

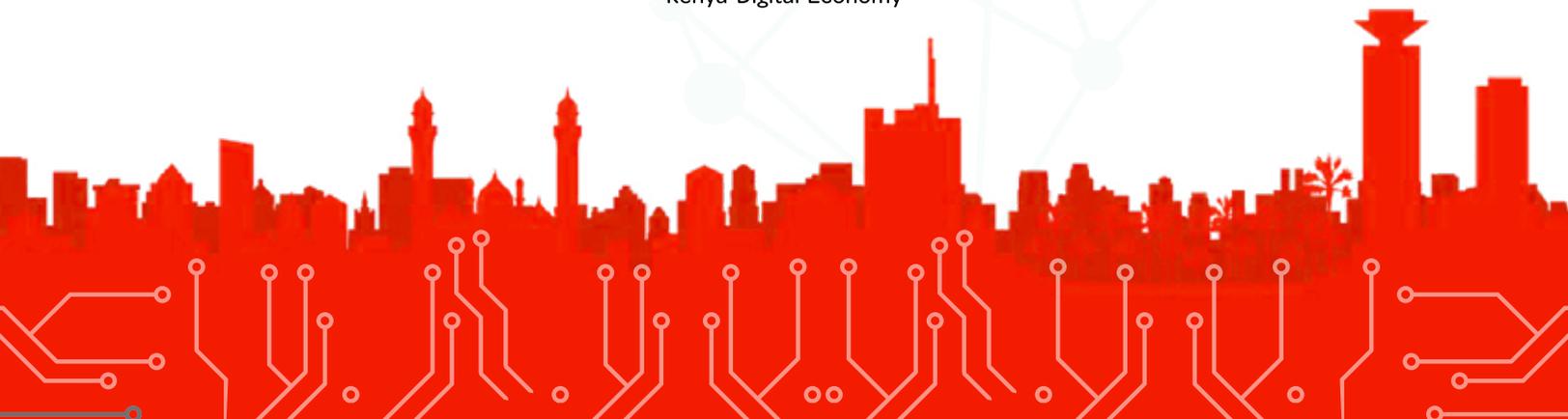
REPUBLIC OF KENYA

DIGITAL ECONOMY BLUEPRINT

POWERING KENYA'S TRANSFORMATION



Kenya Digital Economy







Kenya Digital Economy

DIGITAL ECONOMY BLUEPRINT

POWERING KENYA'S TRANSFORMATION





Kenya Digital Economy

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Kenya Digital Economy

VISION AND MISSION

VISION:

A digitally empowered citizenry, living in a digitally enabled society.

MISSION:

A nation where every citizen, enterprise and organization has digital access and the capability to participate and thrive in the digital economy.



Kenya Digital Economy

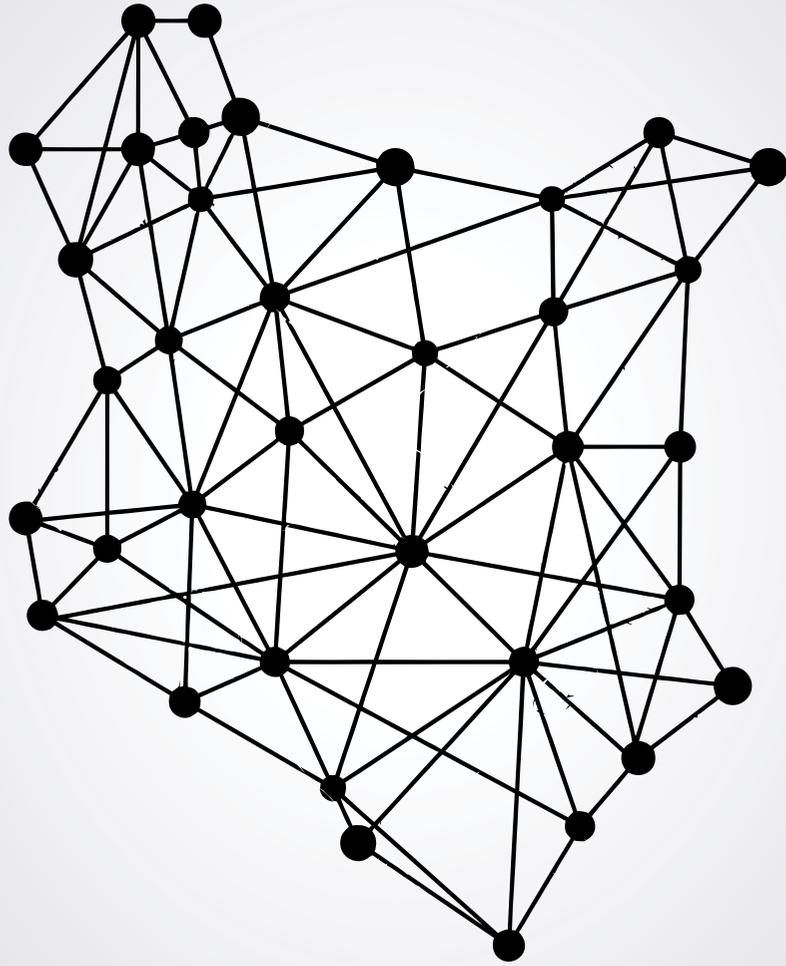
ACKNOWLEDGEMENTS

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Comprehensive national stakeholder consultations were undertaken in preparing and finalizing the Blueprint. The team conveys its gratitude to our colleagues from the Ministry of ICT; The Ministry of Trade, the Ministry of Education, The National Treasury, Communication Authority of Kenya

(CA), Konza Technopolis Development Authority (KoTDA), Postal Corporation of Kenya, The Central Bank of Kenya and The Kenya Revenue Authority.

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H.E. HON. UHURU M. KENYATTA, CGH
*President and Commander-In-Chief of the
Defence Forces of the Republic of Kenya*

FOREWORD

In this growing digital world of ours, we face a future of immense possibilities. With every passing year, new technologies and services are emerging over the horizon. As digital technologies become the cornerstone of our daily activities, Governments, businesses and individuals must adapt to this new reality. Kenya has embarked on its digital transformation journey, to ensure that the digital economy benefits become our reality and it is our hope that all of Africa will walk this journey too.

Kenya is one of the world leaders in driving financial inclusion through the use of digital finance solutions such as M-PESA, Mula, PesaLink and Pesapal. The adoption of such innovations is facilitating transactions and spurring trade for corporations, small and medium enterprises (SME's) and individuals. This in turn translates to improved and efficient business environments, increased accessibility, connectedness and better standards of living. In the same token my Government has adopted technology that is leading to faster and efficient services to the people.

Kenya however, has much more to offer and gain from the digital economy. To harness these benefits, we have to build ecosystems that facilitate digital transactions nationally, regionally and globally. Towards this end, Kenya has developed this document as a proposed framework for developing digital economies.

The Digital Economy Blueprint, presents a frame-

work to improve Kenya's and Africa's ability to leapfrog economic growth. We propose five pillars as foundations for the growth of a digital economy. The pillars are: Digital Government; Digital Business; Infrastructure; Innovation-Driven Entrepreneurship and Digital Skills and Values. The Blueprint also highlights the cross cutting issues that need to be considered for the success of a digital economy.

This Digital Economy Blueprint serves as one of Kenya's contributions in championing the growth of an african-wide digital economy for all of Smart Africa Alliance members. It is our hope and wish that all the member states shall peruse this Blueprint and find value in adapting it within their own ecosystems to realize the potential of digital transformation that will leapfrog our economies to prosperous heights.

H.E. HON. UHURU M. KENYATTA, C.G.H.

President and Commander-In-Chief of the Defence Forces of the Republic of Kenya





PREAMBLE

Worldwide, digital technologies are quickly changing the way we conduct business, a situation we could not foresee only a generation ago.

In tandem with our economic Blueprint the Vision 2030 which is being accelerated through the implementation of the Big Four Agenda, we must seize the significant socio-economic opportunities that digital technologies bring.

Businesses are improving their productivity buoyed by both adoption and adaption of new technologies through e-government and financial services, among others. Notably, the digital financial services have accelerated financial inclusion countrywide, improving e-commerce output and safety, while enhancing our competitiveness globally.

New industries are being created a variety of new products and services, both for the Kenyan and the increasingly accessible global market. The adoption of new technologies is also creating well-paying jobs for professionals of diverse backgrounds, translating into improvement in quality of life, increased connectedness and other auxiliary benefits to citizens.

This Digital Economy Blueprint sets out the opportunities and challenges in maximizing the benefits on offer. It highlights the significant work already happening across Government, private sector, civil society, businesses, academia among others and identifies further action required to ensure all Kenyan citizens and residents can thrive in a global digital economy.

This blueprint has been developed with every Kenyan in mind, from the rural to urban centers, ‘mama mbo-gas’ to masons to accountants to traders. Every citizen will benefit and find value in the proposed strategies set out, and I encourage you to take advantage of the myriad opportunities that will arise from the realization of a true digital economy. In line with the goals set out in Vision 2030. This digital economy will connect you to the world, your goods, services and expertise will be accessible across borders, opening up markets and catapulting Kenya to join 1st world markets where citizens benefit from direct access to global markets.

To reap these benefits that new digital technologies provide us we will ensure that no-one is left behind, and for that we must work together. The Government will continue to engage with all Kenyans to ensure that we are forward looking but also flexible and responsive as new opportunities and challenges arise.

It would be Kenya’s pride if other member countries would peruse this Blueprint and find value in adapting it within their own ecosystems to realize the potential of digital transformation that will propel all our economies to tremendous heights.

HON. JOE MUCHERU, EGH

Cabinet Secretary, Ministry of Information, Communications and Technology

EXECUTIVE SUMMARY

This Blueprint seeks to provide a conceptual framework adopted by Kenya in its quest towards the realisation of a successful and sustainable digital economy. It commences with a brief overview of the digital economy ecosystem, then proceeds to evaluate some of the currently held definition of the digital economy by relying on a much broader concept.

The Blueprint defines the digital economy as “the entirety of sectors that operate using digitally-enabled communications and networks leveraging internet, mobile and other technologies” irrespective of industry.

The document proceeds to highlight the importance of investing in a digital economy, where some valuable statistics are provided on the relative value of global investments in mobile services systems mainly within financial markets, e-commerce platforms, among others. Adoption of the Digital Economy framework offers countries like Kenya opportunities to leapfrog and join nations in the First World and actively contribute to the global economy.

The Blueprint identifies the five pillars of the digital economy, that are described under the headings, Digital Government, Digital Business, Infrastructure, Innovation-Driven Entrepreneurship and Digital Skills and Values.

Each of these five pillars is comprehensively explored, complete with illustrative tables. The description of the pillars is followed by proposed implementation ideas that include, creating a regulatory framework for investments and innovations, encouraging smart society and networks, strengthening privacy and data

protection, enabling new business models for micro and small enterprises and striving for excellence in digital technology research and innovative ecosystems.

Defining what constitutes the digital economy has proven problematic, as it is becoming increasingly difficult to distinguish between the digital and cash economy as the use of technologies becomes more commonplace.

