THE STATE OF ICT IN MOZAMBIQUE 2018

ALISON GILLWALD, ONKOKAME MOTHOBI AND BROC RADEMAN

RESEARCH ICT AFRICA

RIA Policy Paper No. 6, Vol. 5, After Access
The state of ICT in Mozambique
https://researchictafrica.net/2019_after-access_the-state-of-ict-in-mozambique/
January 2019

SERIES EDITOR: ALISON GILLWALD
Assistant to Editor: Broc Rademan
Proofreading and style editing: Jenny Schnetler
Layout and design: Karen Lilje

communications@researchictafrica.net
Research ICT Africa
409 The Studios, Old Castle Brewery, 6 Beach Road,
Woodstock, 7925, Cape Town, South Africa
Tel: +27 21 447 6332 | Fax: +27 21 447 9529

IDRC ❋ CRDI
International Development Research Centre
Centre de reserches pour le développement international

EXECUTIVE SUMMARY

Mozambique has a challenging path ahead if it is to realise the full potential of the ICT sector in developing its economy and to make progress on the information communication technology targets that are intended as enabling the achievement of the United Nations' Sustainable Development Goals. Mozambique's successes include licensing and regulatory achievements in telecommunications, which have stimulated competition and contributed to meeting national policy objectives.

Vietnamese-backed Movitel has shaken up the Mozambican mobile market with its high-investment, low-cost business model – creating the largest 2G/3G network in the country and winning an unprecedented third entrant share (29%) of the subscriber-based market in its first year of operation.

Incumbents Vodacom and MCel have faced intense competition from the late entrant, with MCel being close to exiting the market. However, Vodacom gained a giant share of the market (41%), compared to Movitel (29%) and MCel, which moved down to 30 percent. The latter was the first market entrant and enjoyed the largest number of early subscribers, but was the most affected by the introduction of SIM registration requirements, which removed large numbers of unregistered users from the network.

Prices for data and voice have fallen dramatically with the introduction of the third competitor and Mozambique now ranks 24th out of 49 countries on RIA's African Mobile Pricing (RAMP) Index. Nevertheless, it places third on the 1GB prepaid mobile data index.

Vodacom initially responded to this pricing pressure by investing significantly in its network and competing against Movitel on service quality rather than attempting to compete purely on price. This has proven to be a successful strategy in other African markets in which Vodacom operates, but there is little depth to the upper end of the market where people can afford to pay a premium for service quality. Without this demand in the market's top end, competition for

subscriber numbers has forced all operators to lower their prices to enable them to increase revenue and scale their operations.

The inability of the incumbent mobile operator, MCel, and the fixed line incumbent, TDM, to respond to these pressures has resulted in a decision by the Government to merge the two operations by the end of 2018.

While mobile phone ownership (voice services) stands at 40 percent, Internet penetration is only at 10 percent. The main reason given for not being on the Internet is the high cost of Internet-enabled devices. Like other least-developed economies, Mozambique, Rwanda and Tanzania have not reached the 20 percent critical mass needed to enjoy the network effects of ICTs associated with economic growth and development, and to harness the opportunities for the public and private sectors provided by the digital economy.

Effective regulation of open and competitive markets by the Instituto Nacional das Comunicações de Moçambique (INCM) will drive affordable access to broadband networks. However, it is clear that the majority of citizens are unable to afford devices or to use broadband in the always-on, high-speed way they were intended and required to deploy cost-saving and secure cloud services, over-the-top voice and text substitutable communications services, as well as the online services that reduce transaction costs. It is recommended that any excise duties on entry-level, Internet-enabled devices be removed to meet the pent-up demand for Internet in the country that is currently constrained by the affordability of devices.

Incentivising the extension of backbone and backhaul networks outside of the major provincial capitals by, for example, aggregating public demand in unserviced areas and through the provision of government anchor tenancies is also recommended. These points of presence can be used for the rollout of public access points for citizens.

At the same time, the country will have to develop demand-stimulation strategies such as the

development of user skills through e-schools and e-literacy programmes, in addition to the development of relevant local content in domestic languages. This will stimulate demand and move the country towards gaining the critical mass necessary for the network effects associated with economic growth and development.

An enabling and integrated legal framework for cybersecurity and electronic transactions, including data protection and privacy, and cybercrime, as well as responsive systems and the capacity to respond to threats, enforce legislation, protect citizens' rights and deal effectively with related offences (including detection and prosecution) are key to stimulating demand and protecting its growth among users.

CONTENTS

TABLES AND FIGURES

TABLES

FIGURES

1 INTRODUCTION

The telecommunications market is structured around four vertically-integrated operators, including fixed-line incumbent, Telecomunicações de Moçambique (TDM). Mozambique's situation is rare in Africa in that it has inter-platform competition in most of the provincial capitals, and TV Cabo offers an alternative to mobile broadband. With no voice services, its telecommunications services are licensed as an Internet service provider. Internet packages offered by TV Cabo are priced higher than mobile operators, but they offer much higher bandwidth and data caps[1]. Depending on the contention ratios between mobile operators, the speed offered is likely to be much higher than the effective mobile data bandwidth offering with a cap that is six times the size.

Despite Mozambique being one of the first countries in the region to liberalise its telecommunication sector, the market did not take off initially with negative monopoly effects in the fixed market and, until the entry of Movitel into the market seven years ago, persistent duopoly effects in the mobile market. This resulted in a highly concentrated market without effective competition or the associated consumer welfare benefits.

Although the market is considered open, the fixed telecommunication market has remained uncompetitive, with the incumbent operator, Telecomunicações de Moçambique (TDM), being the only player in the fixed-line market. Due to poor infrastructure, the country has an extremely low fixed-line penetration rate of less than one percent (RIA After Access survey data, 2017).

Competition in the mobile market increased following the launch of the third player Movitel, a joint venture between the Viettel Group of Vietnam and Mozambique's SPI (Management and Investment), a holding company of Mozambique's ruling Frelimo Party, in 2011. This ended the duopoly of Vodacom Mozambique and mCel, the incumbent mobile subsidiary of the national operator, TDM.

Having won the licence bid on the basis of its focus on the underserved rural areas and particularly the war-ravaged northern provinces, Movitel launched in 2012, focusing on its rural supply chain by rolling out 153 shops, 12 600 agents and points of sales, and nearly 4 000 direct sales staff in the rural villages. The entry of the third player put pricing pressure on the entrenched duopoly, initiating price wars and significant price decreases in 2012 and 2015. The first market entrants came under such pressure and prices dropped so dramatically that the regulator, Instituto Nacional das Comunicações de Moçambique (INCM) introduced a price floor to stabilise the market.

ICT policy, regulation and implementation are spread across multiple government departments and organisations. The Ministry of Transport and Communications is responsible for telecommunications policy. Responsibility for 'ICT policy', which more conventionally includes the converging telecommunications and broadcasting or content sectors, but in this case refers to information technology (IT) and public sector use thereof, resides within the National Institute of Information Communication Technology (INTIC) – housed in the Ministry of Science and Technology.

A review of the Telecommunications Act of 2004 was launched in 2012 by the Ministry of Transport and Communications (MTC) with a series of public consultations. However, there was a delay in promulgating the new telecommunications law, which meant that sector developments have not been able to optimise global technology and service innovation.

