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Telecommunication ecosystem evolution in Kenya 2009 - 2019:

**Setting the pace and unbundling the
turbulent journey to a digital economy
in a 4IR era**

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evolution in Kenya, 2009 – 2019:
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Acronyms and Abbreviation

2G, 3G, 4G, 5G	2nd Generation, 3rd Generation, 4th Generation, 5th Generation
4IR	Industrial Revolution
A4AI	Alliance for Affordable Internet
AfCFTA	Africa Continental Free Trade Area
AfDB	African Development Bank
AI	Artificial Intelligence
ATU	African Telecommunications Union
AU	African Union
AUC	African Union Commission
CA	Communication Authority of Kenya
CBD	Central Business District
CCK	Communications Commission of Kenya
ccTLD	country code Top Level Domain
CSO	Civil Society Organisation
DARE	Djibouti Africa Regional Express
DE4A	World Bank's Digital Economy for Africa
DLAK	Digital Lenders Association of Kenya
DLT	Distributed Ledger Technologies
AU DTS	Africa Union Digital Transformation Strategy for Africa 2020-2030
EASSy	East African Submarine System
EU	European Union
GSMA	Global System Mondial Association
HAPS	High Altitude Platform System
ICANN	Internet Corporation of Assigned Names & Numbers
ICT	Information and Communication Technology
ICTA	ICT Authority
IoT	Internet of Things
ISOC	Internet Society
ISPs	Internet Service Providers
ITU	International Telecommunication Union
LION 2	Lower Indian Ocean Network 2

MNOs	mobile network operators
MooC	Massive Open Online Course
MTP	Medium Term Plans
NBS	National Broadband Strategy
NCS	National Communications Secretariat
NFP	Network Facilities Providers
NIRA	Nigeria Internet Registration Association
NITDA	National Information Technology Development Agency
NOFBI	National Optic Fibre Backbone Infrastructure
NTSA	National Transport and Safety Authority
PEACE	Pakistan East Africa Connecting Europe
RURA	Rwanda Utilities Regulatory Agency
SDM	Single Digital Market
SME	Small Medium Enterprise
TCRA	Tanzania Communications Regulatory Authority
TEAMS	The East African Marine System
TESPOK	Technology Service Providers Association of Kenya
TPSPS	Telecommunications and Postal Sector Policy Statement
TvWS	Television White Space
UAVs	unmanned autonomous vehicles
USAC	Universal Service Advisory Council
USF	Universal Service Fund
WOAN	Wholesale Open Access Network



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Executive Summary

Telecommunications and ICTs impact Kenyans' daily socio-economic endeavours in work, commerce, health, and education, and is the gateway to a bright future for Kenya to continue to deliver innovative new e-government services; where the imaginations and skills of youth will deliver innovations and propel Kenya as an ICT driven economy towards prosperity. This is the vision set in the National ICT Policy promulgated in 2006 and restated in the ICT Policy gazetted in 2020. The development of a dynamic and innovative ICT application is premised to facilitate growth and productivity, allowing the development of smart services by generating additional social benefits and increasing the number of jobs, thereby improving the lives of Kenyan citizens. The telecommunications ecosystem is the underlying enabler for this transformation. This review paper undertakes a diagnostic and methodical examination of the ecosystem over the period 2009-2019 by unbundling the ecosystem to empower an informed debate and measures to catalyse further growth of the sector. The diagnostic examination is the basis for findings and recommendations contained in this paper.

The Kenyan government through the Ministry of ICT has been proactive and developed policy frameworks to shape the development of the sector. In doing so, the policy frameworks have been inspired to anchor national development towards socio-political demands for development. In this regard, the sector is aligned and indeed positioned to support development and contribute as a leverage for development. From 2009, telecommunications and ICT has permeated all sectors of the socio-political development, thereby creating, and delivering efficiencies and new ways of experiencing daily life. National ICT Policy of 2006 which heralded broadband was eventually replaced by one published in 2019 and gazetted in 2020 which sets Kenya on a trajectory towards digital economy and Fourth Industrial Revolution (4IR).

With a flurry of frameworks produced, the challenge is the multiplicity of documents which are not aligned, lack coherence, and lack an implementation timeline, resources and appropriately enabled institutional driver. As a result, it becomes difficult to monitor and evaluate progress and therefore a defined point of intervention. This clarity is especially lacking in the National Broadband Strategy, Digital Economy Blueprint as well as Digital Ledger Technologies, and AI Taskforce Committee report. A conversation to harmonise and align including the Government Masterplan 2019 to 2029 developed by the ICT Authority will be helpful to drive the country forward. Another area that requires attention is a coordinated framework across the Counties and the National government. Different policies pursued by different Counties result in a problematic working environment especially on matters of infrastructure rollout.

The policy defined the operational space empowered through a legal framework overseen by Communications Authority of Kenya (CA), the sector regulator. With the promulgation of the Kenya Constitution 2010, the regulator had to evolve from a Commission to an Authority but more importantly address Constitutional matters on fundamental rights on access to information. Its forward planning had to take note of the entry of the Counties. Also, the institutional framework for universal service had to change to align to the revised enabling legislation. Under this environment the regulatory framework has evolved to support market entry for fresh players and bring in new services under a technology neutral licencing framework.

The focus of the regulator has been on access and basic coverage of signal availability expanding across every part of the country. This has called for innovation on the Universal Service Fund (USF) as instrument to enhance coverage. In addition to access, the regulator has focused on affordability and instituted measures including a glide path for termination charges. Network interoperability especially for monetary transfers was remarkably successful albeit in a highly skewed market.

Certain areas have not been as successful and continue to be a challenge. Coverage of basic voice still missing in some areas and worse of for data, affordability for the bottom of the pyramid for usage as well as terminal devices. A significant area is competition with a limited choice on the mobile services, and digital money transfer. In addition to market consolidation of mobile operators which reduces choice for the consumer, there are other areas where action of the regulator is called upon to build out a resilient infrastructure. All undersea fibre land in Mombasa and use the same corridor for inland distribution. This needs to be addressed to enhance resilience. Other areas include duplication of infrastructure which would reduce cost of operation.

The unfettered telecommunications market has rapidly evolved to develop a system that has expanded ICT penetration to increasing higher levels. From basic network with limited coverage, the system expanded over the period to 96% of the population. Equally, the quality and variety of services has increased with introduction of innovative technologies. From narrowband 2G dominance in 2009, the country is enjoying broadband fast growing 4G and now ready for 5G. This has gone hand in hand with huge capacity delivered through nationally driven fibre by multiple players and increasingly by utility corporations outside the telecommunication sector.

Key infrastructure challenges are in the last mile coverage manifested by high investment costs, access to terminal devices and infrastructure duplication. Indicators depict a very good picture from the supply side on market penetration but COVID-19 brought home a new reality – a new conversation on meaningful connectivity that ensures a citizen can take full advantage of internet is nigh – with an appropriate device, always-on connectivity, at a price that is affordable and with appropriate speeds. Huge investment is still required to deliver services and build resilient infrastructure.

The end game is to serve the consumer. While the system has been highly effective as represented by the supply side indicators, COVID-19 has brought out the glaring inequality based on economic status, location – urban/rural – and capacity to use the service offerings. The digital divide also cuts across population segments in access and use – gender, youth, and persons differently abled. This

inequity defined how different society segments experience daily living especially with the induced COVID-19 health policies defining most human activities. It is necessary that the regulator engages other institutions to ensure all consumers continue to get services.

The decade has laid the groundwork for the future to take Kenya to a digital economy, the Fourth Industrial Revolution and position it among other nations.



1.0 Introduction

This review paper examines the evolution of the telecommunications ecosystem through one decade namely 2009-2019. The choice of 2009 as a starting point is a signifier of the momentous shift of international connectivity with the introduction of fibre and thus a massive amount of data and subdued contribution of satellite. Inadequate, expensive, and high latency bandwidth was heralded as a block in Kenya's growth and thus the entry of fibre was intended to unleash latent energy and shepherd Kenya to prosperity in a digitally connected society.

2009-2019 is a tumultuous period for the telecommunications sector, an era when data makes entry into the market through undersea fibre for the first time and from then drives applications with a consequential reduction of voice as the driver of growth. A combination of innovation in applications and the emerging technologies also sets the foundation for a digital economy and 4IR. This is where this paper starts its journey and makes a preliminary assessment of the interplay of the sector. It is a diagnostic reflection on the interplay of institutions, stakeholders, agents to make telecommunications services and its benefits available to consumers, and a desired goal to usher Kenya to ICT driven prosperity. This is set against a backdrop of national social and economic goals, international trends, and experiences, and makes an assessment and recommendations.

The intention is to provide an insight in the evolving telecommunications industry on the key issues facing the industry with a view of laying a framework for continuing informed debate on policy and regulatory framework to enhance the industry's contribution to the Kenyan economy.

The key questions that this paper sought to address:

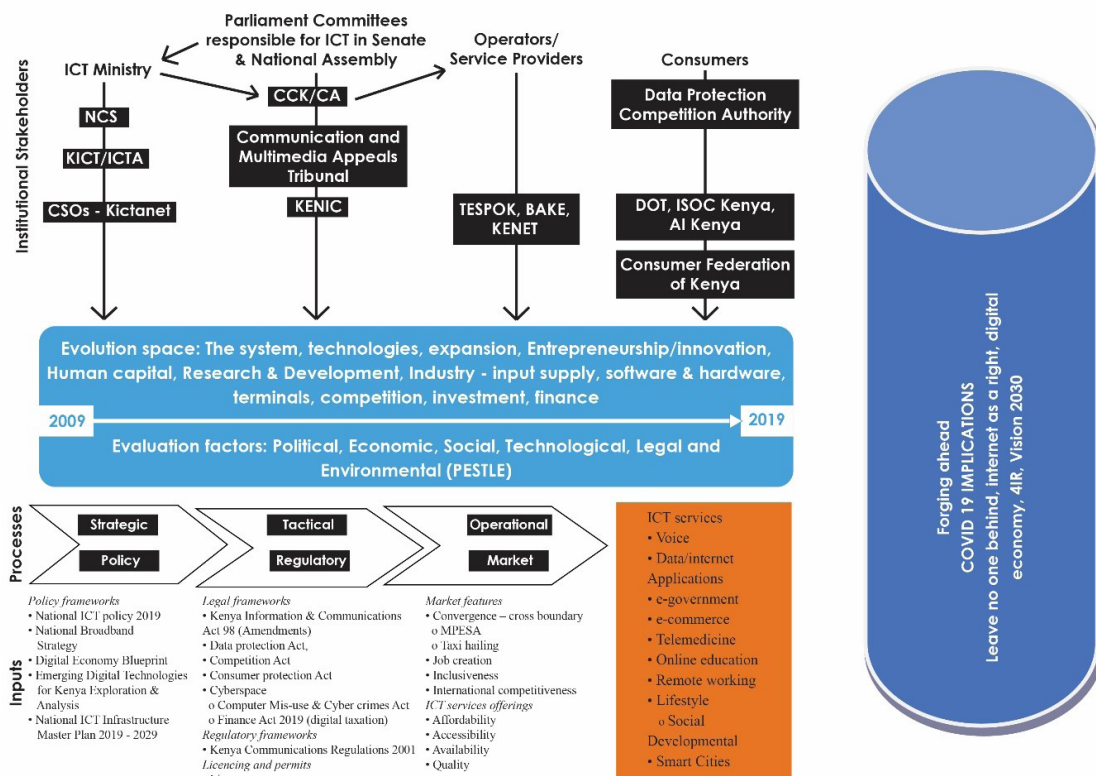
- Is Kenya's current ICT position where it wanted to be? Did Kenya take any missteps such as the existence of a monopoly, and the current state of competition and pricing for the sector?
- In the context of a decade of telecom/ICT system evolution – Where should we be in the next five years/decade while leveraging on the experience so far?

The paper unbundles the key drivers of the telecommunications industry in a way to empower stakeholders engage in an informed debate on the opportunities and threats in the ecosystem and position the industry as foundational to the realisation of a digital economy, 4IR and regional competitiveness.

1.1 The conceptual framework

The conceptual framework to help dissect the ecosystem is two pronged – a vertical approach for an in-depth view of a subject area and a horizontal approach for an in-depth review of the evolution over time as a response of the inputs by stakeholders in a methodical approach (Fig 1).

Fig 1: Telecommunications ecosystem



Source: Summit Strategies Ltd

The vertical approach segments the sector into the subject areas, key stakeholders, and instruments, to drive their contribution over a 10-year period 2009-2019. Through the vertical dissection, it becomes easy to understand the key institutional stakeholders, their linkages, and the dynamics. These dynamics that spawn growth and innovation, also leave behind a trail of challenges that must still be addressed.

The horizontal approach unveils the evolution of the telecommunications system and the evolution towards digital economy and the 4IR. In tracking the evolution, this paper makes a comparative case for Kenya against its peers in the East African Community, select peer countries in Africa and outside Africa. This is in recognition to the expressed desire by Kenya to be competitive in the region. A further consideration is to benchmark with regionally and globally agreed frameworks for development and

the attendant indicators to which Kenya has committed. It is from these indicators and comparisons that the paper is eventually able to derive findings on how the telecommunications ecosystem has developed to help Kenya realise its Vision 2030.

It is through this process that findings and recommendations emanate.

1.2 Structure of the paper

The organisational structure of the paper reflects an attempt to break down the ecosystem into comprehensible components and to rebuild the parts to a whole. This is achieved by an emphasis on the basic building blocks, and the actors, and provides a detailed discussion on the conceptual models based on observed trends in comparable markets. The following themes serve to unify the essence of the paper:

- This is a dynamic industry driven by changing technologies and consumer tastes with a consequential impact on the industry structure. Policy and regulatory regime must move in tandem or constraint the benefits of technology or at worst be rendered irrelevant and encourage extra-legal exploitation of the technologies.
- The industry is multi-disciplinary with multiple players who must work in synergy. It is important that increased stakeholders – supply side, demand side, and support services be integrated in policy and regulation formulation processes.
- Capacity to insulate local telecommunications industry from the impact of globalisation is diminishing by the day. Therefore, a long-term strategy must be built around capacity-building to target opportunities provided by external markets. Legislative action while critical should be medium-term and measure to support capacity building but should not be the end.
- The industry in totality is in a continuous growth phase, the institutions, agents, and the process. To foster growth calls for continuous dialogue to select the best policy path that secures the best for Kenya.

The paper discusses policy evolution, the drivers, and the alignment with international frameworks that Kenya has committed to in Chapter 2 and provides a background on policy development. Chapter 3 presents the regulatory framework and introduces how other regulators entered the realms of ICTs. Chapter 4 discusses the telecommunications system and the service provider space to address the needs of the consumer. This consumer is addressed in Chapter 5 including the challenges to address such as the glaring inequalities laid bare by COVID-19. Finally, Kenya is on a self-declared journey to a better future anchored on digital technology. Chapter 6 reviews the journey and the tools Kenya has chosen to this future.

1.3 Sources of information

To capture the evolution, limited field interviews were undertaken as to represent the following perspectives: policy, regulatory, operational, equipment supply, potential investors, and human resource development within the country and internationally. This information is supplemented with desk and Internet research from among various sources both local and international.

1.4 Time frame

The paper reviews the telecommunications industry since 2009 to 2019. The historical growth trends before and after the onset of the sector reform is used to project the future market scenarios. Data was collected in May/July 2020.

2

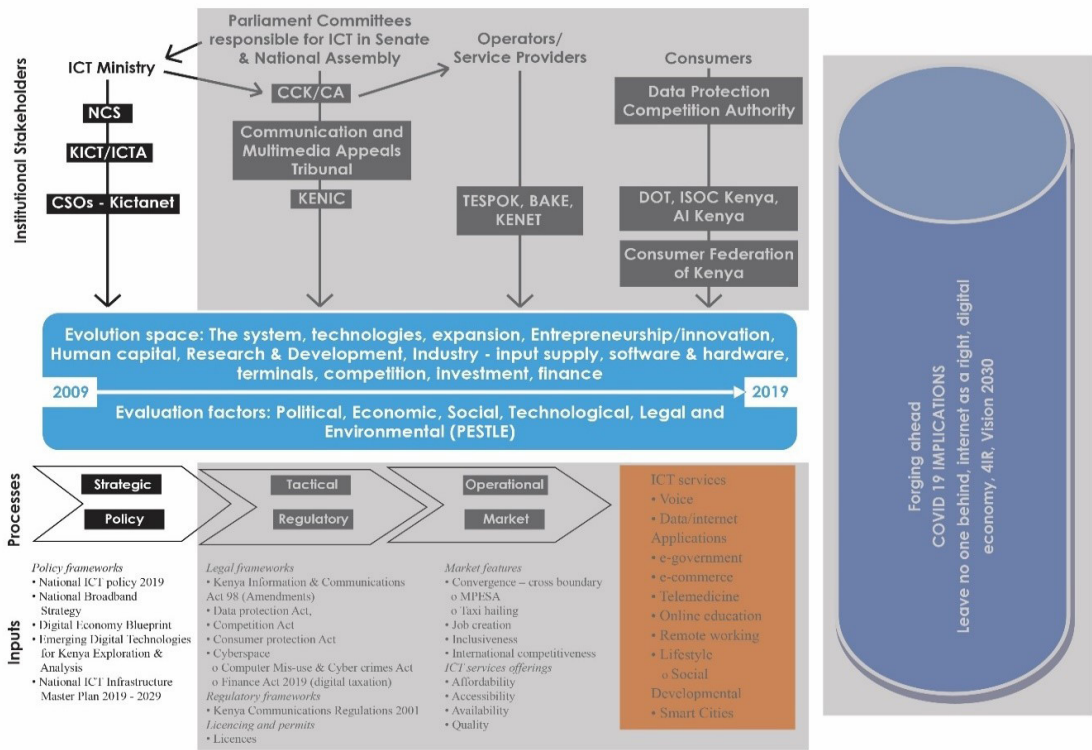
2.0 Telecommunications policy evolution

Policy encapsulates the vision that Kenya aspires to realise. This Chapter examines the policy evolution process, the motivation of policy evolution and the key drivers and the instruments that define the policy frameworks. The chapter relates the Kenya pathway with select comparative countries and the presents findings on the interplay on the stakeholders towards realisation of the vision.

This Chapter discusses this empowerment process over the last decade 2009-2019 which coincides with the development of international connectivity with the arrival of undersea optic fibre, on one hand, and the political evolution through the Constitution of Kenya 2010 which guaranteed access to information to all citizens. This is contextualised under Vision 2030, promulgated in 2007, that sets the pace for the political, social, and economic development of Kenya in the long term. The development of this paper also coincides with the ICT regulator's 20th anniversary, marking two decades since the creation of the Communication Authority of Kenya¹ (CA).

¹Communications Authority of Kenya www.ca.go.ke

Fig 2: Telecommunications ecosystem – Level 1



Source: Summit Strategies Ltd

2.1 Context as a development enabler

The decade of 2000 to 2010 was a re-awakening era for Kenya; driven by internal realities of development and shaped by politics that sought to expand the democratic space in addition to empowerment, and to access to information as a change agent. Thus, the rapid change in the political scenario to multiparty democracy in 1992, borne on the premise of a new constitution, was to bring out a new economic and social framework which was espoused in the Kenya Vision 2030². Anchoring these radical changes was information access and consequently, the pre-eminent role of Information and Communication Technologies (ICT) was set. Since then, ICT policy and regulatory frameworks have been designed to empower the citizen with information from affordable and accessible sources of their choice from across the country. The Constitution of Kenya 2010 entrenched and mandated the National Government with the responsibility to ensure that there is digital infrastructure to deliver information universally.

