DIGITALISATION IN AFRICA AND ITS IMPACT ON THE BUSINESS ENVIRONMENT

Background Paper
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[1] RED-AFR 2020: *https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/Events2020/RED-AFR-2020.aspx*

Content

Executive Summary

In recent years, the significant improvements in technology and introduction of digital technologies have significantly increased the range of uses and applications possible. Digitalisation, or use of digital technologies to change existing business models and processes, has improved efficiencies in a range of industries and has great potential for innovation in social services, health and education. As a result, ICT and digital infrastructure are increasingly playing a central role in social and economic development. While Africa currently lags other regions in terms of digital connectivity and use of digital technologies, there are several areas in which enhanced digitalisation will have considerable benefits to economic development, education and healthcare.

At present, Africa lags behind other regions in terms of many measures of digital infrastructure, access and usage. LTE population coverage, the number of individuals using the internet, active mobile-broadband subscriptions, and international bandwidth are all significantly low relative to Europe. Furthermore, overall 3G and 4G coverage in most African countries is still poor and there are still limitations in terms of device penetration. While there is limited rollout of 5G rollout in a few countries it is unlikely to account for a significant proportion of coverage in the near future. Going forward, it is predicted that there will be increased demand for data in Africa. However, affordability is likely to remain an issue. Furthermore, in the context of macroeconomic slowdown as a result of the COVID-19 pandemic it is possible that investment and digitalisation of existing processes may be delayed.

In recent years developments in technology have enabled new applications. This has significant impact on the volume and quality of data that is generated and processed. In particular, three major developments are changing the shape of the digital environment. These are the Internet of things (IoT), Big Data and platforms. ICT operators and infrastructure providers play two roles in this context. They act as a conduit for data flows by providing the equipment, technology or infrastructure to enable it. However, they also generate massive amounts of their own data (locational, customer, usage, etc.) which can be used or combined with other sources to analyse and draw insights in a range of areas (including population flows and mobility).

While use of newer technologies in Africa may currently be lagging behind other regions, there are a range of ways in which digital applications may become increasingly relevant to key businesses in Africa. This may have strong developmental impacts as well as implications for infrastructure buildout. This includes applications in agriculture, human development, manufacture and mining. However, while a portion of these applications require high speed and low latency, a high proportion simply require connectivity and low costs.

The changes in the use of data, market participants and the role that digitalisation can play both in economic development as well as human development mean that ensuring access, fairness and competitiveness in the environment is growing in importance to policymakers.

The increase in digitalisation has several implications for competition. This has led to forms of regulatory and competition intervention internationally, many of which are still evolving. There have been three main areas of investigation, namely general competition analysis through mergers, competition analysis in abuse complaints and market inquiries. Various legislative reforms have been proposed or implemented including setting up a Digital Markets Unit in the UK, ex ante regulatory instruments proposed by the European Union and anti-monopoly legislation in China. Concerns have also arisen due to distortion between traditional and digital industries. In Africa, despite the large market share of major platforms, enforcement has been predominantly on large local monopolies, including e-commerce sites and mobile money platforms. However, enforcement action in Africa has

been fairly limited thus far and outside of mobile money, investigation has been largely engaged in by South African authorities. There has also been limited progress in terms of other pro-competitive regulation such as data interoperability.

Increased digitalisation in Africa is likely to have several implications for regulation. Changes in technology demand specific new requirements in terms of regulations such as numbering, spectrum management and international roaming for devices for the IoT. Technological developments combined with the high cost of rollout of new technologies increasingly incentivize forms of sharing and this requires regulatory consideration. Internet of Things for example requires regulation in terms of roaming, switching and number portability. At present there is limited regulatory and policy frameworks in Africa for this. The other key area of regulation is cloud computing and data. There are concerns relating to data include privacy, security and ownership of data, particularly where data is beneficial for a country. As a result, there has been movement towards data sovereignty and data localisation in some countries. However, given the benefits to data flows, data localisation or cumbersome processes to regulate data flows should be discouraged outside of highly sensitive data categories as long as privacy considerations are met. Another area of regulation that is evolving is the regulation of sharing in the context of higher infrastructure costs of infrastructure and increased technical options (for example, allowing RAN sharing). As such, from a regulatory perspective consideration of agreements relating to new technology need to be scrutinized. Furthermore, assignment and sharing of spectrum has implications for competitive dynamics in the future and also requires careful consideration.

There are debates on how to improve universal service in African countries. Technology neutral approaches, least cost infrastructure subsidies and demand side subsidies such as vouchers are likely to be useful. Next generation incentives for affordable access include measures to stimulate device affordability, the provision of public access in rural and remote areas, developing frameworks to support broadband access, and developing frameworks that incentivize the digitalisation of agricultural value chains. Importantly, it is essential to work towards building preconditions for competition which will result in better innovation and lower data costs. In turn, lower data costs can provide for increased use and increased consumer demand.

1. Introduction

In recent years, the significant improvements in technology and introduction of digital technologies have significantly increased the range of uses and applications possible. Digitalisation, or use of digital technologies to change existing business models and processes, has improved efficiencies in a range of industries and has great potential for innovation in social services, health and education. As a result, ICT and digital infrastructure are increasingly playing a central role in social and economic development. While Africa currently lags other regions in terms of digital connectivity and use of digital technologies, there are several areas in which enhanced digitalisation will have considerable benefits to economic development, education and healthcare.

This paper seeks to explore the impact of digital technologies in an African context with a view to highligh the potential implications for the business environment and regulation. This will be used to draw out key implications and recommendations for competition, regulation and universal services. Furthermore, recommendations for next generation incentives for affordable access to digital services are proposed.

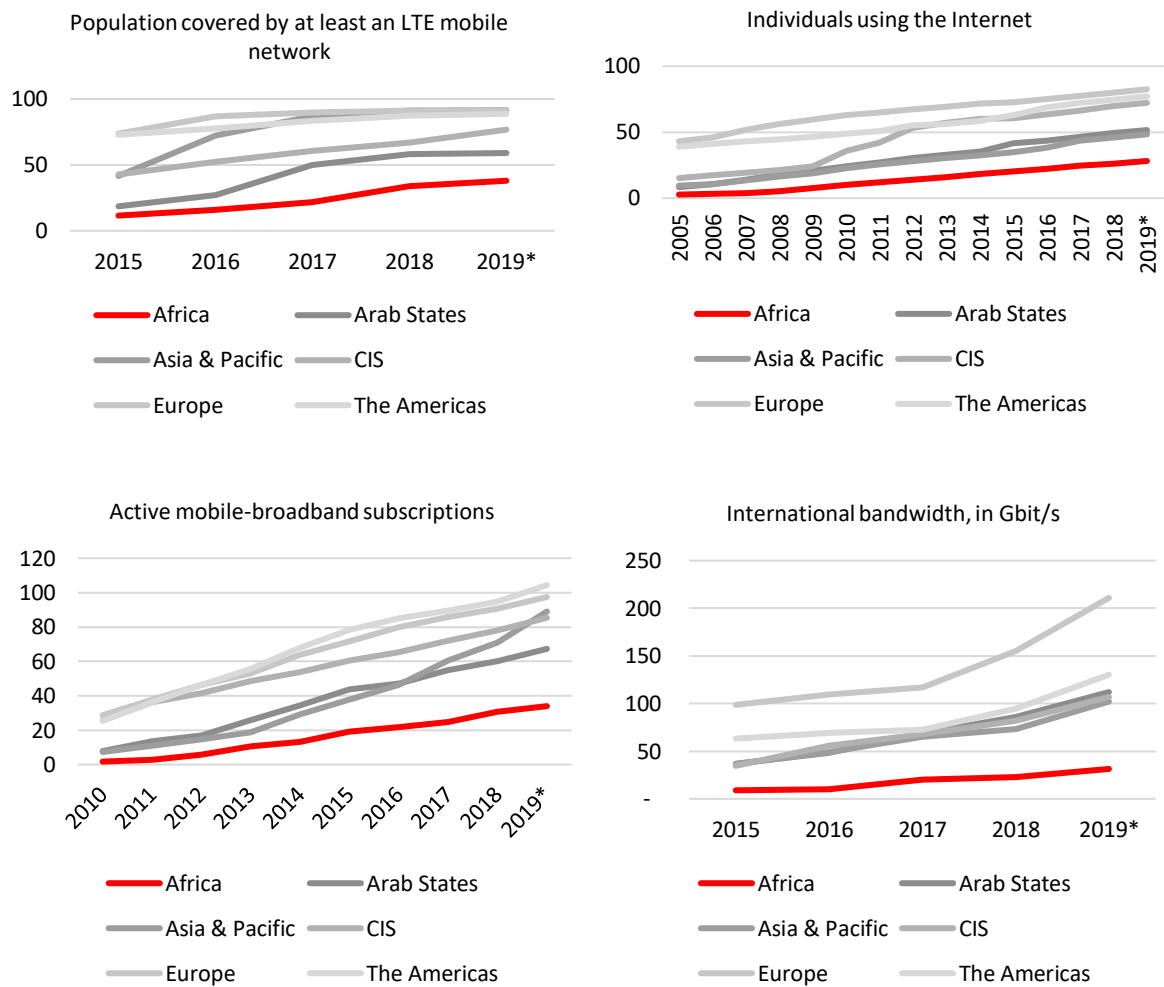## 1.1 Status of digital infrastructure in Africa

Use of digital technologies and digitalisation relies strongly on the underlying infrastructure and connectivity. While there are a range of measures and digital indices, measures of digital readiness often comprise a range of indicators including connectivity or access to infrastructure (with indicators such as broadband subscriptions, Internet servers and networking services), capacity (Internet bandwidth), adoption of technology (including device penetration, usage of the Internet and usage of cloud services), human capital measures including education, literacy and digital skills (including for example, knowledge intensive industries, number of ICT graduates) and factors related to government (such as ease of doing business, government intervention in promoting ICT and provision of e-government services) and affordability (through indicators that adjust cost by GDP).[2]

At present, Africa lags behind other regions in terms of many measures of digital infrastructure, access and usage. For example, as illustrated in Figure 1 below, the LTE population coverage is very low at under 40% in Africa as opposed to 90% in Europe and Asia Pacific. Similarly, the number of individuals using the internet is under 30% in Africa in comparison to over 80% in Europe. A similar pattern is shown for active mobile-broadband subscriptions, and international bandwidth.