The Mozambican Government is, however, aware of the limits to coordination in the sector. Although the change in administration following the 2015 elections created some disjuncture, there appears to be renewed momentum with the latest telecommunications bill being passed by Parliament in June 2016 and the Electronic Transaction Law also going before Parliament after approval by the Council of Ministers on 5 April 2016.

---

1   The lowest-priced package costs USD22.69 and offers equal upload and download speeds – 512kbps – with a 6GB cap.

2

PENETRATION AND GNI

Mobile phone and Internet penetration are highly correlated with GNI per capita. Relatively developed countries are more likely to have the right mix of infrastructure and human capital required to develop the telecommunication industry. It is perhaps not surprising that together with the other least-developed African countries in the 2017 After Access Survey conducted across 16 countries in Global South, Mozambique had among the lowest mobile phone and Internet penetration rates. Rwanda (with 50%) has a higher mobile phone penetration rate than Mozambique (40%), but an even lower Internet penetration rate at nine percent to Mozambique's ten percent.

This finding is perhaps surprising, because people and Mozambican authorities may be more familiar with the supply side indicators produced by the International Telecommunications Union (ITU) and which, because it is only global data available, is used not only in the ICT Development Index, but also in other indices such as the WEF Network Readiness Index, GSMA's Mobile Connectedness Index and Facebook EIU's 3i.

The ITU estimate is based on information collected from countries' regulatory authorities, which comes from the mobile operators. The ITU indicator counts the number of active SIMs rather than measures unique subscribers and tends to overestimate penetration levels, especially in Africa where the majority of mobile subscribers use more than one SIM card. In prepaid mobile markets, it is simply not possible to get accurate supply side data on the number of users. National representative demand side data from household and individual user surveys is the only way in prepaid mobile markets to establish the exact number of people with mobile phones or who are online through public access points. It is also the only way that data can be disaggregated by sex, income, education, age, urban or rural locations, which is required for policy and regulatory purposes. This is also the only way to determine progress made towards attaining the ICT targets that underpin several of the United Nations' Sustainable Development Goals (SDGs).
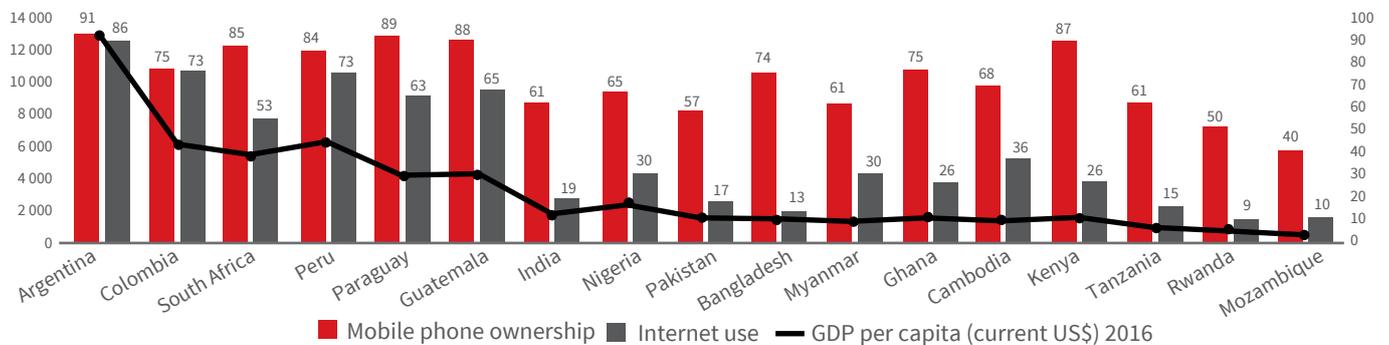
Figure 1: Mobile phone ownership, Internet use and GNI per capita
Source: RIA After Access survey data, 2017; World Bank, 2018
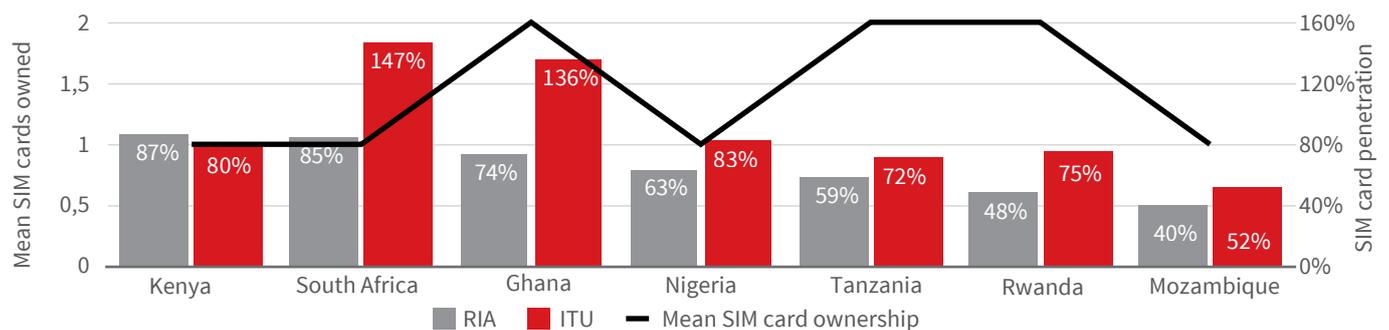
Figure 2: Comparison of ITU active subscribers against 2017 RIA After Access survey data
Source: RIA After Access survey data, 2017; IDI, 2017

2 MOBILE OPERATOR REVENUES, MARKET SHARES AND PRICES

Table 1 shows that the telecommunication revenue has been decline in Mozambique, and has only started recovering in 2017. This is very concerning at a time when massive investments are required to build out next generation networks and to get broadband coverage across the country. The decline in the sector's revenue is attributed to a significant drop in the fixed line revenue, which dropped by 83 percent between 2011 and 2016. While the mobile sector revenue increased in the periods 2011 and 2014, it declined from there, reaching its lowest level in 2016. The decline in mobile revenue may be attributable to pricing pressure from the third entrant, Movitel, in the saturated voice market, while operators in Mozambique have not transitioned to generating significant revenues from data as they have in more mature mobile data markets.

In 2011, the incumbent, mCel, controlled 63 percent of the mobile revenue. Due to competitive pressures from Vodacom and Movitel, mCel was unable to sustain its dominance in the market. Vodacom increased its revenue share from 36 percent in 2011 to 52 percent in 2016, ultimately becoming the dominant operator in the market.

Table 1: Operator revenue (USD '000 000)

	2011	2012	2013	2014	2015	2016	2017
Vodacom	192	237	217	305	214	171	247
mCel	339	300	282	212	149	71	62
Movitel	–	68	106	172	129	88	99
TDM	246	116	116	109	82	41	50
Total	775	721	721	798	574	370	458

Source: Ministry of Transport and Communications/Instituto Nacional das Comunicações de Moçambique (INCM), 2017

The low-cost service strategy adopted by the third entrant, Movitel, helped it to win a significant revenue share, primarily from mCel, gaining about 11 percent in 2012 and subsequently increasing its revenue share to 27 percent in 2016, leaving mCel with only 21 percent of the total mobile revenue (see Figure 3).