Despite these monumental changes as well as demands on the ICT sector, the infrastructure did not have the capacity to adequately respond to fulfil the needs. Without undersea optic fibre, that is before 2009, Kenya relied on satellite for international connectivity which had limited capacity and

²See details of Kenya Vision 2030 at <https://vision2030.go.ke/>

was provided at prohibitive costs. These constraints triggered a new impetus in the development of the sector with a recognition for the need to transition from narrowband (voice) to broadband (data/video). This was set out in the ICT policy frameworks with the first step in 2006 that envisioned ICT as an enabler for growth in new applications for development.

2.2 ICT Policy evolution to address national development

The National Information and Communications Technology (ICT) Policy by Ministry of Information and Communications (January 2006) ushered full liberalisation of the telecommunications sector which created a framework for multiple operators in a competitive market bringing new private sector investment especially in the undersea fibre, mobile network operators (MNOs), and Internet Service Providers (ISPs).

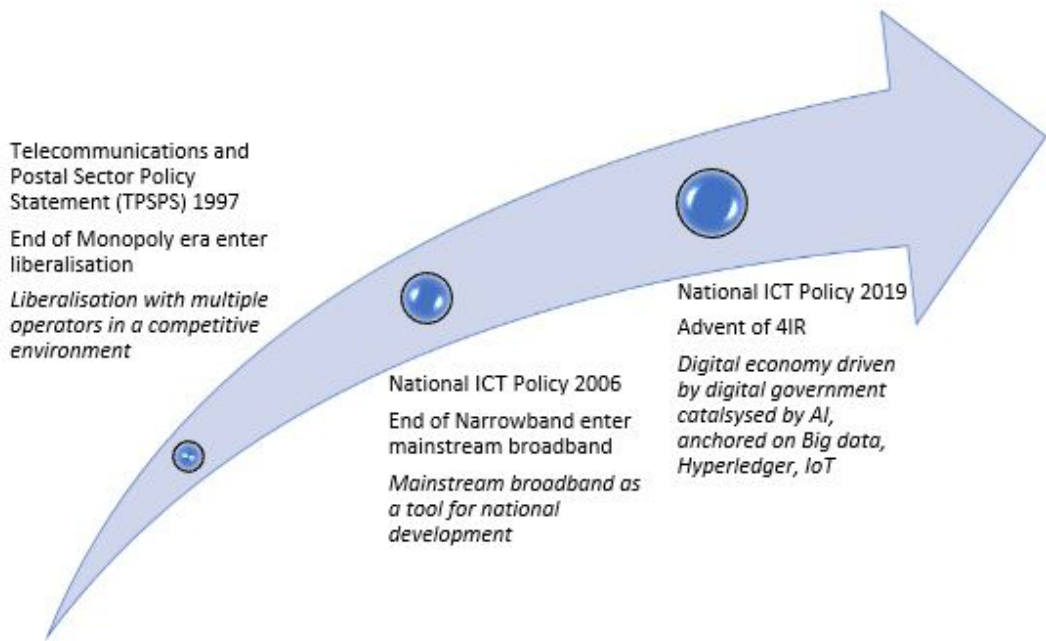
However, the private sector driven largely by commercial considerations cherry picked the urban areas at the expense of the rural areas which were deemed unprofitable. Consequently, in 2009, a mechanism to support extension services to the rural areas – the Universal Service Fund (USF) – was established. Since then, marginalized populations including those in rural areas and those with special needs are now mainstreamed and considered for cheaper spectrum to ensure direct intervention to the rural areas through community centres, schools, and public institutions³.

The development of new applications demanded new service offerings, as such the 2006 National ICT Policy was no longer tenable. An initiative to update the 2006 National ICT policy was ongoing until 2019⁴ when the National Information Communications and Technology (ICT) Policy Guidelines (gazetted 2020), were approved and promulgated. The National Information Communications and Technology (ICT) Policy Guidelines (gazetted 2020) directs Kenya towards greater use in applications to improve the quality of life and enhance Kenya’s competitiveness in the region and more so in Africa (Fig 3).

³See presentation of these interventions at <https://ca.go.ke/industry/universal-access/universal-access-overview/>

⁴National Information, Communications and Technology (ICT) Policy 2019, Ministry of Information, Communications and Technology, Kenya <https://www.ict.go.ke/wp-content/uploads/2019/12/NATIONAL-ICT-POLICY-2019.pdf>

Fig 3: National ICT policy evolution



Source: Summit Strategies Ltd

2.2.1 Frameworks for digital infrastructure – national broadband strategy

To entrench these applications, the government developed frameworks to guide broadband development. In this regard, Kenya’s National Broadband Strategy 2013-2017⁵ (NBS), was among the first to be published in Africa, with the goal to develop a national broadband plan which envisioned universal broadband, setting download speeds of 40Mbps in urban areas and 5Mbps in the rural areas by 2017. This entailed an investment of Ksh. 258 Billion over a 5-year period by multiple actors with Ksh. 70 Billion raised through the money market. The plan called for the buildout of 50,000km of optic fibre for broadband infrastructure nationally, equipping 10 million Kenyans with digital literacy skills and catalysing innovation for the exploitation of the broadband.

Following the landmark NBS 2013-2017, the government launched NBS 2018-2023⁶ designed to take the country to the next level. This strategy while still emphasising on the need for universal broadband, launched a foundation for the realisation of the 4th Industrialisation Revolution (4IR). The strategy set the framework for new applications using Artificial Intelligence (AI) and its supporting technologies; Internet of Things (IoT), blockchain, cloud computing and data analytics running on high speed 5G networks. At an estimated Ksh. 111 Billion price tag which translated to about 3.7%

⁵The National Broadband Strategy: A vision 2030 flagship project <https://ca.go.ke/wp-content/uploads/2018/02/National-Broadband-Strategy.pdf>

⁶The National Broadband Strategy (2018 – 2023) <https://ca.go.ke/wp-content/uploads/2020/05/National-Broadband-Strategy-2018-2023.pdf>

of the national annual budget on broadband and 1.5% of GDP (2017 figures). This is a significant commitment, South Africa, Brazil, and Malaysia government. spend on ICT was respectively at 1.1%, 1.9%, 5.5% of their National Budgets⁷.

The investment calls for the extension of optic fibre to the sub-County and at least two base stations at the Administrative Ward level, and optic fibre along all remaining uncovered areas along the A, B, and C roads. Additional focus areas include digital literacy and the availability of terminal devices. The challenge, however, is establishing the requisite institutional leadership and mobilising the resources. These twin challenges encumbered NBS 2013-2017. Note that NBS 2017-2023 has scaled down the minimum download speeds to 2Mbps from 5Mbps proposed in 2013-2018 National Broadband Strategy.

2.2.2 Exploiting the digital infrastructure – 4IR and digital economy frameworks

With a framework for the development of digital infrastructure, NBS' next focus area is exploitation for the infrastructure for development. Two broad areas have been of focus, namely, a pervasive digital economy catalysed by Artificial Intelligence (AI) on one hand, and as a pathway to 4IR. It should be noted that innovation has been a hallmark in Kenya's ICT development and therefore these initiatives seek to nurture and leverage on existing innovation.

A taskforce report, Emerging Digital Technologies for Kenya: Exploration and Analysis , highlighted opportunities for AI, Distributed Ledger Technologies (DLT) and in particular Blockchain, Internet of Things (IoT) and importantly, data analytics applications in the short and medium term, jumpstarting and anchoring the government's Big 4 Agenda. These are applications in universal health, manufacturing, food security and affordable housing. While these areas are the immediate focus areas, applications continue to evolve in other areas.

Concurrently with the AI taskforce work, the government launched the Digital Economy Blueprint . The Blueprint is part of a Smart Africa Alliance initiative to create a seamless regional economy of which Kenya took leadership to develop a reference framework for Africa. The Blueprint sets a strategy for digital economy based around five pillars – Digital Infrastructure, Digital Government, Digital Business, Innovation Driven Entrepreneurship, and Digital Skills and Values. It elucidates the rationale envisioning an empowered citizenry transacting in emerging digital ecosystems of gig, platform and sharing economies. The Blueprint is ambitious and designed to make Kenya a front runner in the region. Unlike other framework documents, the Blueprint lacks a timeline, resource mobilisation framework and institutional leadership. Researchers for this paper understand that an implementation framework is being developed as at the writing of this research.

⁷IDC reports as cited in National Broadband Strategy 2013-2017.

⁸Emerging Digital Technologies for Kenya: Exploration and analysis <https://www.ict.go.ke/blockchain.pdf>

⁹Digital Economy Blueprint: Powering Kenya's transformation <https://ca.go.ke/wp-content/uploads/2019/05/Kenyas-Digital-Economy-Blueprint.pdf>

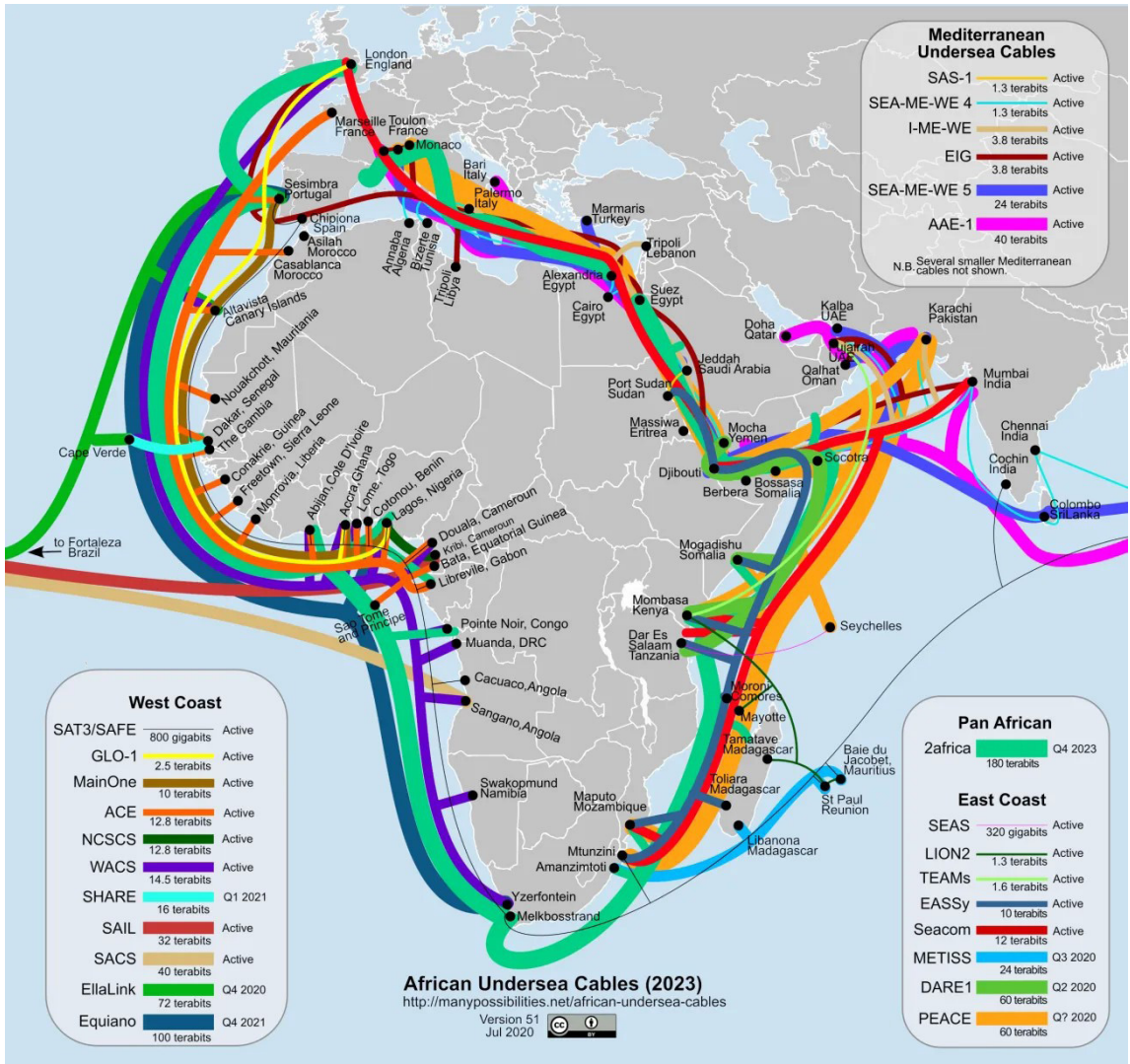
These frameworks are a differentiator and clearly set the direction for Kenya. They, however, lack a clear institutional leadership/ownership, defined resources for the implementation, and a timeline. As at the date of this research there is no indication of the implementation of the otherwise well-developed framework.

2.2.3 ICT policy evolution outcome

The foregoing cited pioneering frameworks since the late 1990s have been driving policy change, with the Ministry of ICT being a key driver in shaping the sector and key outcomes, including high-capacity undersea optic fibre, international connectivity with redundancy, and nationwide terrestrial optic fibre; complimenting a wireless connectivity to the consumer. The journey to universal access to information and communication is well on course.

Undersea optic cable connectivity to Kenya and indeed the eastern seaboard of Africa was the last to be connected to the rest of the world. However, after prolonged delays of the East African Submarine System (EASSy) regional initiative, the government decided to build its own undersea cable. The East African Marine System (TEAMS), a point-to-point connectivity initiated by the government ignited interest, and other investors came on board in 2009. As a result, Kenya now has five undersea optic fibre cables terminating in Mombasa – TEAMS, SEACOM, EASSy, Lower Indian Ocean Network (LION2) and Djibouti Africa Regional Express (DARE). These undersea cables increased the international bandwidth from 18.99 Gbps to 6,241.84 Gbps as at end of 2019 changing the way Kenyans use the internet in daily life.

Fig 4: International undersea cable connectivity for Kenya



Source: Many Possibilities

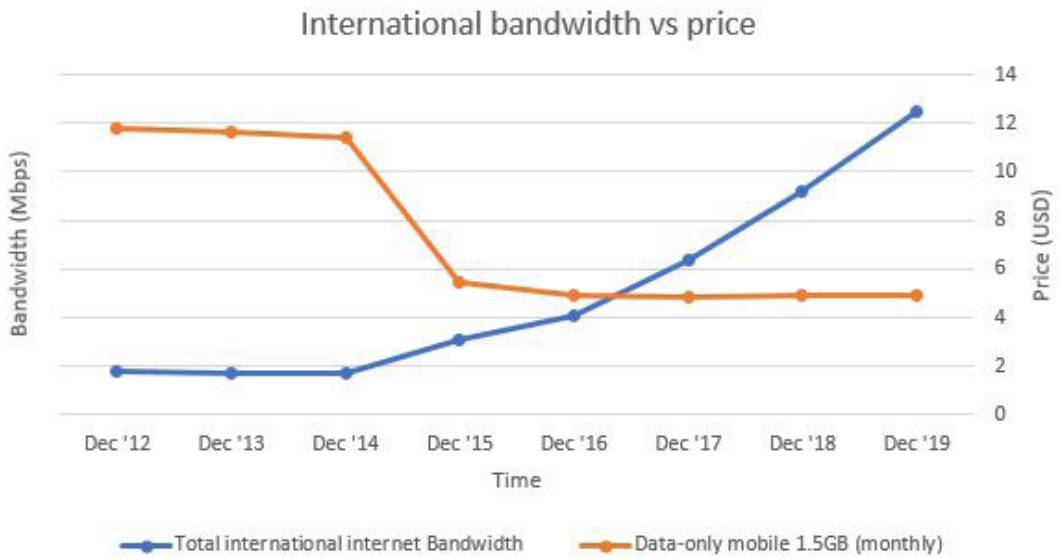
Additional undersea fibre capacity is planned to land in Mombasa through Pakistan East Africa Connecting Europe (PEACE)¹¹ submarine cable system in 2021 and 2Africa¹² promoted by Facebook Inc. in 2023 (Fig 4). International bandwidth is no longer an issue due to the proactive government policy and foresight which reduced bandwidth prices (Fig 5).

More undersea fibre bandwidth bodes well for Kenya’s development, however with increasing heavy reliance on this bandwidth it is time Kenya explore how to have a strategic leverage on undersea cable operators dropping bandwidth to Kenya.

¹¹IDC reports as cited in National Broadband Strategy 2013-2017.

¹²Building a transformative subsea cable to better connect Africa – Facebook Engineering – <https://engineering.fb.com/connectivity/2africa/>

Fig 5: Increased international bandwidth and impact of bandwidth price



Source: Communications Authority and International Telecommunication Union (ITU)

While international bandwidth is no longer an issue, the terrestrial delivery and distribution nationally by a combination of government and private sector investment continues to be a challenge. The government started off by building the National Optic Fibre Backbone Infrastructure (NOFBI)¹³ initially to interconnect the former provincial headquarters and later in conformity with the Constitution of Kenya 2010 to the County headquarters. Private sector operators as well as energy and rail utilities have built optic fibre in the middle mile¹⁴ and metro space. Hard to reach rural areas are still not fully covered and are the focus of the USF to compliment the telecom sector operators.

The National ICT Policy 2006 recognised and encouraged the entry of utility organizations namely Kenya Power & Lighting Company among others to contribute their extra capacity in the sector and today play a significant role in delivering bandwidth in the middle mile.

2.3 Key actors in the policy space

2.3.1 County governments

The Constitution of Kenya 2010 assigned telecommunications services as a function of the National government and thus telecommunication is not a devolved function. However, the operations of the telecommunications sector are centred in the Counties. At the advent of devolution, there was a strong expectation that County governments would seize and implement policies that encourage rapid development of ICT infrastructure as a tool for development at the County level. This has been

¹³NOFBI Transmission Network <http://icta.go.ke/nofbi-transmission-network/>

¹⁴Concept refers to connectivity solutions interlinking international connectivity (undersea cable/satellite) referred to as first mile to end user (last mile)

partly realised and indeed each County government has developed its own framework to respond to those who want to build infrastructure – terrestrial optic fibre cables and towers. This varies with some County governments wishing to maximise revenue collection from licencing and therefore charging for rights of way, permits, and clearance to operate in the County. Other Counties see infrastructure build out as a tool to encourage investment and therefore lure operators with minimal bureaucratic challenges. While other Counties have partnered with operators to rollout services for example Nakuru County who partnered with Liquid Telecom to provide WiFi¹⁵ within Nakuru CBD. This is setting an example for counties to invest in ICT and encourage similar investments in their Counties.

Different approaches by the County governments on how to treat operators wishing to develop infrastructure have been an impediment to operators and the growth of telecommunications across the country. Accordingly, the Ministry of ICT committed to work with the County governments as set out in the National Information Communications and Technology (ICT) Policy Guidelines (gazetted 2020) to develop a unified and nationwide approach on telecommunications infrastructure development. On rights of way/way leave, permits and clearances, the National government will work with County governments to develop harmonised guidelines and charges, to protect the ICT infrastructure and optimise usage. The National government further commits to work with the County governments to develop an integrated ICT infrastructure plan for each County to ensure optimal exploitation of ICT leveraged on national infrastructure thereby reducing duplication.

2.3.2 State corporations under the Ministry responsible for ICT

As indicated, the Ministry of ICT has the singular role in shaping the direction of development. Its unique instruments are policy statements as well as the other frameworks indicated in the foregoing. To support the Ministry, the Kenya Information and Communication Act 1998 established the National Communications Secretariat (NCS) as a research arm for policy development.

Additionally, ICT Authority (ICTA) was established in 2013 following a merger of the Kenya ICT Board and eGovernment, it has the overarching responsibility to develop ICT infrastructure for the government to realise a digital government. ICTA's National ICT Infrastructure Master plan 2019-2029¹⁶ – sets out a government digital infrastructure development plan for the digital government. This plan highlights ICT infrastructure development to be guided by priorities and expand broadband coverage to all government and public institutions.