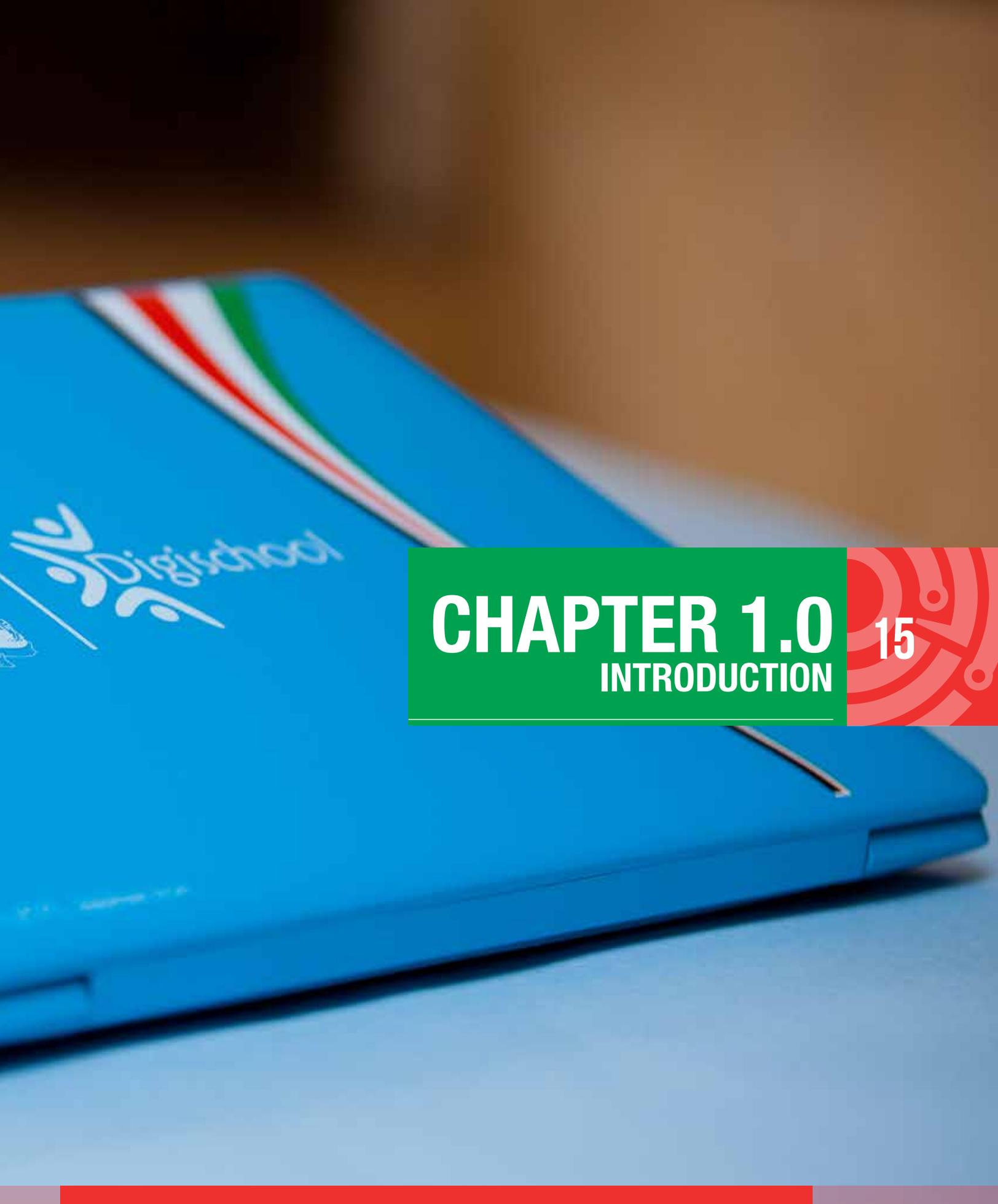
Economies of most countries are managed and underpinned by digital technologies, it would be impossible to imagine a modern stock exchange or a central bank without computers. The dominant paradigm of the digital economy is the multi-sided platform characterized by digitally mediated transactions between global complementary groups. The complements may be buyers and sellers (Masoko by Safaricom), riders and drivers (Mondo Ride, Little Cab), content producers and subscribers (Waabeh, Mdundo) and myriad other complementary groups. The significant value is captured by the platform owners, more of which we want in Africa.

For Kenya, a Digital Economy will therefore be premised on ubiquitous provision of universal broadband access that will drive digitally enabled services for a digital people and economy. Universal access initiatives have provided enabling infrastructure and frameworks to connect every Kenyan and every Government/public facility such as hospitals, schools, police stations and prisons.



Kenya Digital Economy





CHAPTER 1.0

INTRODUCTION

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Kenya Digital Economy

1.0 INTRODUCTION

1.1 FOUNDATION OF THE DIGITAL ECONOMY

Digital Economy has gained substantial importance within the global economy as a driver of innovation and competitiveness. As part of the global village, this new ecosystem presents a unique opportunity for our economic growth. As digital technologies become the cornerstone of our daily activities, Governments, businesses and individuals must adapt to this new reality. Going digital is no longer simply part of how we conduct our day-to-day activities but the bedrock of our economic growth.

The Digital Economy is growing faster than overall economies especially in the developing countries. Evidence shows that information and communications technologies (ICTs) account for 17% of GDP growth in developing countries (*World Bank 2016*). The fastest growth of e-commerce is in the global South (*UNCTAD 2015*) and the Internet economy in developing economies is growing at 15-25% annually” (*WEF 2015*).

The economic/business models that are shaping the modern digital ecosystem are the sharing economy, gig economy and the platform economy. An early promise of the internet was disintermediation. It was hoped that when everyone was on the internet, there would be no middle man and buyers and sellers could interact directly. This removal of arbitrage would hopefully lead to increased trade efficiencies, improved competition, lower costs, increased transaction volumes and an overall better economy. The one

thing that was not immediately clear was that the vast number of actors would make finding products and services harder, hence the prominence of search and “findability” as a key determinant of online success.

Completing a trade transaction online requires three components: trust (escrow), payment and fulfillment. These three components have hitherto been provided as services to online providers by third parties, hence significantly increasing the complexity of the transaction dynamics of online commerce while lowering the anticipated benefits of disintermediation. Platforms are online markets that provide automated matchmaking between the supply and demand sides which facilitate end-point identification and rating, as well as pre-engineering of fulfillment and payment.

Digital Economy policies and the underlying frameworks have become commonplace within Nation States that seek to transform their overall economic outlook. Their main focus then becomes identification of digital ecosystem enablers that are necessary to transform a country. This practice has been adopted by organisations like International Bank for Reconstruction and Development (the World Bank), which has identified five digital pillars: digital infrastructure, digital skills, digital financial services, digital platforms and digital entrepreneurship.

1.2 WHAT IS A DIGITAL ECONOMY?

There is no universally accepted definition of the term

digital economy. However, a most common, albeit somewhat narrow understanding is the internet-based economy or the share of Gross domestic Product (GDP) accounted for by the Information and Communications Technology (ICT) sector. There exist multiple definitions of a Digital Economy. The European Commission defines the digital economy as “an economy based on digital technologies.” The World Economic Forum and the Group of Twenty (G20) define the digital economy as “a broad range of economic activities comprising all jobs in the digital sector as well as digital occupations in non-digital sectors”. These include activities that use digitised information and knowledge as the key factor of production; modern information networks as an important activity space; and ICT to drive productivity growth and optimise economic structures.

This Blueprint relies on a much broader concept and defines the Digital Economy as “the entirety of sectors that operate using digitally-enabled communications and networks leveraging internet, mobile and other technologies”. Digital technologies have been deployed in different parts of national economies for decades, notably in communications networks, but it was the Internet and Internet Protocol (IP)-enabled networks that created a universal platform to form the foundation of the digital economy for all sectors. The distinction between the internet economy and the digital economy (though the terms are often used interchangeably) rests on the difference in sectoral impact: Internet economy “refers to the economic activities, inputs, outputs and employment directly associated with the use of the Internet.” Conversely, the digital economy relies on enhanced interconnectivity of networks and the interoperability of digital platforms in all sectors of the economy and society to offer convergent services. For example, digital traffic can cross between telecommunications and banking networks as is the case in mobile financial payment applications such as MPESA, Airtel Money, T-Kash and Equitel Money that enable transfer of funds among customers

and merchants using various mobile network service providers and financial institutions, as well as the mobile banking applications and Unstructured Supplementary Service Data (USSD) offerings.

The important elements for which consensus has been reached is that the core of the digital economy that is domiciled in the ICT sector extends to the economic output derived primarily from advancements in Internet and digital technologies. This includes outfits with a business model based on digital goods, services and applications onto organisational and social processes. The latter includes the platform economy, the Gig and Sharing economies. In developing a Digital Economy Blueprint, it is important for the ecosystem to be broadly defined to cover all digitally-enabled economic activities. The opportunities presented by digital technologies are not constrained to technology-based companies and start-ups, but can add value across all parts of the economic terrain.

The foundation for public service delivery through leveraging of ICT is where ICT use is deeply integrated into every operation of government. This leads to more efficient and effective, “next-generation” government. Unfortunately, this is an area where African governments are lagging behind. ICT penetration and usage by many African governments is low.

Today, fast-evolving technologies have the potential to transform the traditional way of transacting across all functions and domains of government as well as the ways in which ICTs offer governments an unprecedented opportunity to achieve sustainable development and improve the well-being of their citizens.

1.3 INVESTING IN THE DIGITAL ECONOMY

In 2017, mobile technologies and services generated 7.1% of GDP or US\$110 billion in Sub-Saharan Africa.² According to the Kenya National Economic Survey report of 2019 the value of the ICT sector expanded by 12.9% from Ksh. 345.6 billion in 2017 to

¹ Bukht, Rumana/Heeks, Richard (2017): Defining, Conceptualising and Measuring the Digital Economy. Development Informatics Working Paper Series No. 68. Manchester.

² <https://www.gsma.com/mobileeconomy/sub-saharan-africa/>

Ksh 390.2 billion in 2018, driven by growth in the digital economy.

The rapid adoption of new and emerging technologies in emerging markets and economies in transition is evident in global mobility trends. Statistics from the International Telecommunication Union (ITU) estimate that there are about 5.3 billion mobile subscribers globally with about 73% (3.8 billion) located in the developing world. In Kenya, the penetration rates of the mobile telephony services as measured by subscriptions per 100 inhabitants surpassed the 100 percent mark to stand at 106.2 percent as at December 2018³. The penetration level of more than 100 per cent is attributed to the multiple SIM cards ownership in the country.

Firms use digital platforms to offer commercial products and services such as e-commerce (e.g. Amazon, Alibaba, Jumia), search engines (e.g. Jumia, Masoko by Safaricom), content platforms (e.g. Mdundo, irokovtv, Waabeh) or ride-sharing applications (e.g. Mondo Ride, SafeBoda, Little Cab). A digital marketplace helps create economies of scale and capitalises on the network effects of digital products or services to strengthen a country's competitive edge. This is particularly relevant in context of a digital economy, where tech start-ups have the potential to scale up and capture market share.

Mobile money platforms and infrastructure continue to drive financial inclusion in developing countries and was able to double the number of accounts to

21% between the years 2014-2017 in Sub-Saharan Africa⁴.

The digital revolution has spurred the development of a small but rapidly growing digital sector, with innovative entrepreneurs launching new digitally-enabled services while creating 21st century jobs. More significantly, digital technologies are gradually driving productivity gains in traditional industries through value addition in business processes.

1.4 OPPORTUNITIES TO LEAPFROG

A digital economy offers Kenya a leapfrogging opportunity on economic development. Exploitation of opportunities that are inherent in disruptive technologies can see Kenya emerge from a low middle-income economy to an emerging markets/advanced economy. Disruptive technologies such as Artificial Intelligence (AI), robotics, Block Chain, drones, internet of things, big data, and software-enabled industrial platforms have great potential for impact on economic development. Kenya's M-Pesa disrupted the financial sector and significantly increased financial inclusion as well as opening up the possibilities of new business models and opportunities like PayGo, digital credit, and (for better or worse) mobile betting. The graphic in Figure 1 below shows that mobile banking has continued to grow substantially to reach the unbanked. It is evident from the financial sector that Kenya needs to seek out appropriate innovations that will help disrupt entire industries, increase economic growth and reduce poverty.

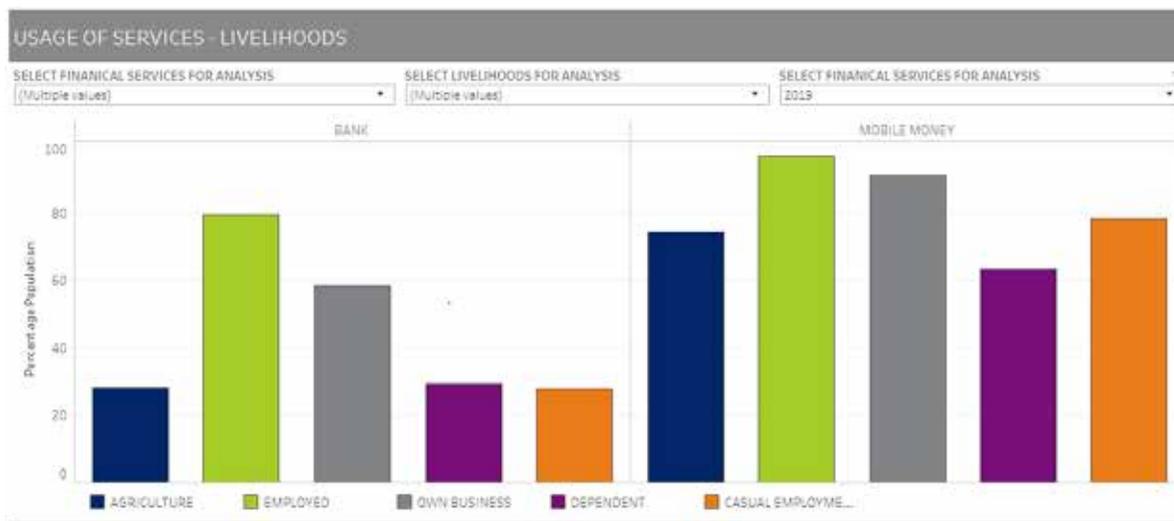


Figure 1: Growth of mobile banking in Kenya in various sectors of the economy

With a well-functioning digital economy, Kenya can achieve economic growth, reduce poverty and ensure all her citizens have the basic needs (food, clothing and shelter). A digital economy will offer new job opportunities for the youth, growth of Micro, Small and Medium Enterprises (MSMEs) and for the majority of the Kenyans who are farmers, the digitisation of the agricultural sector offers new opportunities through innovations that upscale the agricultural value chain. Trade platforms that bring farmers closer to the traders by reducing the number of middlemen between farm and plate. Another benefit to be garnered from a digital economy is precision agriculture.