In 2018, Vodacom Mozambique reported an increase in its revenue (20%) to reach MZN17.6 billion. The increase in Vodacom's revenue is mainly because of strong growth in its voice revenue, up by 18.5 percent. In the same period, Vodacom subscribers increased
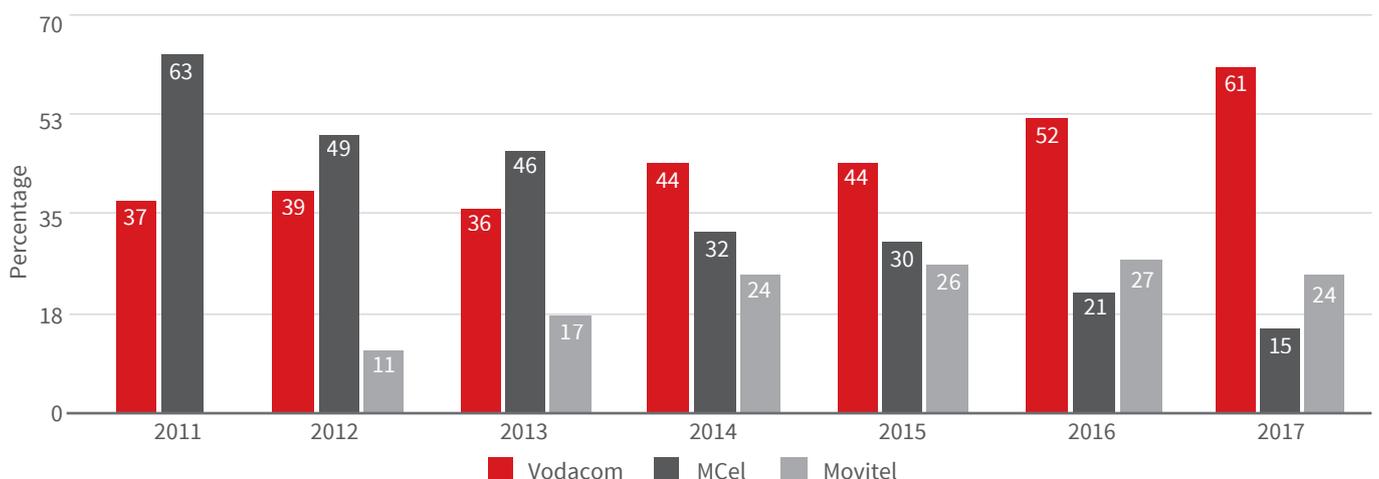
Figure 3: Revenue share of mobile operators
Source: RIA calculation using INCM data, 2017
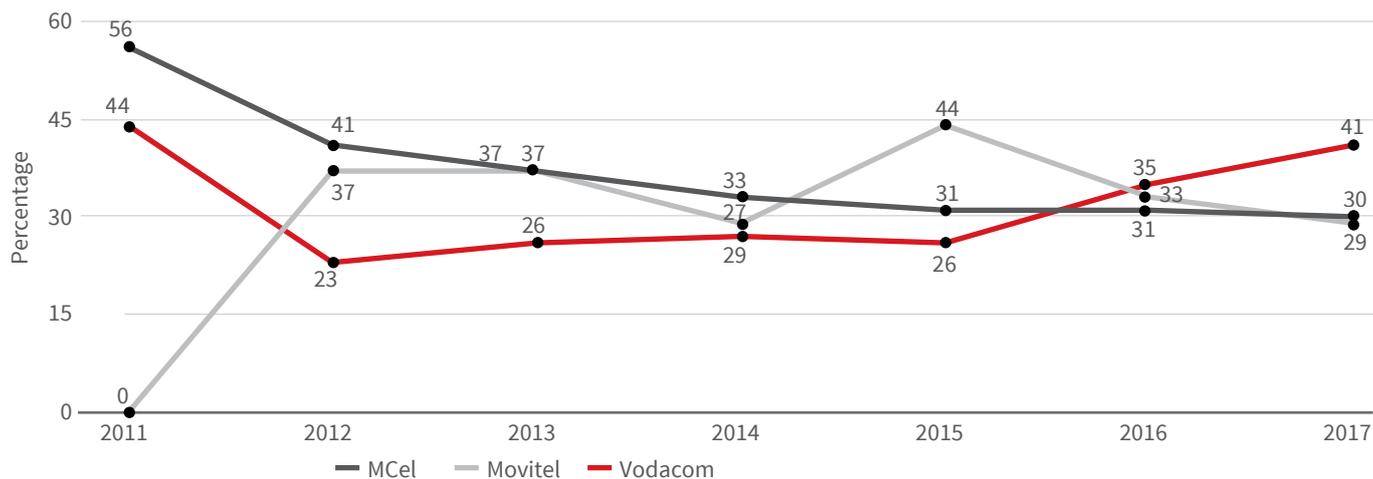
Figure 4: Operator market shares
Source: INCM, 2015; Gillwald, Khan & Rademan, 2016; GSMA Intelligence, 2015–18
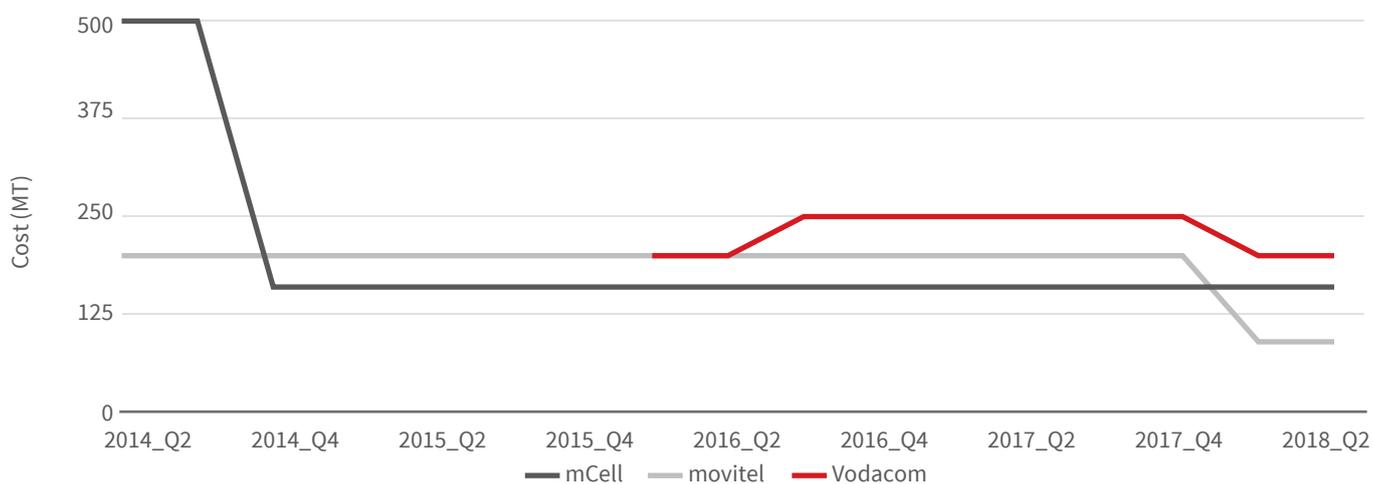
Figure 5: The cost of cheapest 1GB data per operator
Source: RAMP Index, 2018

by 18.7 percent to 6.1 million, making it the dominant operator in revenue and subscribers (40%). Vodacom's data revenue grew by 31 percent and data customers increased by 63.6 percent, reaching MZN3.7 million, but this is off a very low base and voice revenues remain its dominant source of revenues, unlike in the South Africa market where revenues from data now exceed its voice revenues.