2.3.3 Non-governmental actors

In developing these proactive policy drivers, Civil Society Organisations (CSOs) and development partners including UN Agencies, have made significant contribution in advocacy for universal access, reaching out to the unconnected, the poor and marginalised, and importantly highlighting the case

¹⁵Nakuru CBD gets free high speed Wi-Fi – Capital Business – <https://www.capitalfm.co.ke/business/2015/03/nakuru-cbd-gets-free-high-speed-wifi/>

¹⁶National ICT Infrastructure Master Plan 2019 –2029: Transforming Lives Through Smart ICT Infrastructure <http://icta.go.ke/powerassets/uploads/2020/06/The-ICT-Infrastructure-Master-Plan-2019-2029-.pdf>

of digital and gender divide. KICTANet (www.kictanet.or.ke) for example has provided a platform for continuous engagement with government on one hand and the private sector and consumers for the sector development on the other. Other industry associations including Technology Service Providers Association of Kenya (TESPOK), Bloggers Association of Kenya (BAKE), Internet Society (ISOC) Kenya, AI Kenya, and Digital Lenders Association of Kenya (DLAK) each contribute to the sector through representation of unique stakeholder groups.

2.4 Aligning the ICT sector nationally and globally

The national growth strategies are inspired and anchored on the Kenya Vision 2030 and the Constitution of Kenya 2010.

The Kenya Vision 2030 focuses on realisation of improved quality of life for Kenyans. The national strategy blueprint covering the period from 2007 to 2030 aims to transform Kenya into a newly industrializing, middle-income country providing a high-quality life to all its citizens through three pillars: economic, social, and political. ICT is a cross cutting sector underwriting the realisation of all the pillars. The Vision is to be realised through iterations every 5-years called Medium Term Plans (MTP). MTP III is currently running from 2018-2022.

The Constitution of Kenya 2010 and its demand on basic needs for every citizen under the Bill of Rights (Chapter 4) provides for the right of every Kenyan to good quality services (including ICT) and the right to information access. In a modern digital economy, most of these services are best provided through appropriate ICT platforms, networks, and end-user devices.

Kenya is desirous to not only take regional leadership but also learn from the international community. Some of the benchmarks are regional while others are international including African initiatives as well as United Nations initiatives as discussed below.

The African Union Digital Transformation Strategy for Africa (DTS) 2020-2030¹⁷ has an overall objective to harness digital technologies and innovation to transform African societies and economies to promote Africa's integration, generate inclusive economic growth, stimulate job creation, break the digital divide, eradicate poverty for the continent's socio-economic development, and ensure Africa's ownership of modern tools of digital management. AU DTS proposes fit for purpose digital infrastructure that digitally empowers Africans who can safely and securely access at least 6 Mbps all the time wherever they live in the continent at an affordable price of no more than USD0.01 (Ksh. 1) per Mb through a smart device manufactured in the continent at the price of no more than USD100 (Ksh. 10,000) to benefit from all basic e-services and content of which at least 30% is developed and hosted in Africa. This sets a high standard for Africa. AU DTS for Africa 2020-2030 is instrumental in realising and entrenching the Africa Continental Free Trade Area (AfCFTA) and is a steppingstone for the Africa Union Agenda 2063. Kenya through NBS 2018-2022 has set a minimum bandwidth for the consumer at 2Mbps by 2022.

¹⁷The Digital Transformation Strategy for Africa (2020-2030) <https://au.int/en/documents/20200518/digital-transformation-strategy-africa-2020-2030>

Smart Broadband 2025 is an initiative of Smart Africa Alliance with a promise of; affordable broadband service at 3Mbps minimum download speeds, increased access to content at least 30% of which is generated and stored in Africa, devices partially manufactured in Africa, and, increased broadband penetration by 50% from the existing 34% in 2019 up to 51% by 2025 thereby adding 308 million people on broadband. SMART Broadband 2025 also promises to transition 12 additional countries to over 20% broadband penetration; bringing the total number of countries that surpassed this threshold to 46 – a penetration level that provides a threshold of pervasive exploitation and realisation of digital economy benefits. Kenya is a part of Africa and will be called upon to benchmark its growth with its peers in the continent, Smart Broadband 2025 as an initiative of Smart Africa Alliance to realise broadband across the continent by 2025 pursues an interconnected Africa to facilitate trade. Kenya is way ahead on the Smart Broadband 2025 reference parameters and can expect to raise minimum bandwidth to 3Mbps by 2025.

UN Broadband Commission 2025 targets¹⁸ continue to drive the ‘meaningful universal connectivity’ concept that encompasses broadband adoption that is not just available, accessible, relevant, and affordable, but that is also safe, trusted, empowering users and leading to positive impact. Within this context, the Commission set seven targets to direct universal broadband development by 2025 on policy, affordability, connectivity, skills, digital finance, SME’s, and gender.

World Bank has committed to work with Africa towards realising these targets. Under the Digital Economy for Africa (DE4A) programme, World Bank has developed a framework¹⁹ – Digital Infrastructure ‘Moonshot’ for Africa – which estimates an investment of USD100 Billion (Ksh. 10 Trillion) until 2030 to realise a universal broadband penetration. World Bank will help mobilise the resources from multiple sources.

UN Sustainable Development Goals (SDG) 2030 has its clarion call of Leave No One Behind especially those in rural areas and marginalised communities. This is to be achieved through targets set out under various Goals.

Summary

This Chapter provides a background on policy evolution, the motivation behind the evolution, and key drivers for policy frameworks. It also provides a comparison between Kenya and select countries for benchmarking. In addition, the Chapter explores the interplay of politics, policy development and implementation, and their impact to end users. Additionally, the Chapter, highlights the role played by stakeholders on the development of ICT policies which created an enabling environment for the exponential growth of the industry.

The national policy frameworks discussed include the National Broadband Strategy 2013-2017, Digital Economy Blueprint, Emerging Digital Technologies for Kenya: Exploration and Analysis, , Kenya Vision 2030 (which is progressively realised through Medium Term Plans; 5-year iterations),

¹⁹Connecting Africa Through Broadband A strategy for doubling connectivity by 2021 and reaching universal access by 2030 https://www.itu.int/en/ITU-T/studygroups/2017-2020/20/sg20rgafr/20190827/Documents/s1-p2-lix_Digital_Economy_in_Africa.pdf

and the Constitution of Kenya 2010. To assure Kenya as a regional leader, this Chapter also uses other regional/international frameworks for benchmarking including African Union Digital Transformation Strategy for Africa (DTS) 2020-2030, Smart Broadband 2025, UN Broadband Commission 2025 targets, World Bank's Digital Economy for Africa (DE4A) programme, and the UN Sustainable Development Goals (SDG) 2030. These policies nudge the development of digital infrastructure and digital economy, while seeking to set the pace towards 4IR.

Key actors discussed in the paper's policy sector include County governments, state corporations under the Ministry of ICT and non-governmental actors.

Recommendations

MoICT to entrench institutional leadership and mobilize the resources required to realise NBS 2018 – 2023; these twin challenges hindered the realisation of NBS 2013-2017.

Kenya ICT sector has very well-developed vision setting blueprints. Unfortunately, they are lacking in implementation framework including institutional leadership, timelines, resource allocation and a monitoring and evaluation mechanism. Digital Economy Blueprint for example should incorporate a timeline, resource mobilisation framework and institutional leadership/ownership, at the time of writing of this paper, an implementation framework was being developed which unfortunately does not have an implementation timeline, resource mobilisation framework and an institutional leadership structure. This should also be the case for Emerging Digital Technologies for Kenya: Exploration and Analysis, - Taskforce Report if it has been adopted by the Minister.

Design a national framework setting the guidelines for infrastructure deployment in form of rights of way, permits and clearance. In addition, this framework should protect ICT infrastructure and outline an integrated ICT infrastructure plan for each County. This will encourage infrastructure build out, optimise usage, increased investment, and accessibility.

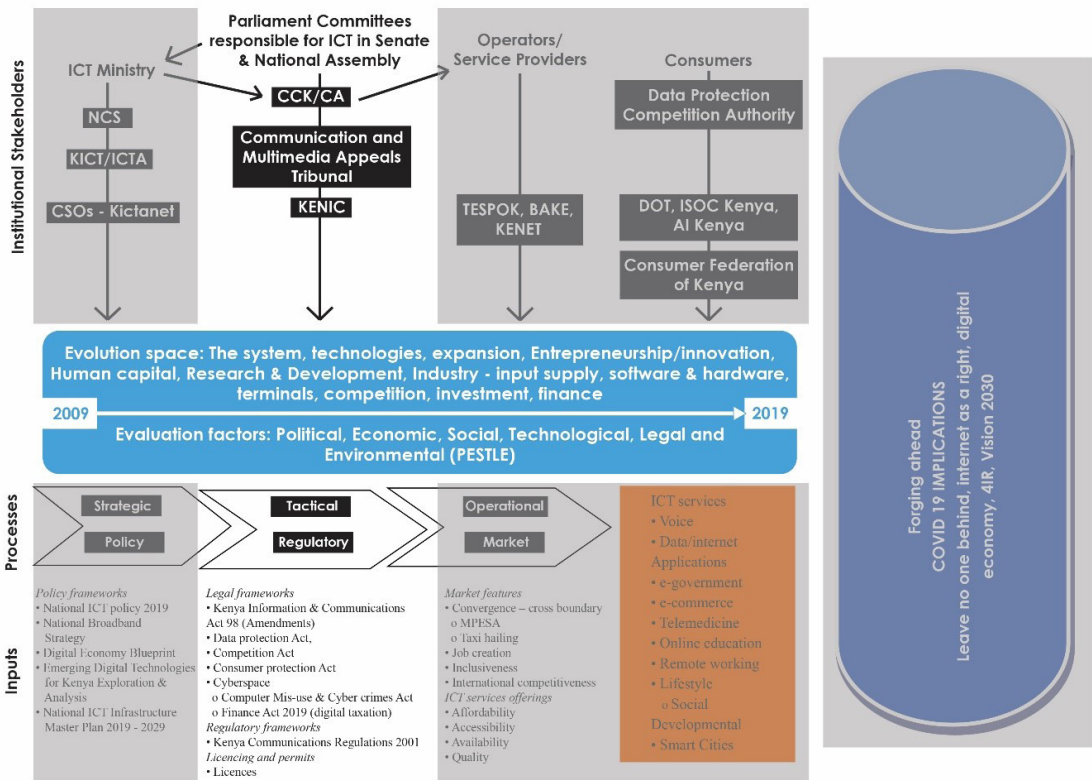
MoICT to explore how to entrench a strategic leverage on undersea cable operators dropping bandwidth to Kenya in recognition of the increasingly high reliance on foreign operators for international connectivity.

3

3.0 Legal and regulatory environment

This Chapter analyses the legal and regulatory framework as an instrument to realise the vision expounded in the policy frameworks. The key player is the ICT regulator exercising sector management through licencing instrument.

Fig 6: Telecommunications ecosystem – Level 2



Source: Summit Strategies Ltd

3.1 The legal evolution

With the overarching policy direction, the Legislature enacted relevant legislation to support the ICT sector. The focus areas over the period from 2009 includes the repeal of the Kenya Communications Act 1998 in 2012 and additional repeals over the period. This repeal introduced fundamental changes in the sector’s regulatory framework that ushered:

- USF as an intervention tool to expand communication to the rural and hard to reach areas. The repeal has since established Universal Service Advisory Council (USAC) as the advisory arm to the Board of the Communication Authority of Kenya to advice on universal service matters.
- Electronic transactions framework that paved the way for e-commerce, digital transactions, and acknowledgment of the digital records.

Other legislation includes.

- Computer Misuse and Cybercrimes Act 2018 which recognised ICT as a critical infrastructure and empowered Kenya to secure cyberspace for Kenyans assuring their safety online.
- Data protection Act 2019 which has been the missing piece, but its enactment will go a long way to position data as a key enabler for development.

Telecommunications related legislations are set out in Table 1.

Table 1: Telecommunication related legislations

Title	Description
Kenya Information and Communication Act, 1998 [Rev 2012]	<p>Defines the functions of the Communication Authority in relation to electronic transactions to:</p> <ul style="list-style-type: none"> • Facilitate electronic transactions by ensuring the use of reliable electronic records, • Facilitate electronic commerce and eliminate barriers to electronic commerce such as those resulting from uncertainties over writing and signature requirements, • Promote public confidence in the integrity and reliability of electronic records and electronic transactions, • Foster the development of electronic commerce using electronic signatures to lend authenticity and integrity to correspondence in any electronic medium, • Promote and facilitate efficient delivery of public sector services by means of reliable electronic records, and • Develop sound frameworks to minimize the incidence of forged electronic records and fraud in electronic commerce and other electronic transactions. <p>Provides for licencing of certification services and country code Top Level Domain (ccTLD) i.e. dot Ke. Recognition of electronic records, contracts, and signatures</p>
The Data Protection Act 2019	Established the Office of the Data Protection Commissioner; to make provision for the regulation of the processing of personal data, and to provide for the rights of data subjects and obligations of data controllers and processors. Key focus areas are

- Registration of data controllers and data processors,
- Principles and obligations of personal data protection,
- Processing sensitive personal data,
- Conditions of transfer of personal data outside Kenya, and,
- Exemptions for personal data protections.

In addition to the telecommunication related laws, other pieces of legislation impacting on the sector include:

- Competition Act 2010 provides an oversight mandate on competition in the Kenyan economy including the telecom sector. Over the period however, the two regulators – Competition Authority and Communications Authority have had to define their remit on telecom competition with the Competition Authority having its way on competition and definition of abuse of monopoly²⁰. In this instance, Competition Authority differed with the contention of Communications Authority that Safaricom had abused its dominance.
- Finance Act 2019 that defined a ‘digital marketplace’ and is now paving way for taxation in the digital marketplace. The Finance Act 2019 defined a ‘digital marketplace’ as a platform that enables the direct interaction between buyers and sellers of goods and services through electronic means. This is paving way to impose taxation on digital services offered in Kenya.
- Personal data protection under the Data Protection Act 2019 paves the way for the digital identity for Kenyans. Digital identity is a foundation for participation in the digital economy.

Table 2: Telecommunications impacting legislations

Title	Description
Finance Act 2019	An Act of Parliament to amend the law relating to various taxes and duties and: <ul style="list-style-type: none"> • Defines a digital marketplace ‘as a platform that enables the direct interaction between buyers and sellers of goods and services through electronic means’, and, • Provides taxation exemption for Income earned by an individual who is registered under the Ajira Digital Program for three years beginning 1st January 2020
Finance Act 2020	Fixed the Digital Service Tax at 1.5% to commence in 2021
The Value Added Tax (digital marketplace supply) regulations,	Defined taxable digital services and location. Provided for registration of suppliers.
The Data Protection (Civil Registration) Regulation, 2020 (Draft)	Complements the Data Protection Act and provides for the lawful processing of personal data.
The Registration of Persons (National Integrated Identity Management System) Regulations, 2020 (Draft)	Defines management of an integrated digital population register.

Subsidiary legislations/regulations have been developed/being developed to ensure implementation of these legislations.

²⁰Kenya’s competition watchdog says no need for action on Safaricom – Reuters – <https://www.reuters.com/article/kenya-telecoms/kenyas-competition-watchdog-says-no-need-for-action-on-safaricom-idUSL5N1UY44D>

3.2 Key actors in the regulatory space

Communication Authority of Kenya (CA) previously Communications Commission of Kenya (CCK), continues to drive ICT growth throughout the country. This is driven through licencing instruments and management of the spectrum. CA has encouraged competition as a tool to ensure quality, make services affordable, offer choice and ensure a variety of services are provided nationally, and enhance innovation. Where services are not provided especially in the rural areas, CA has had to use the USF framework to ensure coverage. As at the date of the research for this paper, CA is implementing a Ksh. 1 Billion Phase 2 of the universal service to areas that were not yet covered. Unlike phase 1 which focused on voice, phase 2 will provide broadband on 3G and above to all those areas that have no coverage in Kenya.

Communications and Multimedia Appeals Tribunal is a quasi-judicial organ that adjudicates on decisions taken by the CA on telecommunication.

3.3 Licensees

Over the period, the telecommunications space has grown with multiple actors to support the development of a resilient telecommunication system. As indicated in Table 3 there is multiplicity of actors in all areas.

Table 3: Unified licencing framework licensees

International	International gateway operators	12
	Submarine cable landing rights operators	3
Network facilities providers	Tier 1	3
	Tier 2	24
	Tier 3	30
Applications service providers		234
Content service providers		358
Dot ke sub-domain name registrar services providers		65
Business process outsourcing service providers		26
Telecommunications contractors		582
Telecommunications technical personnel		559
Telecommunications equipment vendors		545
Public communication access centres		14

Source: CA 2018²¹

Some areas need attention for long term health and resilience of the system. Key areas include diversity of the undersea cable landings, the competition among mobile operators, local manufacture of ICT components, and branding of Kenya on the cyberspace.

²¹Register Of Unified Licensing Framework Licensees <https://ca.go.ke/wp-content/uploads/2018/03/Register-of-Unified-Licensing-Framework-Licensees-May-2018.pdf>

3.4 Constraints to fuller contribution

Undersea cable landing rights operators bring undersea cable capacity to Kenya and as indicated earlier have increased to five cables with two more due in 2021 and 2023. Currently, all the undersea cables land in Mombasa and all the capacity is delivered to the rest of the country along the same corridor. This reduces route diversity and increases risk in case of a major catastrophe at the landing area or along the delivery corridor from Mombasa. It is important that route diversity be a key consideration for the future undersea cable landings and inland delivery corridor.

Network Facilities Providers (NFP) tier 1 are national operators that have extensive reach across the country through mobile signal. As of 2009, Kenya had four operators comprising of Safaricom, Zain (now Airtel), Essar Yu and Orange (now Telkom Kenya), with Safaricom having a 69% market share. This has changed over time. One operator, Essar Yu exited the market in 2014 and two operators Airtel and Telkom are at the time of this research considering a merger, meaning the market will have two operators. This does not augur well for consumer choice. Due to their pre-eminent position in the provision of national services, the mobile operators have significant impact on the rest of the parties in the telecommunications ecosystem. It should be noted that even as one operator exited the market at least two major operators have applied to enter the market namely MTN²² and Viettel²³. Viettel was not able to enter the market and today has instead entered four other markets in Africa – Cameroon, Mozambique, Burundi, and neighbouring Tanzania. Despite being the last entrant in Tanzania, Viettel has acquired a significant market share (10%) and built a huge 25,000km fibre infrastructure across the country.

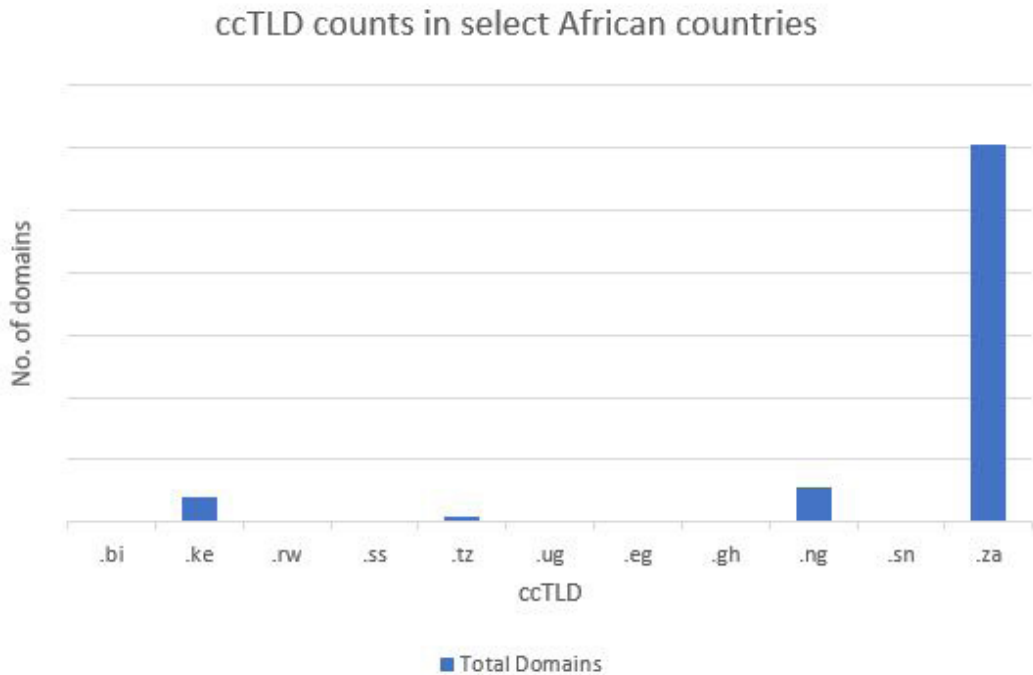
Telecommunications equipment vendors import all products for telecommunications systems. This has significant implication on the long-term health and strength of the system. It is time the government worked with this group towards manufacturing some of the products locally. This is in line with the commitment Kenya made under Digital Transformation Strategy for Africa 2020-2030 to ensure that components are locally manufactured. An example to emulate, Rwanda, is manufacturing smart phones thereby creating job opportunities. It is expected that Konza Technopolis will be at the forefront towards the research and manufacture of components. This will reduce foreign exchange drain and create jobs.