Today, fast-evolving technologies have the potential to transform the traditional way of doing things across all functions and domains of government as well as the ways in which ICTs offer governments an unprecedented opportunity to achieve sustainable development and improve the well-being of their citizens.

1.5 RATIONALE FOR DIGITAL ECONOMY

1.5.1 Socio-cultural

Worldwide, political leaders face an era of unprecedented change. The manner in which citizens interact

with their governments, their expectations of government and their interactions with each other have been revolutionised by globalisation, social media, internet access, rapidly evolving behavioral norms and new previously undiscovered psychological vulnerabilities. The advent, as it were, of the Fourth Industrial Revolution as it is characterised, has led to a significant fracture in the structure of the economy which has in turn led to a growing dearth of jobs. The economy has gone digital.

Government has a critical role to play in the creation, establishment and promulgation of a digital economy, first as an orchestrator of the national ecosystem, as a controller of significant natural and monetary resources and finally as the indicator of preferred direction to the private sector. The creation of a digital economy is a whole-of-government effort - requiring articulation, consensus and the use of political will.

Government holds the key to unlocking the third party provision of services, reducing operational and transactional friction in the ecosystem, while facilitating innovation around digital services and opportunities. Government digital platforms come in a wide array of shapes and sizes, some of which are:

1.5.2 Political Rationale

Worldwide, political leaders face an era of unprecedented change. The manner in which citizens interact with their governments, their expectations of government and their interactions with each other have been revolutionized by globalization, social media, internet access, rapidly evolving behavioral norms and new previously undiscovered psychological vulnerabilities. The advent, as it were, of the Fourth Industrial Revolution as it is characterized, has led to a significant fracture in the structure of the economy which has in turn led to a growing dearth of jobs. The economy has gone digital.

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1.5.2.1 Whole-of-government Platforms:

This is a single extensible platform on which all government services are built. Typically, this means that citizens only have a single place to go to get any and all government services. Government provides access to its platform to third parties so as to perform verification of identity and other services that only the government could provide. A classic example of this is the free and open source ALTINN platform built by Norway.

To achieve its objectives of improving public services, the Government must modernise and upgrade its internal ICT systems by digitising the working and functioning of the government as a foundation for and to accelerate digitised service delivery. Modernised internal government ICT platform is foundational to all aspects of a digital Government, whether it's external services or internal operations.

To deliver on all outcomes for a digital economy then using technology internally for government operations is the best place to start. Government investment in ICTs will lead to better, faster and more efficient services for the citizens. Digitising health records and automating processes will lead to improved health-care delivery. Agricultural information systems connecting government, farmers and agro-business will improve food security. Digitising land records will reduce fraud and unlock value. In addition, integrating ICTs in education increases skills base.

Immediate benefits can be realized by having optimised local data centres for reliability and reduced costs, a cloud-based infrastructure for flexibility and efficiencies and a unified communications and collaboration system for daily operations. There is also a need to securely identify and authenticate a government worker, citizen or business, providing the foundation for securing identities, protecting privacy and enabling trusted benefits and services. This should be implemented alongside a cyber-security framework to ensure security everywhere. Finally, the government needs to work with partners to ensure the continued stable functioning of all the ICT components.

1.5.2.2 Ecosystem Platforms:

In this platform model, Government acts as an ecosystem hub to provide services by itself and with third parties. Businesses and entrepreneurs can build service on top of the government platform to service citizen or human needs. An example is the "L'Emploi Store," ((derived from the French Pôle emploi, the public employment services agency) an open por-

tal where people can download employment-related Apps developed by Pôle emploi and third parties. Pôle emploi partnered with a third party to provide over 1,000 online courses to help the unemployed acquire marketable skills.

1.5.2.3 Crowdsourcing Platforms:

The Crowdsourcing platform is a collaborative and innovation-focused approach in which governments openly collaborate with citizens, companies, other government organisations or NGOs. In this approach, government serves as an orchestrator or hub for ecosystem collaboration, but with largely undefined roles for participants. This platform is best suited for countries in which new policy issues demand innovative problem solving with civil society.

The archetypical crowdsourcing platform, www.innocentive.com, pays a bounty for ideas and global expertise on highly complex issues. It is far cheaper to use bounty programs than to fund in-house research and development (R&D). More government types like the USAID Grand Challenge for fighting the Ebola epidemic or UNHCR's open platform, "UNHCR Ideas," which invites ideas for improving the lives of refugees are other examples worth emulating.

1.5.3 Economic Rationale

As more and more economic activities take place online, geography and place advantages disappear, local communities no longer sell to each other and formerly national businesses are thrust into competition with global players. It is vital that each country develops a vibrant digital economy lest it be swamped by fast moving global brands and companies.

1.6 ENABLERS FOR DIGITAL ECONOMY

Ease of doing business: Regulatory framework that facilitates start-ups and business operations.

Societal Readiness: A societal quest for efficiency, promptitude of delivery and timeliness of service. A

willingness to communicate fully the needs, characteristics and properties of goods and services, and the acceptance of those descriptions.

Consumer Protection: Mechanisms of ensuring protection of consumer rights in the digital domain and the fostering of a trustworthy environment online. This has both personal and regulatory dimensions.

Data Protection: Establishment of a clear legal and attendant regulatory institution responsible for data protection could provide a point of contact for the business community and the public, streamline rules, and avoid challenges and costs due to overlapping regulations.

Cybersecurity: The protection of the integrity of electronic and digital systems is a paramount concern in a digitally enabled economy.

Payments: Encouragement of online, electronic and digital payment systems that work satisfactorily.

Transport Infrastructure: Provision of mass movement of goods, distribution systems and effective insurance of goods in transit in order to provide timely fulfillment of orders.

Contract Enforcement: The enforcement of online contracts and agreements, and timeous resolution of conflict. Criminalization of cybercrime. Although jurisdiction may have comprehensive laws, the institutions that enforce the law need to be efficient and reliable.

Trust: A failure of trust in the integrated digital economy (government and private sector) - either in the managers, consumers, purveyors or regulators. A key consideration is the management of data. The question to answer is, do people trust how their data will be managed?

Digital Government: Improved service delivery that give citizens choice with personalised services designed around their needs with the focus being on:

- Customer-centrism : Citizens and Business
- Enhance interaction across a platform of public services
- Open public data sources
- Move rapidly away from outdated business models, management cultures, technologies and processes.
- Move from closed, top down, bureaucratic and paper based transactional services towards, online, integrated digital offerings, encouraging interaction between citizen and state.

Digital Governments manifest themselves in certain ways amongst which we have:

Invisible Government

Government services become seamless and painless for citizens to use. Commercial Services set the bar for Government Services delivery with private partnership replacing government operations.

Inclusive Government

Government needs to accelerate policy, legislation and trust i.e. inclusion of all citizens and businesses to help in transforming Government.

Improved decision and policy making

Government uses real-time data as a basis of decision making and Policy changes.

However, there is always the need to adjust the same for future trends i.e. sectorial, unemployment.

New business models

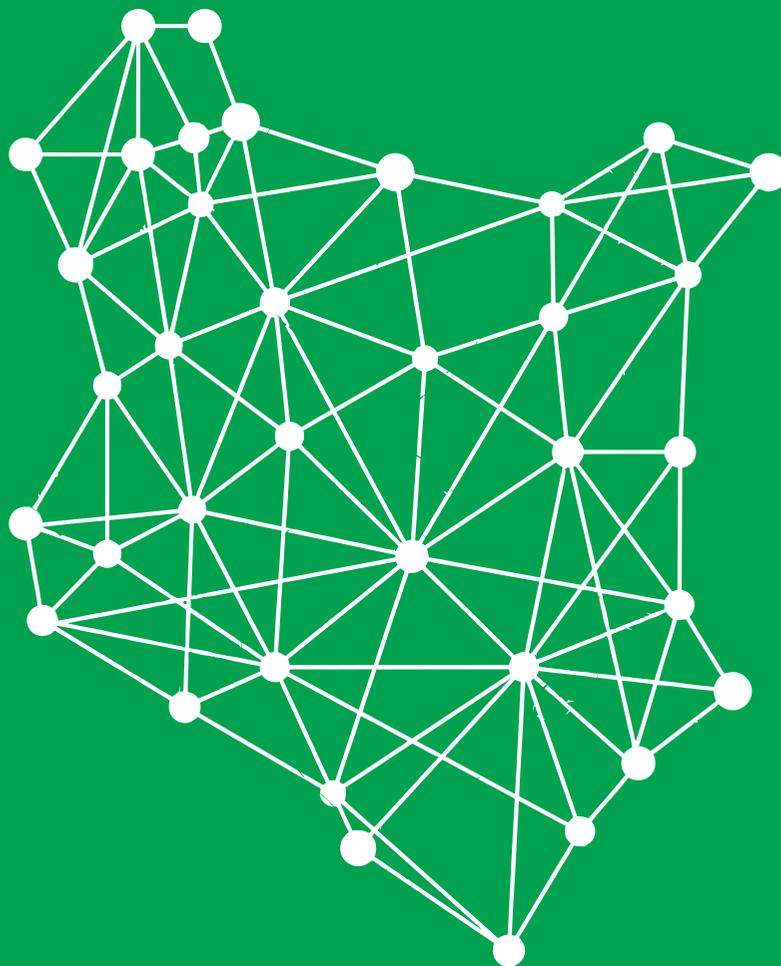
Advanced Technology will greatly impact Government on revenue and infrastructure spending. Technology will replace human jobs at a pace not seen before.

Digital Citizenship

The need for electronic ID will require massive changes to regulations, laws and citizen trust and culture.

“While e-government began with bringing services online, the future will be about the power of digital government to leverage societal innovation and resilience and to transform governance to better achieve the SDGs.”

Social media and mobile platforms are replacing traditional channels as a means to interact with government, report concerns and provide feedback. Mobile services, such as Apps and SMS, enable people to access the services they need in a more convenient and targeted way. These e-participation tools also encourage greater collaboration with citizens by involving them in decision making, policy setting, budget prioritisation, problem solving and the co-design of services.



Social media and mobile platforms are replacing traditional channels as a means to interact with government, report concerns and provide feedback.

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CHAPTER 2.0

PILLARS
OF THE KENYA DIGITAL ECONOMY

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Kenya Digital Economy

2.0 PILLARS OF THE KENYA DIGITAL ECONOMY

This Blueprint is based on the national priorities as articulated by Kenya Vision 2030 and the Big Four Agenda. The Vision 2030 aspires to make Kenya a globally competitive and informed society that effectively participates in the knowledge-based economy. The Vision identifies ICT as a key enabler in the achievement of economic pillars and a critical factor in driving the economic, social and political development in our country.

On the other hand, the Big Four Agenda, is an accelerated five-year development plan designed to fast-track the realisation of the Vision 2030 and focuses on four pillars, namely Manufacturing, Food and Nutritional Security, Universal Health and Affordable Housing. Under manufacturing pillar, the national aspiration is to ensure that 15% GDP shall be realized from this sector while the second pillar aspires to have Food and Nutritional security for all. The third pillar, Universal Health, anticipates 100% coverage of the population. The last pillar, Affordable Housing, seeks to deliver at least 500,000 affordable shelter for Kenyan families over five years.

For one, digital economy offers Kenya opportunities to achieve the national priorities and leapfrog into a

transformed society where every citizen will have access to basic needs, create opportunities and prosper, living fulfilled lives enabled by technology. The development of this Digital Economy Blueprint seeks to formulate a forward-looking framework that will assist Kenya to transform to a digital economy and harness the benefits of a digitalised society.

2.1 OBJECTIVES OF THE DIGITAL ECONOMY BLUEPRINT

This Blueprint aims to tap into the unique opportunities that will spur the unlocking of the benefits of the digital economy potential and guide the transformational journey espoused by new and emerging technologies. The Blueprint seeks to:

1. Identify the foundations for a Kenya digital economy framework by defining the pillars/enablers of a digital economy.
2. Define the imperatives necessary for Kenya to move to a digital economy.
3. Identify areas that Kenya can intervene and seize the opportunities therein.