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[2] See, for example, the EC Digital Economy and Society Index (2020), available at https://ec.europa.eu/digital-single-market/en/digital-economy-and-society-index-desi, the World Banks Digital Adoption Index, Katz, Koutrompis and Callorda (2014), "Using a digitization index to measure the economic and social impact of digital agendas", Info 16(1):32-44, Yoo, de Wysocki, and Cumberland, Cisco Corporate Affairs, "Country Digital Readiness: Research to determina a country's digital readiness and key interventions"

Figure 1: Internet access indicators

Population covered by at least an LTE mobile network

Individuals using the Internet

Active mobile-broadband subscriptions

International bandwidth, in Gbit/s

Source: ITU

Furthermore, there are geographic disparities in these measures both across and within African countries.

Overall 3G and 4G coverage in most African countries is still poor (Figure 2) and there are still limitations in terms of device penetration (0

Figure 3). The lack of coverage is linked at least in part due to the lack of radio frequency spectrum assignments (Figure 4), since more spectrum means cheaper coverage, more capacity, and therefore lower prices.

Figure 2: 3G and 4G coverage, by region, 2014-2019
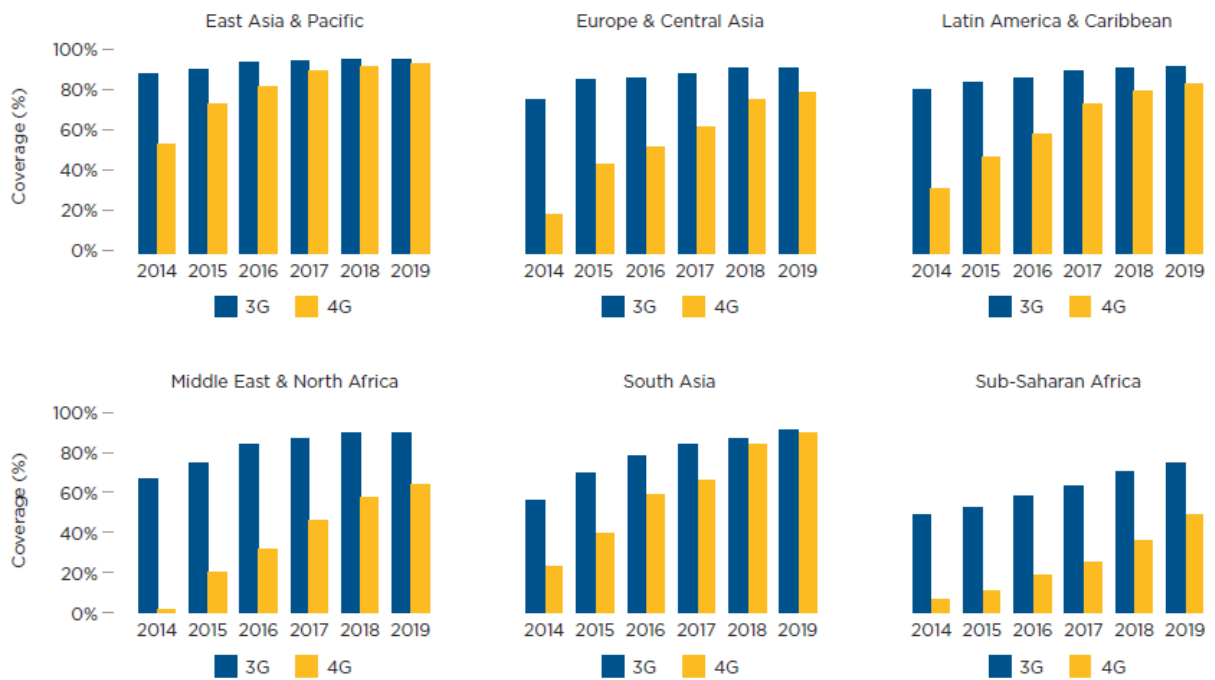
Source: GSM Association, 2020, 'The state of mobile internet connectivity 2020

Figure 3: Feature phones dominate the device landscape in Africa, 2020
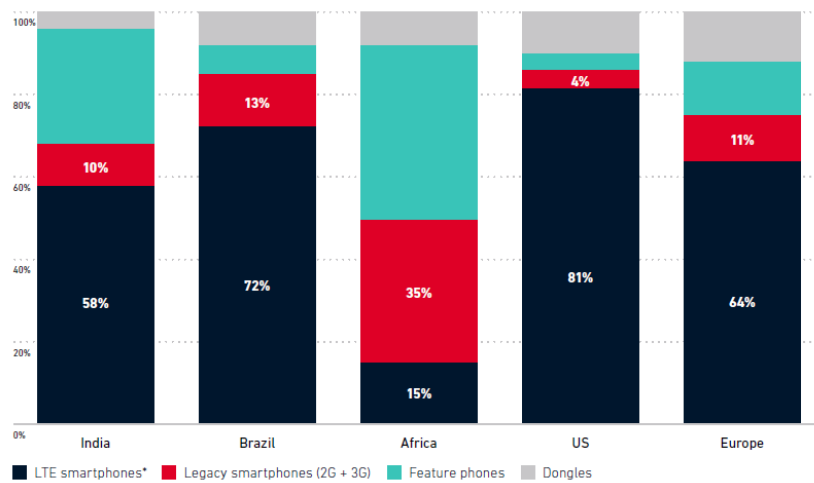
Source: GSM Association, 2020 Trends (GSMA intelligence)

Figure 4: Fewer countries in Sub-Saharan Africa have digital dividend assignments, 2019
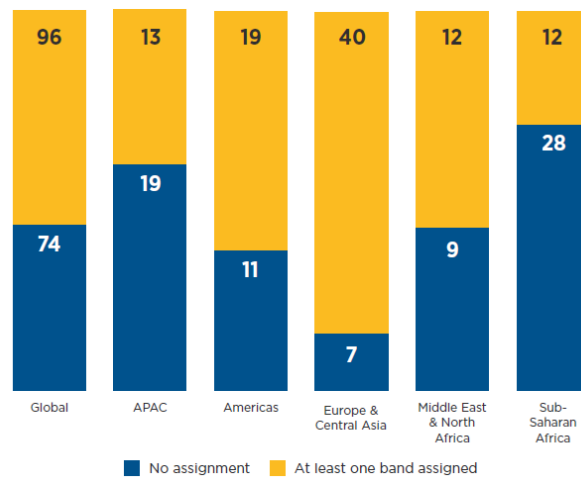
Source: GSM Association, 2020, 'The state of mobile internet connectivity 2020'

As such, increasing coverage to allow individuals to benefit from the Internet overall is important. This requires a better rollout of broadband and enhanced coverage. For commercial applications better technologies such as 5G is needed. However, both access to more basic connectivity in remote rural areas and 5G rollout can be very expensive.

Going forward, it is predicted that there will be increased demand for data in Africa. For example, the GSMA predict data increasing fourfold, the number of smartphone connections doubling, as well as a doubling of 5G investment. However, their predicted scores in terms of both penetration as well as readiness is low for Africa in comparison to other regions with an estimate of penetration of just over 50% by 2025 and measures of infrastructure, affordability, consumer readiness and content below global averages.

While 5G experiments have been taking place in a few countries (such as Nigeria and Ghana), overall only Lesotho and South Africa have introduction commercial 5G on a limited basis, with Lesotho primarily focused on the central bank and a mine. It is likely that 5G will have limited commercial application in a lot of countries in the near future.

There are several challenges in enhancing connectivity and infrastructure to exploit the use of digital technology.

Affordability of usage is likely to remain an issue. Overall, African countries rank lower in terms of affordability of the Internet (*Figure 5*). While economic growth is predicted overall, growth in GDP per capita is still likely to remain low. The impacts of macroeconomic shocks as a result of the COVID-19 pandemic are likely to make this even more pronounced. As such, affordability of devices and data for consumers is likely to be constrained.

In addition, business expansion including capital upgrades and digitalisation of existing processes may be delayed. Given the combination of high device costs and high data costs it is unlikely that that coverage will grow significantly without lower prices (possibly through greater competition) and lower costs, including through infrastructure sharing and greater spectrum assignments.

Figure 5: African countries (highlighted in red) rank lower in terms of affordability (A4AI, 2020)
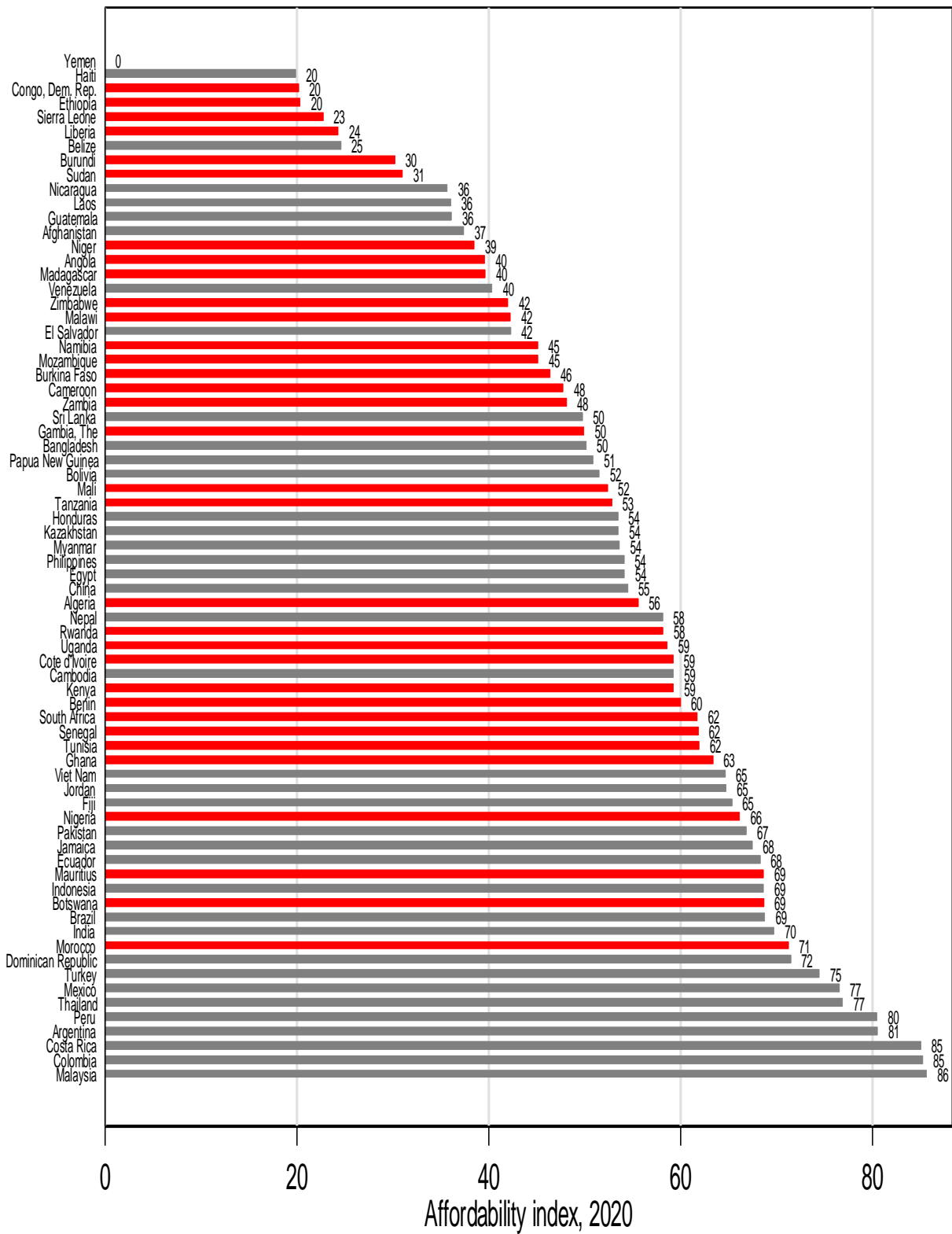
Source: Alliance for Affordable Internet, 2020, 'Affordability report 2020'