Dot-ke Sub-Domain Names Registrar Services Providers have a great responsibility to put Kenyan organisations on the cyberspace through the DOT KE (.ke) domain name, administered by the Kenya Country Code Top Level Domain (ccTLD) registry KENIC Ltd established in 2002. The domain .ke is a Kenyan identity and it would be expected that many Kenyan organisations would take this domain space. By the end of 2019, the second level domains registered had reached 100,000. Compared to other countries in the Eastern African region, the level of registration is significant and way ahead of others (Fig 7). Kenyan ccTLD domain registrations are however dwarfed by registrations for South Africa and countries outside Africa.

²²MTN bids for Econet's stake in Yu – Bizcommunity Africa – <https://www.bizcommunity.co.ke/Article/111/78/34682.html>

²³MTN, Viettel and UK firm bid for Orange Kenya assets – The Standard – <https://www.standardmedia.co.ke/business/article/2000110937/mtn-viettel-and-uk-firm-bid-for-orange-kenya-assets>

Fig 7: ccTLD comparative growth



Source: Domain Tools

The low registrations may be due to incorrect perceptions by organisations to opt out and choose generic Top-level Domains (gTLD) like .com, .org and .net and the increasing new ones released by ICANN. Some issues raised include, security, data integrity, costs, ease of registrations etc. The low domain names registration set against fast growth of internet or the social media – Facebook among others points to a need to explore if Kenyans take social media as an alternative to cyberspace presence. It is important that these perceptions are debunked, and mainstream organizations use .ke as a brand for Kenya in cyberspace. Domain name is a unique identifier in the cyberspace and is a critical component to brand Kenya.

Some countries have taken regulatory actions to require use. Nigeria for example require that local companies must have a national domain name to access government tenders. To encourage use Nigeria, bundle other services to the domain name i.e. free hosting for a year and reduced costs for three years. Note also, that government organisations get domain names cost free. Sustainability of the national registry Nigeria Internet Registration Association (NIRA) is assured by National Information Technology Development Agency (NITDA) co-funding. Tanzania require local companies to have local domain names. Nevertheless, the ICANN community discourage any form of discrimination on domain name use.

Kenya needs to explore additional strategies to enhance the use of .ke.

3.4.1 Sector specific taxation

The telecommunication sector has been a fast-growing area with huge revenue generation and, in many countries, dwarfing other corporate businesses. It is no wonder that this has attracted tax and rates by both national and local governments. In its research, a 2014 GSMA study found that operators take an inordinately high taxation beyond the rest of the corporate enterprises in Sub Sahara Africa²⁴. The study published in 2017, found that sector specific taxes and fees were a significant tax burden. In 12 Sub-Saharan African countries where data was available at the time of the study in 2015, 26% of the taxes and fees paid was sector specific rather than broad based taxation thus the mobile operator taxation outweighed their size in the economy. Overall, an average of 35% of their revenues were taxes, fees, and charges. This is especially the case on the sector specific taxes on the mobile operators and then additional levies imposed on the rights of way, clearances, business licences, among others. In a study specific to Kenya published in 2020, GSMA notes that this is the case for Kenya²⁵. Sector specific taxation burdens the operators and negatively impacts their capacity for rapid growth of digital infrastructure.

Finance Act 2019 loads additional sector specific taxes on the telecommunications sector. Where taxes are high, they inhibit the growth and innovation of the sector. It is true some of the operators are making profits, but the sector could invest more to increase coverage.

Other challenges include levies and costs the sector must bear to build infrastructure. National government through its Ministries and especially the Ministry responsible for Roads levy fees on the rights of way to build fibre, and the same levies are duplicated by the County governments as suppliers deliver fibre or build towers in various parts of the country. These levies are not standardised and so for the same project, an operator must renegotiate with each County government. Not all County governments pose the same challenge, as some County governments want to partner with operators to build an ICT infrastructure for growth.

Taxation and levies, while being an important contribution to the national economy, will be necessary to be reviewed so as not to impede the operators as they continue in their growth trajectory for even more financial contribution. Its growth as noted earlier creates a necessary foundation for the desired digital economy.

Some countries are taking measures to reduce costs for operators. The Chad government took a bold decision to remove its 18% excise duty for telecom service providers with a consequential reduction of internet data services via Finance Act 2020²⁶.

²⁴Taxing mobile connectivity in Sub-Saharan Africa: A review of mobile sector taxation and its impact on digital inclusion https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/Taxing-mobile-connectivity-in-Sub-Saharan-Africa_July-2017.pdf

²⁵Mobile taxation in Kenya Accelerating digital: Accelerating digital development https://www.gsma.com/publicpolicy/wp-content/uploads/2020/03/Mobile_taxation_in_Kenya.pdf

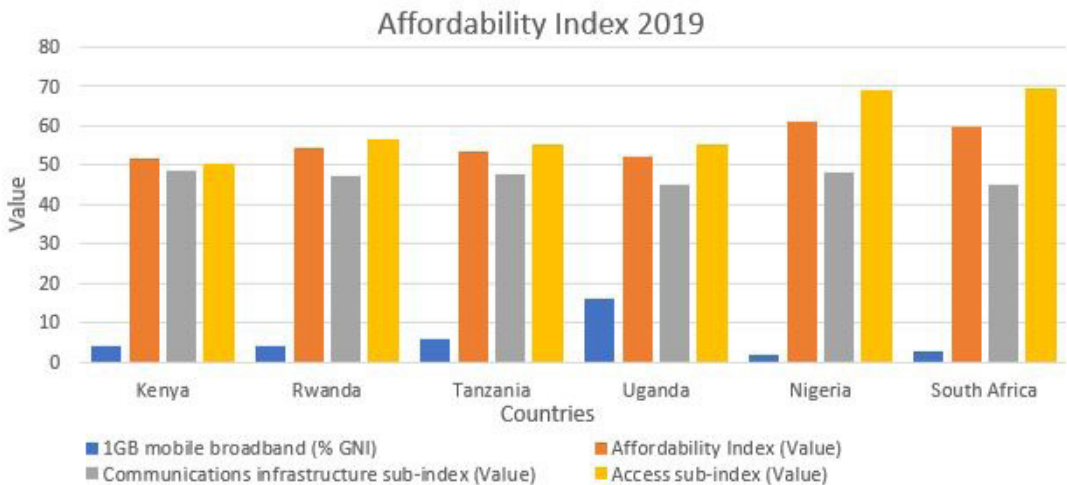
²⁶Chad cuts telecoms excise duty to bolster internet – ITweb –<https://itweb.africa/content/Pero3MZxZZPvQb6m>

3.4.2 Market competition and constraints on choice

Liberalisation in telecommunications in the 1990s ushered multiple players in the market in Africa and around the world competing against the incumbent operator which was either privatised or in the process of being privatised. Competition also came in form of technology – fixed line vis mobile service – and was the preferred mode to introduce new services, provide higher quality, reduced prices and finally a choice of services. The increased market interest over time has tapered off market entry with fewer organizations entering the markets and indeed some operators exiting the markets altogether.

Today, most markets in Africa are consolidating to increasingly fewer operators in the market. Senegal, Ghana, and Namibia which started off with multiple operators and robust competition have consolidated towards a monopoly. In Ghana, the government has declared the biggest operator MTN as the dominant operator. MTN disputes this declaration and has taken the government to court for review²⁷. Kenya has walked a similar path with an exit (Essar), and a merger being considered for consummation (Airtel and Telkom). A study by Alliance for Affordable Internet (A4IA) on competition in the telecommunications market in Africa depicts the challenges of this trend²⁸. Of concern is cost and choice which negatively impacts Kenya’s Affordability index as indicated in Fig 8.

Fig 8: Impact of competition and number of operators



Source: Alliance for Affordable Internet (A4AI)

²⁷Ghana: MTN Ghana Seeks Judicial Review of SMP Declaration – allAfrica – <https://allafrica.com/stories/202006300507.html>

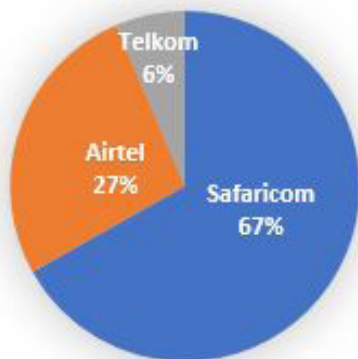
²⁸Alliance for Affordable Internet (A4AI): Affordability Drivers Index 2019 https://a4ai.org/affordability-report/data/?_year=2019&indicator=INDEX

A4AI describes the Affordability Index as a composite measure that summarises in a single (average) number an assessment of the drivers of internet affordability in various countries. The Communications Infrastructure Sub-index measures the current extent of infrastructure deployment and operations, alongside the policy and regulatory frameworks in place to incentivise and enable cost-effective investment in future infrastructure expansion. Finally, the Access Sub-index measures current broadband adoption rates and the policy and regulatory frameworks in place to encourage growth and ensure provision of affordable and equitable access. As indicated in Fig. 9 Kenya's cost for 1GB Mobile Broadband (%GNI) is like Rwanda's but could be more affordable as indicated by Uganda and Tanzania. In addition, Kenya's Access Sub-index is the lowest in comparison to the select countries while its Communication Infrastructure Sub-index is slightly higher. This, however, makes the average for Kenya's Affordability Index low, meaning Kenya is not an affordable country in comparison to the others regarding mobile connectivity.

The Kenyan mobile market has consolidated the number of players, hence reducing choice (Fig 9). Different options have been explored to entrench market competition, but these initiatives have not been effective. Since early 2000, the initiatives included removal of walled gardens – prohibitive cost of off-net calls to keep consumers on-net, number portability, and interoperability in digital transaction platforms.

Fig 9: Market share in Kenya

Mobile telephone subscriptions 2019

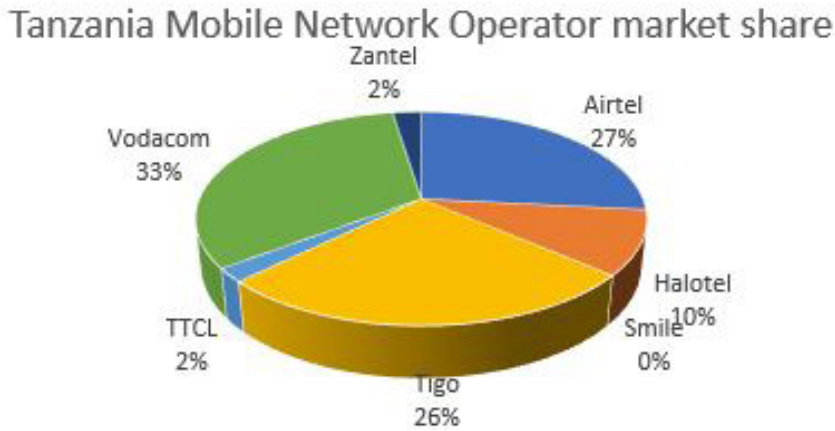


Source: Communications Authority

It is still important to explore ways to sustain competition in the market. A common approach is cited as strategies to constrain the market leader considering the huge market share. However, Kenya is still a developing market and it is feasible that the market offers other huge market opportunities to accommodate additional innovative actors.

For example, India spawned Jio Telecom which is now a market leader without taking away the market from its competitors; Tanzania, a competitive market, in 2016 welcomed the seventh player Viettel (Halotel) who has since taken a sizeable market share and is still growing (Fig 10).

Fig 10: Comparative market dynamics and market shares – Tanzania



Source: Tanzania Communications Regulatory Authority (TCRA)

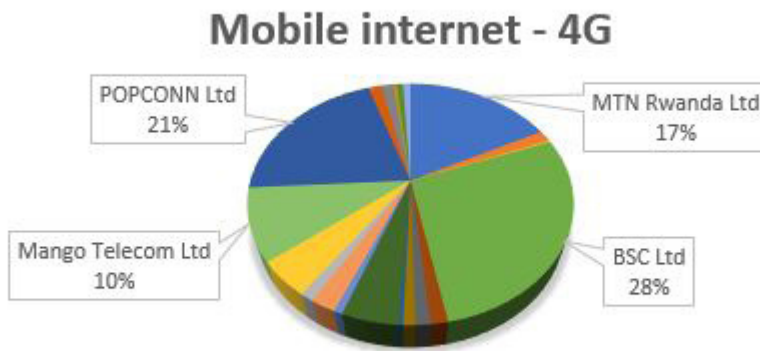
In the quest to expand choice and competition, Kenya should look beyond the current constraints of technology, service offerings and operators and explore a path that looks at the bigger picture. As the market is huge and provides opportunity for innovation and other options for new players. A tried and tested strategy includes the implementation of a Wholesale Open Access Network (WOAN²⁹).

WOAN as an opportunity to level the ground for 4G was proposed by the Ministry of ICT in 2012/2013. Unfortunately, the proposed partnerships had differing perspectives, and this did not materialise. Rwanda borrowed the Kenyan WOAN proposed framework and now together with Mexico have taken this route successfully deploying open 4G access realising enhanced competition, increased 4G coverage and reduced costs³⁰. It is through the WOAN strategy that Rwanda, for example, has been able to realise a 95% national coverage on 4G (2018) with multiple competing players to deliver 4G service (Fig 11). The opportunity for 4G in Kenya is no more. It is time to look at the bigger picture and explore an opportunity for WOAN for 5G considering the huge investment required. It is a promising way out of the emerging duopoly.

²⁹An initiative to build open access networks to offer equitable access to backhaul infrastructure.

³⁰Alliance for Affordable Internet (A4AI) Report 2019 <https://a4ai.org/affordability-report/report/2019/>

Fig 11: 4G market shares in Rwanda



Source: Rwanda Utilities Regulatory Agency (RURA)

Summary

The Chapter espouses the implementation journey of ICT policies outlined in Chapter 2 through legal instruments promulgated in the sector. The critical legislation noted in this Chapter include the Kenya Information and Communications Act 1998 [Rev 2012], Computer Misuse and Cybercrimes Act 2018, Data Protection Act 2019, Competition Act 2010, and the Finance Acts of 2019 and 2020. Under these legislations, the rights of citizens to access universal service and have legal protection when engaging online are identified and protected.

The key player in implementation of these policies is the ICT regulator, Communication Authority (CA), who has the mandate to oversee provision of services that are affordable and of high quality across the country through competition. The Chapter also discusses the role of various licensees as categorized and the role of competition and entry of taxation especially in the digital marketplace. These findings are contextualized in contrast with other countries in the region.

Recommendations

Through licencing, CA should enforce route diversity for undersea cable landing as well as terrestrial fibre networks to eliminate system vulnerability in case of a major catastrophe at the landing site or along the delivery corridor.

The government needs to work with telecommunications equipment vendors to manufacture ICT products locally similar to the initiatives in Rwanda and Egypt among others. This will help create job opportunities, encourage innovation, and reduce foreign exchange drain and importantly, stake a claim in the fast-expanding sector.

KENIC Ltd to create increased awareness to debunk incorrect perceptions to increase subscription to Kenyan ccTLD and enhance Kenyan identity in the cyberspace. KENIC through the ICT regulator should also explore other innovative strategies to encourage use such as regulatory actions that require use of Kenya ccTLD similar to Nigeria and Tanzania.

MoICT to design and implement innovative frameworks that sustain competition among operators encouraging reduced pricing and providing consumers with choice. To explore choice and competition, Kenya should look at the bigger picture as the market continues to grow and provide more opportunities for innovation and entry of new players. Implementation of tested strategies such as Wholesale Open Access Networks (WOAN) would be great opportunities to level the playing field for new and existing consumers.

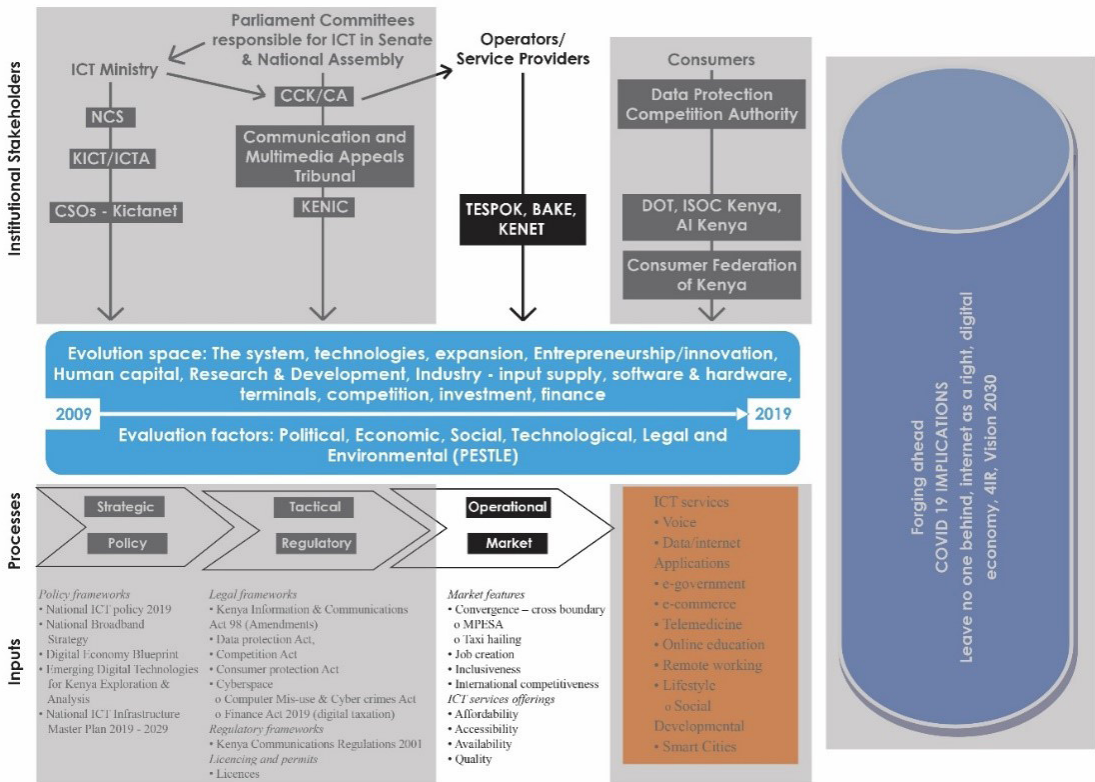
MoICT to engage with Ministry of Finance for an in-depth and sector wide review on the sector specific taxation on the ICT which is an inordinate burden on the sector in comparison with other economic sectors. The review is critical considering that ICT provides a unique foundation for the digital economy and 4IR and Kenya's competitiveness in the cyberspace will be predicated on its digital infrastructure resilience

4

4.0 The telecommunications system: market dynamics

The multi-operator market has unique dynamics which act together towards exploiting the opportunity. It is however to be noted that there are challenges that needs to be addressed to empower the actors. This Chapter highlights for some of the constraints.

