on Internet connectivity, is a powerful general-purpose technology, although it requires a certain penetration threshold before significant impact is discernible. Thereafter, it drives widespread changes in the IT sector, enabling services such as cloud computing and AI. Furthermore, there is no clear finding about diminishing returns at higher levels as it influences innovation across many other sectors, including health, transport and government. Studies differ, but generally, with a 2016 background paper for the World Development Report reporting that a 10% increase in national [broadband penetration](#) results in an [increase](#) of 0.6 to 2.8% of GDP. A recent [World Bank blog](#) summarized findings from a range of studies that internet access likely drives economic development on both the supply side and the demand side of an economy since digital connectivity directly affects productivity and access to markets. The productivity gains of the internet vary considerably across different contexts, however, as does its role in building skills and students' academic achievements.

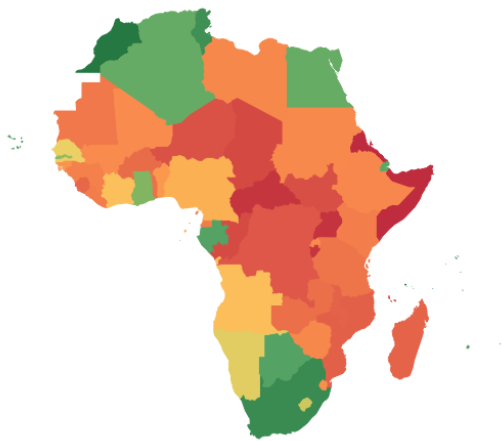
Increased mobile phone penetration guarantees further innovation and additional investment, currently unavailable in many rural areas. Given the potential of Africa's large population as the last remaining unconnected market, large IT companies are all trying to achieve a first-mover advantage. Google was one of the first to try with Project Loon, which sent a fleet of balloons into the stratosphere to beam Internet service to people below but abandoned that effort two years later. Other tech giants such as SpaceX, Facebook and various [SoftBank](#) startups are trying different approaches involving satellites, drones and blimps, respectively.

Then there is the 37 000 km undersea cable that Facebook and a host of partners are building around Africa to connect 35 countries in Africa, the Middle East and Europe. The project, dubbed 2Africa, will provide nearly three times the total network capacity of the subsea cables currently serving Africa and is scheduled for completion in 2024. That effort is in addition to a project by Google, [Facebook](#), MTN and China Mobile that recently completed an underwater cable called [Equiano](#), connecting North, West, Central and Southern Africa with Europe.

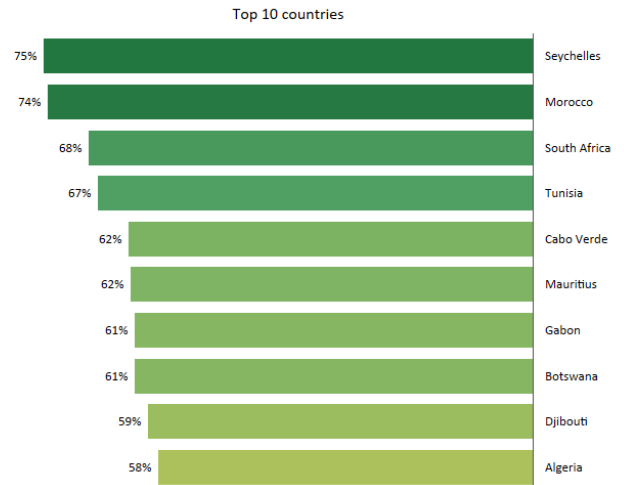
Perhaps the most exciting [projects](#) were announced by the telecommunications firm AST & Science and more recently [Starlink/Jumia](#). The former is a partnership with Vodafone, through which AST & Science plan to establish a space-based mobile network (AST SpaceMobile) to connect directly to 4G and 5G smartphones without needing specialised hardware such as ground antenna systems. The first phase of the project aims to transform mobile network coverage north and south of the equator, where Vodafone will integrate its technology into existing brands in the DR Congo, Ghana, Mozambique, Kenya and Tanzania. The second partnership, between Space Exploration Technologies Corp Starlink and e-commerce company Jumia Technologies AG, started in Nigeria to sell terminals in areas that lack formal addresses and city mapping, linking the portable terminals capable of connecting to Starlink's network of thousands of small satellites low-earth orbit satellites. Jumia plans to eventually sell Starlink's products in the 11 African countries where it operates.

Internet access in and to Africa is set to explode.

Chart 4: Percent of the population using the internet, 2019



Source: IFS 7.84 initialising from ITU dataSource:



5G networks will have almost no delay, be at least a hundred times faster than 4G networks and be able to serve a hundred times more devices within a square kilometre. Together with AI it will allow driverless cars to make decisions through the cloud, robots to become more common and doctors to perform more complex operations remotely as precision transforms healthcare, enabling health systems to provide more targeted and accurate diagnoses and treatments.

Moving to 5G will, however, require a step change in infrastructure roll-out and much more rapid technological shifts. A 2020 GSMA Mobile Economy report showed that 3G will remain the most dominant network (58%) for the 1.05 billion mobile connections projected in Africa by 2025. 'The focus in the near term for operators and other stakeholders is to increase 4G uptake,' the report states. Indeed, 4G connections are expected to account for only 27% of mobile connections by 2025—up from 4% today.

The road ahead is a long one, but providing household electricity and then Internet access to all of Africa could unlock rapid progress, including in the financial sector.

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About the authors

Dr Jakkie Cilliers is the ISS's founder and former executive director of the ISS. He currently serves as chair of the ISS Board of Trustees and head of the African Futures and Innovation (AFI) programme at the Pretoria office of the ISS. His 2017 best-seller *Fate of the Nation* addresses South Africa's futures from political, economic and social perspectives. His three most recent books, *Africa First! Igniting a Growth Revolution* (March 2020), *The Future of Africa: Challenges and Opportunities* (April 2021), and *Africa Tomorrow: Pathways to Prosperity* (June 2022) take a rigorous look at the continent as a whole.

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