2.2 THE FIVE PILLARS

To guide the collective way forward in the digital economy, five pillars for growth have been identified

DIGITAL GOVERNMENT

The presence and use of digital services and platforms to enable public service delivery

DIGITAL BUSINESS

Development of a robust marketplace for digital trade, digital financial services and digital content.

INFRASTRUCTURE

The availability of affordable, accessible resilient and reliable infrastructure

INNOVATION-DRIVEN ENTREPRENEURSHIP

The presence of an ecosystem that supports homegrown firms to generate world class products and services which help to widen and deepen digital economic transformation.

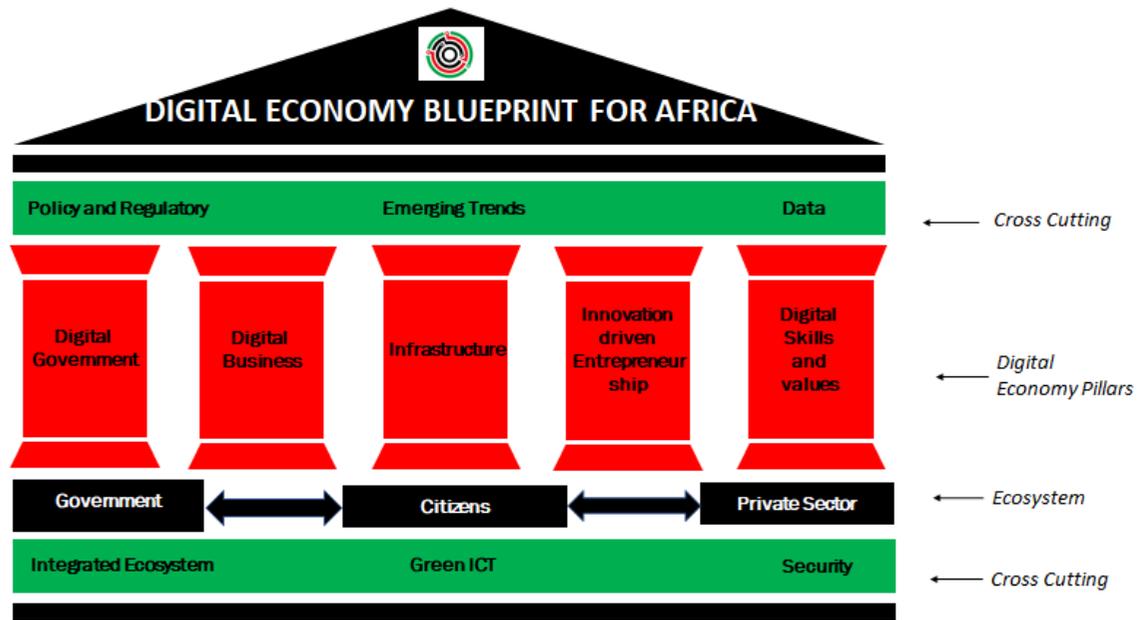
DIGITAL SKILLS AND VALUES

The development of a digitally skilled workforce that is grounded on sound ethical practices and socio-cultural values

The Blueprint sets clear outcomes, identifies opportunities and areas that need further focus, while outlining corresponding plans of action for Government, private sector and the citizens. By working together,

citizens can share in the opportunities of a growing, globally competitive modern economy, enabled by technology.

The figure below illustrates the pillars that have been identified to drive the digital economy for Kenya.



The development of the digital economy is brought about not just by a specific isolated change in technology but by multiple factors, which are all unique to a nation-state. In Kenya, the identified factors are ubiquitous access to **infrastructure**; **digital government**, **digital business**, a thriving **innovative and**

entrepreneurial ecosystem and a new set of **digital economy skills and values**. There are four cross-cutting themes that are resident in every pillar, namely legal and policy frameworks, emerging technologies, interoperability and data.



Kenya Digital Economy





CHAPTER 3.0
DIGITAL GOVERNMENT





Kenya Digital Economy

3.0 DIGITAL GOVERNMENT

3.0 DIGITAL GOVERNMENT

Government has a critical role to play in the creation, establishment and promulgation of a digital economy, first as an orchestrator of the national ecosystem, as a controller of significant natural and monetary resources and finally as an indicator of preferred direction to the private sector. The creation of a digital economy is a whole-of-government effort requiring articulation, consensus and the use of political will.

This pillar focuses on the power of government to rally citizens, businesses and other national actors to create a digital economy. Modernisation of governments through the use of ICT for efficient, transparent and inclusive government service delivering effect, to create a next-generation government. Digital technologies can help governments to:

- Understand their citizens better and achieve better outcomes
- Provide services more effectively and efficiently
- Find new solutions to policy challenges
- Engage with external partners to develop new delivery models
- Commercialise some public services and develop fresh sources of revenue

In a digital economy, the role of government changes from being a service provider to be an orchestrator and moderator of the ecosystem.

3.1 DIGITAL GOVERNMENTS LEAD TO THE FOLLOWING:

- i. Improved efficiency and productivity of Government:** ICTs can improve communication and collaboration in Government and digitisation of key processes, thereby improving the functioning of Government.
- ii. Improved citizen services with e-Government:** ICTs can improve the e-government infrastructure and provide a stable and secure platform for better, faster, cheaper, efficient and secure services for citizens and businesses. ICTs also enable improved citizen engagement with government.
- iii. Accelerated achievement of SDG and social agenda:** ICT is a key enabler of the social sectors such as education, health and agriculture.
- iv. Cost savings:** Savings in government can be achieved by consolidating and sharing infrastructure and digitising and automating processes.
- v. Promote transparency and reduce corruption:** Digitisation of government process, e-government services improves transparency, accountability, good governance and reduces opportunities for corruption.
- vi. Improve Ease of Doing Business:** Having a solid ICT infrastructure and providing e-services to citizens and businesses will promote a business-conducive environment for the country as reflected in the doing business rankings.

3.2 FOCUS AREAS FOR DIGITAL GOVERNMENT

Policy generally originates as part of the country's constitution, implemented by local laws and regulatory framework. Some of these include areas of privacy, freedom of expression and media; access to information; intellectual property; labour relations; and economic and social rights. One of the fundamental policies needed is a National ICT Policy. This should harmonise across multiple sectors, within departments and governments, local and federal alike. It should be comprehensive, covering a range of areas, including unified communications; open data; privacy and integrity of information; infrastructure sharing and reuse; plus IT policies like department managing and maintaining openness across software interfaces; refreshing of IT legacy equipment; security; and more. This ICT policy should align to the national priorities of the country and provide a measurable plan to enable everyone to participate in the digital economy and reap its benefits.

Electronic ID system at the national level- Securely identifies and authenticates a government worker, citizen, or business, providing the foundation for securing identities, protecting privacy, and enabling trusted benefits and services.

Interactive government portal with open application program interface (API)- The internet has made it easier, faster and more cost effective to deliver services, interact with businesses and citizens, and provide transparency. Governments around the world are embracing and enabling web-based services. Governments should focus on creating a one-stop shop or portal with a few critical services, while enabling the private sector and its technology-literate, creative youth to develop additional secure services through an open API without the government funding these services.

E-government services for citizens, business and government- For businesses, citizens, and other governments. This includes services like e-tax, licenses

and registrations, e-parking, smart city services, digital signatures, and more. Government customer-centricity is the new standard expected by business, citizens and other government entities. High quality, timely and accurate data and services are required and should be provided in a safe and secure, yet transparent and accountable manner.

Government keeps the peace. It makes sure our food is safe to eat. It keeps our air and water clean. The laws and regulations it promulgates order economic and political life. Big data technology stands to improve nearly all the services the public sector is delivering with smart healthcare, smart learning, smart energy, smart agriculture and smart infrastructure.

Security: With the Government integrating ICTs within its core operation, cyber security tools and frameworks are critical to ensure the security of data, transactions and citizen identities end to end. A critical part of securing government assets is to securely identify all government employees and citizens accessing government resources.

3.3 GOALS AND OBJECTIVES

3.3.1 Goal:

Improve access, quality, transparency, equity, efficiency and effectiveness of government services

3.3.2 Objectives:

- i. **Improved services to citizens-** services provided anywhere at anytime
- ii. **Increased revenue:** Having unified, digitised and automated processes makes it harder to evade tax and reduces leakage thus increasing revenue
- iii. **Increased productivity:** Digitising the government processes and making it easy to communicate, collaborate and coordinate across Government will lead to increased Government employee productivity

- iv. **Cost reduction:** By sharing infrastructure across government and digitizing and automating processes, Governments can see significant cost reductions in service delivery[1].
- v. **Improved business environment:** By making it easier for businesses to register, digitising land records, pay payment of tax through electronic system improves the ease of doing business. This will lead to improvement in Kenya Government Ease of Doing Business global ranking and therefore attract Foreign Direct Investment.
- vi. **Technology transfer and job creation in the wider ICT sector:** Can be achieved by involving the local technology eco-system in the delivery of Digital Government projects.
- vii. **Promoting local manufacturing of ICT:** Governments can drive local ICT industry by promoting local manufacturing of ICTs used by Government

3.4 INDICATORS FOR DIGITAL GOVERNMENT

Table 1 below highlights the indicators of the Digital Government

Digital Government Focus Areas	Digital Government Indicators
Security, resilience and availability	<ol style="list-style-type: none"> 1. Nil security breaches 2. 99.99% Availability
Accessibility and Utility	<ol style="list-style-type: none"> 1. Number of new providers of digital financial services (DFS). 2. Government uptake of digital services eg. the number of government services available to citizens digitally. 3. Percentage of citizens and businesses with a digital ID. 4. Government payments to suppliers made digitally i.e. government inflows and outflows. 5. Percentage of active accounts/wallets 6. Percentage of population able to access the platform 7. Number of services online 8. Government Portal to access services online 9. Number of shared infrastructure services for Government 10. Number of common core applications shared across government
Affordability	<ol style="list-style-type: none"> 1. Cost should not be more than 1% of value of transaction. 2. Percentage of surcharge for cross-platform transactions.
Convenience and Ease of Use	<ol style="list-style-type: none"> 1. Positive customer survey on convenience 2. No training required 3. Number of queries on how to use 4. Time spent per transaction
Scalability	<ol style="list-style-type: none"> 1. Number of new deployments 2. Growth in number of transactions

3.5 DIGITAL GOVERNMENT IN KENYA

A digital government framework should holistically look at the role of ICTs in driving the national development goals. By adopting and implementing this Digital Economy Blueprint, African governments can generate more revenue; reduce waste; improve Government services and efficiency; increase citizen participation in a transparent and trusted environment. Kenya's ICT vision is guided by the Kenya National ICT Master Plan that is based on Kenya's Vision 2030, which envisages Kenya as an ICT hub and a globally competitive digital economy[2]. The Master Plan has three pillars namely:

- i. E-Government services, which aims at ensuring provision of eGovernment information and services as key to improving productivity, efficiency, effectiveness and governance in all key sectors;
- ii. ICT as a driver of industry, which aims at transforming key Vision 2030 economic sectors to significantly enhance productivity, global competitiveness and growth; and
- iii. Developing ICT businesses that can produce and or provide exportable quality products and services that are comparable to the best in the world.

The Government of Kenya has made great strides in providing e-Government services. Currently, the Government is registering all citizens inside or outside of Kenya and foreigners residing in Kenya will soon issue a new digital ID called the "Huduma Namba" (service number). The Digital ID, which will be a first of its kind on the continent, involves biometric registration (digital fingerprints and photo) of all persons in the country.

Kenya's flagship Government to Citizen (G2C) platform is the e-Citizen (<https://www.e-Citizen.go.ke/>). E-citizen is a Kenya G2C portal that provides services

including business name search and registration, notice of marriage, registration of marriage, driving licenses, land searches and clearances, passport and visa applications. The system allows citizens to sign up, apply for government services and conveniently pay using mobile money, credit cards, debit cards and online banking. The system also allows foreign residents to apply for services. Users receive email and SMS notification every time their application has progressed.

In addition to e-citizen, Kenya has adopted a one-stop-shop model (or Huduma Centre). A Huduma Centre is a one stop shop for various government services. Huduma Centres are mandated to deliver governmental services from "a single location and are amplified by online e-Huduma: e-citizen. As indicated above *e-citizen* provides integrated services offered by various government ministries, departments and agencies and a unified and integrated channel Huduma payment gateway to facilitate ease of payment for government services".

This Blueprint proposes that a digital government is a prerequisite for a digital economy. To enhance the security of the digitised system, there is also a critical need to authenticate people and/or businesses through a digital ID. Digital IDs will enable trust and will promote other aspects of the digital economy such as digital business including digital financial services.