Fig 12: Telecommunications ecosystem – Level 3

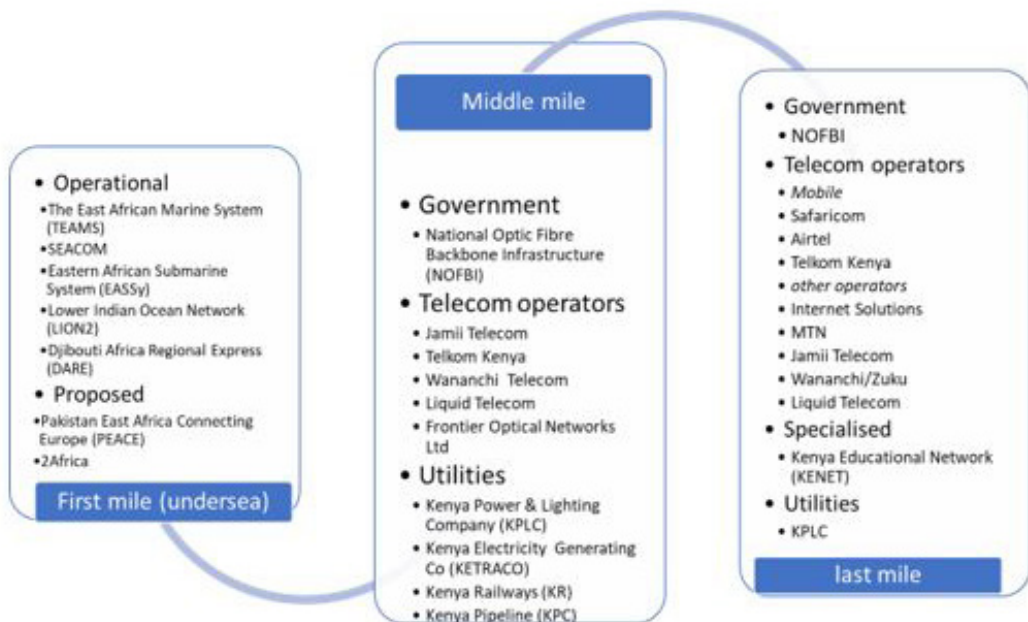


Source: Summit Strategies Ltd

4.1 The market value chain

Liberalisation ushered multiple operators into the telecommunications market, and this has changed over time. Some operators are thriving while others exited the market as others took over. It is also noteworthy that in general, as the market expands, it is also consolidating in certain spaces of the market. Some features of the market include a definition of actors in different spaces in the market along the telecommunications value chain. These operations are licenced as international gateway operators, or submarine cable landing rights operators or NFP as listed in Table 3. These spaces broadly refer to the first, middle, and last mile as indicated in Fig 13.

Fig 13: Telecommunications market value chain



Source: Summit Strategies Ltd

The first mile

The first mile has radically changed international bandwidth availability which has increased from 18.99 Gbps in December 2009³¹ to 6,241.84 Gbps in December 2019³². The undersea cable saw the reduction of reliance on satellite for international connectivity and ushered Kenya to a new paradigm, huge availability of bandwidth, reduced costs, and lower latency. This has been the foundation of the new services which Kenyans now enjoy.

³¹Communications Commission of Kenya Quarterly Sector Statistics Report 2nd Quarter Oct -Dec 2009/2010 <https://ca.go.ke/wp-content/uploads/2018/02/Sector-Statistics-Report-Q2-2009-10.pdf>

³²Communications Authority Second Quarter Sector Statistics Report for the Financial Year 2019/2020 (October-December 2019) <https://ca.go.ke/wp-content/uploads/2020/03/Sector-Statistics-Report-Q2-2019-2020-1.pdf>

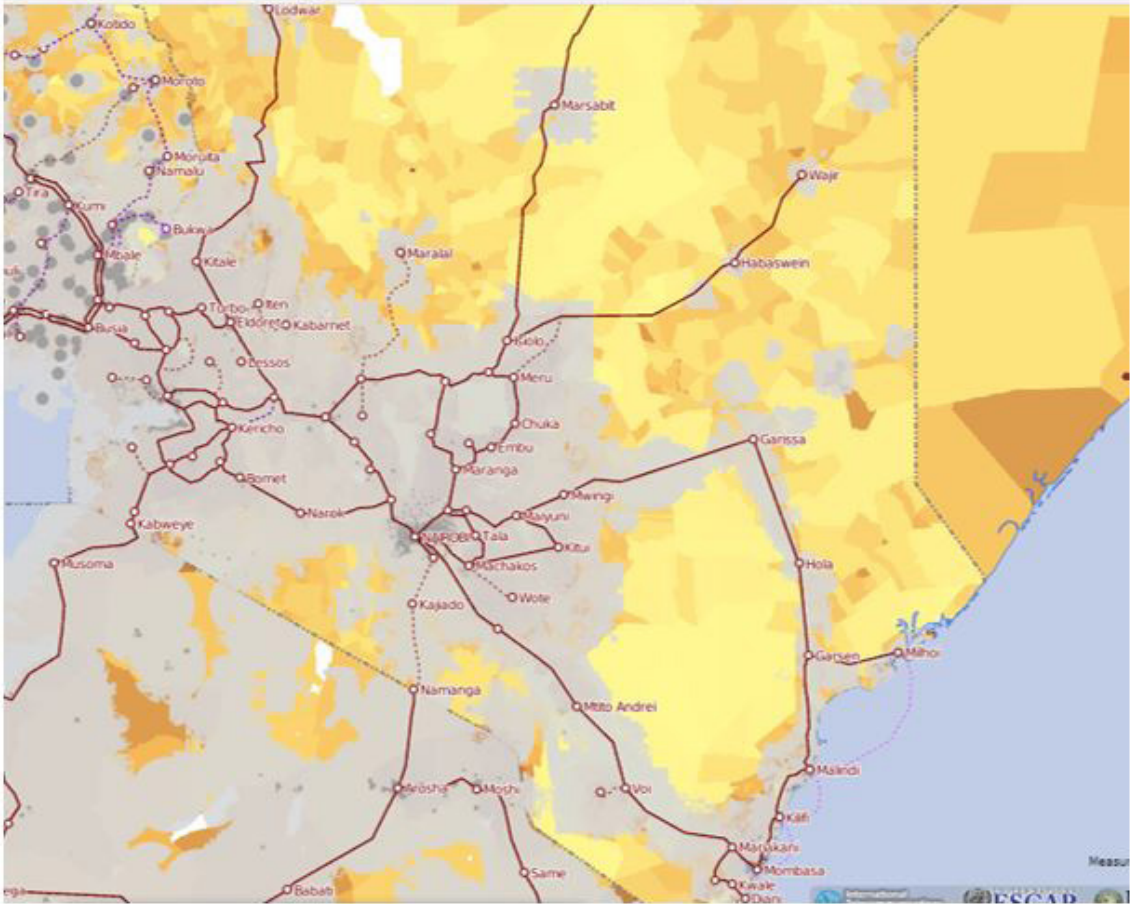
As discussed earlier, the advent of the undersea cable brought huge bandwidth to Kenya which continues to increase as more operators land undersea cables. As at the end of 2019, lit fibre available to Kenya had increased from 18.99 Gbps in 2009 to 6,214.84 Gbps in 2019 brought by three cables namely TEAMS, SEACOM and EASSy. However, we note that only 2,720.26 Gbps representing 56% of the capacity is in use. An additional undersea cable, DARE, landed in March 2020 and two additional undersea cables are planned namely PEACE, landing in 2021, and 2Africa in 2023.

There is huge wet bandwidth at Mombasa but only a fraction of it is being used inland, this is a challenge of middle mile infrastructure to deliver the bandwidth to the end consumer. Heavy investment is needed to address the delivery of bandwidth through the middle and last mile to the end consumer.

Middle mile

Government and private sector operators have been engaged to roll out fibre and distribute bandwidth capacity inland to the end consumer, but it is clear additional measures are required. NBS 2013-2017 proposed a national fibre network of 50,000km, but by 2020 this had not been realised. The major initiatives include NOFBI, a government initiative providing regional fibre (utilities and the operators) which now amounts to about 20,000km (Fig 14). More fibre is necessary to provide the necessary backhaul for universal broadband on the upcoming 5G. NBS 2018-2022 proposes rollout to all sub-counties and along all road category A, B, and C networks across the country.

Fig 14: Terrestrial interurban fibre distribution



Source: ITU

Challenges impacting the middle and last mile include:

- Implementation cost – prohibitive cost associated with the build out and maintenance,
- Widely dispersed consumers especially in the rural areas requiring the development of extensive networks, and
- Difficult operating environment especially the lack of a consistent rights of way/wayleaves.

Despite paying levies to allow fibre construction, that infrastructure is not protected. Road constructions uproot fibre resulting in huge costs for replacement and repair, and the multiple fibre cuts degrade quality.

Last mile network coverage

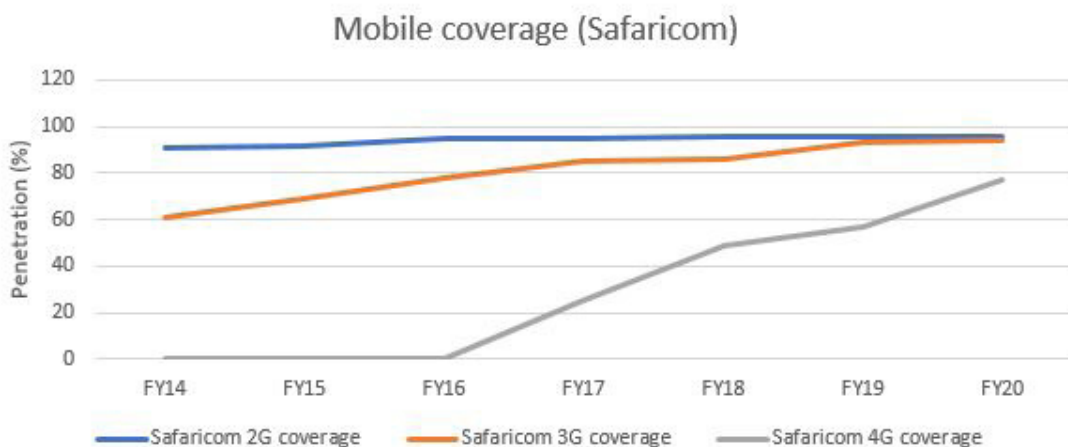
Basic 2G coverage has increased to cover 96% of the population, while land coverage is much lower at 17%. This reflects the sparsely populated and arid areas of our country need concerted effort to provide basic services to the population that still remains uncovered.

It is the government's policy to ensure all areas are covered and the USF is an intervention designed to complement licencing obligations and market factors to deliver services in the underserved areas. CA is now embarking on the 2nd phase of rural development.

Telecommunications system technology evolution

Technologies and the consequent service offerings as well as applications have evolved. From 2G offering voice and limited data to broadband in mobile services through 3G/4G which is now pervasive, and 5G being trailed (Fig 15). On the other hand, operators are now delivering fibre to homes and offices especially in metro areas. Thereby increasing the availability of bandwidth which has brought new services to homes and offices.

Fig 15: Safaricom's 2G/3G/4G coverage



Source: Safaricom Annual reports

5G is the next frontier. With the evolution towards 4IR and digital economy, a key pillar is connectivity infrastructure at high speeds with low latency. 5G is a foundational enabler for 4IR and CA is proactively engaging seven operators undertaking the requisite trials as CA develops licencing framework and a rollout roadmap³³. No licences have been issued as at the time of this research but Safaricom announced that they have completed the trials and intend to launch commercial services in select cities in late 2020³⁴.

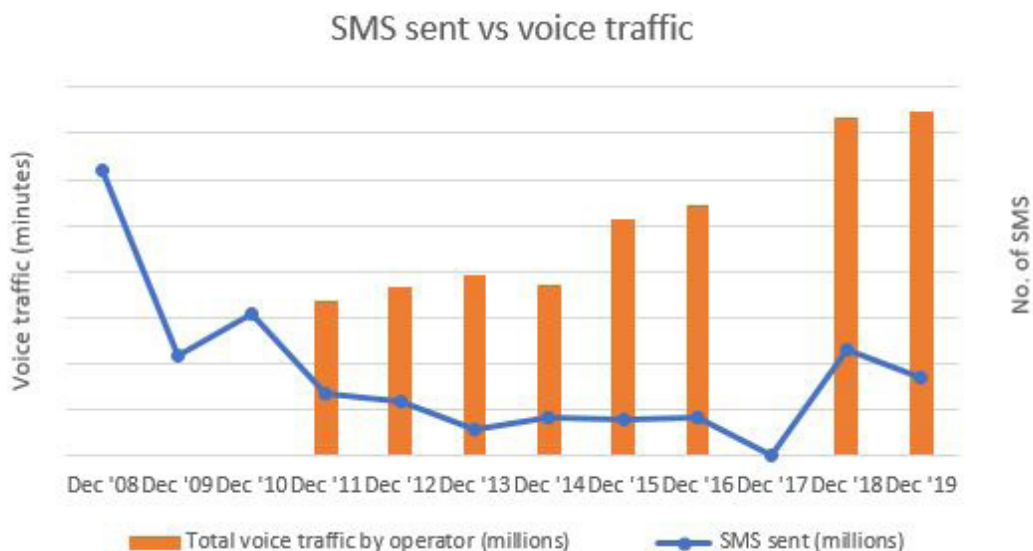
Broadband on 5G paves the way for pervasive applications of Internet of Things (IoT) and other technologies that collectively facilitate 4IR.

³³Is Kenya an inch away from adopting the 5G technology? – CIO – <https://www.cio.co.ke/is-kenya-an-inch-away-from-adopting-the-5g-technology/>

³⁴Safaricom to launch 5G network this year – Business Daily – <https://www.businessdailyafrica.com/corporate/companies/Safaricom-set-for-5G-network-launch/4003102-5453976-84hqeqz/index.html>

Along the way, some technologies are losing their appeal as a utility – SMS, MMS and equally voice that was a dominant offering is now tapering off and this is expected to flatten while data takes over with its varied applications (Fig 16).

Fig 16: SMS & voice evolution



Source: Communications Authority

Television White Space (TvWS) technology is being piloted for the last mile high speed internet for rural and underserved areas. This technology is complimentary to other communications technologies and opportunistic as well, especially in the rural and hard to reach areas. This is part of the strategy in the NBS 2018-2023 and CA's corporate strategy.

High Altitude Platform System (HAPS) has made its mark through the launch of Project Loon – a partnership with Telkom Kenya straddling the middle and last mile space³⁵. The project formally launched on July 7th 2020 will eventually comprise of up to 35 balloons (flight vehicles) flying at about 20km in the stratosphere with each balloon hoisting an equivalent of a terrestrial 4G cell tower beaming to end users on the ground or to other base stations. The project gives an instant coverage of 50,000km² to users in Western, part of central Rift Valley, Central and the capital Nairobi, providing services from 0600 to 2100 hrs as they are solar powered. The project claimed to have achieved a downlink speed of 18.9Mbps, an uplink speed of 4.74Mbps and a latency of 19ms in June. Since the launch, Telkom Kenya indicated that they had intermittently connected 35,000 unique consumers. The project opens connectivity in new areas that were not fully covered or had only voice coverage. The network is however most appropriate for data. Telkom Kenya has an opportunity to expand market share by leveraging on the increased coverage from Project Loon. Currently Telkom Kenya has the smallest market share (Fig 9).

³⁵Loon is live in Kenya: A new era of stratospheric communications has begun – Medium – <https://medium.com/loon-for-all/loon-is-live-in-kenya-259d81c75a7a>

4.3 Constraints to expansion

4.3.1 Investment costs

Huge investment is required to expand services. As reported by this researcher on a paper for the Smart Africa Alliance – titled Smart Broadband 2025: A Transformative Broadband Strategy to Single Digital Market – cited work from World Bank which sets a framework for African countries to increase broadband penetration to 51% by 2025. Huge investment is required in switches, base stations, and fibre to the tune of USD10 Billion (Ksh. 1 Trillion) per year across Africa.

Here at home, National Broadband Strategy 2018-2023 estimates a Ksh 111 Billion price tag for a national broadband over a 5-year period. This amounts to Ksh 22Billion per year. This additional investment calls for all stakeholders including government and private sector to invest in the market. Countries have incentivised additional investment by bringing fresh players into the market. An alternative is targeted investment by the government in areas that require huge investment especially fibre, data centres, passive infrastructures – ducts, masts etc – to reduce investment costs and in certain cases even satellite capacity. This is a complimentary area to increase access and use.

Utilities are now a key player, especially in the middle mile providing inter-urban connectivity. Consequently, telecom operators are moving away from inter-urban fibre investment to focus more on metro networks and the customer facing fibre to the home/office. Other utility players that have entered the market include the rail, pipeline and shortly road will be providing passive infrastructure which will reduce civil works cost for fibre rollout.

4.3.2 Access of terminal devices

Signal coverage has increased rapidly over the last decade to cover up to 95% of the population. This has not matched with individual specific use particularly in the data/internet segment. One challenge is access to suitable terminal devices. These devices can be classified in a variety of ways, the basic voice terminals, and data /internet applications. Basic voice requires low end terminals with cost being the main barrier for poor communities. The emerging future is data applications driven which calls for smartphones. As at end of March 2020, Safaricom reported that there were 15 Million smart phones in its network indicating that every second customer in its network had a smartphone. The corollary is that half its customers are impaired in the quest for full participation in the digital economy. This penetration is indicative for the overall market and is a major barrier which needs to be addressed. Other challenges include:

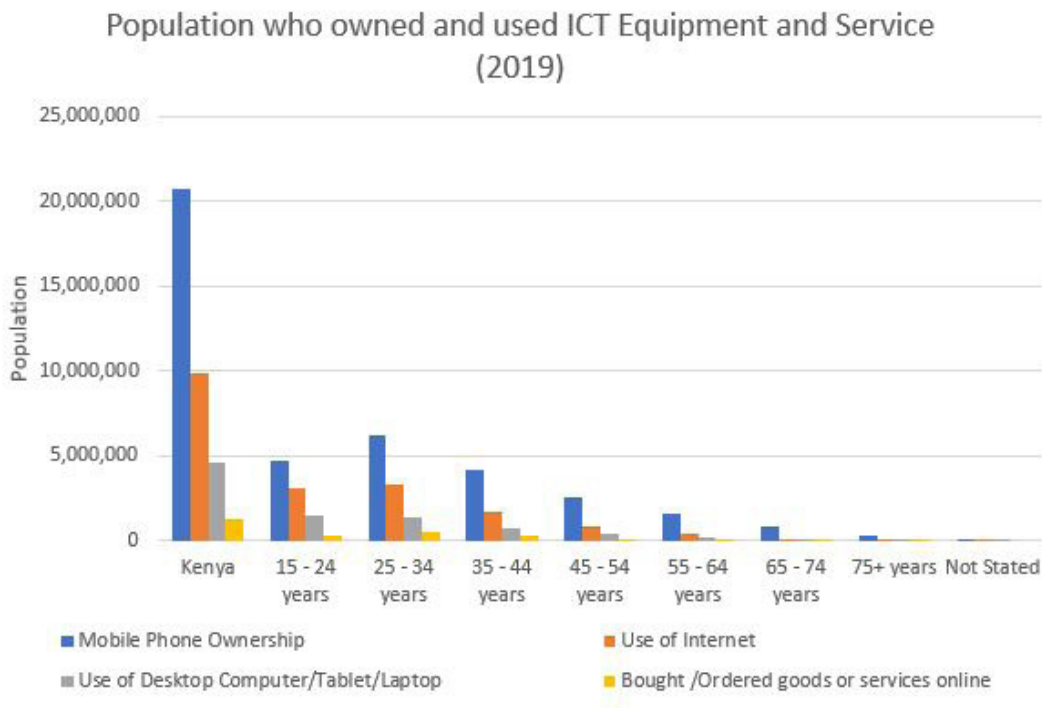
- Cost of the device
- Capacity and skills to use the devices
- Access to electricity for charging the device
- Digital literacy skills on how use the device

CA launched a public consultation³⁶ to explore how to increase uptake of ICT devices and following this consultation, CA is developing a strategy to address increased uptake. Strategies used in other countries include:

- Local manufacture – Rwanda is now manufacturing smartphones³⁷. This initiative is expected to reduce the costs of the terminal and therefore make it affordable while increasing uptake. This can be a long-term strategy to address affordability, increase foreign direct investment and create jobs
- Reduction or elimination of taxes on terminal devices
- Removal of type approval fees

Data collected in Kenya’s 2019 Kenya Population and Housing Census indicates that ICT in homes is still limited (Fig 17). To take advantage of the optic fibre investments and launch Kenya to higher penetration, it is critical to address access to terminal devices.