After losing a significant share of its subscribers to Movitel, Vodacom adopted the low-cost service strategy of Movitel and matched its price in 2014. While the mCel strategy of undercutting Movitel in Q2 2014 did not lead to any significant market changes, Vodacom's strategy of reducing prices and investing in infrastructure coverage and quality was successful. Vodacom's subscriber market share increased from 26 percent to 35 percent, to become the largest operator, as shown in Figure 4. Despite a data price increase in 2016, Vodacom's market share continued to rise, reaching 41 percent in 2017. Movitel then further reduced its prices in Q4 2017 (RAMP, 2018), as shown in Figure 5.

The 1GB data pricing information from the RAMP shows that fierce pricing competition among operators has resulted in low data prices. Among 49 African
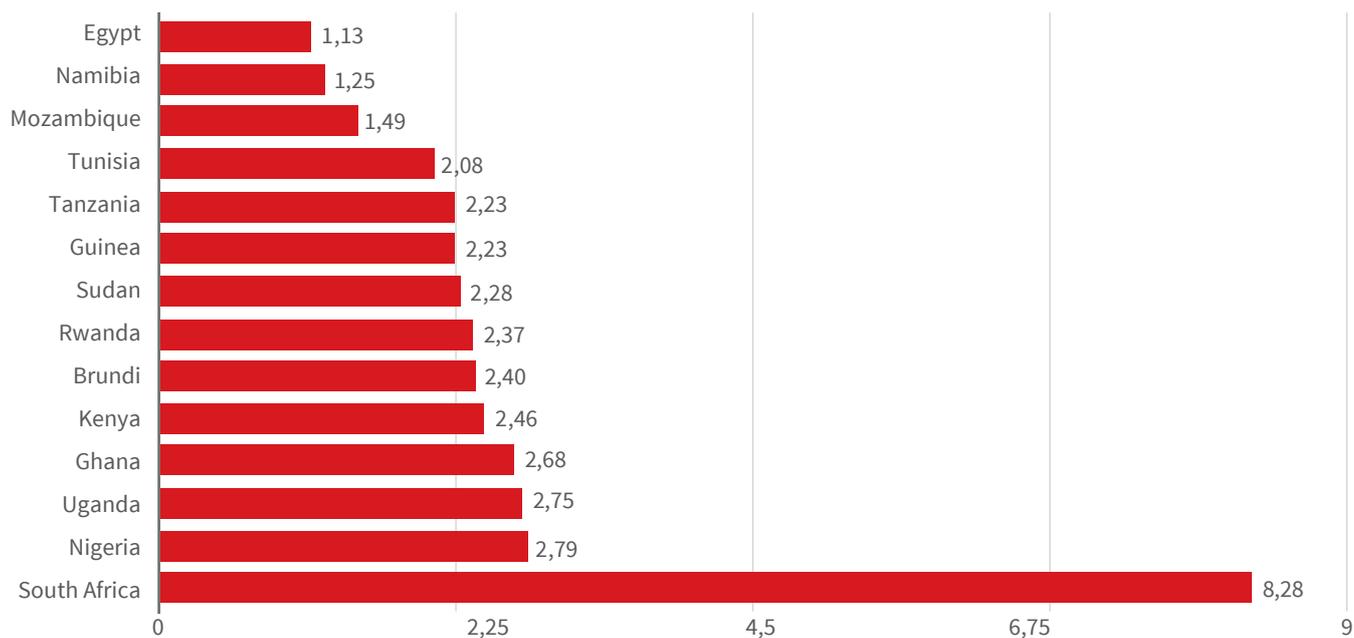
Figure 6: Mozambique's cheapest prepaid mobile 1GB data compared to Africa's top performers (USD)
Source: RAMP Index, 2018

countries, Research ICT Africa ranks Mozambique third above Ghana, Kenya and South Africa (see Figure 6). However, compared to these countries, Internet penetration in Mozambique is very low – the lowest rate except for Rwanda of all the countries surveyed (see Figure 1).

Despite the shake-up of the market and the series of positive competitive outcomes, the After Access Survey undertaken by Research ICT Africa in Mozambique finds that it is still at an early stage of adoption. A significant proportion of Mozambicans (15 years and older) do not have mobile phones (60%). Internet penetration is even lower, with only 10 percent of the population using the Internet (see Figure 1). Although there are still considerable supply side constraints on Internet diffusion in the country, there are large numbers of people within the coverage areas of the mobile broadband operators, indicating not only significant demand side constraints of both affordability and lack of local content, but also the classical human development challenges of education and digital skills.

4

GENDER GAP

Figure 7 shows that the gap correlation with the GNI per capita is also broadly true of the gender gap. Of all the countries surveyed, Mozambique has the lowest mobile phone adoption level and the second highest gender disparity at 36 percent after Rwanda's 38 percent. More than half of all men (50%) have mobile phones as compared to only 32 percent of women. The disparities are more pronounced among Internet users. The gender disparity in Internet use of 50 percent (see Figure 7) is only exceeded by Rwanda at 62 percent, which is the only African country surveyed that has a gender gap in the vicinity of the gigantic gender gaps in Bangladesh, India and Pakistan.

Modelling of the data indicates that the primary determinants of digital exclusion are education and income. Although there are slight differences in mobile phone and Internet usage, broadly speaking, men and women of a similar education level and income group access these services similarly. As women are concentrated among the poor, lacking education and therefore unable to gain employment, they are disproportionately marginalised from the benefits of ICTs to enhance their well-being.
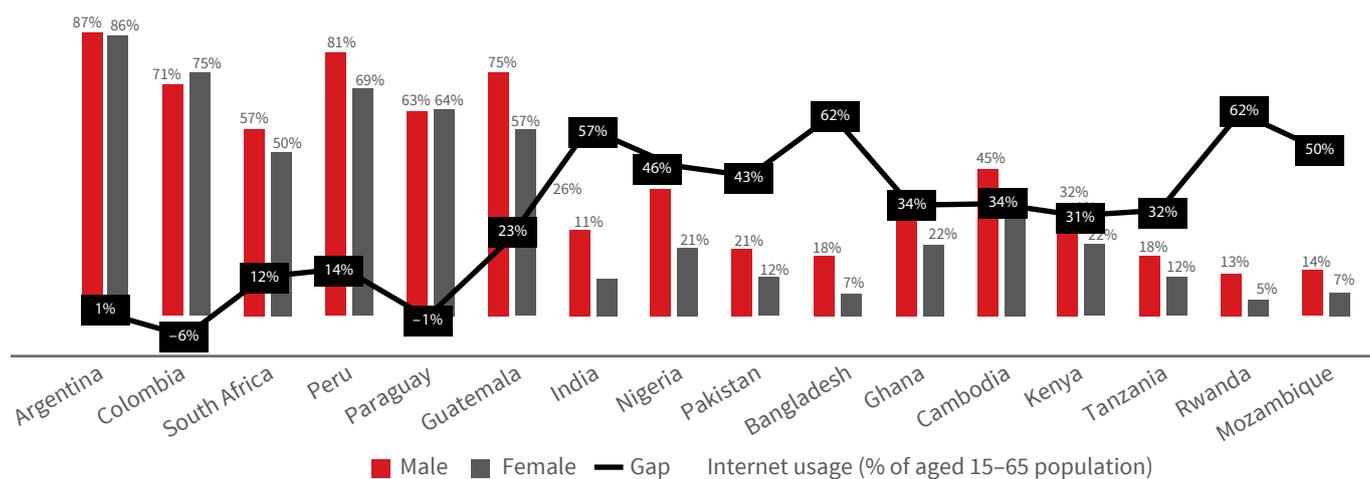
Figure 7: Gender disparity in Internet use in Mozambique and other African countries
Source: After Access survey data, 2017