[1] A European Union study estimated that e-government (online systems) could reduce costs by 15-20% while e-procurement systems could save over \$100B per year across the EU

[2] The Kenya national long-term development blueprint, Vision 2030 (<http://www.vision2030.go.ke/>) aims to transform Kenya into a globally competitive and prosperous nation providing a high quality of life to its citizens.



Kenya Digital Economy





CHAPTER 4.0

DIGITAL BUSINESS

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Kenya Digital Economy

4.0 DIGITAL BUSINESS

4.1 FOCUS AREA

The digital business pillar focuses on the development of a robust digital market characterised by increased quality of financial inclusion, fair competition, resilient data infrastructure, advanced consumer protection and greater regional integration. This pillar has three main focus areas namely: **digital trade, digital financial services and digital content**. It identifies the necessary precursor to the emergence of platform economies as:

- i. Identification:** The unique and incontrovertible identification of parties, places and goods in a transaction
- ii. Pervasive, reliable communications:** reliable networks, hardware and connectivity between parties and platform providers
- iii. Trust:** Timely contract recognition and enforcement either by judicial action or on-platform sanctions. Legal and systematic guarantees of security and privacy of information.
- iv. Payment Infrastructure:** A generally acceptable method, mediated or otherwise, of rapid settlement of debts between parties.
- v. Fulfillment:** Eventually “things” need to change hands and move geographically, efficiently and with minimum handoffs.

4.2 GOALS AND OBJECTIVE

The main goal is to create a digital economy wherein

every citizen and business can trade: Real goods; Information goods and Services, including labour. The goals and primary objectives of the pillar are elaborated as follows:

Affordable, resilient, open and efficient payment systems: To develop and adopt widespread merchant acceptance of digital payments platforms that are both customer and business-friendly in terms of interoperability, security, fees/tariffs and quality of service.

Digital financial services for all to enable participation: To support growth of digital financial services that lead to financial inclusion and the resulting increase in prosperity through poverty alleviation (by helping people and enterprises to manage day-to-day, deal with risks and invest in the future) and job creation.

Legal framework to enforce contracts, resolve disputes and protect consumers: To develop adaptive legal frameworks that establish a level playing field between providers and customers and advance consumer protection through improved supervision, transparency and digital/financial literacy

Developed regional markets for cross border trading: Encourage greater usage of a regional payments switch that has the potential to facilitate the single digital market ambitions of the EAC and to contribute to increased financial inclusion through interoperability at the regional level.

4.3 RATIONALE FOR DIGITAL BUSINESS

Digital technology creates opportunities for disruption. New technologies give access to markets that were previously closed and removes distortions in demand by giving customers direct access to products previously controlled.

Rapid technological developments have created new markets that now connect consumers, lower transaction costs and reduce information asymmetry. M-PE-ESA, Kenya's leading mobile money platform, was one of the first banking applications to be embedded in mobile SIM toolkits. The mobile money infrastructure has created a new market and disrupted the financial industry ecosystem to become a major competitor against the traditional banking sector.

Mobile money enables transfer of money from person to person, buying airtime, paying utility bills, among others. The product connected a population which was hitherto unbanked mostly in unserved and under-served areas of the populace. In Kenya, a taxi-hailing company, Little Cab, powered by an app managed by a mobile network services provider Safaricom, is operational and has made debuts in Uganda, and will soon be in Rwanda. Uber recently innovated further by launching an option for motorcycles (locally known as 'boda boda') dubbed "Uber Boda" service

that now provides an additional value to the original model.

E-commerce offers great opportunity for Kenya, with the possibility of trading platforms designed for the Kenyan user. In Kenya, platforms such as 'Masoko', 'MYDAWA', 'Kilimall', 'MoBar' and 'PigiaMe', among others, have great potential to grow exponentially, a feat that could be realized through the strengthening of some foundations such as competitive payment solutions.

Kenya has made great strides in mobile payments. However, there is now a concerted effort to move from mobile payments towards a focus on value creation, which encompasses access to credit, access to markets and access to business skills. Secondly, the country is focusing on the need to increase interoperability among e-payment platforms.

The government of Kenya is convinced that mobile payments and cashless solutions must be easy-to-use and not limited to one primary provider. Furthermore, payment solutions should reduce operating costs for businesses and platforms. Enhanced interoperability will reduce friction in e-commerce transactions, increase ease-of-use for consumers and reduce costs for platform operators. E-commerce and its users benefit from an environment where payments are secure and can be made easily and confidently.

4.4 INDICATORS

Table 2 below highlights the indicators of the Digital Business

Digital Business Focus Areas	Digital Business Indicator
<p>The goal is to create a digital economy where in every citizen and business can trade</p> <ul style="list-style-type: none"> - Real goods - Information goods - Services including labour 	<ol style="list-style-type: none"> 1. Unique and irrefutable identity of persons and their signatures 2. Electronically accessible global addressing scheme 3. Property register (movable and immovable) 4. Public key infrastructure (cryptographic).

Digital Business Focus Areas	Digital Business Indicator
<i>Affordable, resilient, open and efficient payment systems</i>	5. Ubiquitous access 6. Interchangeable between digital and cash 7. Real-time
<i>Digital financial services for all to enable participation</i>	8. Low-cost (less than 1%) 9. Highly available (99.99%).
<i>Legal framework to enforce contracts, resolve disputes and protect consumers</i>	10. Recognized in law 11. Digital signature is binding 12. Rapid dispute resolution.
<i>Developed regional markets for cross border trading</i>	13. Individual privacy 14. Real-time portability 15. Secure
	16. Insurance in transit 17. Appropriate reliable infrastructure (see infrastructure pillar) 18. Availability of reliable 3rd party provider.
	19. Transparency of terms (costs, times, returns, etc.) 20. Value for money 21. Truth in advertising.

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Case study: Digital Business in Kenya

Kenya has seen an upsurge in the number of e-commerce platforms. A joint 2016 *National ICT Survey* by Communications Authority and the Kenya National Bureau of Statistics (KNBS) established that 39% of private enterprises are engaged in e-commerce. This percentage continues to grow exponentially as currently most businesses offer some form of digitized service, especially in the mobile payment ecosystem. Industry estimates indicate that 70% of all e-commerce payments in Kenya are settled through various mobile money payment platforms. This is reflected in *Economic Survey 2018*, that shows a remarkable growth on mobile commerce transactions. In 2017, mobile commerce transactions grew by 85.5 per cent from KSh 1.8 trillion in 2016 to KSh 3.2 trillion in 2017. Total mobile money transfers increased by 8.4

percent from KShs 3,356 billion in 2016 to KSh 3,638 billion in 2017. Established e-commerce players in Kenya include Africa Internet Group Jumia, Masoko (operated by Safaricom) and Kilimall International.

In Kenya, the growth of e-commerce has been underlined by the success of mobile money payment platforms such as M-PESA, an innovation that was initially rolled out in Kenya and acclaimed globally as an instrument of digital financial inclusion.

Beyond e-commerce and digital finance, this Blueprint proposes the need for e-commerce to expand beyond national boundaries. Integrating Africa to a **single digital market** will create economies of scale and opportunities to grow the local and regional economies.



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CHAPTER 5.0

INFRASTRUCTURE PILLAR

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5.0 INFRASTRUCTURE

5.1 INTRODUCTION

“Infrastructure has always been important to nations’ economic growth and success, but the infrastructure needed for today’s economy is rapidly changing with advances in information and communications technology (ICT)...” ITIF 2016⁷.

“As the next industrial revolution sweeps the world, and the Internet of Things rides the wave, the reality here and now is that, organizations of the future are destined to be digital by default.” KPMG 2014⁸.

Digital infrastructure supersedes the normal infrastructure in that it has Information Technology capabilities embedded within it thus rendering it to have smart and more responsive capabilities sensors to make them smart and more responsive. The smartness enables the infrastructure to be intelligent enough to interconnect to other devices e.g. Smart cars, Speed sensors, Traffic lights, Drones, Smart metering devices among other machines to electronically collect, process, analyze, store, memorize and transmit data.

The difference between infrastructure and smart digital infrastructure e.g. smart roads, smart power and smart water is that smart digital infrastructure exhibit connectivity which enables them to support Internet of Things (IoT), Machine Learning, Machine to Machine communication and operation of ubiquitous technologies. All these capabilities combine to create an enabling platform for a digital economy which supports actualization of smart interconnected

life through wearable technologies, smart healthcare, smart retail, intelligent transportation and smart cities for instance, Konza Technopolis.

It is therefore imperative for governments to reconsider how they plan and implement or upgrade infrastructure, in respect to today’s technological strides. Expansion of existing infrastructure or implementation of new infrastructure should aim at transforming the country’s infrastructure into digital infrastructure to enhance a country’s readiness for a smart life and digital economy.

For instance, ICT can be employed in the supply of utilities like water, power, sewer etc. through integration of sensors and intelligent systems to monitor water quality, power outages, sewer leakages, among other disruptions. Digital technologies can as well be employed to enhance safety and efficiency of motorized and non-motorized transportation, logistics and delivery of digitally traded commodities.

This chapter discusses infrastructure and focuses on digital infrastructure as the main driver of digital economy. It is important to note that in the function of digital trade, cost of use or provision of infrastructure forms part of the constant costs. The other costs are variables. Therefore, to lower cost function of a digital economy, the cost of use or provision of infrastructure including digital infrastructure should be all-time low.

5.2 SITUATIONAL ANALYSIS

Affordable, accessible and reliable infrastructure is fundamental to achieve an inclusive digital economy. They are critical parameters and enablers for a sustainable digital economy. This pillar looks at all forms of infrastructure- both hard and soft which are prerequisite for establishment of a digital economy. Other examples of infrastructure elements that are important within this pillar are Logistics (Postal and Courier services), appropriate and affordable Devices, enabling Utilities and managements of Digital Assets.

The foundation of infrastructure is the physical connectivity that is a combination of First Mile, Middle Mile, Last Mile and Invisible Mile. First Mile is the underwater cables, the Middle Mile is the backbone and metro networks along with transmission and core network, and the Last Mile is the final connection to users such as fiber, wireless or satellite. The Invisible Miles are the policies, legal and regulatory frameworks that enable investment and maintenance of the infrastructure such as spectrum, fees and taxes etc.

It is equally important are the devices that are used to access broadband, whether individual or shared devices for personal, work or commercial purposes. Meanwhile, for the digital economy to function, where E-commerce is a core part of, a well-developed logistics sector, for instance, the postal system is crucial.

The infrastructure, devices and logistics sector e.g. postal system and courier services rely on supporting infrastructure, particularly affordable and accessible broadband, power, roads and air for transportation and deliveries. Meanwhile it is imperative that the infrastructure is fast, secure and available. It is therefore important to protect physical infrastructure and digital assets, including the data from physical vandalism, cyber-security threats and privacy infringements. Such security is also imperative to ensure consumer trust in broadband infrastructure and all that it enables.

5.3 CROSS CUTTING ISSUES ON DIGITAL INFRASTRUCTURE

5.3.1 Socio-cultural nuances

There are socio-cultural nuances surrounding proximity and use of digital assets, information technology infrastructure and devices across cultures. Demographics also define preferences and access to certain types of digital infrastructure. Other than demographics, other factors such as level of education, work experience, religion and skills will define uptake of technology, digital finance and e-commerce. These cause significant challenges in usage of broadband infrastructure and uptake of digital trade, hence slowing a country's digital economy.

5.3.2 Political Rationale

There is a strong political rationale for governments to support and provide digital infrastructure to facilitate digital trade and service delivery to citizens. On the other hand, there are political consequences that may arise due to unregulated access to broadband, digital infrastructure and e-commerce.

5.3.3 Economic rationale

The economic rationale for digital infrastructure is very strong with clear historical evidence of the impact of broadband on economic growth. For example, a one percent increase in a country's score on the Global Connectivity Index correlates with a 2.1% increase in competitiveness, 2.3% increase in productivity, and 2.2% increase in innovation.

It is estimated that the Digital Economy will be worth US\$23 Trillion by 2025 and that returns on ICT Investment will be 6.7 times higher than other sectors. Ultimately, because digital infrastructure rarely leads to direct social or economic impact, and any returns on investment (Whether public or private) may be long-term, there can be a lack of willingness to make the necessary investments.

Alignment with Africa Agenda 2063 and SDGs ac-

According to the ICT SDG benchmark, the correlation between ICT and SDG progress is as high as **91%**, with SDG 4 (Education), SDG 3 (Healthcare) and SDG 9 (Industry and innovation) having the most potential for ICT-enabled transformation.

5.3.4 Constraints to Digital Infrastructure

5.3.4.1 High costs of digital infrastructure

Key constraints for the digital infrastructure include limited access to fiber and broadband connectivity due to high costs of installation and use, low availability of spectrum for wireless, low availability of public access points and shared access to devices, as well as inability for persons with disabilities (PWDs) to access and use digital infrastructure.