1.2 Key changes in the digital economy

Digital technologies are an encompassing term that refers to technologies that convert, process and store data, including software, hardware, platforms, machinery and infrastructure in use. In recent years developments in technology have enabled new applications. This has significant impact on the volume and quality of data that is generated and processed. In particular, three major developments are changing the shape of the digital environment. These are the Internet of things (IoT), Big Data and platforms.

The Internet of Things: Internet of Things is a term for technologies that allow *objects* to communicate. This includes forms such as passive radio frequency identification, near field communication and machine to machine communication. The Internet of Things allows for linking remote machines or devices to information systems to gather real-time intelligence, sharing information over networks without manual human intervention. Key examples of uses include automotive tracking, healthcare monitoring, electronics, agriculture, smart-metering and smart homes. IoT requires connectivity and this can occur over a range of technologies including Bluetooth, WiFi, mobile and satellite depending on the application, devices and structure. IoT may use different spectrum bands, different data protocols and may be enabled for global mobility. Some of the IoT applications that are relevant to Africa are discussed in the following section.

Big data: Big data is a term used to describe the ability to derive value from combining and processing extremely large data sets and analysing it computationally to see patterns, trends and associations. Big data is often defined by what is termed "the 3 Vs", namely volume of data generated and processed, velocity or speed with which this occurs and variety (in terms of data structure). Big data uses are wide ranging and encompass sources of data ranging from health data to card transactions and locational data, all characterised by frequency of observations. Tools such as artificial intelligence and machine learning often rely on big data as a base.

Platforms: From a business perspective there has also been a change as a result of the introduction of platforms which facilitate exchanges between different groups of customers and providers, as new business models. This has had many impacts on the market. Firstly, it has changed the routes to market and customers. Secondly, given economies of scope and scale inherent in the development of large platforms, the tipping of markets has meant that platforms have increased concentration at some layers of the value chain and this has led to increased market power for a few companies, as will be discussed in the next section.

As such, advances in technology have led to large changes in the types of data being used by businesses and consumers as well as the volume, structure and velocity of data. Furthermore, it has changed the geospatial patterns of where infrastructure is required and what level of sophistication is required in different areas. Furthermore, the increasing importance of technology is changing which market participants compete in different segments of the value chain. For example, international platforms such as Google and Facebook are now entering infrastructure provision in order to provide the means of disseminating their other products in areas with limitations in connectivity as will be discussed later.

ICT operators and infrastructure providers play two roles in this context. They act as a conduit for data flows by providing the equipment, technology or infrastructure to enable it. However, they also generate massive amounts of their own data (locational, customer, usage, etc.) which can be used or combined with other sources to analyse and draw insights in a range of areas (including population flows and mobility). The changes in the use of data, market participants and the role that digitalisation

can play both in economic development as well as human development mean that ensuring access, fairness and competitiveness in the environment is growing in importance to policymakers.

As a result, internationally there is a stronger movement towards regulation of aspects of the value chain. However, there has been slower intervention in African markets. How policy and regulation shape these markets going forward is important for both investment and development purposes. As such, this report seeks to highlight some of the key issues that have arisen internationally and assess their relevance and importance to Africa.

2. Digital connectivity – new needs and implications for infrastructure and capacity in Africa

While use of newer technologies in Africa may currently be lagging behind other regions, there are a range of ways in which digital applications may become increasingly relevant to key businesses in Africa. This may have strong developmental impacts as well as implications for infrastructure buildout.

1. *Agriculture*: There are a range of ways in which digital technology can be used to enhance productivity in the agricultural sector. There are a number of interventions that can assist agricultural productivity including for smallholder farmers. These range from simple informational interventions that can occur using basic ICT infrastructure such as dissemination of prices to slightly more complex applications such as weather forecasting, collecting information to optimise irrigation (for e.g.: through sensing and monitoring devices), and radiofrequency identifiers for animal tracking through the IoT. Digital phytosanitary records which are required for certification for exports can open up further markets for African farmers. Early adopters of technology are likely to be large commercial farms with scale and sophistication, but high benefits for smallholders and developing farmers in this and the informational flows that connectivity allows. However, challenges in the rollout of digitalized projects for agriculture include the high cost of setting up, high data costs and a lack of even basic broadband connectivity in many rural and remote areas.

2. *Human development:* The biggest social benefit likely as a result of new technologies is the potential for it to impact on human development. This includes potential uses in health through digital healthcare records, telemedicine and remote health monitoring through wearables which may limit hospitalisation in areas of scarcity, can assist in healthcare planning and control.[3] In education there are potential benefits through online teaching, including use of computer aided learning that uses big data to personalize teaching for students.[4] In terms of utilities, such as electricity and water, smart metering can optimize use as well as reduce the risk to supply. We are already seeing innovative uses of data in financial services targeted at lower income markets particularly in terms of credit analysis. However, there is scope for far more use of digitalisation to allow for savings optimization, extension of credit to small businesses and facilitating safer transactions. Digital IDs and digital means of ascertaining proof of address are likely to assist in connecting individuals to financial services in light of international legal requirements. E-Government services can also enhance efficiency and access to services for people. However, challenges in use of digital applications for human development also include high set up costs (including high costs of devices), high data costs, a lack of connectivity.

3. *Manufacture*: Digitalisation of the factory including integration of systems through the supply chain and condition monitoring and predictive maintenance. This involves embedded sensors that allow objects to be tracked in space and time. This can be used for the management of products and assets. Location capability can lead to digital factories that can connect multiple factories across the value chain. This can also enhance use of inputs such as energy or water use monitoring on a per machine basis, and for phased equipment start-ups and shut-downs which can assist in optimization. There is also the potential for smart factories, utilization of feedback between retail and manufacture based on data analytics, including integration with

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[3] Abrahams, L (2016). ICT regulation for fostering the digital complexity economy in the SADC region 2016-2030", ACER Conference, Livingstone, Zambia, 10-11 March 2016.

[4] Muralidharan, Karthik, Abhijeet Singh, and Alejandro J. Ganimian. "Disrupting education? Experimental evidence on technology-aided instruction in India." *American Economic Review* 109, no. 4 (2019): 1426-1460.

online systems, and the potential in time for additive manufacture or 3D printing which is limited in rollout at present but used for certain components. In terms of industrial uses there is also scope for use of private networks.[5]

4. *Mining*: Going forward there is likely to be increased digitalisation of geological information, outsourcing identification of mineral deposits, predictive maintenance and monitoring systems. There are also sensors (for monitoring maintenance of machinery), wearable monitoring devices for staff safety, big data analytics and AI.

5. *Tourism:* Platforms, including search, social media and booking platforms are increasingly a route to customers and markets for providers of tourist services including restaurants, hotels, and activities. These changes have the potential to benefit small and medium enterprises.

The use of many of these technologies depends significantly on movement of data. Technologies such as 5G which allow for higher speeds, lower latency and more precision are required for certain industrial applications including types of smart manufacture and mining equipment. However, not all digital interventions require 5G access. h Broadband is sufficient for several beneficial applications. For example, many health and education services can operate off broadband as can the beneficial tourism applications. As such, access and the provision of Internet in schools, hospitals and public Wifi will provide much benefit and would therefore be "quick wins".

However, exploiting the potential benefits of digitalisation is not straightforward and there are multiple challenges in balancing the potential benefits of new applications and the limitations in the affordability and cost-effectiveness in provision. In Africa at present, there are key challenges faced by different businesses in relation to uptake of digital technologies across different sectors. Firstly, the cost of devices and conversion and products ranging from sensors to the devices with the correct functionality are often prohibitively high. Secondly, the affordability of data at present, which as discussed above is still very high relative to other regions, and thirdly the level of connectivity, speed or bandwidth available.

It is likely that the first phase of connectivity for digitalized applications will be focused on particular areas including manufacturing or financial hubs which have sufficient demand to justify rollout costs. In addition, particular large companies and firms may also require better infrastructure for applications. This can be done using existing mobile networks (as is the case in Lesotho) or through private networks. Wider rollout to individuals for personal use is likely to be slower and focused on denser and higher income areas in the first instance as was the case with the rollout of other technologies.

As such, there are two key challenges, ensuring that Africa is not left behind in terms of rollout of suitable infrastructure to support digitalisation of industry and ensuring that communities across the continent can benefit from at least a basic level of connectivity that is sufficient to allow for human development goals to be attained and support more basic business applications to support smallholder farmers and SMMEs.

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[5] Industrial Development Think Tank (2019).Towards a digital industrial policy for South Africa: A review of issues. Centre for Competition, Regulation and Industrial Development.