5 URBAN–RURAL DIVIDE

The urban–rural gap is of 85 percent is even bigger than the gender gap (see Figure 8). With rural inhabitants being mostly subsistence farmers, the urban–rural divide in Mozambique is significant and this is reflected in the access to infrastructures The majority of rural households (66%) reported not having access to electricity, while only 32 percent of urban households reported the same. The After Access Survey shows that very few households in rural areas have access to telecommunication services. Despite the rural strategy of Movitel, the penetration of ICT services and devices remains very low nationally, and there exists a significant location gap in the access of telecommunications in Mozambique.
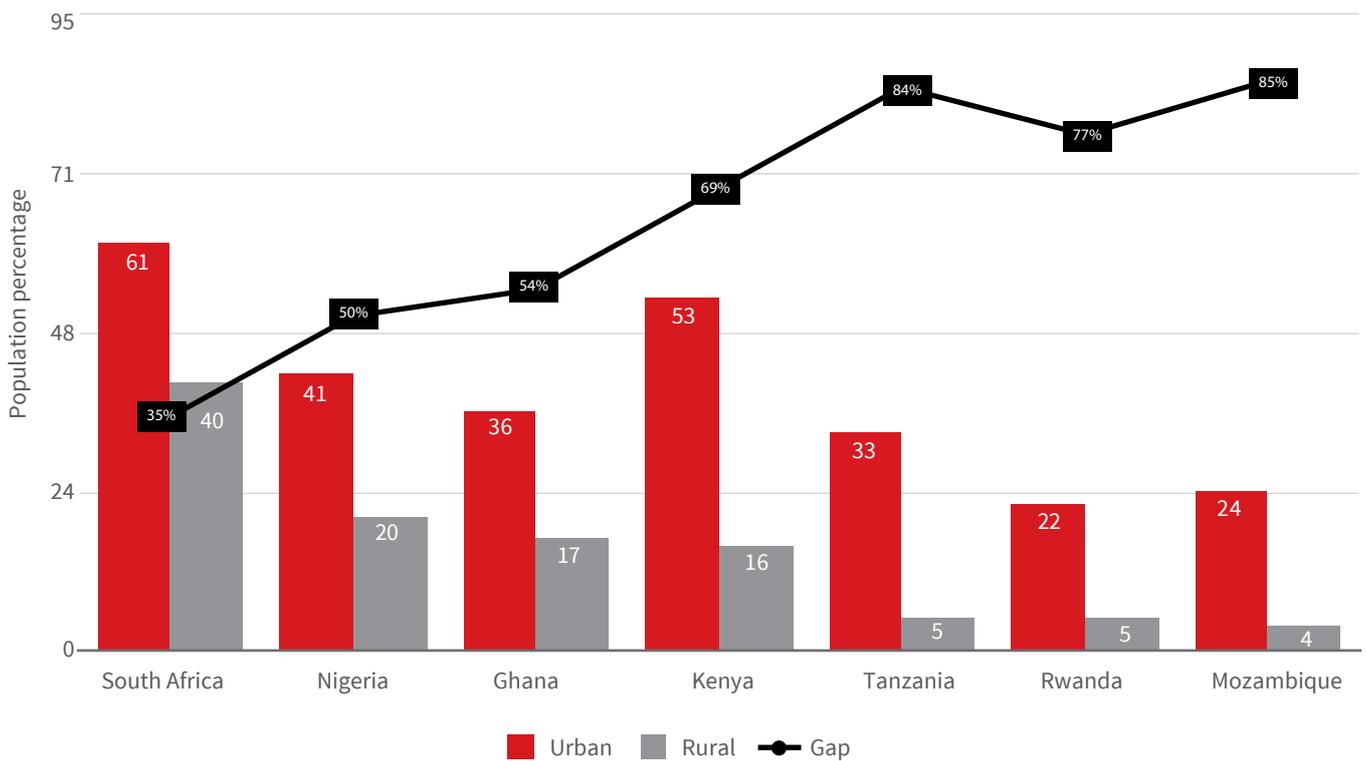
Figure 8: Location disparity in the use of the Internet in South Africa and other African countries
Source: RIA After Access survey data, 2017

6 AFFORDABILITY

Affordability of devices that are necessary to access the Internet and e-literacy are the main barriers to Internet access in Mozambique. Of those who are offline (90%), 76 percent stated that they do not have devices to access the Internet, while 14 percent stated they do not know how to use the Internet (see Figure 9). When asked why they do not have a mobile phone, 78 percent of the respondents stated that they cannot afford a mobile phone. A substantial proportion (36%) of those who do not have mobile phones reported lack of electricity as the main reason why they do not have mobile phones.
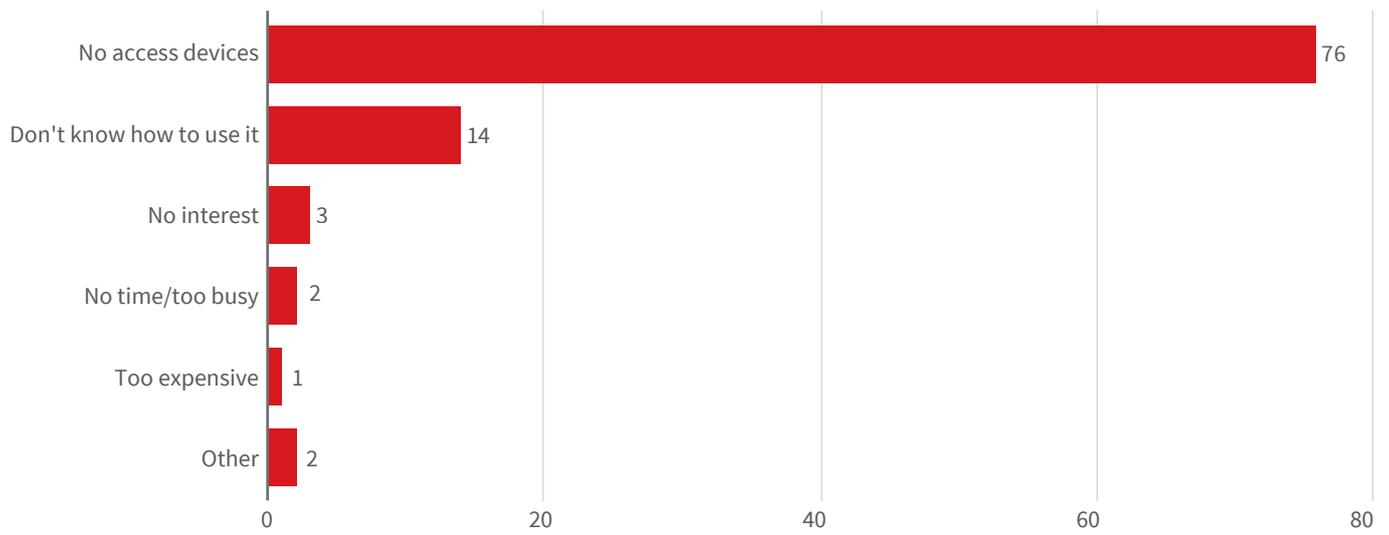
Figure 9: Main reasons for not using the Internet (in percentages)
Source: RIA After Access survey data, 2017

7 SMARTPHONES DRIVING INTERNET ADOPTION

The adoption of Internet-enabled devices such as smartphones is the main driver of Internet use in Africa. The 2017 After Access Survey shows that Internet penetration is mostly driven by smartphone take-up. Of those who use the Internet in the seven surveyed countries, 67 percent access the Internet via smartphones.