5.3.4.2 High Capex vs Low Opex

The other key constraint for digital economy is the tendency of governments or public sector to invest heavily in capital expenditure (CAPEX) for digital infrastructure projects. On the other hand, it makes insufficient operational expenditure (OPEX) for operation and maintenance (O&M) for the same projects, hence reducing their efficiency and lifespan.

5.3.4.3 Taxation of IT equipment, devices and telecommunication services

The current trend of governments imposing heavy taxation on digital infrastructure equipment, digital devices and telecommunication services leads to unaffordability of such digital infrastructure, digital devices and telecommunication services.

5.3.4.4 Cyber security threats

Digital economy is highly reliant on online presence, digital trade and logistics. Therefore, cyber-security threats remain a factor in the success of a digital economy. Insufficient regulation, uncontrolled access to digital infrastructure and lack of digital hygiene

predisposes all players of the digital economy to cyber-security risks and threats.

5.3.5 Opportunities for Digital Infrastructure

5.3.5.1 Expansion of National Broadband coverage

There are tremendous opportunities for governments to increase usage of digital infrastructure and access to digital services and digital assets in order to spur growth of digital economy. Governments should consider expanding their roles and participation in the digital economy through expansion of national broadband coverage, creation of conducive regulatory environment, provision of digital economy incentives, provision of logistical services through transformed digital postal services, etc.

5.3.5.2 Financial Deepening

On the positive side, the national broadband deepening has led to financial deepening in the country, which has led to robust innovations in the fintech sector. For instance, all banks in Kenya are using banking apps to provide 24 hour banking services regardless of location. It has also led to deepening and spread of financial credit sector as evidenced by the recent explosion of loaning apps e.g. Tala⁵, Branch⁶ and M-Shwari etc. for which citizens can access loans after downloading the apps, registering and agreeing remotely with the credit vendors on Terms and Conditions.

5.3.5.3 Digital Gaming

Further, as a result of investments in the digital infrastructure, the country has also experienced growth in the digital gaming sector. The specific aspects of growth in this sector are evidenced by sprouting of digital gaming casinos, game shops and multiple sports betting companies and shops. Further, the Government of Kenya, through Konza Technopolis, in collaboration with Kenya Film Services, have signed an agreement with the Korean Government to establish a Digital Media City which will headquarter vari-

⁵ <https://tala.co.ke>

⁶ <https://branch.co.ke>

ous digital gaming entities and players, house various international digital media company brands, digital gaming and movie theatres as well as digital gaming companies.

5.3.5.4 Technology Spread

From Kenya's experience, the availability of reliable and affordable digital infrastructure increases the demand for technology and associated smart devices. This leads to technology spread across the country, which is key towards increasing the country's connectivity index and uptake of internet and digital services from government and the private sector. Examples of government services include Huduma⁷, ecitizen, etc.

5.3.5.5 Smart Cities

Smart cities are key drivers of a digital economy in that they create huge demands for technologies, innovations, smart intelligent devices, connectivity, digital services and digital infrastructure that otherwise would have been difficult to achieve from households and individual firms.

The smart cities also play a critical role on the supply side for a digital economy. They supply skills, research and development, innovations, digital technologies and digital infrastructure e.g. data centres, smart mobility and logistics that are requisite for running a digital economy.

Kenya invested in undersea cables in 2009 and has upgraded most of its grid into smart grid. In the same year, the government conceptualized Konza Technopolis, a smart city which was to house the country's Business Process Outsourcing industry and utilize the fiber capacity to position the country as a global destination for outsourcing. This created a domino effect that has seen various smart cities sprouting e.g. Tatu City, Tilisi etc.

The Foundation of infrastructure is the physical connectivity that is a combination of several facets:

⁷ <https://hudumakenya.go.ke>

1. **First Mile** (the undersea cables)
2. **Middle Mile** (the backbone and metro networks along with transmission and core networks)
3. **Last Mile** (the final connection to users such as fiber, wireless, VSAT and delivery centres/hubs)
4. **The Invisible Mile** (the policies that enables the investment and maintenance of the infrastructure such as spectrum, fees, taxes etc.).

5.4 FOCUS AREAS

There are tremendous opportunities for growing the digital economy by expanding the infrastructure pillar. This is based on the fact that a significant proportion of the population is not yet having access to broadband, 4G and related services with a hugely underdeveloped e-commerce industry. This pillar identifies the cost, quality reliability and reach of key infrastructure such as transport networks, telecommunications and energy as critical for development of a digital economy and an enabler of socio-economic wellbeing.

The main areas of focus include:

- i. Broadband Infrastructure
- ii. Reliable, affordable and Secure Broadband Connectivity
- iii. Logistics Infrastructure
 - Interoperability of the delivery and logistics infrastructure which would include distribution centers, warehouses and delivery. The development of innovative services that align with context
- iv. Appropriate and Affordable Devices
- v. Management of Digital Assets
- vi. Payment systems
- vii. Data Centres

5.5 GOALS AND OBJECTIVES

The overarching goal for Infrastructure is to have Affordable, accessible, ubiquitous and reliable infrastructure that is fundamental to achieve an inclusive digital economy.

- i. Development of the integrated infrastructure master plan
- ii. Classification of ICT infrastructure as a critical public utility
- iii. Development of enabling policies that safeguard the appropriateness and affordability of devices, with due consideration of the growing regional trade. This includes the creation of light industries for assembly of devices, facilitation of certification

of devices through the establishment of regional or sub regional conformance and interoperability programs such as regional or national test centers, as well as Mutual Recognition Agreements.

- iv. Promotion of continuous and innovative infrastructure investments from all who commercialise on its use.

The key objectives of the Infrastructure Pillar include provision of physical and digital infrastructure to connect every Kenyan, commercial entity and Government or public facilities such as hospitals, schools, post offices, police stations and prisons. This requires broadband coverage of all permanently inhabited locations including residential areas as well as transport corridors.

Infrastructure Focus Areas	Infrastructure Indicators
Connectivity and Devices	<ul style="list-style-type: none"> ▪ Percentage of broadband and mobile network penetration including 3G, 4G and 5G ▪ Percentage of mobile and smart devices penetration ▪ Percentage of IOT interconnected devices
Data Governance	<ul style="list-style-type: none"> ▪ Availability and affordability of Data ▪ Availability and affordability of Data Storage ▪ Number of tiered Data Centres available ▪ Reduced cyber security breaches
Logistics	<ul style="list-style-type: none"> ▪ Percentage of country covered by usable physical infrastructure (i.e. road, rail, air etc.) ▪ Availability of warehousing capabilities, with designated pick-up and drop-off points. ▪ No. of local expertise (per subject matter area e.g. data scientists)
Energy	<ul style="list-style-type: none"> ▪ Percentage of electricity connections and affordability with low frequency of outages.

5.6 COUNTRY EXPERIENCES ON INFRASTRUCTURE DEVELOPMENT

5.6.1 Broadband infrastructure

The Kenya National Broadband Strategy defines broadband as “*connectivity that delivers interactive, secure, quality and affordable services at a minimum speed of 2 Mbps to every user in Kenya*”.

Kenya has made great strides in broadband coverage (both fixed and mobile), including investment of over 200 million USD in National Optic Fiber Backbone Infrastructure (NOFBI) on the national backbone spanning over 9,000 KM and touching all 47 counties.

There is a functioning Universal Service Fund (USF) and major investments from the private sector that have spurred the growth of broadband in the country.

This is essentially for both fixed and mobile.

As at 31st December 2018, the total number of active data/ Internet subscriptions [1] stood at 45.7 million of which 47.9 percent were on broadband.

Note 1. Broadband defined as speeds \geq 256 Kb/s

[1] Subscribers should be distinguished from users. Subscribers are entities (e.g. businesses, individuals) that subscribe to an Internet access service. Users are entities that use those services. In the case of fixed Internet services such as fiber, wireless, satellite, users are always more numerous than subscribers, because one subscription can service several users. The difference is likely to be even greater where public access to the Internet is common. However, it is the opposite for mobile Internet services. In this regard, subscriptions are always more than users since one subscriber can own multiple SIM cards.

Despite the interventions to deepen broadband access, universal access to broadband has not yet been achieved. Lack of access to easily accessible and affordable broadband hinders access to online services, which hinders the transformative nature of ICTs for all.

Access to reliable, affordable, and secure broadband is therefore imperative for Kenya. A digital economy for Kenya will therefore be premised on ubiquitous provision of universal broadband access that will drive digitally enabled services for a digital people and economy.

5.6.2 Reliable, Affordable, and Secure Broadband Connectivity

Access to broadband connectivity has been identified globally as key driver of economic development, socio-economic wellbeing and innovation. Broadband connectivity in Kenya has experienced tremendous growth largely due to government initiatives, liberalization, and a robust regulatory environment. However, despite heavy investment in broadband connectiv-

ity infrastructure, there exists a wide “digital divide” in the access to connectivity services in the country.

Previous studies have been conducted to establish the extent of the digital divide in Kenya. For example, in their study, the Communications Authority (CA) in the year 2016 established that there are more than 580 sub-locations with less than 50% GSM population coverage, of which 164 had no mobile signal at all.

Further, there were 2,221 sub-locations with less than 50% 3G population coverage, of which 1,221 have no access to 3G services at all. Additionally, there is low geographical coverage of broadband services; for example, 50% of locations have no 3G services; while 83% of the land mass lacks broadband services coverage. Finally, fiber optic cables only cover 60,000 km (17% land coverage).

Several efforts have been put in place to bridge the gaps in the digital divide and these include:

- i. Investments by private sector operators to expand backbone and last-mile access networks using optical fiber (inter-county fiber, metro fiber networks), 3G, 4G, FTTH, FTTB, WiMax and Wi-Fi technologies.
- ii. Government initiatives such as the National Optical Fiber Backbone Infrastructure (NOFBI), TEAMS, Government Common Core Network, Kenya Transparency and Communication Infrastructure Project, Kenya Education Network Trust (KENET), Security Infrastructure among others.
- iii. Investment in broadband network infrastructure for research and education covering higher education and research ecosystem, tertiary colleges, hospitals and schools.
- iv. Initiatives by the Communications Authority using the Universal Service Fund (USF) such as the Voice Infrastructure and Services Project (provision of basic mobile services to unreached sub-locations) and the Education Broadband Project (provision of Internet bandwidth to public secondary schools).

Critical infrastructure that support broadband connectivity needs to be identified and secured. The critical infrastructure should also be designed and implemented to ensure scalability and elasticity that will meet current and future demands of the country. Some of the critical infrastructure include:

- i. The country's top level domain operated by KeNIC.
- ii. The national exchange points operated by TESPOK, where different broadband connectivity operators exchange data traffic.
- iii. National Optical Fiber Backbone Infrastructure (NOFBI) and other inter-county optical fiber installations.
- iv. Subsea Optical fiber infrastructure such as TEAMS, SEACOM, EASSy and DARE.
- v. Public and Carrier-neutral Data centers hosting other critical infrastructure installations.

To further improve the penetration of broadband connectivity, initiatives geared towards implementing cost-effective last mile access solutions should be adopted by both the private sector and the government. Extension of fiber to the home where a critical mass of users has been established coupled with last-mile WiFi access should be encouraged.

Further, implementation of intelligent, secure and low energy consumption technologies such as 5G, Bluetooth Low Energy (BLE), LoRa, among others, should be encouraged to spearhead the push towards a highly connected society that will support a digitized economy.

5.6.3 Digital Logistics Infrastructure

A well-functioning trade logistics environment and services are vital for achieving e-commerce success, domestically as well as internationally. An effective postal and courier system is crucial to the development of e-commerce and the digital economy. The Government recognizes that all citizens have a right to access basic postal services and will ensure that the

country has a vibrant and efficient postal and courier sector across physical, electronic and financial platforms.

Postal and courier networks will be used to deliver e-services to citizens and the development and establishment of the National Addressing System will be accelerated with the aim of improving access to individuals and businesses as we transition from the current Postal to Physical addressing system.

Physical addressing systems remain underdeveloped in particularly outside urban areas, making it difficult to efficiently deliver packages transacted via e-commerce platform. Dealing with this issue requires a multi-pronged approach, including improving road infrastructure, developing forward-looking postal service strategies and increasing the capacity of national postal services and private sector couriers. There is an opportunity for the development of e-commerce delivery solutions that has potential to disrupt the ecosystem. Private enterprises are beginning to develop innovative package delivery solutions that serve even the rural areas.