Fig 17: ICT penetration in Kenya



Source: 2019 Kenya Population and Housing Census, Kenya National Bureau of Statistics

³⁶Strategies for Increasing the Uptake of ICT Devices in Kenya <https://ca.go.ke/strategies-for-increasing-the-uptake-of-ict-devices-in-kenya/>

³⁷Mara Group opens Africa’s first smartphone factory in Rwanda – African Business – <http://africanbusinessmagazine.com/gp6gR>

4.3.3 Meaningful connectivity

The current definition borrowed from ITU recognises connectivity at whatever speeds above 256kbps as broadband, on any device, and having occurred in the last 90 days. This is inadequate because there is a minimum threshold in speeds, frequency of connection, and device to be able to access and use information and knowledge online. Going forward, connectivity is not just voice but the ability for one to use connectivity for applications in daily life. Connectivity therefore needs to be defined from the demand side preferably always-on, at sufficient speeds, and data volumes, to ensure that a Kenyan citizen can use it for daily life applications.

A significant percentage of Kenya's population do not have meaningful connectivity. New metrics are now required to measure how we are progressing in this regard. The NBS 2018-2023 is a way to realise this, with the goal to ensure broadband access across the country and set minimum speeds of the 2Mbps for every citizen. When realised, meaningful connectivity provides a foundational framework for beneficial use of the internet.

4.3.4 Infrastructure duplication

Implementation of fibre often has resulted in the duplication of the civil works costs with every operator excavating the ground to install fibre and the same route is again excavated by a competitor when building its fibre. The repeated dig outs compromise the quality of the ground cover resulting in fibre cuts and thus a deterioration of the fibre quality.

A policy to require operators to excavate and build sufficient capacity of ducts to cater for other players is most efficient. Thus, operators digging for fibre in a new area will be required to build additional space that can be used by others in future. Access terms to this space is a commercial consideration whose framework is set out by the regulator. Tanzania has developed this framework ensuring operators build additional capacity to incorporate future players.

Such a policy should encompass other infrastructure sharing; passive sharing which includes sharing of masts and active sharing including sharing of radio channels and national roaming. The policy framework for infrastructure sharing is developed but needs to be enforced to reduce costs for operators by reducing infrastructure duplication.

Summary

This Chapter presented opportunities and challenges experienced by service providers in the telecommunications sector. Although market liberalisation introduced multiple operators, some operators have thrived while others have exited the market over the last decade citing adverse operating environment. In the same breath, there are some market spaces that continue to expand while others are consolidating.

The Chapter presents the various operators within the first mile (undersea), middle mile and last mile. Further, it highlights the large amount of wet bandwidth delivered at the coast but due to challenges in the middle mile, only 56% of it is used inland. In the middle mile, challenges of cost, widely dispersed customers and harsh operating environment hinder the expansion of the network to the hard-to-reach rural areas. With the challenges experienced in the first and middle mile, delivery of last mile network coverage continues to be a challenge, a gap USF is seeking to bridge.

Additionally, the evolution of the telecommunication sector which was heavily reliant on voice has shifted to broadband supported by both old and new technologies (HAPS, TvWS) being explored to increase reach. The Chapter highlights investment costs, access to terminal devices and infrastructure duplications as challenges to achieving meaningful connectivity.

Recommendations

Countries recognised that telecommunications sector require heavy investment and have tackled it in several ways; introducing new players or government providing targeted investment in unique spaces in the value chain thereby reducing investment costs and increase access and use. This innovative approach is necessary to ensure appropriate investment is made to ensure delivery of bandwidth through the middle and last mile to the end consumer. This targeted investment should not disorient the market dynamics.

CA should enforce a framework that reduces prohibitive costs, establishes consistent rights of way/way leaves and infrastructure protection which interfere with the build out and maintenance of fibre. This will encourage the private sector to develop extensive networks targeting widely dispersed consumers in hard-to-reach areas of the country.

CA should continue encouraging operators to undertake requisite trials in readiness for establishing 5G which is an enabler for 4IR and digital economy by providing high speeds with low latency.

Continue to support new innovative technologies such as Telkom Kenya's Project Loon (using HAPS technology) and TvWS. These technologies are opening coverage and services to new areas.

CA to continue with the initiative to increase access to terminal devices. The government should encourage establishment of local manufacture of devices, reduce/eliminate taxes on terminal devices and type approval fees.

Electricity penetration to the rural areas continues to be a barrier to ICT use to rural consumers and working together with the private sector, government should continue supporting access to alternative power sources including solar energy.

ICT policy encouraged the utilities to enter in the telecommunications space and provide their excess bandwidth capacity to the ICT sector. This has brought immense benefits to the sector especially through the middle mile. However, this entry is forcing out the telecom operators in the middle mile which exposes the ICT system to the intricacies of the operational and strategic dynamics in utilities.

CA should carry out a study to understand the long-term implications and how the long-term benefit needs to be exploited by the sector without compromising the resilience of the ICT sector.

Reduce infrastructure duplication among service providers who are excavating fibre in a new area to build sufficient capacity for ducts to cater for future players. The regulator, CA, should then establish a framework for access terms. This policy would also encompass infrastructure sharing, although the policy on infrastructure sharing is developed, it needs to be enforced to discourage infrastructure duplication.

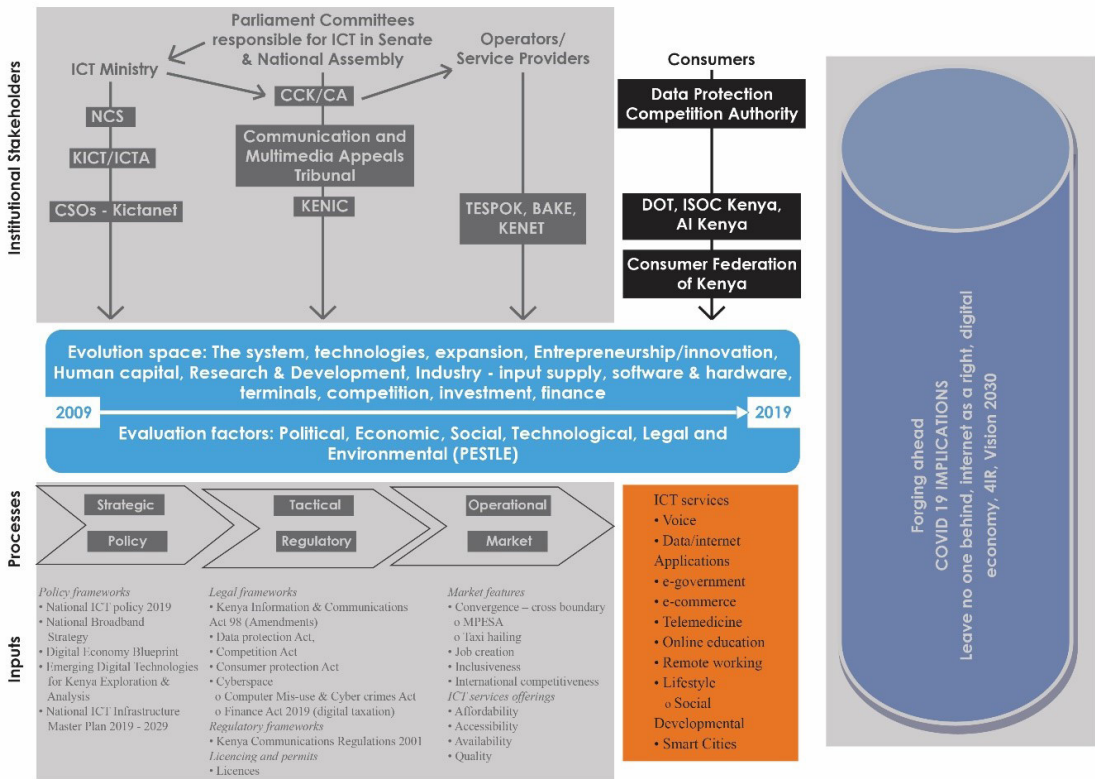
With entry of the digital economy and pervasive use of the ICTs for daily life, it is now clear that current indicators of connectivity no longer give a comprehensive view of use. CA should engage stakeholders to develop indicators for meaningful connectivity.

5

5.0 The consumer space: The demand side

The telecommunications system is to serve the consumer needs. This chapter addresses the interplay of the service providers to serve the needs of the demand side – the consumer.

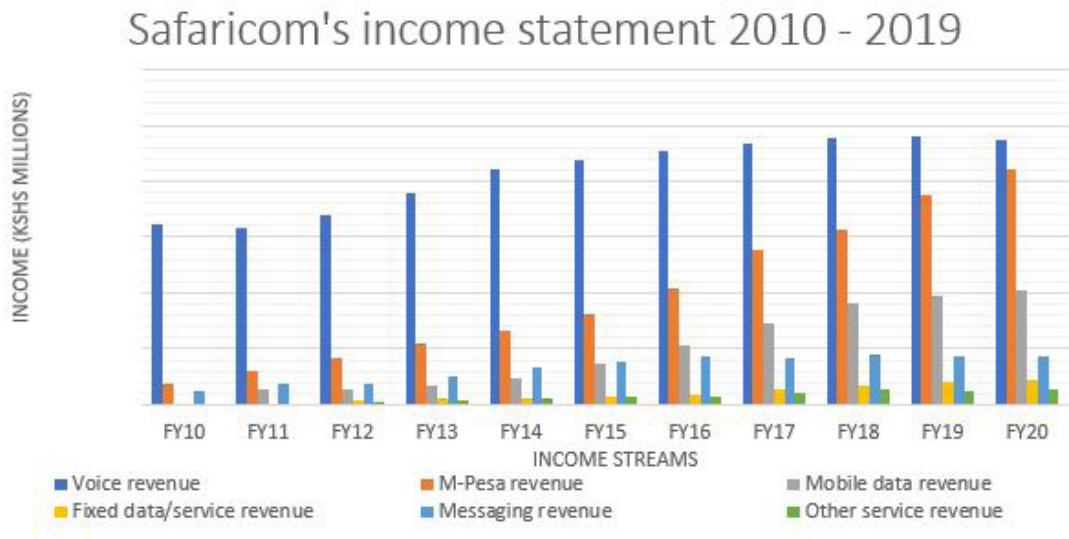
Fig 18: Telecommunications ecosystem – Level 4



Source: Summit Strategies Ltd

The Kenya telecommunications system presents a wide array of services in different presentations, prices and across the country to the consumers. These range from generic voice, data, and hardware (terminal devices – phones/computers) in a wide variety and applications. In 2009, voice was a dominant offering, but this has now changed to data as a driver in ICT use as manifested by Safaricom the largest operator and as illustrated in Fig. 19.

Fig 19: Safaricom's voice revenue in comparison to other sources of revenue 2010 – 2019



Source: Safaricom Annual Reports

Market competition has been the greatest influence for the consumer bringing down costs of services, enhancing consumer choice as well as increasing coverage. Additionally, rapid innovation has expanded the scope of applications to serve a wide range of consumer needs; broader services include:

- E-governance – e-Citizen
- Justice – e-Justice
- E-commerce/e-trade – payment systems, National Public Key Infrastructure (PKI)
- Health – m-health, m-Tiba
- Online education
- Teleworking – working from home
- Lifestyle – social applications
- News – Viusasa

In areas where competition tools were ineffective, the regulator intervened and enforced measures to influence or even change the market. Such measures included:

- Direct intervention on tariffs e.g., reduction of off-net voice tariffs
- Implementation of number portability to enable a consumer port their number to a competing service provider
- Reduction of tariffs especially removal of type approval fees on terminals
- Oversight to prevent dominance abuse

In complimenting these measures, the regulator has continued to set standards to ensure quality in service offering and has undertaken heavy investment in quality measurement infrastructure/systems with consequent heavy penalties applied for non-compliance. This cuts across all services including the internet. Key areas for CA include:

- Provide a platform for service quality complaints reporting
- Set quality standards, undertake relevant measures, and enforce conformance
- Engage in digital literacy measures and especially use of the services
- Evaluate services to inform consumers

Despite all these initiatives, not all consumers are served by the telecommunication system for several reasons and extraordinary measures are necessary. These challenges are discussed later in this chapter.

5.1 Converging services and regulatory implications

The drive to create a hospitable environment is set out in ICT policy frameworks as promulgated and anchored by legislation oversighted by CA. Due to the convergence of the services, regulation now spans outside the ICT sector to encompass a wider range of regulators beyond the ICT sector-specific regulator. In this regard, the horizontal/functional regulators compliment vertical sector-specific regulators for all-round consumer safeguarding as illustrated in Table 4.

Table 4: Converging regulation in the digital evolution

Regulatory space	Core Focus	Regulator	Specific intervention impacting on the consumer
Vertical – sector-specific	ICT	Communications Authority	Primary role over ICT sector
	Electricity	Energy and Petroleum Regulatory Authority	Optic fibre over power lines
	Financial/ Monetary	Central Bank of Kenya	Digital payment systems
	Tax administration	Kenya Revenue Authority	Digital Market place
	Environmental management	National Environment Management Authority	Electronic Waste
	Aviation space regulation	Kenya Civil Aviation Authority	High Altitude Platform Systems e.g. Project Loon Unmanned Aerial Vehicles e.g. Drones
	Digital system integrity	Kenya – Computer Incident Response Team (CIRT) a multi-agency collaboration led by CA	Cybercrime
	Data integrity	Data Protection Commissioner	Personal Data Protection
	Competition	Competition Authority of Kenya	ICT operator competition Competition in digital lending space
	Transportation	National Transport and Safety Authority	digital taxi hailing operations

This is an expression of the convergence and deepening of the service demand. With emerging innovation anchored on digitalisation, it is increasingly necessary that the ICT sector regulator reaches out and collaborates with other regulators to provide all-round support to consumers. It is also demonstrating that it will be necessary to establish new regulators/regulatory frameworks to address unique areas that are currently unregulated. These areas include AI and its applications in autonomous driving, health, among others.

5.2 ICT consumer space organisation

Enabling legislation bestows the primary responsibility of ICT consumer welfare to CA and as discussed in the foregoing now includes other regulators as illustrated in Table 5.

Table 5: Legal framework for the ICT consumer

Title	Description
The Consumer Protection Act, 2012	Provide for the protection of the consumer, prevent unfair trade practices in consumer transactions: <ul style="list-style-type: none"> • Recognise internet agreements, personal information, and access to credit negotiations.
Competition Act, 2010 [rev 2016]	Promotes and safeguards competition in the national economy: <ul style="list-style-type: none"> • To protect consumers from unfair and misleading market conduct, and • Provide for consumer welfare.

Additional measures to inquire and regulate conduct of service providers for consumer welfare include the fast-growing digital lending space and digital taxi hailing, among others.

While payment system is regulated under the National Payment System by the Central Bank of Kenya, there is no specific regulation of the lenders thus often, extremely high interest rates are charged. This has resulted in an outcry by consumers in addition to Parliamentary demands for intervention by the Central Bank on the digital lenders who have uncontrolled interest rates. In response, the digital lenders have established – the Digital Lenders Association of Kenya (DLAK) – which has set self-regulatory framework for digital lending and engages with the regulatory development process.

Taxi digital hailing is now prevalent but like emerging applications has been unregulated (Table 6).

Table 6: Ongoing regulatory initiatives for consumer welfare

Title	Description
Digital lending	<p>Competition Authority of Kenya (www.cak.go.ke) was conducting (Feb 2020) a public inquiry of digital lenders with a focus on competition and the high interest rates leading to high blacklisting on the Credit Reference Bureaus.</p> <p>Specific objectives are:</p> <ul style="list-style-type: none"> • Provide evidence regarding the size and nature of the digital credit market. • Identify potential consumer protection risks and consumer outcomes within Kenya’s digital credit sector. • Increase transparency and comprehensiveness of product information and terms and conditions. • Address probable fraud in digital financial services. • Improve consumer redress for digital credit products. • Increase consumer control over personal information to expand choice and competition, and • Inform the development of policies to ensure adequate consumer protection across regulated and unregulated lenders and equal protection of all Kenyan consumers
Taxi Hailing Service – The Traffic (Digital Hailing Service) Rules, 2020 (Draft)	<p>Defines the taxi hailing platform, the operators, drivers and use of personal data and registration of the operators. To be implemented by National Transport and Safety Authority (NTSA).</p>

Civil Society Organisation stakeholders: Consumer Federation of Kenya among others are active in the ICT consumer space.

5.3 Intervention for special groups: Social exclusion

ICT distribution varies widely among various population segments and access/use define the opportunity that these groups can be able to exploit. Features that define access and use of ICT include location; rural areas without voice/data coverage, economic capacity; ability to pay for meaningful connectivity, infrastructure; access to terminal devices/electricity, digital skills; ability to navigate the cyberspace, and use relevant content; language barrier or use value. It is possible that among the poor, all these factors have a cumulative and debilitating impact as such potential consumers are unconnected.

With COVID 19, such consumers were especially disadvantaged in all spheres of life exemplifying the digital divide³⁸ – access to government services, education, commerce and even socialising. The 2019 Kenya Population and Housing Census illustrates the multiple divides in our society, firstly, by population segments, gender disparity, youth and Persons with Disabilities (PWDs); secondly, by location especially rural areas which continue to experience challenges in accessing ICT (Fig 19). Special intervention measures are necessary to support these unique populations segments.