Smartphone penetration in Mozambique stands at seven percent, which explains the low ten percent, Internet penetration in Mozambique. A quarter of mobile phone users use smartphones and the majority (70%) use basic phones, which do not have the capability to connect to the Internet (see Figure 10). Asked why they do not have smartphones, about two-thirds (64%) stated that smartphones are too expensive and 21 percent said that they do not need them, while nine percent reported that they are too complicated to use (see Figure 11). The lack of access to devices is the main stumbling block to the country making progress towards its own national universal access goals and Sustainable Development Goals.
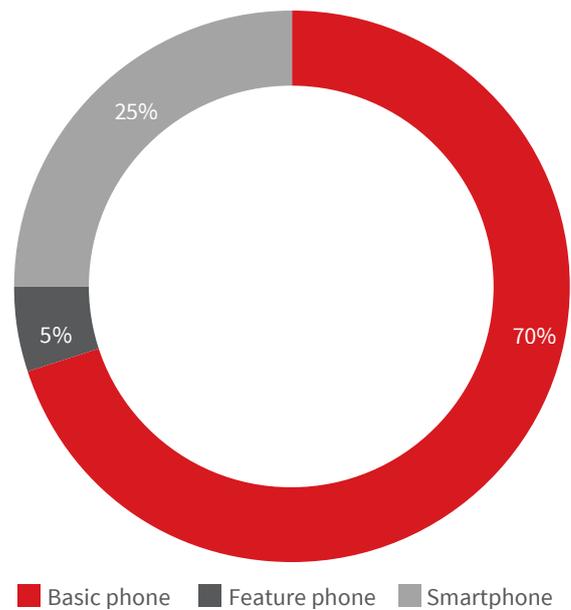
Figure 10: Type of mobile phone owned
Source: RIA After Access survey data, 2017
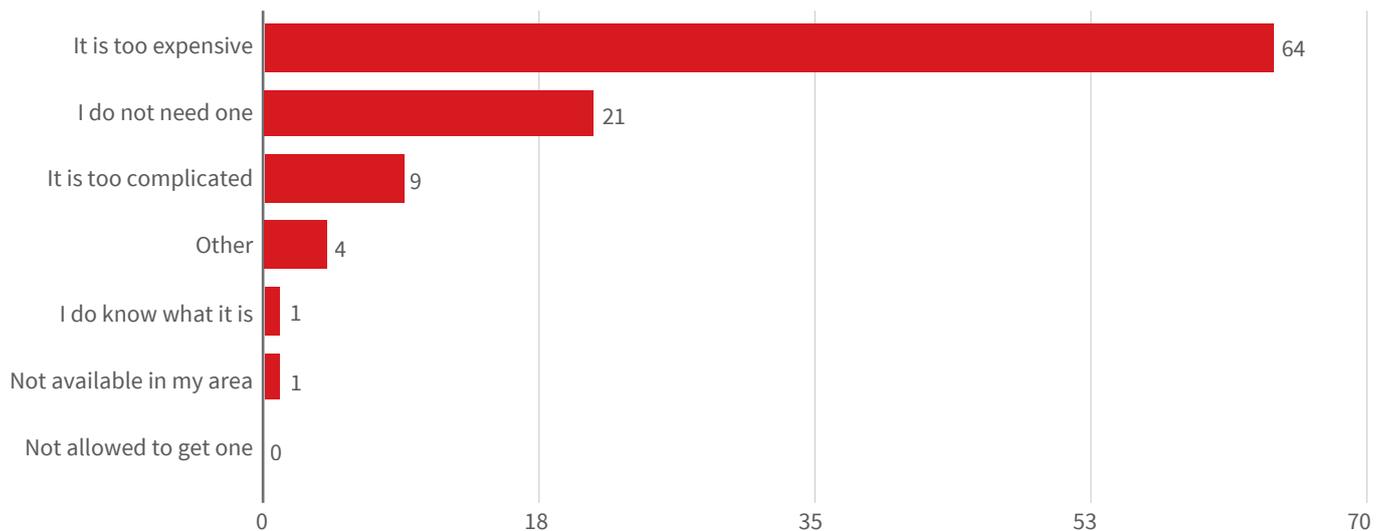
Figure 11: Why individuals do not have a smartphone (in percentages)
Source: RIA After Access survey data, 2017

8 NO ENERGY, NO INTERNET

Access to electricity is also a major supply and demand side constraint on broadband adoption in the country. Half of the Mozambican population has no access to electricity, compared to only six percent in South Africa and 33 percent in Nigeria. The use of solar energy in Mozambique is high at 24 percent in comparison to one percent in South Africa and 0.04 percent in Nigeria. Only two percent of Mozambican households have water piped into their houses, while 84 percent do not have piped water at all (see Table 2).

The majority of rural households (66%) reported not having access to electricity, while 32 percent of urban households reported the same. The After Access Survey shows that very few households in rural areas have access to telecommunication services (see Table 3). Despite the penetration of ICT services and devices being very low nationally, a significant location gap exists in access of telecommunications in Mozambique.

Rural households, which are mostly either not connected to the main electricity grid or have no electricity at all, are less likely to have telecommunication services than urban households. The location gap is huge in

Table 2: Percentage of households with water electricity access

	Mozambique	Rwanda	Tanzania	South Africa
No electricity	52%	68%	53%	6%
Main electricity grid	24%	29%	33%	89%
Generator	0.3%		0.3%	1%
Solar	22%	3%	18%	1%
No piped water	84%	80%	86%	27%
Piped water into the yard	14%	18%	10%	33%
Piped water into the house	2%	2%	4%	40%

Source: RIA After Access survey data, 2017

Table 3: Percentage of households using ICTs

	National	Urban	Rural	Location gap
Landline	1%	2%	0.1%	95.0%
Desktop	2%	5	0.3%	94.0%
Laptop	1%	7%	4.0%	43.0%
Tablets	8%	15%	4.0%	73.0%
Television	23%	40%	10.0%	75.0%
Radio	37%	40%	35.0%	13.0%