3. Implications for competition

The ICT ecosystem required to enable digitalisation has multiple layers of products and services. Different components required generally included an end user device, an application that is focused on processing the information, a communications service or network that can exchange information over the system and content that is consumed or exchanged.[6]

Competition issues in digitalisation have arisen in different areas:
1. Concerns over abuses due to dominance in particular platforms
2. Competition across different products, for example, traditional and digital offerings that compete with each other.

At this stage there has not been significant competition enforcement related to IoT or AI. However, a large part of the consideration of market power in digital platforms arises from use of data.

The increase in digitalisation has several implications for competition within the industry. The key issue arises from the fact that digitalisation has led to the rise of several large digital platform companies. There are various types of digital platforms that differ based on the type of platform and the platform layer under which it operates but typically refer to a structure on which multi-sided agents can interact and build on.[7] This includes both transaction platforms which facilitate exchange and innovation/technology platforms which are a foundation upon which others can develop complementary technologies[8].

Digital platforms focused on transactions typically bring together consumers on different sides of the market to provide a digital means of exchange. This encompasses a large range of applications and business models including core platform services such as online search, social networking, video sharing, number independent interpersonal electronic communication services, operating systems, cloud services and advertising services. In addition, there are applications that are built on core services including e-commerce, sharing or gig economy platforms (such as ride hailing and domestic worker platforms) and price comparison websites. Often power derives from (i) the number of users on either side of the market or (ii) their access to the large amount of data that these transactions generate.

There are network effects in these markets as the benefit to a user rises the more individuals that use the services as well as scale economies which means that there is a benefit to being the largest platform. This has led competition for scale, to gain a first mover advantage, and an increase in concentration in these markets. The global nature of digital markets means that some platforms, particularly those that do not require any localized logistics (as, for example, e-commerce may require) compete on a global extent.[9] Furthermore, in recent years these platforms have benefitted from access to high levels of data which provides a competitive advantage (for example, allowing personalization) as well as access to technical assets and financial strength. The largest platforms have also grown through mergers. The results have been that there is a limited number of platforms that are available for particular functions. Furthermore, these platforms often have strong bargaining power, and can create barriers to entry for innovation among digital firms and startups. They are also in a strong position to enter adjacent markets. In addition, there have been numerous allegations of

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[6] GSMA, "A new regulatory framework for a digital ecosystem"

[7] Andreoli, A and Roberts, S (2020), Governing data and digital platforms in middle-income countries- regulations, competition and industrial policies, with sectoral case studies from South Africa. Blavatnik School of Government Digital Pathways Publication

[8] Evans and Gawer (2016), The rise of the platform enterprise: A global survey, Centre for Global Enterprise, The Emerging Platform Economy Series No 1.

[9] International Telecommunications Union and World Bank (2020), Digital Regulation Handbook, Geneva.

unfair trading practices including self-preferencing, bundling practices, killer acquisitions and data related practices that raise barriers to entry.

Concerns over the implications of such platform growth and associated behaviour that is considered abusive has been raised by authorities internationally such as the European Commission[10], the Australian ACCC[11], the US Fair Trade Commission, China[12] and Japan.

This has led to forms of regulatory and competition intervention internationally, many of which are still evolving. There have been three main areas of investigation:
1. competition analysis by competition authorities for mergers which often focused on removal of a competitor, combination of datasets and input foreclosure with major mergers in the sector (e.g.: Google/Fitbit, Google/DoubleClick, Google/Waze, Google/YouTube, Facebook/WhatsApp, Facebook/Instagram);
2. competition analysis for abuse complaints including problematic clauses used by booking platforms in the tourism sector (such as the booking.com cases), related to self-preferencing and bundling (e.g.: Google Shopping, Google Android, Microsoft browser) and
3. market inquiries.

These have led to various subsequent developments in terms of codes of conduct and legislation. The ACCC, has engaged in market inquiries into digital advertising and digital platforms (with additional monitoring ongoing) and released a code of conduct relating to the relationship between media organisations and Google and Facebook. The UK is setting up a Digital Markets Unit with the Competition and Markets Authority to introduce and govern the behaviour of platforms on the back of in inquiry by the Digital Competition Expert Panel (the Furman Review)[13] which made various strategic recommendations.[14] Similar expert advisory reports were undertaken for the European Commission[15] and the US[16]. In terms of outcomes, the UK and US reports argued for a regulatory authority of some form, the Digital Markets Unit within the UK and a Digital Authority in the US which would provide for regulations for firms with bottleneck power, as well as on data mobility and interoperability.[17]

The European Union, however, has taken this forward and has recently proposed two Acts that are ex ante regulatory instruments, a draft Digital Services Act and a Digital Markets Act. These are ex-ante regulatory instrument for platforms that the EC considers to be "gatekeepers" in the digital sector based on their size, control over gateways to customers and an expected entrenched market position.

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[10] European Commission, Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act), Brussels, 15.12.2020, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12418-Digital-Services-Act-package-ex-ante-regulatory-instrument-of-very-large-online-platforms-acting-as-gatekeepers

[11] https://www.accc.gov.au/publications/digital-platforms-inquiry-final-report

[12] https://www.lexology.com/library/detail.aspx?g=a15d385b-4b7d-4598-85c1-52c1940f7063, http://www.samr.gov.cn/, https://www.chinalawinsight.com/2020/11/articles/compliance/10-highlights-of-the-antitrust-guidelines-for-platform-economy/#_ftn1

[13] Furman, Coyle, Fletcher, McAueley and Marsden, "Unlocking Digital Competition".

[14] https://www.gov.uk/government/news/new-competition-regime-for-tech-giants-to-give-consumers-more-choice-and-control-over-their-data-and-ensure-businesses-are-fairly-treated

[15] Cremer, Montjoye and Scheweitzer, Competition Policy for the digital era, Report to the European Commission, 2019

[16] Scott Morton, Bouvier, Ezrachi, Julien, Katz, Kimmelman, Melamed, Morgenstern, Committee for the Study of Digital Platforms, Market Structure and Antitrust Subcommittee, Stigler Center for the Study for the Economy and the State.

[17] See Ennis and Fletcher (2020), "Developing international perspectives on digital competition policy" for a comparison between the expert reports.

The proposed act will require these companies to be subject to a range of additional requirements including requiring interoperability, allowing for advertising on the platform, allowing business users access to data generated by their activities and to allow use outside the platform. They also may not use data obtained from their business users to compete with them or accessing services outside of the gatekeeper platform.[18]

China has also undertaken legislative reforms focused on internet platforms. The State Administration for Market Regulation has released draft Anti-Monopoly measures for internet platforms. These include online platforms treating customers differently based on spending behaviour and data, prohibitions on requiring exclusivity on a platform, greater regulation of acquisition of startups (where the party to the merger is an emerging platform or startup, where turnover is low due to free services and where there are high levels of concentration). In addition, there are specific clauses relating to abuse of dominance. For example, MFN provisions are considered to be monopoly offences and the legislation additionally limits exclusive contracts. This is aligned with competition cases undertaking in various EU jurisdictions which prohibited MFN clauses. Certain platforms and data can be considered essential facilities in China based on a range of considerations including whether they are indispensable, whether there are other substitutes and the impact of the operators in possession of the platform or data. Furthermore, agreements that are potentially problematic to competition including, for instance, horizontal, vertical, collusion are highlighted, and algorithmic agreements or conspiracies are also specifically prohibited.

Key themes emerging from expert reports and legislative changes therefore include the following:
- *Mergers*: A focus on digital mergers (including killer acquisitions), and changes to guidelines to allow for specifics of digital markets including lower notification thresholds.
- *Abuse of dominance:* Special status for large platforms with different ex ante requirements. Regulation of relationships with business customers particularly pertaining to use of data, exclusivity and problematic provisions such as MFN clauses. Provisions related to advertising and self-preferencing.
- *Data*: Regulation of relationships with business customers particularly pertaining to use of data to compete with customers or gain an unfair advantage. Movements towards interoperability and open standards in data. Data as a potential essential facility.
- *Regulatory structure:* Ex ante approaches and digital authorities considered.

A second broad area of competitive distortion that is resulting from digitalisation relates to **distortions in competition between traditional and digital forms of media**. The digital ecosystem has meant that markets that were previously served by infrastructure focused communications providers can often now be provided by suppliers of applications and devices. Concerns over what is deemed unfair competition from digital innovation often arises from non-digital incumbents. Historic examples include taxi operators raising concerns over ride-hailing apps, and pay television operators raising concerns over streaming platforms. This is often due to distortions created by uneven regulatory requirements.

Concerns have arisen from the emergence of OTT providers. For example, while historically voice and SMS communications were provided by telecommunications operators who were regulated by telecoms authorities, digitalisation has meant that companies such as Facebook, Google and Apple through offerings such as WhatsApp, Messenger and Facetime. Similar considerations apply to broadcasting as well as financial services in which mobile money operators compete with online banking or e-wallet services. There are concerns that discriminatory regulations in areas such as local

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[18] European Commission (2020), "Digital Markets Act: Ensuring fair and open digital markets", Brussels.

content, restrictions on foreign ownership, content restrictions, regulatory costs (such as spectrum charges and industry levies) and universal service obligations may apply on an asymmetric basis.

This is problematic in instances in which regulation is directly applied asymmetrically as regulatory requirements are applicable to some providers and not others based on structural (rather than functional) differences and indirectly as some companies face less regulatory risk and are therefore able to innovate and experiment to a greater extent. This can have both horizontal impacts on competition as competition between different suppliers of functionally substitutable but structurally different services face competitive distortions and vertical effects where distortions mean that a less efficient mix of inputs is used.[19]

3.1 Developments and recommendations for Africa

While there have been various investigations and enforcement decisions related to digital platforms internationally, competition assessments of digital markets in Africa have been more limited.