Postal services and express carriers play a fundamental role in this optimization, as well as the integration of cross-border deliveries with Customs procedures and the payment of duty and taxes. In order to eliminate challenges related to processing of import and export cargo documentation that have impacted on Kenya's business climate and global competitiveness, these services remain a key factor in the Government's transformative agenda and were a key milestone which was achieved in the roll out of a Single Window System. This is an online cargo clearance platform known in Kenya as the Kenya TradeNet System that was launched in Nairobi in May 2014 during the regional Heads of State Summit hosted by President Uhuru Kenyatta. Kenya Trade Network Agency (**KenTrade**) is the state agency mandated to implement and manage this complex and cross cutting project.

5.6.4 Appropriate and Affordable digital devices:

Digital infrastructure includes having reliable and fit-for-purpose mobile and fixed phone and broadband services. Without this infrastructure, Kenyans will not have ready access to digital services that we use in our everyday activities, such as transacting online and ensuring end-to-end digital delivery of goods and services associated with the digital economy, mobile money, and communicating with family and friends, as well as work related communication. Previous initiatives by the Government, such as the Digital Literacy Program (DLP) which was aimed at providing affordable devices for learners in primary schools, drove the implementation of local assembly facilities for appropriate digital devices. Thus, further efforts should be made towards standardizing the affordable digital devices such as mobile phones, fixed phones, laptops, tablets, personal computers, IoT devices and sensors, to ensure interoperability and their fit-for-purpose before adoption in the country. These efforts should be geared towards ensuring that the devices access other digital platforms, assets and services in a secure and reliable manner.

5.6.5 Enabling Utilities

Building enabling physical infrastructure is crucial in supporting the rollout and sustainability of a digital economy. A good road network, reliable energy and water, will be crucial to support Kenya's digital economy. Kenya has made changes to improve the reliability of power supply. Major upgrades have been made to the network infrastructure resulting in a notable reduction in the duration of outages.

However, to maintain high-power computing infrastructure and data centers that require un-interrupted energy source, Kenya will need well-targeted investments that are able to support the digital economy need for energy. Kenya has so far invested green energy sources such as hydro, wind and geothermal which will significantly lower the cost of running some of these facilities such as Data Centers, given that power

is the single most expensive component of running a data center. Kenya is also exploring locating large energy consuming projects eg, data center sources that power the digital economy closer to the generation points hence reducing the cost of transmission.

Given the recent heavy investment in road, railway and pipeline infrastructure in the country, it should be mandatory for the builders of these critical installations to ensure that they make provision for space for Telecommunications infrastructure. This will ensure easy reach of broadband, and by extension, ICT services to the current underserved parts of the country. This could also serve as a redundancy measure without expensive investment by service providers which will then reflect in the consumer prices.

5.6.6 Management of Digital Assets:

Data Centers play a key role in the storage of digital assets and data. The ability to store data in a secure manner in highly secure data centers is critical. One of the key steps in this is the establishment of a National Government Data Center to centralize the storage of critical government data, reduce and manage the costs of storing data and ensuring it is secure. This data center can also be used to host local entrepreneurs and innovators who form an important part of the digital economy. This can also be a template to be used by private sector to invest in the country.

Kenya's National Digital Infrastructure also needs to be secure. A key way to reduce national security risks of adopting new technologies (including infrastructure such as 5G and the Internet of Things) is by promoting security-by-design where technologies are designed from the ground up, to be secure by being embedded right from inception, rather than as a future consideration.

Designing the infrastructure to collect pertinent and useful data from the beginning makes it easier to access data that enables platforms to have information on their users. Implementation of public key infrastructure (PKI) will enhance our security further and ensuring that every citizens has a digital identity.

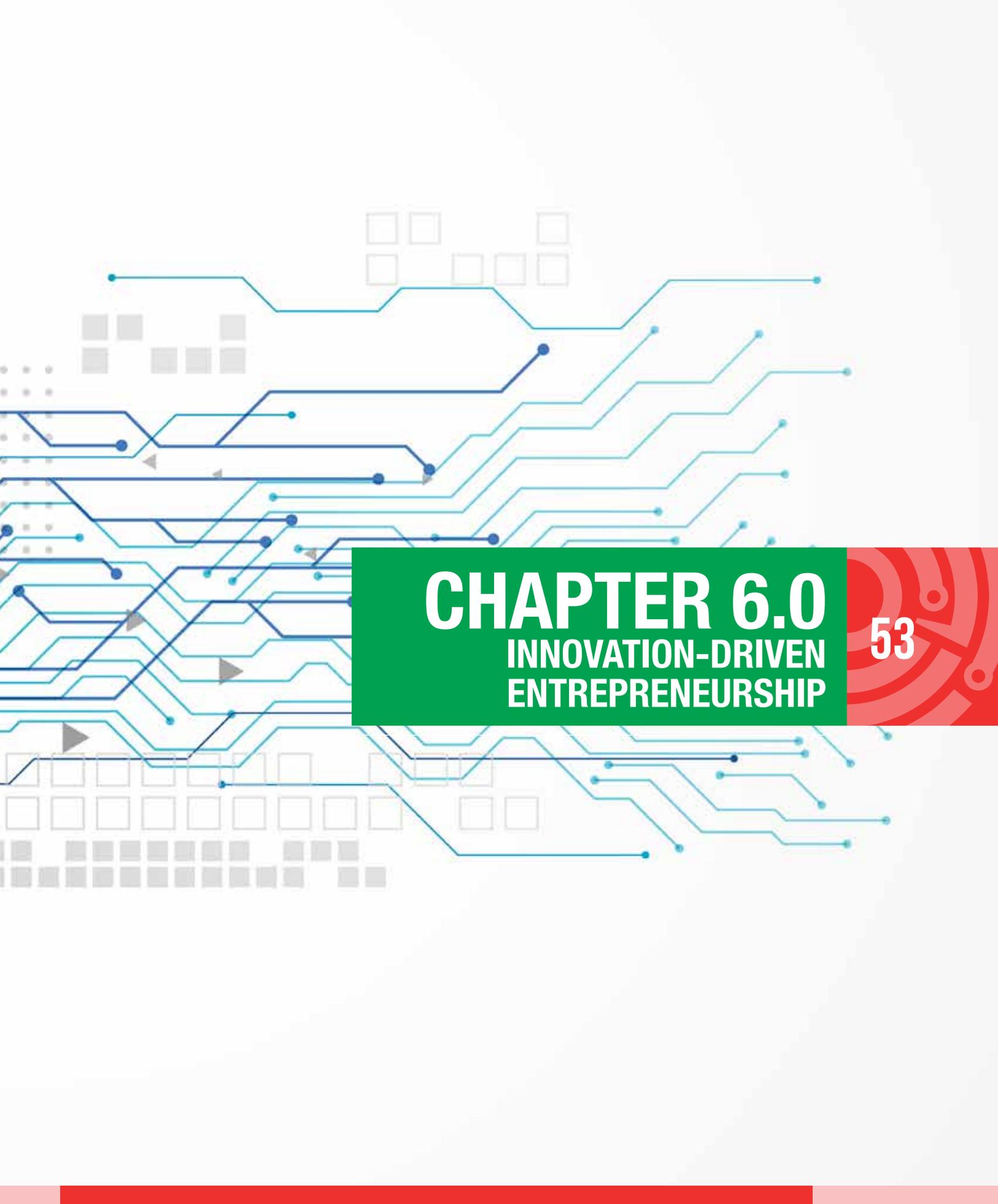


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CHAPTER 6.0

INNOVATION-DRIVEN
ENTREPRENEURSHIP

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Kenya Digital Economy

6.0 INNOVATION-DRIVEN ENTREPRENEURSHIP

There is a boom in innovative technology start-ups both locally and internationally. The pillar, which is Innovation driven entrepreneurship, is anchored on the presence of an accessible, inclusive and collaborative innovation ecosystem that supports entrepreneurship at all levels, encourages investments and integrates research and development through partnerships. Harnessing the potential of disruptive technologies to drive Africa's transformation requires addressing the main barriers to digital entrepreneurship. While countries in Africa have made great strides in fostering entrepreneurship ecosystems, progress is mostly clustered in a few countries and urban centers.

An innovators-entrepreneurship ecosystem is essentially a collection of stakeholders, which include government agencies, financiers such as venture capitalists; educators and R&D agencies; service providers and support agencies; and entrepreneurs themselves. Well-developed innovation-driven entrepreneurship ecosystems provide the bedrock for a robust private sector, by facilitating the creation and growth of businesses.

Well, these ecosystems are central to the way digital businesses operate today, and effective policies need to reflect accordingly. A successful innovation-driven entrepreneurship ecosystem would help realize the full potential of digital transformation, support entrepreneurial experimentation, and re-allocate human capital and resources to promising start-ups, SMEs, and high-growth technology companies.

New and emerging technologies are expected to change and improve many fundamental tasks and interactions in the coming years, including work ethics, travel, and communication. Emerging technologies such as artificial intelligence, blockchain, Internet of Things and quantum computing, among others, present significant opportunities for Kenyans. Harnessing the disruptive nature of these new technologies to build a digital economy, however, requires huge capital investments in research and development.

In simple terms, the digital economy is a marketplace that is defined, organized, enabled, and facilitated by technology. The Digital Economy transformation will open up opportunities on three fronts: digital skills, entrepreneurship and innovation.

Kenya's transition toward the digital economy has led to the emergence of an innovation driven entrepreneurship ecosystem based on factors and features rather than established game rules. Digital transformation of businesses will bring different benefits depending on the sector it is operating in, the stage of its digitalization journey and its value proposition to customers, among others. In addition, digitalization could enable businesses reach out to a broader customer base or tapping new markets. Digital transformation will also target the MSME sector that accounted for 81.1 percent of employment opportunities in the country. MSMEs employ approximately 14.9 million Kenyans⁸. SMEs are a key driver of the digital economy, and need to be a key focus of the digital transformation process through digital entrepreneurial programs.

6.1 CHARACTERISTICS OF INNOVATION-DRIVEN ENTREPRENEURSHIP

- i. Businesses utilization of new digital technologies (particularly social, mobile, analytics and cloud solutions)
2. Use digital technologies to improve business operations, invent new (digital) business models, sharpen business intelligence
3. Businesses that engage with customers and stakeholders through new (digital) channels

The overall goal of the digital strategy should be to make every business a digital business. These inventions should be tailored to improved productivity, efficiency and, most importantly, profitability.

6.2 RESEARCH AND DEVELOPMENT FOR INNOVATION

Research targeted at enhancing innovation will allow businesses to gain a competitive advantage, support sectors to transform, and achieve their digitalization potential. To achieve this, the strategy will focus on a framework for creating various facilities and programs to enhance and support the country's innovative capability to enable them to build new and innovative products.

6.3 FOCUS AREAS

Developing the entire value chain of innovation driven entrepreneurship will contribute greatly to the GDP, and in addition aim to surpass the traditional sectors that add to Kenya's GDP. To achieve that, these are the focus areas;

- i. Entrepreneurial interest in the innovators i.e. innovators come up with ideas that can be commercialized.
- ii. Funding towards research and innovation.
- iii. Seed capital, angel investment, venture capital, for investments.

- iv. Tax and other incentives (including subsidies and waivers), innovation-oriented companies that may include companies involved production of digital products. To include tax support and other incentives for startups.
- v. Commercialize with an aim of globalizing businesses in order to grow or scale up
- vi. Support business models that leverage on both open access and intellectual property systems.
- vii. Incubation and accelerators for innovation e.g Ministry of ICT "Whitebox"
- viii. Vision and strategy for innovation driven entrepreneurship
- ix. Development of talent/human resources for digital businesses/economy
- x. Facilitation of access of Public procurement for innovation products by innovation driven entrepreneurs

As with most countries around the world, Kenya is already deeply engaged in the process of understanding the levers that will push it from being a traditional agrarian or manufacturing-based economy to a fully automated, information-based economy.

Many countries are engaged in a race to establish information supremacy, with those who are able to grow and attract the high value and knowledge-intensive manufacturing, research, software, information technology, and services jobs being the ones that will likely overcome the challenges brought about by a new information-based age.

In a global economy where low value-added, commodity production of goods or services can, and does locate in nations with low wages, communities are fighting a losing battle by competing on the low end.

But even as this push continues, it by no means indicates that industry and manufacturing should be neglected. Instead, in building a digital economy, more countries are ensuring that their traditional enterprises still rely heavily on the core foundations of the drivers

of the economies of old. What’s different is that these industries are modernizing, and taking advantage of the cost-cutting efficiencies brought about by new technologies.

These shifts are creating more productive companies which compete on a global scale, with their key differentiators being value addition, efficiency, and higher productivity.

Government’s that are keen to adopt this approach must support new ideas and innovations by creating enabling policies and incentives for knowledge-based businesses.

Kenya already possesses a number of elements that make up a vibrant innovation ecosystem. Its population is young (over 50% are under 18), and relatively well educated; and there already exists a strong bias towards innovation for growth. Kenya is already the world’s biggest mobile money market, and has al-

ready made several strides in establishing itself as the Silicon Savannah.