Source: RIA After Access survey data, 2017
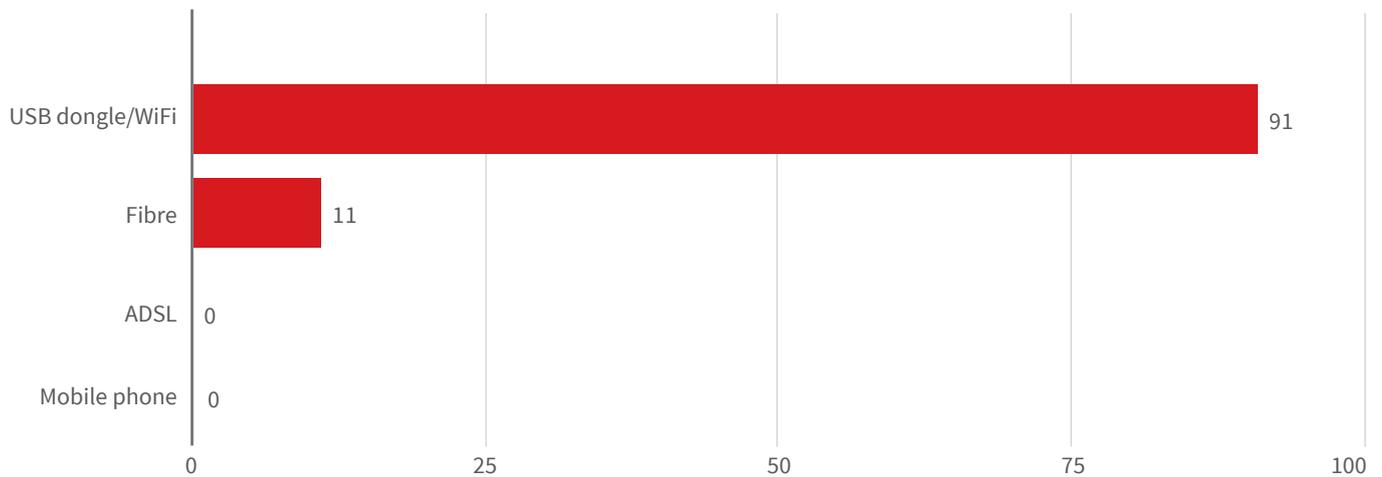
Figure 12: Internet devices used by households (%)
Source: RIA After Access survey data, 2017
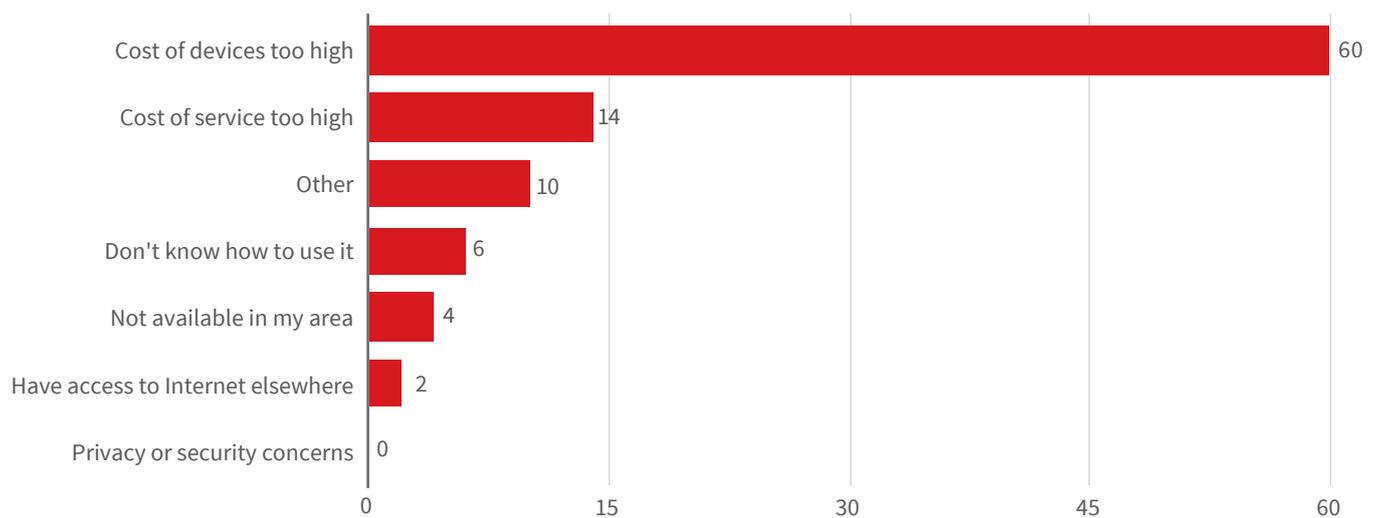
Figure 13: Why households do not have a working Internet connection (%)
Source: RIA After Access survey data, 2017

the household ownership of fixed technologies: land-lines (95%) and desktop (94%). Nationally, household ownership of desktop is very low (2%) while only one percent of the population has access to fixed-line tele-phones. While television and radio are most common in most of the surveyed countries, less than a quarter of Mozambican households own a television set and just over a third (37%) own radio sets.

Only a minuscule proportion (0.7%) of households in Mozambique has access to Internet services. The major-ity of these households connect to the Internet through USB dongle/WiFi (91%), while 11 percent connect to the Internet via fibre (see Figure 12).

9 FINANCIAL INCLUSION

Access to formal financial services is extremely limited in Mozambique and most other developing countries. The majority of rural area inhabitants do not have access to banking facilities and are normally left out of the formal banking services. In Mozambique, only one in five households has access to formal banking services, meaning deficient access to formal savings. At an individual level, the 2017 After Access Survey shows that nine out of ten of Mozambicans older than 15 years do not have access to a banking account. Following the success of mobile phones, especially in rural areas, Mozambican authorities passed legislation in 2004 allowing mobile operators to partner with financial institution to provide mobile money services.

Mobile money was launched in Mozambique in 2011 by mCel through its sister company Carteira Movel (branded mKesh). Vodacom later launched its mobile money services, M-Pesa, in 2013. As of 2016, there were about three million mobile money subscribers in Mozambique.[2] The Survey shows that five out of ten mobile phone users use mobile money in Mozambique (see Figure 14).

Mobile money is more common in urban areas than in rural areas, as 63 percent of mobile phone users in urban areas use mobile money and only 29 percent in rural areas.
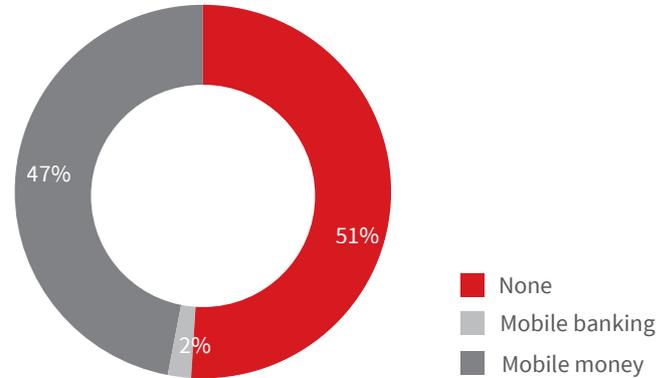
Figure 14: Mobile money and mobile banking splits
Source: RIA After Access survey data, 2017

As seen in Figure 15 below, the most common transaction performed on mobile phones is the topping up of air time (91%) – a somewhat expected finding since prepaid air time is the common currency of mobile markets in Africa. However, Mozambicans show how prevalent mobile money is, and important for the sustaining of their livelihoods, by declaring the receiving of payments as the second most common transaction (69%). This indicates how important mobile phones are in including citizens into the digital economy with digital finance, a point further supported by the third most-popular transaction: the paying of bills (30%).
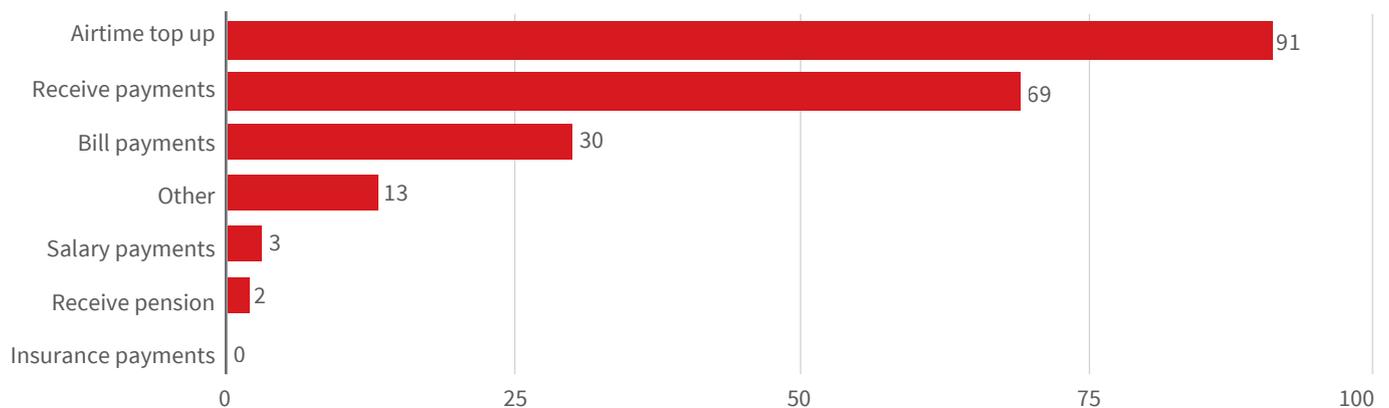
Figure 15: Use of mobile phone for transactional purposes (multiple answers)
Source: RIA After Access survey data, 2017