Several large technology platforms have strong positions of dominance in African markets. For example, according to Statcounter (which uses web analytics to track website usage for a sample of users internationally), Google has a 97% share of search in Africa which has remained unchanged over the past year. This rises to 99% if the market share is limited to mobile devices.[20] Facebook has around 73% of the social media market share.[21] However, this includes competitors such as YouTube which may arguably not be substitutes. Despite the large market shares and enforcement actions against these platforms in other jurisdictions, competition and regulatory authorities in Africa have not chosen to engage in investigations against these companies. This is largely a result of the difficulties in pursuing an international company given jurisdictional issues and prioritization.[22]

Enforcement has instead been focused predominantly on large local monopolies rather than international platforms. This has meant that enforcement actions have been more focused on companies that have a strong local presence such as platforms with a stronger local presence or impact on local industries (such as ride hailing or travel platforms) and on digital products that have extensive reach in African markets such as mobile money. Digital competition enforcement in terms of platforms in Africa thus far has focused predominantly on enforcement of mergers and localized abuse of dominance cases. For example, in South Africa the merger between MIH (part of the Naspers group) and WeBuyCars was the first significant digital competition case to be prohibited on the basis that it would prevent potential entry and that the combination of datasets would provide Naspers with an "unmatchable competitive advantage".[23] The portfolio effects resulting from the dominance of We Buy Cars and the benefits that it would obtain through portfolio effects in the Naspers group were central to the prohibition. Other mergers between digital companies (such as local travel websites) were also scrutinized in some detail. Some mergers with a strong impact in the South African market such as Facebook/WhatsApp were not notifiable in South Africa under current laws.[24] In Kenya,

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[19] NERA and GSMA (2016), "A new regulatory Framework for the digital ecosystem."

[20] Statcounter Global Stats November 2019-November 2020

[21] Statcounter Global Stats November 2019-November 2020

[22] See Competition Commission of South Africa (2020), Competition in the Digital Economy- For public comments, Pretoria.

[23] Competition Tribunal, Competition Commission and MIH Ecommerce Holdings (Pty) Ltd; We Buy Cars (Pty) Ltd, LM183Sep18, C:/Users/27799/Downloads/2020-03-27-Naspers-WBC-Merger-Prohibition-MediaRelease.html, and Competition Commission of South Africa (2020), Competition in the Digital Economy- For public comments, Pretoria.

[24] Competition Commission of South Africa (2020), Competition in the Digital Economy- For public comments, Pretoria.

a review was undertaken based on allegations that Uber was engaging in a predatory pricing strategy, lodged by traditional taxis. But on review they found that there was no barrier to entry and that in fact the increased competition resulted in a drop of prices from Ksh 35- Ksh30.[25] A similar case against Uber in South Africa also found that Uber was not pricing below cost. Though tourism is an important part of the African economy, and booking platforms (such as booking.com) comprise a large share of online bookings, thus far competition authorities have not as yet applied restrictions on MFN clauses and there is evidence that this is still common in at least some African countries.[26]

A key area of analysis for digital competition investigations in Africa has been in relation to mobile money platforms. There are several parallels in the underlying economics in these cases and those being undertaken in other jurisdictions with respect to digital platforms. As a platform, mobile money platforms are also subject to network effects as well as scale effects. They also have the propensity to tip towards a dominant platform. The Competition Authority of Kenya investigated Safaricom for abuse of dominance in 2014. They required Safaricom to remove requirements for agent exclusivity. A 2016 intervention on the back of a market inquiry required that operators including Safaricom reduce their USSD pricing. Similarly, the Zimbabwe Competition and Tariff Commission investigated whether Econet mobile money transfer contravened competition law. This included them initially not allowing banks to access their platform and later charging them prohibitively for use of the service. The key remedies in these instances dealt with ways in which to limit the impact of network effects. This included agent exclusivity and allowing for interoperability.[27][28]

In terms of more general investigations of digital markets and the development of competition strategies there appears to have been slower progress outside of South Africa. In South Africa a digital issues paper was recently released by the South African Competition Commission.[29] The paper noted that there was potentially some underenforcement of digital mergers historically and notes that they aim to develop guidance notes on valuation of assets for digital companies as well as a practice note on the assessment of digital market mergers, and merger creep. They also note that they are developing tools for detecting digital cartels, piloting a tender bid-rigging detection programme, building a cartels forensic lab staffed by data scientists and developing guidelines for jurisdiction in cases of digital collusion. In terms of abuse, they note that cases against dominant international digital companies are difficult to prosecute due to jurisdictional reach. However, they note that outside of globalized search and social media there is a contestable digital space in which South African firms take part. Thus, they aim to map the digital landscape in South Africa, engage in proactive investigations against abusive conduct by dominant online firms within this space, issue guidelines in respect of conduct which the Commission deems likely to impact on competition, and engage in a scoping study into digital markets. The issue paper highlights too the importance of investment in digital infrastructure, the importance of technology neutral approaches to regulation in terms of traditional or digital business models that levels the playing field.

[25] Competition Authority of Kenya, "Country Statement: Competition issues in the digital economy- The case of Kenya. UNCTAD Intergovernmental Group of Experts on Competition Law and Policy, 10-12 July 2019, Geneva
[26] Goga, S (2019) The impact of digital platforms on competition in the tourism industry. CCRED IDTT Discussion Paper 4.
[27] Mazer and Rowan (2016), Competition in Mobile Financial Services: Lessons from Kenya and Tanzania. *The African Journal of Information and Communication, 17* 39-59.
[28] Robb, G., & Vilakazi, T (2016). Mobile payments markets in Kenya, Tanzania and Zimbabwe: A comparative study of competitive dynamics and outcomes. *The African Journal of Information and Communication (AJIC)*, 17, 9-37.
[29] Competition Commission of South Africa (2020), Competition in the Digital Economy- For public comments, Pretoria.

In assessing competition in Africa on a forward-looking basis it is likely that some concerns and focal companies may be substantially different from those in the EC and US. Three broad concerns that have been noted in an African perspective is platform power over routes to market, the impact of contracts on retailers who use platform marketplaces and the impact of platform power over user data.

E-commerce in Africa is nascent but growing strongly and it is important that it is monitored and quick wins are enforced. At this stage there is still substantial competition from bricks and mortar stores. However, there are large e-commerce platforms such as Jumia and Takealot which have followed similar patterns of incremental mergers, venture capital backing and growth as Amazon.[30] It is important that competition authorities monitor contracting by these platforms where they involve third party sellers that compete to ensure that the abuses that have occurred in other markets due to a dual role of marketplace and retailer such as problematic contractual clauses (exclusivity and MFN clauses) as well as use by platforms of business data to compete with them is considered in any digital strategy and proactively monitored. In industries in which there is established international presence such as tourism booking platforms, authorities in Africa should consider enforcing prohibitions on MFNs parallel to the restrictions in other jurisdictions.

The large platforms still control access to consumers and customers. Google as a gatekeeper of search is likely to maintain its role in providing access to customers and information as the African e-commerce environment matures. This should be monitored and digital policies developed should consider drawing on regulations relating to self-preferencing and advertising space in line with the emerging international practices.

It is also important to note that companies that hold power over consumer data are likely to differ based on country contexts. For example, a mobile money operator that is dominant and linked with a dominant MNO may have widespread data on consumers, location, purchases that can be aggregated and used, which may not have a parallel in a developed country jurisdiction. There may also be other digital giants. In South Africa, for example, companies such as Discovery which has a bank, insurance and health insurance divisions has a reward programme Vitality that holds information on individuals' health (including through the IoT via fitness tracking devices and car tracking devices), has adjacent businesses in insurance, banking and through its extensive rewards programme tracks other indicators (such as healthy food purchases). As a result, the power over data held by these companies is extensive and requires monitoring in a way that a health insurer in another country with a less sophisticated data ecosystem would not. The potential for such companies to behave in a manner that leverages dominance is there and should be monitored.

There have been few developments in Africa thus far regarding interoperability of data. In some countries, such as Kenya, credit information must be shared by banks and digital financial services providers with credit reference bureau, for example. However, this is very limited in comparison to open banking data of the type that is shared on open banking platforms. In addition, there are some developments regarding open banking in which APIs allow for use of data on mobile money and banking platforms by third party operators. However, these are generally limited in functionality. For example, Safaricom allows for payment integration, but not transaction records and history. Nedbank

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[30] Goga, S, Paelo, A and J, Nyamwena (2019). Online Retailing in South Africa: An Overview", Working Paper 2019/2, Centre for Competition Economics, University of Johannesburg (with A,), Goga, S and Paelo, A (2019) Strategies for Adapting to Online Entry: The Case of Retailers in South Africa", Working Paper 2019/3, Centre for Competition Economics, University of Johannesburg and Goga, S and Paelo, A (2019), Issues in the Regulation and Policy Surrounding E-Commerce in South Africa", Working Paper 2019/6, Centre for Competition Economics, University of Johannesburg

and Investec in South Africa also have limited APIs that can be used.[31] Nigeria has an open banking initiative similar to the PSD2 in the UK which allows for open banking, but this is still in its early stages and is not mandated but voluntary.[32] Interoperability of other data such as social media, telecoms and search has not as yet been developed.

Large platforms have used different strategies in Africa in order to promote their products and investing or co-investing in physical infrastructure - This needs to be considered from a competition perspective. This includes the provision of zero-rated or free services at times, raising concerns about net neutrality (for example, Facebook free). Large platforms have also been investing or co-investing in physical infrastructure. Facebook has invested in a range of areas including backhaul fibre partnerships, edge, express wifi.[33] Google has invested in a subsea cable and fibre partnerships as well as Project Loon which is a network of balloons aimed at bringing internet connectivity to rural and remote communities. It is important to consider the ways in which the different business models being used in Africa would impact on privacy, consumer exploitation and leveraging into adjacent markets. At the same time, it is important to note that these large platforms have an incentive to bring about greater connectivity in developing countries, in competition with existing broadband providers. In many African countries, for example, having free or zero-rated access to streaming media helps mitigate the market power of large satellite TV platforms.[34]

In terms of competition between digital and traditional products, it is important to ensure regulatory neutrality to avoid market distortions.

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[31] Goga, S (2020). Digitalisation, data and open banking: A South African perspective" (2019) CCRED IDTT Discussion Paper 3

[32] https://apis.openbanking.ng/#intro

[33] https://thefintechtimes.com/facebook-commits-to-infrastructure-investment-that-will-add-57-billion-to-africas-economy-by-2024/

[34] Robb, G., & Hawthorne, R. (2019). Net neutrality and market power: The case of South Africa. *Telecommunications Policy*, *43*(9), 101814.

4. Implications for regulation

Increased digitalisation in Africa is likely to have several implications for regulation. This includes regulation in a range of areas including taxation, trade and industrial policy as well as intellectual property and privacy. However, this paper focuses on areas of regulation that are important from the perspective of ICT regulators.

Firstly, changes in technology have some specific new requirements in terms of regulations such as numbering, spectrum management and international roaming for devices for the IoT.