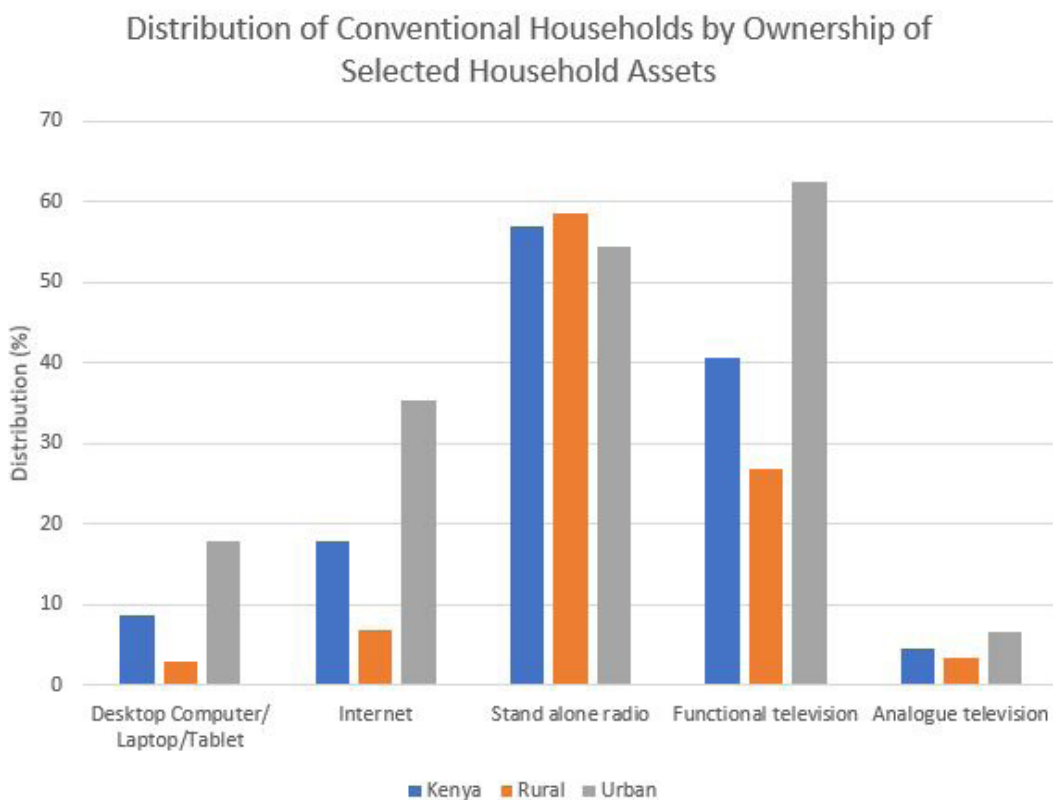
³⁸Defined as “the gap between individuals, households, businesses and geographic areas at different socioeconomic levels regarding their opportunities to access information and communications technologies (ICTs) and to their use of the Internet for a wide variety of activities

5.3.1 Rural digital divide

Applications in education, as an example, illustrate the disparity and inequality presented by COVID-19. Basic connectivity with no signal or broadband coverage is a challenge for many areas, with the cost of bandwidth not sustainable, or inappropriate devices for the learning environment and finally the lack of skills to use ICT by either parents/caregivers or the students themselves including those in university.

Access to education could be through TV, radio, online internet (smart phone, laptop, or computer). The availability of these tools is limited as illustrated in Fig 20.

Fig 20: Access to ICT at household level



Source: 2019 Kenya Population and Housing Census, Kenya National Bureau of Statistics

Rural areas are disadvantaged on access to tools for online learning apart from standalone radio. The challenge however varies from lack of broadband signal in rural areas, prohibitive cost of the data, and skills to manipulate. In the end, it is estimated only 21% of the students could continue with education online leaving the rest without education access³⁹. CA took a regulatory action to compel Broadcast Signal Distributors to carry educational content from Kenya Institute of Curriculum Development (KICD) as an intervention for access.

What COVID-19 illustrated is a need to mainstream online learning as an alternative channel to address challenges of learning infrastructure, distance to institutions of learning, scarcity of supporting skills among teachers, development of Massive Open Online Courses (MooC) infrastructure, and finally the need for national coverage. Outside ICT, electricity access is critical to power devices with 30% of the households without a form of electricity⁴⁰.

In e-commerce, the rural–urban divide affects both men and women equally. The incidence of those transacting online is five times more in urban areas than in rural areas (Fig 21).

COVID-19 also laid bare the supply side indicators of infrastructure. The penetration indicators are no longer viable, a new way to measure meaningful connectivity needs to be implemented so that all consumers can tap into the applications – education, commerce, social, among others.

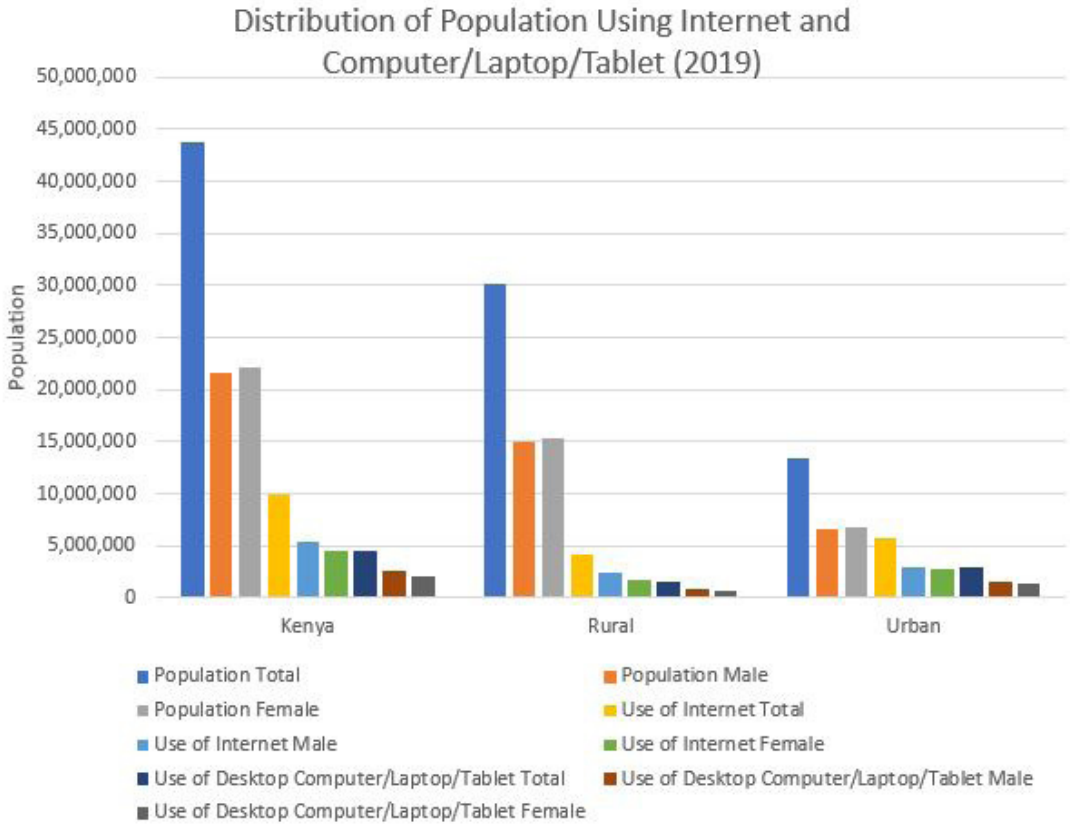
5.3.2 Gender divide

Unlike other countries, Kenya has managed to close the gender gap on connectivity in both rural and urban settings. There is equality in connectivity, but this advantage disappears in applications and their use which is noted in Mpesa connections and applications in digital use e.g. online transactions. Additionally, internet use is lower among women. There is also a clear gender disparity within the urban verses rural divide in digital trade adoption (Fig 21).

³⁹Kenya's digital gap widens as Covid-19 penalises students without internet – rfi – <http://www.rfi.fr/en/africa/20200417-covid-19-widens-kenya-s-digital-gap-as-students-without-internet-access-penalised-coronavirus-rural>

⁴⁰According to the 2019 Kenya Population and Housing Census, 50.4% total household depend on grid electricity followed by 19.3% on solar for lighting- <https://www.knbs.or.ke/?wpdmpo=2019-kenya-population-and-housing-census-volume-iv-distribution-of-population-by-socio-economic-characteristics>

Fig 21: Rural vis urban digital divide

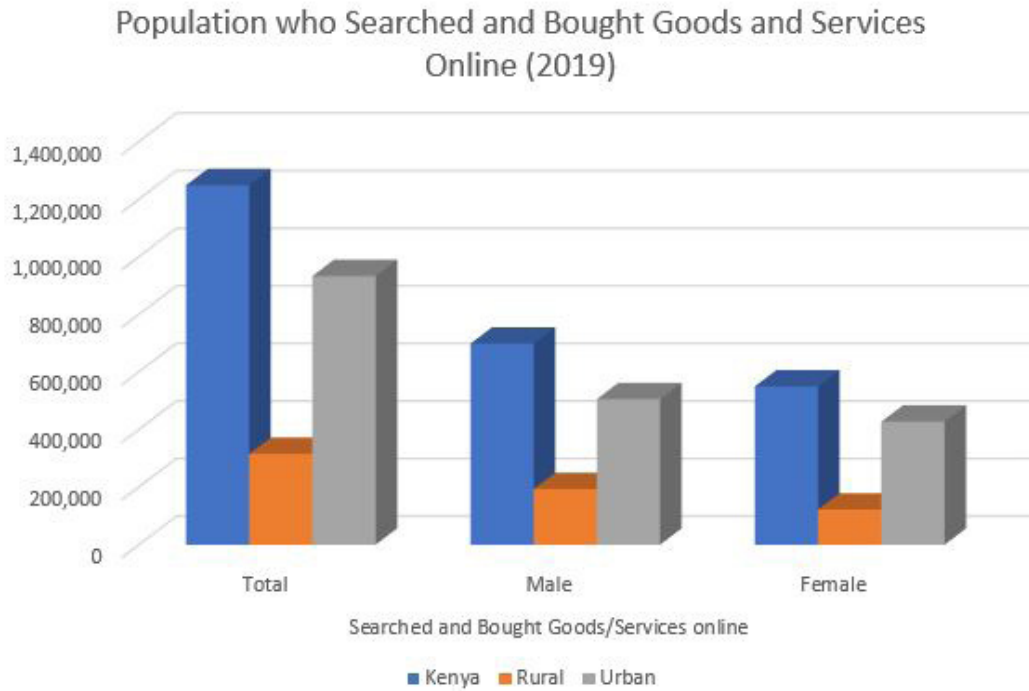


Source: 2019 Kenya Population and Housing Census, Kenya National Bureau of Statistics

This calls for targeted intervention to address the disparity.

As demonstrated in Fig 22 men searching and ordering products online was higher than women, yet they have equal phone penetration. Digital economy and 4IR is on applications hence it is imperative to ensure equitable exploitation of the benefits of ICTs.

Fig 22: Applications in digital economy



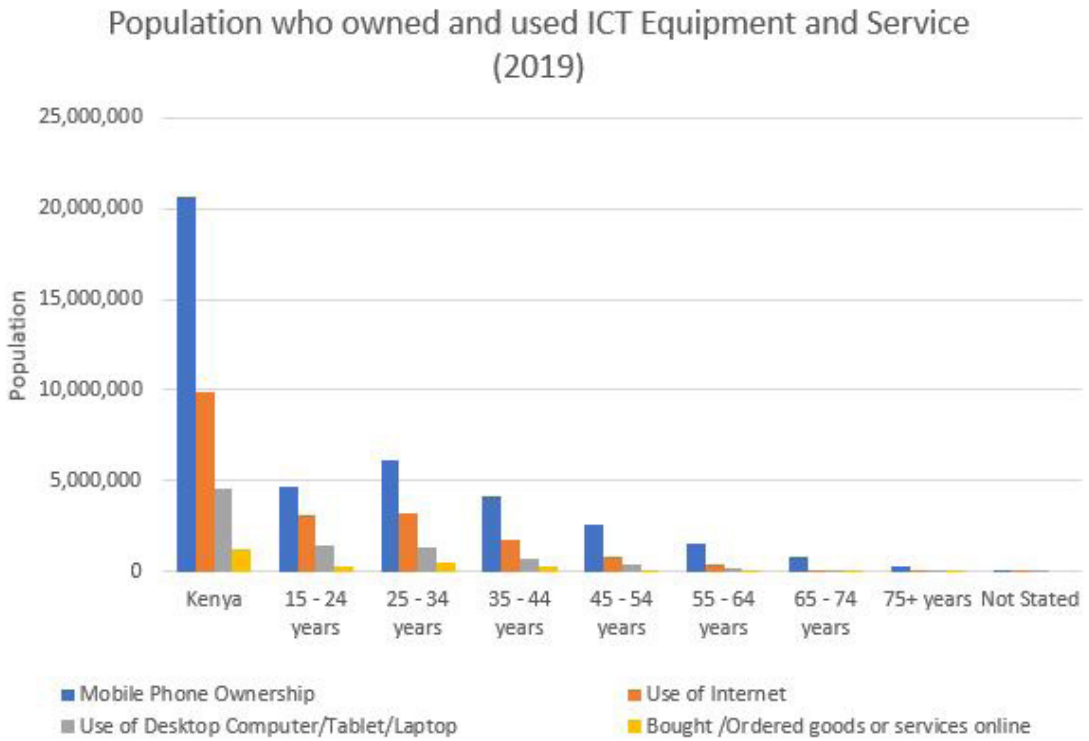
Source: 2019 Kenya Population and Housing Census, Kenya National Bureau of Statistics

5.3.3 Limited usage across age segments

Household data (Fig 22) illustrates the extremely low occurrence of online searching/ordering with 3% of the population searching or ordering goods or services online. In all the age groups, digital transactions are significantly low even among mobile phone owners by a ratio of 12 phone owners to one digital transaction. Given that some of the phones are not smartphones, the incidences are still low.

Internet users are more predisposed to digital transactions with one in every six internet users having searched or ordered goods/services online. Those who have invested heavily in ICT i.e., through a desktop, tablet and/or laptop are more predisposed to digital trade with one in three owners having transacted online.

Fig 23: Demand side ICT ownership and use (2019)



Source: 2019 Kenya Population and Housing Census, Kenya National Bureau of Statistics

In general, the numbers transacting online are still extremely low. The highest prevalence of digital trade observed is at 7% for the 25 – 34 age segments as of 2019. This a segment of working youth who are engaged in economic activities. They also have the highest penetration of internet use, high phone penetration rate at 84% and the highest users of the internet for digital trade at one user for every six internet users.

There is therefore a huge opportunity to expand digital trade even with the current ICT infrastructure.

5.3.4 Persons with Disabilities (PWDs)

No data is available on ICT access and challenges for those who are differently abled. They however need ICT services like the rest of the population in line with Constitutional provisions.

Summary

This Chapter explores the symbiotic relationship between service providers and consumers, and the role consumers play in the industry. Market competition has been driven by consumers who have also influenced coverage, cost reduction and innovation to increase services provided to fulfil consumer needs. In cases where competition was ineffective, the regulator has in the past enforced measures to regulate the market, these methods have been highlighted in this document. The convergence of services and regulators has also been discussed herein to provide all-round support to consumers. Additionally, legislation and frameworks that are being developed to enhance oversight for operators within the digital economy including Digital Lending, and Taxi Hailing Service – The Traffic (Digital Hailing Service) Rules 2020 (Draft) are discussed in this Chapter.

Tackled within this Chapter is the varying extent of exclusion for various population segments (PWD's, rural population and gender) either through lack of access, digital literacy, affordability, relevance, awareness and the effects this exclusion has had especially with onset of the COVID-19 pandemic.

Recommendations

New regulators/regulatory frameworks are required to address unique areas that are currently unregulated as they continue to evolve. These regulators will need to establish measures to protect consumer welfare and regulate conduct of service providers. An example is the need for regulation for lenders who charge extremely high interest rates as they are unregulated. Other emerging areas include AI and its various applications e.g., autonomous driving, remote surgery etc

Special intervention measures by the government, private sector and civil society organizations need to be implemented to provide connectivity to disadvantaged population segments including rural communities, Persons with Disabilities.

Increased investment and awareness creation from government and private sector will ensure populations in the rural area have access to broadband coverage. As such, the consumers in rural areas will have the opportunity to access ICT and continue education, a disparity evidenced with onset of COVID-19.

CA to effect data segregation on ICT use especially on the gender, PWDs and population segments to aid policy action targeting those population segments.

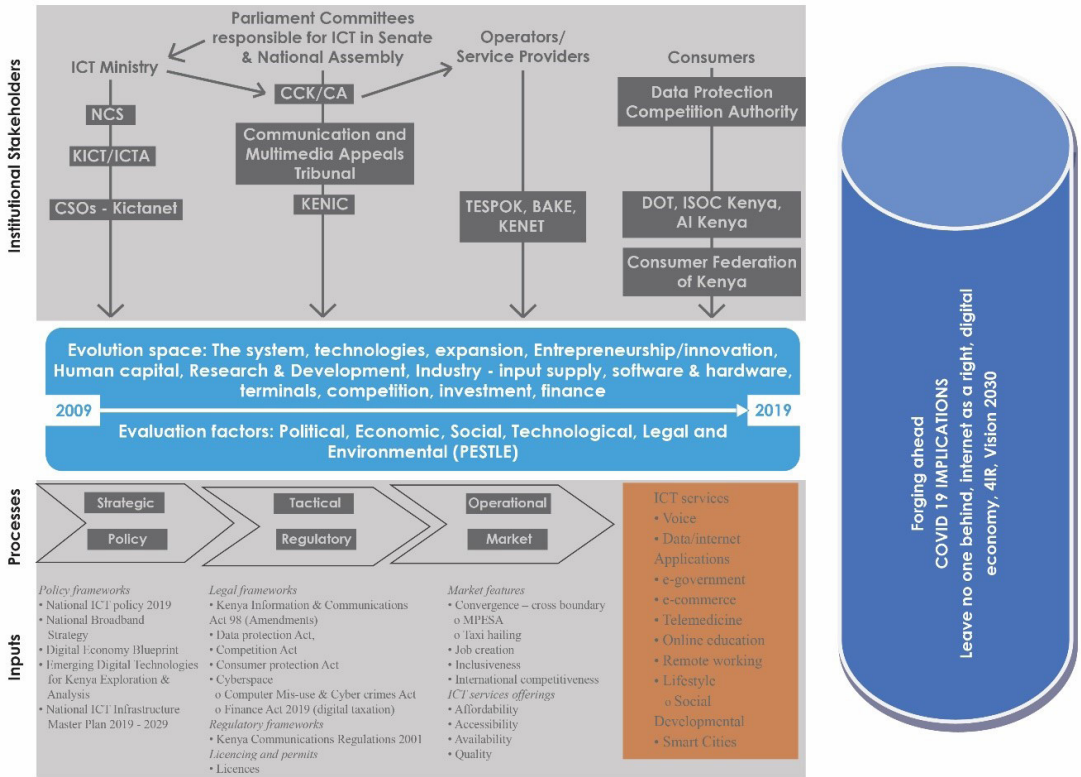
CA to spearhead massive digital literacy drive working with other stakeholders and importantly launch demonstration programmes of consumer opportunities in the digital economy. CA should leverage the experiences brought out by COVID 19 to place Kenya firmly in e-commerce applications, remote working, virtual conferencing, among others. COVID-19 was an awakening on ICT sector and the opportunity should not be lost.

6

6.0 Forging ahead into the future

Kenya has defined an ambitious pathway to harness the emerging opportunities in the cyberspace and the role of ICT to anchor the pathway. COVID-19 presents painful lessons on what infrastructure needs to be closed to create the appropriate foundation for the desired future.

Fig 24: Telecommunications ecosystem – Level 5



Source: Summit Strategies Ltd

Kenya is charting a path into the future broadly defined by Vision 2030 for a medium level country with high quality of life for its citizens. In charting this path, Kenya is also aware of the momentous development globally driving new technologies that affect it. From this perspective the ICT sector led by the Ministry responsible for ICT has continued its role to shape the future of Kenyans through

proactive policies and strategies that tap new technologies and wide scale implementation for its citizens. It is in this regard, that the Ministry of ICT launched the National Information Communications and Technology (ICT) Policy Guidelines gazetted in (2020)⁴¹, Kenya's Digital Economy Blueprint (2018), Distributed Ledgers Technology (DLT) and Artificial Intelligence (AI) Taskforce Strategy; anchored on universal broadband through National Broadband Strategy 2018-2022 and a government that is fully digital through the National ICT Infrastructure Master plan 2019-2029.