2   See Feinstein, E. (2017). The e-commerce and digital payments landscape in Mozambique. Available at: http://blog.directpay.online/ecommerce-digital-payments-landscape-in-mozambique

10

CONCLUSIONS AND RECOMMENDATIONS

Similar to other African countries, the telecommunication sector in Mozambique is predominantly mobile. Competition in the mobile market intensified in 2012, following the launch of the third mobile operator, Movitel. Its strategy of rolling infrastructure in rural areas and providing low-cost services led to lower costs for communication services in Mozambique. Despite increased competition and the low cost of prices in Mozambique, mobile phone penetration in Mozambique remains far below the African survey average.

Mozambique recorded the highest gender disparity (41%) in the adoption of mobile phones among surveyed countries. The disparities are more pronounced among Internet users, at 50 percent. The location gap is even more pronounced (85%), with 24 percent of the urban population 15 years and older using the Internet, while only a few (4%) in rural areas use the Internet. The low levels of Internet usage in the country is attributed to issues relating to affordability, education and lack of electricity in rural areas. About eight out of ten of those who do not use the Internet stated that they do not have Internet-enabled devices- computers or smartphones, while more than a third (37%) stated that they do not have mobile phones due to lack of electricity.

Of concern is the decline in telecom sector revenue since 2011. This decrease in sector revenue is attributed to the continued significant drop in the fixed-line service revenue and subscriptions. Furthermore, continued competition in the mobile sector, with operators undercutting each other, has significantly decreased revenues as well. Despite this, the dominant operator, Vodacom, reported an increase in its revenue in 2018. Its revenue increased by 18 percent, which it attributes to strong growth in mobile voice revenue and an 18 percent increase in subscribers. Reacting to Vodacom's strategy, Movitel further reduced its 1GB data prices to become the cheapest operator in Q1 2018.

For countries to see the economic growth associated with investment in broadband infrastructure, a critical mass of 20 percent has to be reached. With only 10 percent penetration, Mozambique will not enjoy the network effects and positive multipliers associated with broadband connectivity.

With evidence that prices of devices and even low-priced services are not affordable to most Mozambicans, government needs to find ways to support the reduction of these costs and provide additional complementary public access. Government needs to create an enabling environment for operators to transition to data services, which can complement licensed networks, (for example via the hand-off from GSM to public WiFi, which now also has backhaul application), and expand broadband access in low-cost, last-mile access and backhaul. Extending unlicensed spectrum to new frequency bands can spur investment and innovation, and lead to the introduction of technologies. The 'free' over-the-top (OTT) services such as WhatsApp offer price-sensitive users substitutability for higher-cost traditional voice and text services.

To create this enabling environment, the government could:

- remove all excise duties on feature and entry level smartphones
- review universal services levies and funds that are not meeting objectives – review the negative impact of premium secondary taxes on cost of services, and direct existing taxes to free public WiFi to offer complementary access to price-sensitive users
- leverage private investments for servicing public sector connectivity in under-serviced areas by creating incentives through smart procurement and offer anchor tenancies on the basis of aggregating public sector demand, which can shift costly capital expenditure by government to much lower-cost OpEx
- produce incentives for infrastructure-sharing and wholesale regulation of facilities and bandwidth to reduce input costs for service providers and private networks, but this requires a fair, competitive

environment in which all players can compete in this relatively small market

- ensure more optimal co-existence of licensed and unlicensed spectrum that will optimise spectrum for diverse needs in the country and prioritise affordable access to communications
- assign the licensed spectrum required for the evolution of existing services at a competitively determined (efficient use) price to ensure the build-out of capital-intensive networks benefitting from economies of scale and devices (with spectrum trading to correct value/use errors)
- make available the secondary use of spectrum, such as deployment of dynamic spectrum assignment in rural areas, which can be delivered at one tenth the prices of GSM technologies
- make available the nationally allocated spectrum not in use in remote areas through low-cost or licence-exempt spectrum for communities, non-profit providers or micro-networks to enable free low-speed Internet (less than 64Mbps) on networks (possibly as part of the play instead of pay universal service obligation)

- stimulate local content development through the deployment of RCDF funds or other consolidated budget appropriations to support the development of apps and local content, particularly in local languages;. making government data open to the public in a format that is manipulable could spur on its use in the development of apps for commercial and public service purposes
- amplify efforts to redress human development lags, focusing on the skills required for participation in digital economy and aligning those skills with national development demands
- ensure that all available talent is harnessed, and interests represented, by setting up a multi-stakeholder advisory council made up of public, private sector and civil society experts to advise government.

10 REFERENCES

Batista, C. and Vicente, P.C. (2017). *Introducing mobile money in rural Mozambique. Growth and Labour Markets in Low Income Countries Programme*. Working Paper No. 30. Available at: https://glm-lic.iza.org/wp-content/uploads/2017/06/glmlic-wp030.pdf (Accessed August 2019).

Feinstein, E. (2017). *The e-commerce and digital payments landscape in Mozambique*. Available at: http://blog.directpay.online/ecommerce-digital-payments-landscape-in-mozambique (Accessed August 2019)

Gillwald, A., Khan, S. and Rademan, B. (2016). *The Movitel miracle-new dynamism in the Mozambican mobile market.* Research ICT Africa Policy Brief No. 6 2016. Available at: file:///Users/onkokamemothobi/Downloads/2016_Policy_Brief_6_The_Movitel_Miracle%20(2).pdf. (Accessed August, 2018)

GSMA Intelligence (2015-2018). *Mobile industry data.* Available by subscription only

INCM (2015). Statistical database. Available at: http://www.incm.gov.mz/index.php/mercado/estatisticas (Accessed August 2018).

Mothobi O, Schoentgen A and Gillwald A (2018) *Platform work in Seven African Countries*. After Access Policy Paper Series, Paper No. 5. www.researchICTafrica.net.

Rego, L. and Fernandes-Samuel, H. (2017). *Consulting Services for technical assistance on study for rural communications viability in Mozambique. Ministry of Transport and Communications/Instituto National das Communicaoes de Mozambique (INCM).* Available at: http://www.fundacaofan.org.mz/images/Study%20for%20Rural%20Communications%20in%20Mozambique%20VF%20-%2031102017.pdf. (Accessed August, 2018)