Secondly, technological developments combined with the high cost of rollout of new technologies increasingly incentivize forms of sharing and this requires regulatory consideration.

4.1 Regulating the Internet of things

In order to create a business ecosystem to allow for IoT there are a range of areas in which regulation is required. This includes ensuring that there are regulations governing cybersecurity, licensing, data protection, numbering, spectrum allocation, pricing, international roaming and access. Various authorities have considered the IoT. For example, BEREC engaged in a 2016 review of whether rules created for voice were relevant to M2M communication.[35] They found that treatment of IoT was only necessary for roaming, switching and number portability.

1. *Numbering and identifiers:* The adoption of a system for numbering is required for IoT. This includes IP addresses and other identifiers. Numbering of IoT will need to be considered. BEREC notes that E.164 and E.212 could be used but that the availability of numbers and ranges needs to be ensured.

2. *Licensing and spectrum management:* IoT can operate using a range of technologies. This can include local short-range connectivity through WiFi and Bluetooth (for example personal health trackers), technology that requires wide area coverage through sub-1GHz spectrum, those that rely on mobile technologies (including in term 5G) and satellite technology. Spectrum bands can be opened up on a shared basis as well as through the use of small cells. As such, monitoring of spectrum with a view to licensing white space and shared spaces is necessary. In addition, global harmonization of bands for IoT will assist in reducing the cost of devices.

3. *Switching/lock-in:* Number portability and an approach to switching services providers need to be considered to avoid lock-in and ensure competition.

4. *Security and privacy:* BEREC has argued that it should consider enhanced data protection rules for the IoT environment. This may differ depending on the application. For example, the data privacy concerns around health monitoring devices of an individual would be quite different to the data from water quality monitoring.

5. *Interoperability*: IOT is a cluster of technologies. As such concerns over standards and interoperability have arisen. There are concerns that the complexity of technologies means that players specialized in one of the technical components of an IoT system can dominate and lead the architecture of the system. Interoperable standards are likely to assist in deployment.

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[35] BEREC (2016), BEREC Report on Enabling the Internet of Things, BoR (16) 39

6. *Technological neutrality:* Given the different means of connecting with IoT it is important that there is technology neutral regulation to avoid distortions in the market. For example, SIM and non-SIM based providers need to be regulated in the same manner.

At present only 6.82% of countries in Africa have a policy and regulatory framework for IoT and M2M and it is not clear how developed these frameworks are.[36] As such, this is a key area for assessment going forward. However, it is important to note that the IoT is still at early stages so any interventions should ideally be light touch and technology neutral.

4.2 Cloud computing and data storage

With the increase in data generated and processed through big data and machine learning there are additional suggestions related to regulatory frameworks governing it. This includes cloud computing in which data is held and processed externally by a third party. Concerns relating to data include privacy, security and ownership of data. This is particularly in instances in which data generated by a country's population is held by a third party and where that data could be used for developmental benefits. There are various concerns that lead to requirements of data localization or sovereignty. This includes data security, privacy concerns, access and control to data that is beneficial for the country and industrial policy concerns.[37] For example, concerns from developing countries that open data will prevent the emergence of local industries and create a first mover advantage for platforms and businesses from developed economies. Recent trade agreements such as the Trans-Pacific partnership have included obligations that prevent data localization requirements.

As a result, in Africa there have been movements towards requiring data sovereignty, which ensures that the laws and structures of a country apply to all data generated in a country (regardless of storage location) and in other countries data localization which requires that collection and processing occurs within national boundaries.[38] While data sovereignty is less of a concern, there are serious challenges related to data localization in terms of the limitations it causes on cross-border data flows. There are concerns that this creates local monopolies where there is insufficient scale to provide for multiple local data centres, that it restricts use by businesses and individuals of the best tailored computing solution and thereby limits quality competition and that it ultimately limits the benefits of the global information economy. However, several countries have specific types of sensitive data that need localization such as health and financial data.

In Africa at present there is much variation in terms of the regulation of data flows. A large number of countries do not have any form of regulation. South Africa has the Protection of Personal Information Act of 2013[39] which allows cross border data flows under certain conditions including consent and that data flows go to countries with a law that provides an adequate level of protection, which is a loose form of data protection. Rwanda has declared data sovereignty, defined as retaining "exclusive sovereign rights on her national data with control and power over own data" but allows for cross-border storage of data in a cloud outside of Rwanda.[40] Kenya has a stricter interpretation. Kenya's Data Protection Act of 2019 [41]requires registration of data controllers and processors, has data protection requirements and importantly requires that personal data is not transferred out of

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[36] ITU Eye, (Accessed December 2020).

[37] GSMA, The impact of data localization requirements on the growth of mobile money-enabled remittances, 2018.

[38] Nyamwena, J and Mondliwa, P, CCRED Policy Brief 3: Data governance matters: Lessons for South Africa, July 2020.

[39] Republic of South Africa, No 4 of 2013, Protection of Personal Information Act, 2013.

[40] Republic of Rwanda, Rwanda Data Revolution Policy. April 2017.

[41] Republic of Kenya, The Data Protection Act, 2019, Nairobi.

the country unless certain conditions are met, including that the data controller has given proof to the Data Commissioner that there is sufficient security and protection. Furthermore, on strategic grounds certain forms of processing may only occur through a server or data centre in Kenya. Nigeria requires localization of several categories of data including government or sovereign data, financial data and the subscriber and consumer data of telecommunications, network service and data companies.[42] In addition, there are Pan African initiatives. For instance, there is an African Union convention on cyber security and data protection, which includes a commitment to strengthen personal rights over data, and the establishment of a regulator in this regard.[43] Given the benefits to data flows, data localization or cumbersome processes to regulate data flows should be discouraged outside of highly sensitive data categories as long as privacy considerations are met.

4.3 Rollout of high-speed infrastructure

Digitalisation requires suitable connectivity infrastructure, devices and lower costs of data. As such, traditional regulatory tools are useful for ensuring the preconditions to benefit from digitalisation. As noted previously, in many African countries coverage overall is still low. Therefore, incentives for general broadband rollout including in rural and remote areas required, and several benefits from digitalisation can be achieved with this. However, in addition, some applications require better infrastructure including 5G which has higher speeds and lower latency. Both reaching the last mile for consumers and 5G and higher speed networks are expensive. As such, regulatory strategies are required to assist.

Sharing

The high cost of rollout in rural and remote areas as well as the costly rollout of 5G technologies mean that there is a strong incentive to share. 5G networks have various new benefits including enhanced mobile broadband but also has other applications, including low latency applications and facilitating internet of things ('IoT') and machine to machine communications. There are various features of 5G networks that should be noted. 5G networks are generally dense and use smaller cell sizes. Investments including network upgrades, densification requirements, and increased fibre for backhaul, mean that 5G will be expensive to roll out. The differences in technology, particularly the ability to engage in network slicing in which virtual networks are created over the same infrastructure, mean that infrastructure sharing can be incentivised to reduce costs.

In addition, developments in technology have enabled newer forms of RAN sharing, including (i) multi-operator radio access network (MORAN), a form of RAN sharing where equipment is shared but not spectrum, and (ii) multi operator core network sharing (MOCN) which is a form of RAN sharing where all elements of the RAN including spectrum can be shared. The latter means an end user can access their MNO service through all frequencies in the shared network. This can occur with frequency or spectrum pooling. Changes in LTE standards to an IP based network architecture can also allow for increased network virtualisation. These technological developments have changed how sharing can occur in the market.

However, sharing ultimately can also have a negative impact on infrastructure investment. As infrastructure competition can still pay an important role in reducing prices and increasing quality this may not be beneficial in the long run. A key consideration for regulators is how to encourage sharing

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[42] Nigerian Communication Commission, Guidelines for Nigerian Content Development in Information and Communications Technology.
[43] See: https://au.int/sites/default/files/treaties/29560-treaty-0048_-_african_union_convention_on_cyber_security_and_personal_data_protection_e.pdf

where it reduces costs for operators, and as a result, for consumers, while ensuring that the benefits of competition, particularly on a dynamic, long-run basis, are not reduced significantly as a result.

From a regulatory perspective, agreements relating to sharing using new technology therefore need to be scrutinized and should be carefully weighed up on a case-by-case basis.

Spectrum

Radio frequency spectrum plays a key role in shaping outcomes in markets for mobile telecommunications services. Spectrum assignments matter in at least two ways: (i) in shaping the market structure (number and size of rivals), and (ii) affecting the costs incurred to offer wireless services. A significant trend in recent years is towards allowing for greater shared of use spectrum, including by expanding existing unlicensed bands[44] and by means of share use of licenced bands[45]. For instance, in the recent invitation to apply for radio frequency spectrum in South Africa, licensees must share unused spectrum.[46] This may have important implications for innovation in wireless broadband technologies, and allow for more competitors serving a number of niche applications in the coming years. This can include use of spectrum by private or community networks. This is an important area for regulators in Africa to emphasize in the coming years.

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[44] See, for instance, the US Federal Communications Commission expansion of the Industrial, Scientific and Medical (ISM) unlicensed bands to include 1200MHz in the 6GHz range: https://www.fcc.gov/document/fcc-opens-6-ghz-band-wi-fi-and-other-unlicensed-uses.

[45] See, for instance, Directive (Eu) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

[46] See: https://www.icasa.org.za/pages/invitations-to-apply

5. Implications for access/universal service

Universal service policy in African countries is especially important given the large coverage gaps in many countries, as discussed above in Section 1. In respect of targets and goals, the Broadband Commission for Sustainable Development emphasizes the UN sustainable development goal (SDG) 9c: *"Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020".*[47] There are a number of targets proposed to achieve this, including that basic broadband access should cost less than 2% of gross monthly income per capita and that broadband penetration should reach 35% in least developed countries, by 2025. The various State of Broadband reports since 2012 have proposed 76 interventions, including fostering relevant content creation and local hosting, improve internet of things and smart city policy frameworks, and incentivising public private partnerships.

There is also a plan by the African Union, the 'Africa's digital transformation strategy (2020-2030)', which supports the expansion of connectivity, and emphasizes affordability and infrastructure sharing.[48] African countries typically score poorly compared to other developing countries where universal service is concerned. For instance, other than Rwanda, most African countries rank among the lowest in terms of universal service funds used to fund broadband infrastructure (Figure 6), or to fund broadband subsidies to end users (Figure 7*Figure 6*). In addition, access to public WiFi, including at public buildings and via community networks, is limited (Figure 8).