These frameworks promise a vastly improved future of opportunities and contribute to faster economic growth and inclusion. The ICT policy for example makes a bold promise to help deliver 20 Kenyan Multi-national ICT Companies, 300 Mid-sized Companies, 5,000 Small and Medium Enterprises and 20,000 Start-ups by 2025. Kenya's Digital Economy Blueprint, DLT and AI taskforce seek to position Kenya as globally competitive by exploiting emerging digital technologies and positioning it as a leader in 4IR. This chapter describes the envisaged roadmap from a foundation that has been radically shaken by COVID 19.

6.1 COVID-19 disruptions and the lessons

COVID-19 was a wake-up call and fast-tracked evolution of ICTs and its applications in all spheres of life. The pandemic laid bare the underlying chasm in ICT infrastructure and specifically the great disparity and inequality in our society. COVID-19 was abrupt and there was no time to prepare. All stakeholders on the supply side as well as demand side were unprepared. On the supply side, the planning paradigm was upset overnight from the following perspectives:

- Telecommunications traffic shifted from central commercial centres to residential areas following a call for people to work from home.
- New applications were rapidly launched in the network – education, social, spiritual and government services to conform to the Ministry of Health guidelines on physical distancing.
- Online commercial transactions increased in response to stay at home requirements.

This cumulatively resulted in a huge spike in data traffic of up to 50%⁴². In response, CA indicated its willingness to support and avail additional spectrum to operators to ensure continuity and quality of service is not compromised. Kenya's innovation prowess is called upon not only to address the challenges exposed by COVID-19 but also build a digital economy and take Kenya towards 4IR.

6.2 Innovations in the ICT ecosystem and applications

Overall, Kenya continues to support a robust innovation environment overseen by the Kenya National Innovation Agency (KNIA). This supports an enabling environment for a vigorous front and back end capacity development for Applications (Apps) development, websites and hosting spawned by

⁴¹THE KENYA GAZETTE Vol. CXXII—No.150, GAZETTE NOTICE NO. 5472 dated 7th August 2020

⁴²Inside Telkom Kenya corona resilience plan – Business Daily – <https://www.businessdailyafrica.com/corporate/companies/Inside-Telkom-Kenya-corona-resilience-plan/4003102-5552926-opfyl4z/index.html>

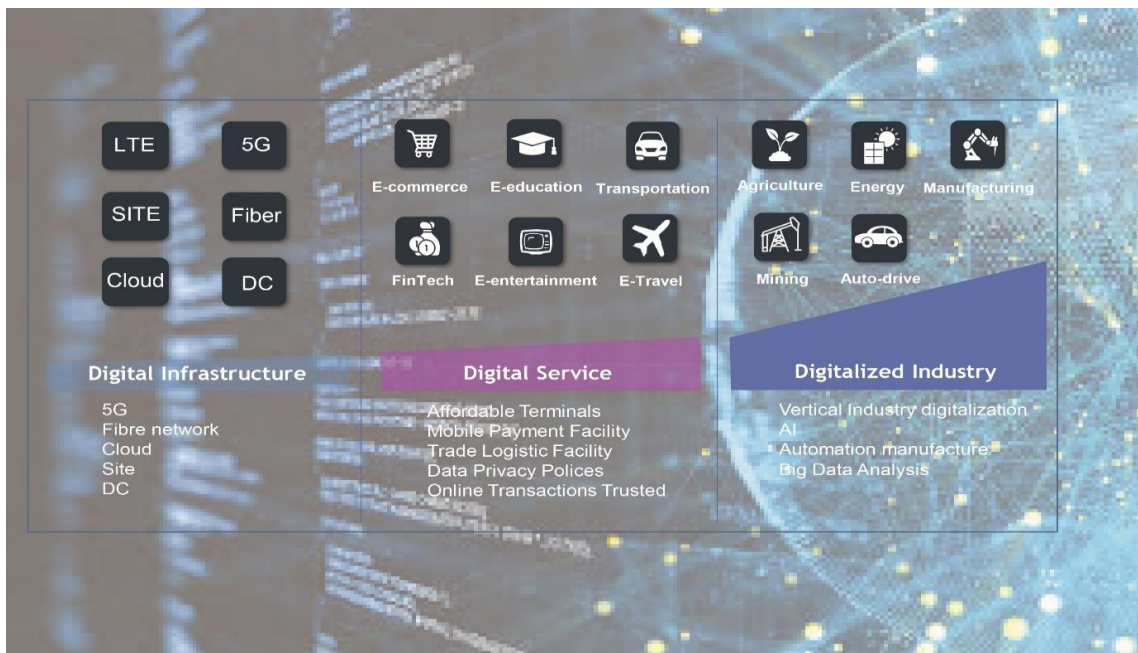
numerous innovation hubs within and outside universities. Many of the applications support various aspects of digital transactions including digital payments.

Digital payments and credit for digital transactions are among the most advanced applications pioneered by MPESA. As at the date of the research for this report, Kenya has over 50 digital lenders under the umbrella of the DLAK. Regulatory framework is under development to best harness the benefits from the membership. This locally driven innovation and global momentum is ushering Kenya towards 4IR and a digital economy.

6.3 Kenya in the Fourth Industrial Revolution (4IR) era

4IR is a progression of the earlier revolutions witnessed in other regions and is premised on the fusion of physical, digital and biological technologies as first proposed by Klaus Schwab, Founder and Executive Chairman of the World Economic Forum in 2014, and brings numerous benefits to the society⁴³. Technologies are based on access and processing of huge volumes of data to support 4IR and include, AI, Big data, Internet of Things (IoT), cloud computing, high speed connectivity on 5G, and DLT in particular Blockchain. These technologies are applied in areas such as robotic applications and unmanned autonomous vehicles (UAVs) (Fig 25). Kenya seeks to not only align itself but take advantage of emerging 4IR and in this regard, the Ministry of ICT launched a taskforce to define how Kenya can leverage DLT and AI for its development in 2018.

Fig 25: The pathway to 4IR



Source: Huawei

⁴¹THE KENYA GAZETTE Vol. CXXII—No.150, GAZETTE NOTICE NO. 5472 dated 7th August 2020

⁴³See a detailed discussion on 4IR and implications to society, governments, industry at <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

The Taskforce – The Distributed Ledgers Technology and Artificial Intelligence Taskforce – proposed several strategies to guide Kenya on a roadmap towards 4IR leveraging DLT and AI namely:

1. Fast track development of a National Digital Infrastructure comprising of a government cloud, national digital ID, and national payment gateway as a platform to provide government services in real time and engage citizens in collaborative and participative governance.
2. Develop a Digital Asset Framework to enable cryptocurrency and other alternative currencies in anticipation of the Initial Coin Offering (ICO) – a type of funding that could catapult SMEs currently unable to raise funds through Initial Public Offering (IPO) at the stock market.
3. Introduce a Regulatory Sandbox for the FinTech Innovations as a tool to balance support for FinTech in the context of financial stability and consumer protection.
4. Explore and evaluate Digital currency (Digital fiat money) for adoption in Kenya in recognition of the demise of the traditional economy now undergoing transition and no longer possible to separate the digital age from the economy. Areas of interest include applications in payments, lending, and as alternative currency configurations.
5. Promote new and flexible forms of employment such as microwork and online contracting by Tokenisation of the Economy – Ajira Platform.
6. Build capacity and leverage AI to strengthen Cybersecurity on both data and systems.
7. Implement emerging technologies particularly Blockchain to strengthen Democracy and Election process.
8. Use Blockchain and AI to enable government deliver on Big 4 Agenda comprising of Universal Housing, Manufacturing, Universal Health and Food Security.

The taskforce focused on DLT (Blockchain) and AI as the tool for 4IR, other critical technologies including IoT and 5G are not considered but only mentioned in passing. No institutional infrastructure to guide the process and no implementation timelines and resources are presented and thus it will not be possible to monitor its realisation. The document by the taskforce is however detailed, bringing out emerging technologies for a national conversation.

In support of the pathway to 4IR, industry associations are promoting the journey including – AiKenya⁴⁵ focusing on democratising AI, promoting AI applications, and training. Another industry organisation active in this area is Blockchain Association of Kenya⁴⁶ promoting Blockchain applications. In 2018, CA had set out guidelines on use of IoT Devices, machine-to-machine-based devices as well as devices with embedded universal integrated circuit cards.

Kenya is among the pioneers to harness 4IR and other African countries have joined the bandwagon but through different approaches. In April 2019, South Africa launched a 4IR Presidential Commission⁴⁷ to shepherd the country towards 4IR. The Presidential Commission under the Ministry responsible

⁴⁴Emerging Digital Technologies for Kenya: Exploration and analysis <https://www.ict.go.ke/blockchain.pdf>

⁴⁵See AI Kenya <https://kenya.ai/>

⁴⁶See Blockchain Association of Kenya www.bak.or.ke

⁴⁷Presidential Commission on Fourth Industrial Revolution: Members and terms of reference – South African Government – <https://www.gov.za/documents/presidential-commission-fourth-industrial-revolution-members-and-terms-reference-9-apr>

for ICT brings together different stakeholders with a mandate to coordinate a national response to 4IR through policies, strategies and action plans to position South Africa as a leader in evolution of 4IR. As a precursor to the Presidential Commission, key stakeholders led by Telkom South Africa, and certain Universities among other stakeholders had established a platform to sensitise, promote, and bring together partnerships on 4IR. The platform 4IRSA Partnership⁴⁸ has been operational since 2018 and in July 2019 organised a national summit with the President as a keynote speaker. The two-pronged approach impressed the urgency of 4IR on South African journey.

Other countries with similar initiatives include Rwanda, Uganda, and Morocco.

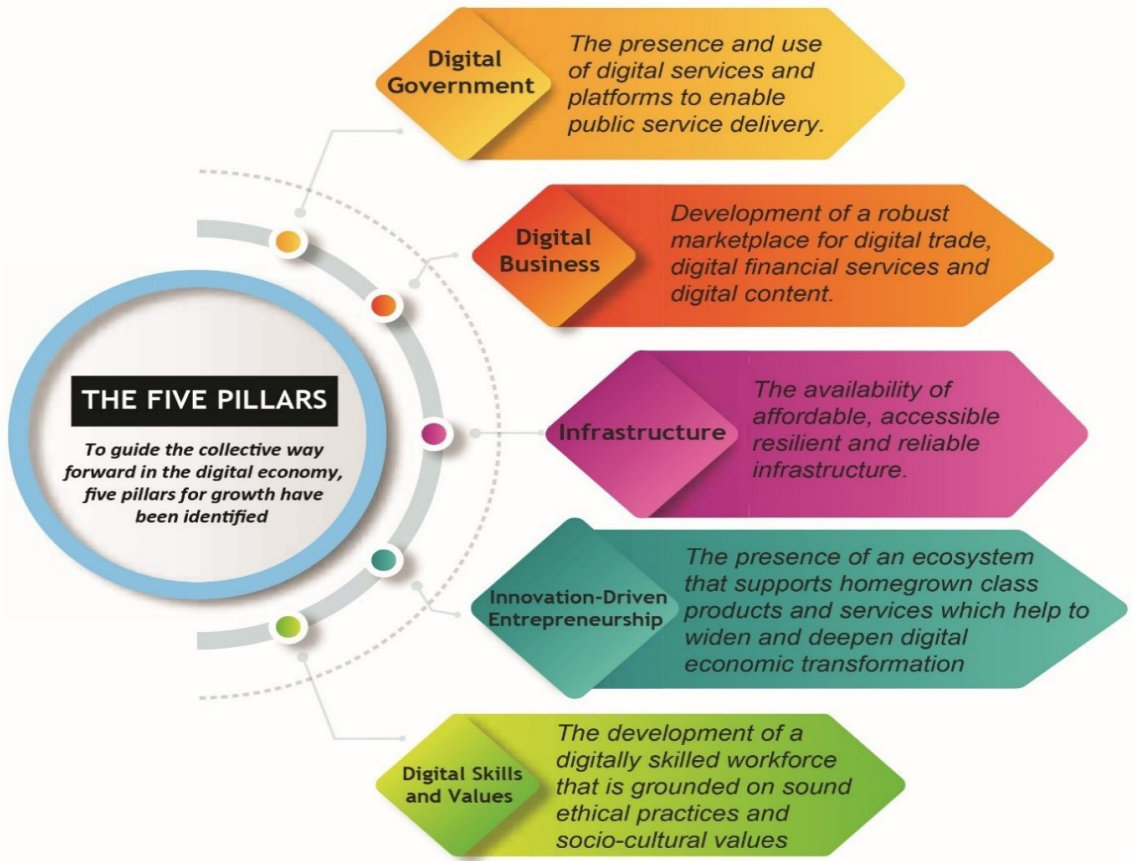
At regional level, African Telecommunications Union (ATU), Smart Africa Alliance, and African Development Bank (AfDB) is seized on 4IR and to ensure Africa is on course. In 2018, ATU established a special committee comprising of South Africa (Chair), Benin, Chad, Egypt, and Rwanda to develop an African response and a 4IR strategy. Intermediate findings have been incorporated in the AU DTS Africa 2020-2030, nevertheless its work is still ongoing as at the time of preparation of this paper. Smart Africa Alliance on the other hand invited South Africa to develop a reference framework for African countries. Similarly, AfDB undertook a study on the potential of 4IR in Africa. Its report published in October 2019 identifies vertical sectors aligned to its strategic focus as entry points for 4IR. The report also identifies the emerging technologies and encourages African countries to nudge the technologies as well as the outcomes. The additional technologies AfDB cites include drones, robotics, additive manufacturing, and 3D printing.

6.4 The Kenyan digital economy

The government has defined and prioritised the digital economy as an enabler for development and developed a framework for its realisation. This framework – Kenya Digital Economy Blueprint launched in 2018 and a draft Strategy in 2020 – is built around five pillars namely Digital government, Digital Business, Infrastructure, Innovation-driven entrepreneurship, and Digital skills and value (Fig 26).

⁴⁸4IRSA Digital Economy Summit <https://4irsa.org/>

Fig 26: Five pillars of Kenya digital economy blueprint



Source: Digital Economy Blueprint

Implementation and realisation of the pillars to propel rapid growth of the digital economy is the next phase. It should be noted that the pillars are not new but are evolving from the national evolution and proactive ICT policies pursued by the government in the past. This is the foundation that the government is building on to pursue the digital economy.

Kenya is acknowledged in its leadership on its innovation history. The government intends that digital economy is a driver contributing to the realisation of Vision 2030 and is a driver of economic growth. This effort leverages on the AU DTS 2020-2030 and AfCFTA across Africa.

Under the new ICT policy, National Information Communications and Technology (ICT) Policy Guidelines 2020, the State projects to help create 20 Kenyan multi-national ICT companies, 300 mid-sized firms, 5,000 small and medium enterprises and 20,000 start-ups by 2025. This is expected to increase the number of start-ups by easing their barrier to entry. The policy also proposes a government venture capital fund that will invest in start-ups for a portion of equity on a first-loss basis in case the start-up fails.

In Africa, there are few outstanding government initiatives to support digital economy. The Mauritius government is leading the way to promote digital economy through innovation. In wide-ranging tax reforms announced in 2019–2020 national budget proposals, the government offered a 5-year tax holiday for start-ups or companies setting up e-commerce platforms and incorporated before June 30th, 2025. Included in the package, is peer to peer lending companies established before December 31st, 2020. Innovation on intellectual property rights from Mauritius developed after June 2019 were also targeted with an 8-year tax holiday.

At regional level, African Union Commission (AUC) is promoting an enabling environment that fosters a rapid evolution of the African digital economy. Accordingly, AUC has developed the Digital Transformation Strategy for Africa 2020-2030 (AU DTS) with a key focus to stimulate an enabling environment for the growth of broadband infrastructure as a foundation for digital economy to realise a Single Digital Market (SDM) by 2030. To anchor the journey to SDM, AUC developed a trust and security framework – AUC Convention on Cybersecurity and Personal Data in 2014 (Malabo Convention) – to ensure trust and security online. The Convention defines the scope of digital trade and goes ahead to create structures for secure personal data and framework to address challenges of trust. It imposes obligations on Member States to establish legal, policy and regulatory measures to promote cybersecurity governance and control cybercrime in the quest for a framework for promoting regional cyber stability. The Convention however has not yet marshalled the requisite ratifications to enter into force. Kenya has yet to ratify and given Kenya's pre-eminent position as a leader in ICT, its ratification can propel other nations to ratify for Malabo Convention to come into force.

In support of AU's DTS, Smart Africa Alliance, the World Bank and European Union (EU) launched initiatives targeting different but complimentary components of the African digital economy.

Smart Africa Alliance invited Kenya to take leadership in digital economy and in that role develop a reference framework for African countries in their quest to digital economy. The Kenya Digital Economy Blueprint is the response and is Kenya's contribution to the realisation of digital economy at national level across Africa.

World Bank launched Digital Economy for Africa (DE4A) in 2019 and has identified key focus areas to grow Africa's Digital Economy namely digital infrastructure, digital financial services, digital platforms, digital entrepreneurship, and digital skills to digitally enable every African individual, business, and government by 2030. In its report *Connecting Africa Through Broadband: A Strategy for Doubling Connectivity by 2021 and Reaching Universal Access by 2030*, WB indicates that Africa requires a USD100 Billion (Ksh. 10 Trillion) fund to realise this objective. This calls for collaboration among many partners from government, private sector and multilateral agencies.

In the same quest, EU – AU Digital Economy Task force has developed a framework to work with AUC and targets the following areas for support – universal access to affordable broadband, essential

⁴⁹Connecting Africa Through Broadband: A strategy for doubling connectivity by 2021 and reaching universal access by 2030 https://www.broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica_Report.pdf

skills to enable citizens thrive in digital age, improved business environment to boost digitally enabled entrepreneurship, and accelerated adoption of e-Services.

These initiatives among others give Kenya an opportunity to benchmark in the quest of the national digital economy and shape 4IR for Kenyans.

Summary

This final chapter reviews the direction the telecommunications sector as a cornerstone for digital economy and 4IR, and the lessons learnt during COVID-19 to better build a foundation for Kenya's way forward. The Chapter explores the emerging 4IR and the digital economy and possible scenarios for Kenya predicated on the policy choices pursued. In the end, MoICT is very proactive to entrench Kenya as a key player in the cyberspace . This commitment is illustrated through proactive policies and strategies led the Ministry such as the National Information Communications and Technology (ICT) Policy Guidelines gazetted in (2020), Kenya's Digital Economy Blueprint (2018), Distributed Ledgers Technology (DLT) and Artificial Intelligence (AI) Taskforce Strategy, National Broadband Strategy 2018-2022, and the National ICT Infrastructure Master plan 2019-2029. These policies highlight a pathway to a competitive nation in the cyberspace.

New opportunities and challenges are always evolving, and the Chapter discusses steps being taken to support and encourage innovation through Kenya National Innovation Agency (KNIA) and other institutions. The steps being taken are to ensure Kenya is not just ready but a leader in the emerging 4IR and the digital economy.

Recommendations

The Distributed Ledgers Technology and Artificial Intelligence Taskforce proposed a need to fast track development of a National Digital Infrastructure, Digital Asset Framework, Regulatory Sandbox for the FinTech Innovations, Digital currency (Digital fiat money), new and flexible forms of employment, build capacity and leverage AI to strengthen Cybersecurity, and implement emerging technologies. Other critical technologies which were mentioned in passing are just as critical and need to be prioritised. Importantly, after developing these important frameworks for digital economy and DLT & AI, it is imperative to create a high level focused institutional infrastructure fully empowered to be the focal point. Countries that seek to establish leadership in the 4IR have instituted a Presidential Commission with a wide and appropriate mandate.

MOICT to take leadership to ensure Kenya ratifies African Union Convention on Cyberspace Security and Protection of Personal Data (Malabo Convention). This provides cybersecurity framework in support of the Africa Continental Free Trade Area (AfCFTA) being launched on January 1st, 2021 to which Kenya wish to take leadership in harnessing the opportunities.



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