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[47] Broadband Commission for Sustainable Development (UNESCO, ITU), September 2020, 'The State of Broadband 2020: Tackling digital inequalities'.
[48] See: https://au.int/sites/default/files/documents/38507-doc-dts-english.pdf

Figure 6: Many African countries (highlighted in red) rank lower in terms of whether USF prioritised infrastructure investments that will reduce costs and increase access for under-served communities and market segments (A4AI, 2020)
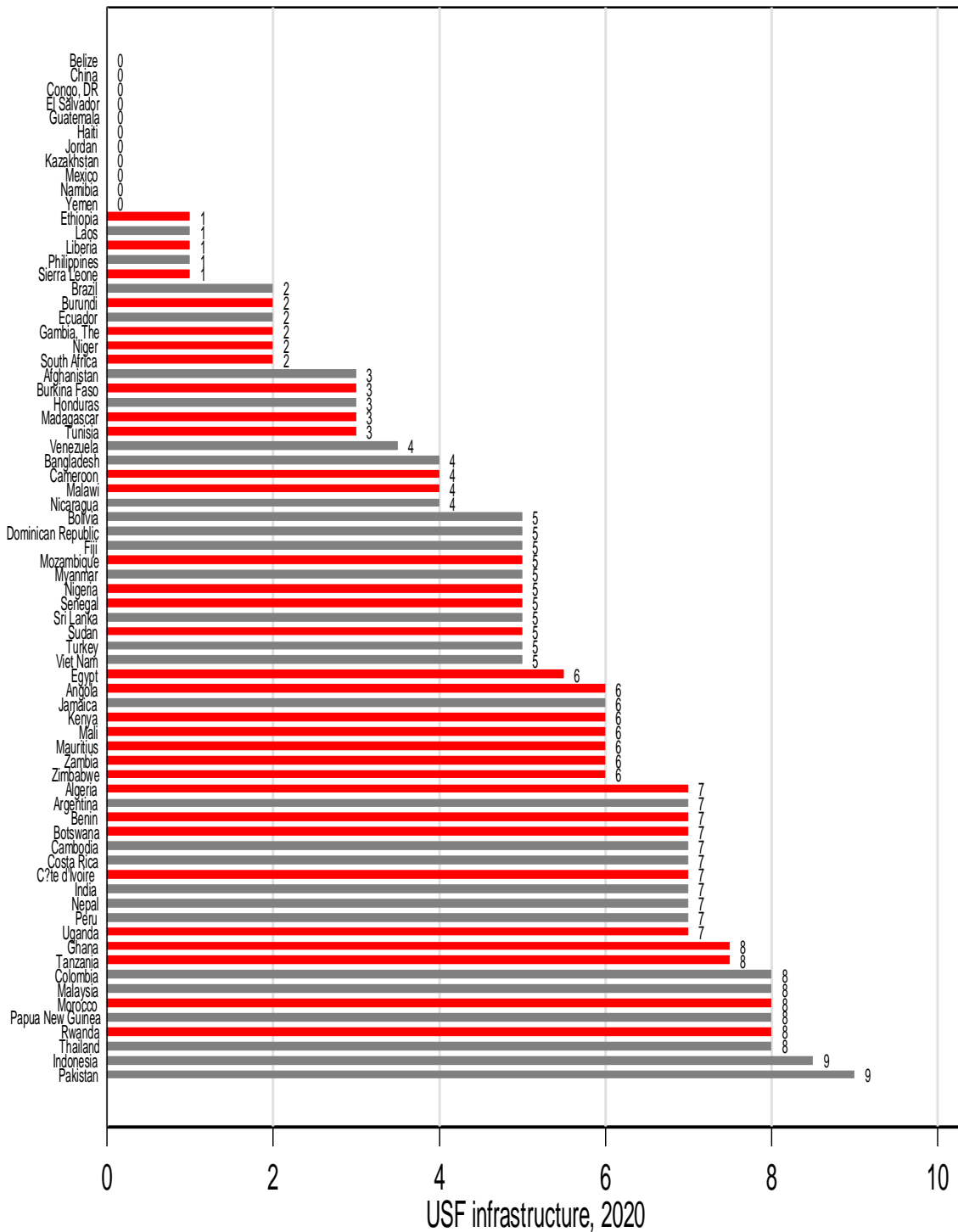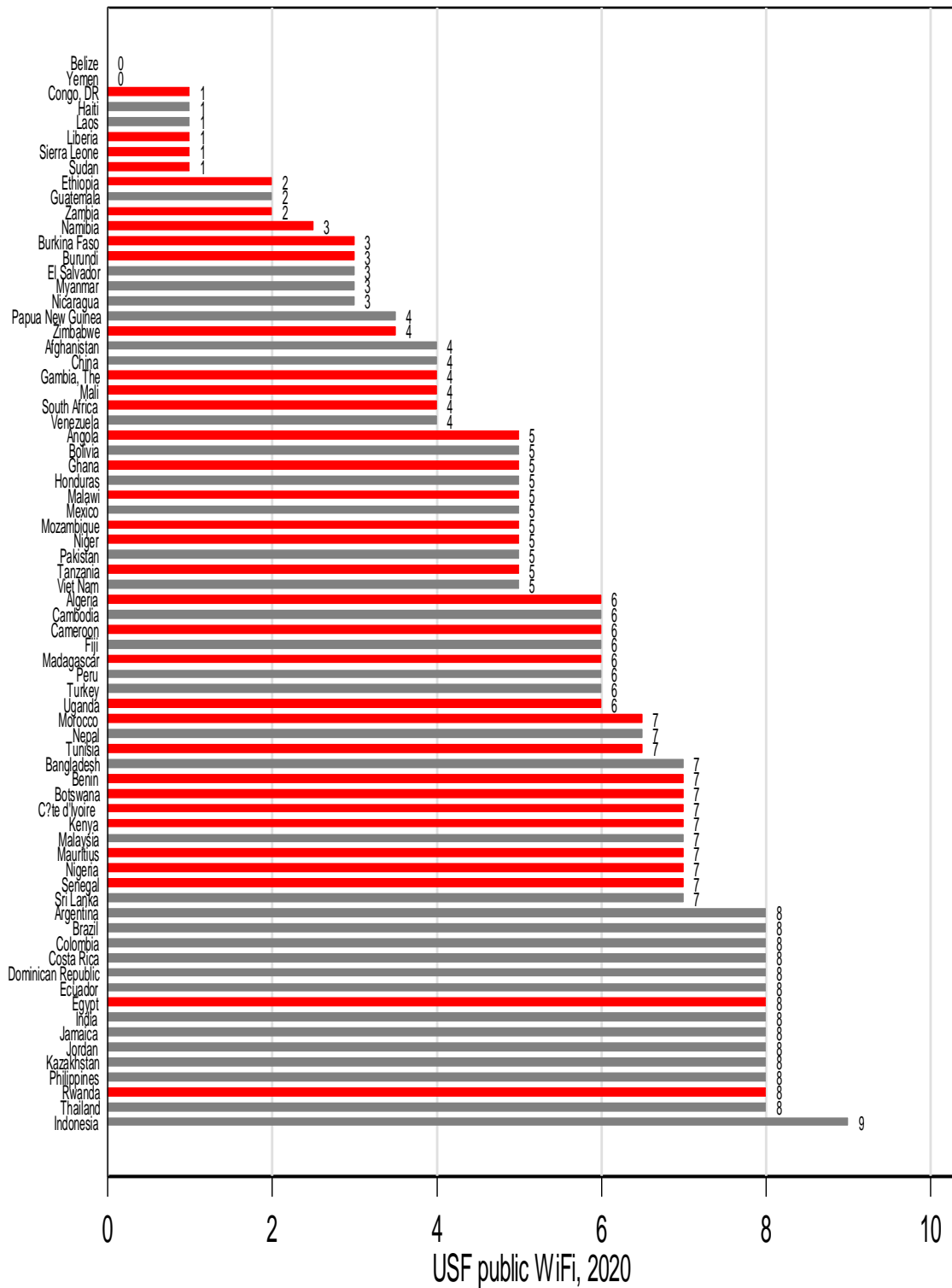
Source: Alliance for Affordable Internet, 2020, 'Affordability report 2020'

Figure 7: African countries (highlighted in red) also rank lower in terms of whether USF funds are used to subsidize broadband access for end users in underserved and underprivileged populations
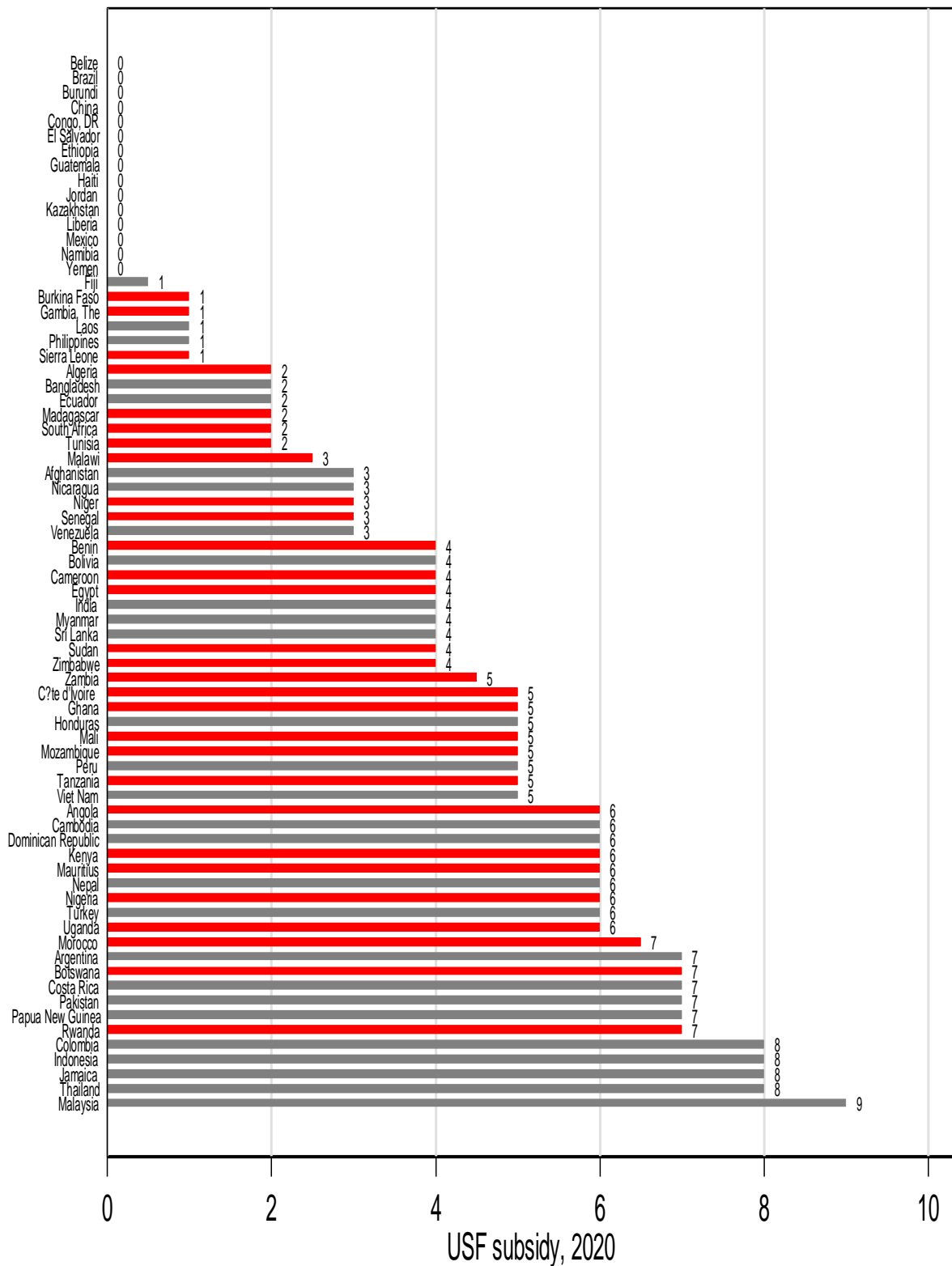
Source: Alliance for Affordable Internet, 2020, 'Affordability report 2020.

Figure 8: Relatively few African countries (highlighted in red) are highly ranked according to whether there are specific policies to promote free or low-cost public Internet access*

Source: Alliance for Affordable Internet, 2020, 'Affordability report 2020.
Note: * Such as budget allocations for internet access in public libraries, schools and community centers, or provisions for spectrum use by community wi-fi options

This suggests that reforms are needed in respect of universal service programmes in African countries. However, there is a debate as to how to achieve universal service aspirations in many regions. One approach is that adopted in the 2018 European Electronic Communications Code ('EECC'), which considers a gigabit society as desirable and often refers to broadband at a fixed location. However, there is mixed evidence that consumers value very high speeds[49] and, in Africa, the predominant means of connecting is via mobile.[50] 'Universal service operators' are also permitted, though private investment and then using infrastructure expansion funds should be considered first before considering a universal service operator. Where universal service operators are designated, they should be compensated for the costs of universal service obligations, on a competitively neutral basis. Another aspect that the EECC emphasizes is infrastructure sharing, and particularly 'co-investment' in new infrastructure, including sharing costs between incumbents and rival networks, in return for regulatory forbearance.[51] This approach has in mind large, fixed-line incumbents delivering higher speeds, while at the same time emphasizing competition in the supply of services.

It is important to note that there is a risk, in this infrastructure-sharing or co-investment approach, together with universal service operators and an emphasis on gigabit speeds, to the desirable 'end-state' of telecommunications regulation, where competition renders regulation unnecessary.[52]

An alternative in this regard is, for instance, the least-cost auction approach adopted by Federal Communications Commission in the USA, which allows for a plurality of network infrastructures to be built for universal service purposes.[53] While there is an emphasis on speed, including gigabit speeds, this is not the only goal, and cost-effective bidding by rival providers appears to be as important in the process. Recently, 180 broadband providers were awarded funding to serve 5.2m unconnected homes using a variety of technologies, including low-earth orbit (LEO) satellites. The costs to serve the 5.2m homes came in at USD 9.2bn, significantly lower than the USD 16bn that was budgeted for. This outcome suggests that, when considering universal service, including in Africa, a technology neutral approach can result in significant cost-savings.

A further consideration is that choice should be given to end users as to what technology best serves them, given the resources available. Thus, demand-side subsidies, such as broadband voucher schemes, may be considered in addition to least-cost infrastructure (supply-side) subsidies.[54] This is likely to be more feasible in developing countries where mobile financial services are more widely available, and pro-poor targeting should be possible based on a variety of factors, including geography and the expansion of identification documents. Spectrum licence coverage obligations may also help to expand access, in addition to other obligations such as a requirement to share spectrum if it is not being used, as discussed above. There are also additional factors that are important, including expanding internet access at public facilities (such as schools, clinics and hospitals), which stimulate the construction of networks including in more marginal communities. As discussed above, it is also important to allow a permissive environment in respect of service and spectrum licensing (including

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[49] Vogelsang, I. (2019). Has Europe missed the endgame of telecommunications policy? *Telecommunications Policy*, *43*(1), 1-10.

[50] There are also targets for mobile, of 30Mbps indoors and outdoors available to all citizens via mobile. Nonetheless, the emphasis on broadband in the EECC appears to emphasize fixed line connectivity, and the investments needed to achieve this.

[51] See: Directive (Eu) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN

[52] Vogelsang (2019), cited above.

[53] See: https://arstechnica.com/tech-policy/2020/12/spacex-won-rural-fcc-funding-in-surprising-places-like-major-airports/

[54] Muente-Kunigami, A. and Navas-Sabater, J, "Options to Increase Access to Telecommunications Services in Rural and Low income areas", World Bank Working paper no 178, 2010.

allowing unlicenced and shared spectrum use) in order to promote innovation in technology-neutral network offerings, including in respect of community networks.

As such, technology neutrality is an important consideration for universal service in Africa, given the significant changes in technology that are currently taking place, due to changes in the ways in which networks are built and shared, and in respect of growth in the use of licence-free or shared spectrum use. These features mean that, more than ever, universal service funds should be made available on a technology-neutral basis.

6. Next generation incentives for affordable access

Digitalisation has much promise for enhancing efficiencies for businesses and providing benefits to individuals and small businesses in Africa. This applies in a range of areas including manufacturing, agriculture, mining and tourism as well as areas that are more directly related to individuals such as health, education and access to financial and government services. However, at present it is clear that Africa is lagging in terms of ICT infrastructure to support this both in terms of more sophisticated high-speed networks as well as the more basic broadband coverage requirements that would enable more basic applications.

It is therefore essential that the policy and regulatory environment focuses on supporting digital development. Next generation incentives for affordable access therefore need to be developed and implemented. This can include the following:

- **Stimulating device affordability:** Encouraging the removal of tariffs and non-trade barriers (such as lengthy regulatory applications) for electronic goods including end user devices (such as smartphones and computers) and components for IoT including sensors and network equipment is important to ensuring that devices can reach the market quickly and efficiently.

- **Provision of access in rural and isolated areas:** Support should be provided for least-cost technologically-neutral universal services policies that emphasise access to basic services to as many people as possible as opposed to speed. Technology neutrality is important in ensuring that a range of technologies (including, for example, satellites or balloons) are used based on the cost of service given the appropriateness for the terrain. This can be done through technologically neutral demand-side incentives (such as vouchers and the provision of community services) and least cost auctions that allow a range of operators to compete for provision based on the lowest cost. In addition, both in rural and more built-up environments, intervention by authorities to assist with key obstacles such as rights of way would also be beneficial.

- **Developing regulatory frameworks to support investment in broadband infrastructure:** National Regulatory Authorities should play an enabling role by creating supportive regulatory structures in areas such as innovative spectrum management, the development of license exemptions or lesser notification requirements for small private/community networks and use of white space and to allow cost saving sharing where there is no competitive harm.

- **Develop integrated regional policies to support competition and consumer protection:** With the concerns that have arisen regarding digitalisation and its impact on competition as well as concerns related to consumer protection in other markets it would be beneficial for African authorities to draw on the lessons learnt, and carefully consider whether and how they apply to an African context. However, given the small size of many African economies there is benefit to having regional standards and regulatory approaches. This should include cooperation in competition investigations and the sharing of best practices, ending data localization within Africa, and creating functionally neutral regulations (for content for example).

- **Regulatory frameworks to incentivise the digitalisation of agricultural value chains:** There is great benefit to digitalisation of agricultural value chains in Africa. This includes warehouse receipts, phytosanitary certificates and customs processes. Prioritising the development of frameworks and investment in systems to support digitalized processes by government is

therefore important to development overall but will also assist in stimulating demand in rural areas.

- **Work towards lower data costs:** Authorities need to focus on ensuring that preconditions for competition are in place, demand side use of digital technologies is encouraged through demand side incentives as well digital literacy initiatives and the efficient assignment of spectrum including for dynamic and shared spectrum.

Conclusions

Improvements in technology and digitalisation has resulted in significant changes to technologies and business processes. This has significant potential to increase business, agricultural and human develop capabilities in Africa. However, at present, infrastructure in Africa lags other regions, costs are often high and there is limited affordability. Absent policy and regulatory focus, this could stymy potential gains from digital innovation.

The changes in the use of data, market participants and the role that digitalisation can play both in economic development as well as human development mean that ensuring access, fairness and competitiveness in the environment is growing in importance to policymakers. Furthermore, new technologies and digitalisation also require specific regulatory adjustments. This includes regulatory and competition intervention focused on limiting abuse of market power by dominant platforms, guarding against abuse through data monopolization alongside measures to ensure that competition in the ICT sector assists in bringing down costs. This includes regulation of sharing arrangements in light of new technological possibilities. Furthermore, there is specific regulation for IoT and data flows that are required and should be carefully considered to avoid over-regulation

Furthermore, specific interventions are required to improve access to technology. Supply side incentives that are technology neutral approaches such as least cost infrastructure subsidies and auctions, provision of public broadband and demand side subsidies such as vouchers should be implemented. Complementary frameworks to enhance digitalisation of agriculture and provision of access to financial services through digital will also play a role in enhancing demand.

Importantly, it is essential to work towards building preconditions for competition which will result in better innovation and lower data costs. In turn, lower data costs can provide for increased use and increased consumer demand.