An increasing number of innovations being brought to life in Kenya are typically incremental and frugal innovations that have led to the redesign of products and business models that significantly reduce costs.

As Kenya moves to its next phase of growth as an innovation economy, strengthening innovation capacity and ensuring it creates an enabling business environment for entrepreneurs and established companies, innovation will become an increasingly important and critical area of focus to power sustained economic growth.

Kenya will have to build the capacity to acquire, disseminate, and use technologies to promote innovation and encourage new and existing firms to invest in business opportunities.

6.4 GOALS AND OBJECTIVES

- i. Increase the number of innovations that progress to market locally, regionally
- ii. Increase the contribution of digital products and services to the GDP
- iii. Enhance the contribution of innovation driven entrepreneurship to the growth of the digital economy in Kenya
- iv. Develop a vibrant and sustainable support system for innovation through industry and academia research collaboration as well as access to funding

6.5 INDICATORS

The table below is a summary of the Innovation Driven Entrepreneurship pillar.

Innovation Driven Entrepreneurship Focus Areas	Innovation Driven Entrepreneurship Indicators
Accessible, Inclusive and Collaborative Innovation Ecosystem	<ol style="list-style-type: none"> 1. Number of collaborative research projects involving the government, academia and the private sector. 2. Number in products and services offered to the public in innovation driven entrepreneurs

Innovation Driven Entrepreneurship Focus Areas	Innovation Driven Entrepreneurship Indicators
Accessible, Inclusive and Fair Funding	3. Number of products and services that are brought to market by innovation driven entrepreneurs 4. Improved Global Innovative Index listings. 5. Number of quality graduates with relevant skills for the digital economy
Legal Framework that is fair, encourages investment, Aligns with global standards ensures increased protection for innovators and create awareness on the formalisation of the business process Research and Development that is accessible, Integrated into the education system and collaborative	6. Number of academic and scientific on at a global level on innovation driven entrepreneurs 7. Number of innovation hub, incubators, accelerators 8. Growth in intellectual property rights applications. 9. Growth in revenues from entrepreneurs invested in information economy.

6.6 CASE STUDIES

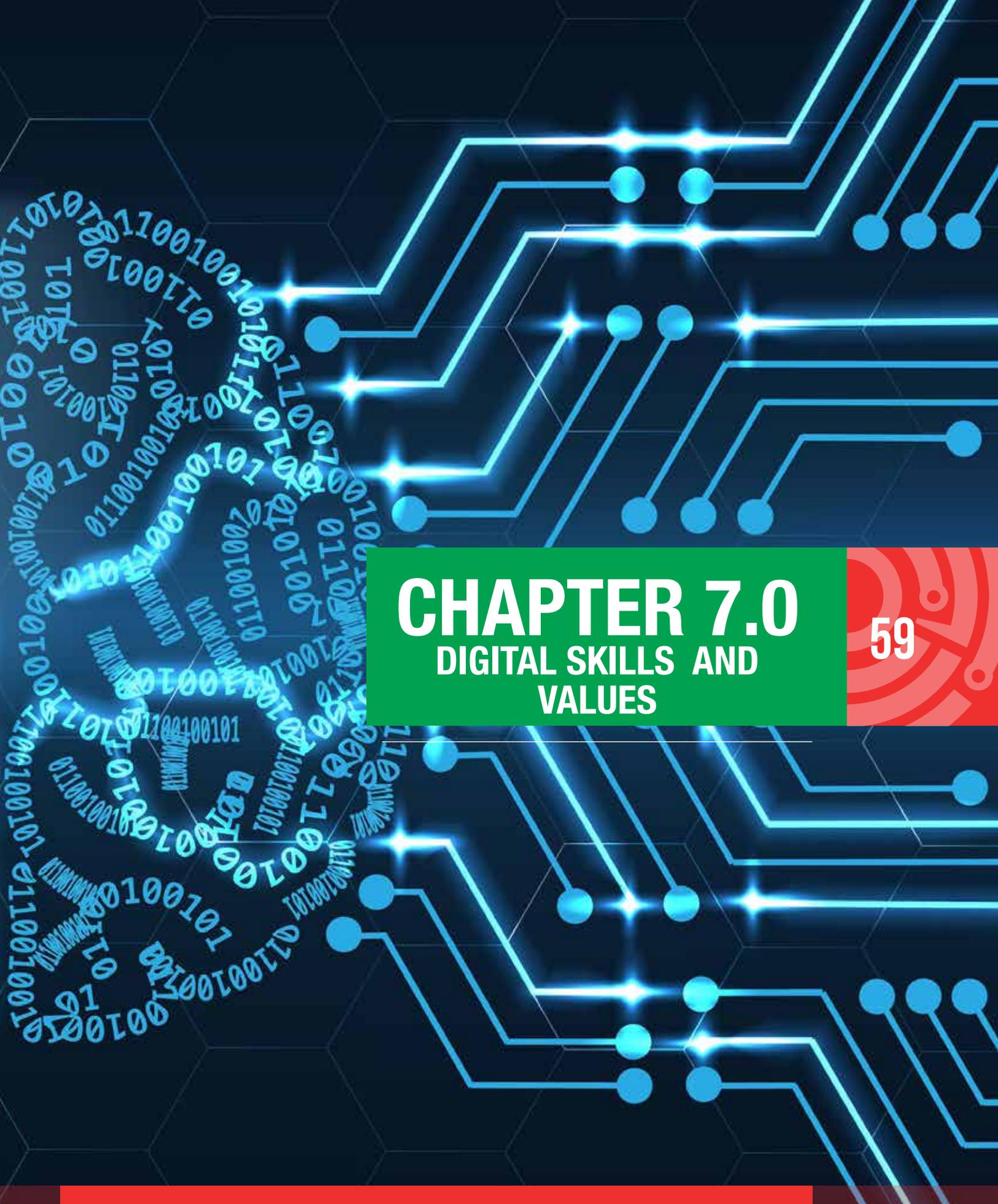
Kenya is renowned for innovative entrepreneurs launching new digitally-enabled services and creating 21st Century jobs. Successful start-ups in Kenya include:

- i. Africa's Talking** – A unified API platform for software developers in Africa building SMS, USSD, Voice, Payments and Airtime applications. Founded in 2010, it now has a presence in over 8 African countries and successfully raised US\$ 8.6M from IFC in 2018 for its' expansion efforts.
- ii. Cellulant Corporation** – Founded in 2002, Cellulant offers digital payment solutions for Africans by Africans. Its digital payment ecosystem connects 95 banks in 13 countries servicing 34 countries and 500 mobile projects. In 2018, the company successfully raised \$47.5M from TPG Growth's The Rise Fund, to scale digital payments across Africa.
- iii. Little Cabs** – Launched in partnership with Craft Silicon and Safaricom, Little Cabs is a taxi hailing service in a competitive ecosystem with other players such as Uber, Taxify, Mondo Ride and Maramoja. The local company has successfully innovated around the unique transport ecosystem in Kenya, and in 2018 launched a shared public SHUTTLE solution, a first of its kind, allowing users to book spaces in public buses operated by the company.
- iv. Wezatele** - Weza Tele provides a number of innovative value added mobility solutions in commerce, supply chain and distribution and mobile payment integration. Its solutions are in use in Kenya, Tanzania, Zimbabwe and Nigeria. In 2015, the company was acquired by financial services group AFB for US\$ 1.7M. At the time, this was one of the largest acquisitions for a tech startup in the country.
- v. Sokowatch** – A local startup that aims to digitize informal retailers in Africa, connecting them to local and multinational suppliers such as Unilever and Proctor and Gamble – by digitizing orders, delivery and payments with the aim of reducing costs and increasing profit margins. In 2018, the B2B e-commerce company closed a US\$2M seed investment led by 4DX Ventures.
- vi. BitPesa** - A digital foreign exchange and payment platform that leverages blockchain settlement for fast, cost-effective payments to and from Africa. The startup has so far raised approximately \$10M in funding including companies like Greycroft, a well-established venture capital firm in the U.S.

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CHAPTER 7.0

DIGITAL SKILLS AND
VALUES

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Kenya Digital Economy

7.0 DIGITAL SKILLS AND VALUES

7.1 INTRODUCTION

Digital skills are a prerequisite for benefiting from any technology, across all sectors of the economy, and at all levels of the skills spectrum. Digital skills will enable every Kenyan to have access to digital technology, having the literacy and know-how to use this technology, and being able to participate in and create with this technology. If technologies and all other complementary factors were in place, but people did not have the skills to use such technologies, there would be no impact. Ultimately, the impact of technology depends on the use of technology. Digital and 21st Century skills are key to digital entrepreneurship, digital adoption and transformation, and even successful conceptualisation and implementation of digitalisation projects in both the private and public sectors.

The digital skills pillar is focused on developing digital skills for its citizens [Mostly ICT professionals] to meet the competencies and expertise required for the digital economy. Government continues to improve skills through the various initiatives that include digital literacy in the primary schools, developing curricula and creating centres of excellence in all levels of education system. Some initiatives include the Presidential Digital Talent Programme, among others.

Globally, the rise of high-tech innovation hubs in places around the globe like Silicon Valley, in the US, Bangalore in India, Shenzhen in China (Startup Warehouse), Dublin (Silicon Docks), Tokyo in Japan, Taipei, Seoul, in Korea and several in Kenya, have led to

a shortage of coders after the early 2000s. The problem has invoked interventions and cautions by elders in the ICT industry globally. The growth in demand for coders was more than 30% between 2007 and 2012, and is predicted to grow at 22% between 2012-2022. Most recently a group has formed what is called the ‘learn to code’ movement (see code.org). There is a push for coding to be taught in schools.

The table below is a summary of the Digital Skills pillar.

Basic Skills

Basic digital skills enable us to function at a minimum level in society. They are foundational skills for performing basic tasks, and there is growing consensus that basic digital functioning corresponds to a foundational literacy, taking its place alongside traditional literacy and numeracy. Basic skills cover hardware (for example using a keyboard and operating touch-screen technology), software (for example word processing, managing files on laptops, managing privacy settings on mobile phones), and basic online operations (for example email, search, or completing an online form). Basic skills enrich our lives, enabling us to interact with others and access government, commercial and financial services.

Intermediate skills

Intermediate skills enable us to use digital technologies in even more meaningful and beneficial ways, including the ability to critically evaluate technology or create content.⁹ These are effectively job-ready skills since they encompass those skills needed to perform work-related functions such as desktop publishing, digital graphic design and digital marketing. For the most part, these skills are generic, meaning their mastery prepares individuals for a wide range of digital tasks needed to participate as engaged citizens and productive workers. However, such skills are not cast in stone. Indeed, one of the characteristics of intermediate skills in particular is that they expand to account for changes in technology. For instance, data skills feature more prominently as the data revolution gains further momentum, generating demand for skills needed to produce, analyze, interpret, and visualize large amounts of data.

Advanced skills

Advanced skills are those needed by specialists in ICT professions such as computer programming and network management. Globally, there will be tens of millions of jobs requiring advanced digital skills in the coming years. These include artificial intelligence (AI), big data, coding, cyber security, Internet of Things (IoT), and mobile app development, with some economies predicting a talent gap for workers with advanced digital skills and others, ranking ICT specialists among their fastest-growing roles.¹⁰ Many employers claim they cannot find staff with the requisite skills. Jobs requiring advanced digital skills also generally pay much more than jobs requiring basic digital skills or none at all. Advanced skills are typically acquired through advanced formal education, though this toolkit describes other channels for learning, such as coding boot camps, that are viable options for many countries.

Source (ITU, 2018)

Another skill-set in the advanced category is that of digital entrepreneurship, which combines traditional entrepreneurship with new digital technologies. “Digital enterprises are characterized by a high intensity of utilization of novel digital technologies (particularly social media, big data analytics, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders.” (ITU, 2018)

Strategies aimed at fostering digital entrepreneurs need to address a range of skill-sets. They include non-digital elements such as business, finance and tax, often linking to related digital innovations. Such skill-sets include; entrepreneurial skills for example risk-taking, adaptability and critical thinking and intermediate and advanced digital skills such as data analytics, cloud, social media, digital marketing, and web and app development.

7.2 FOCUS AREAS

Developing the digital skills training framework from primary to university

- Produce highly skilled ICTs graduates having been trained in advanced digital skills. These include:
 - Artificial intelligence (AI),
 - Machine Learning
 - Robotics
 - Big data,
 - Coding in relevant tools e.g. R, Python etc.
 - Cyber security,
 - Internet of Things (IoT), and
 - Mobile app development

7.3 GOALS AND OBJECTIVES

Increase the number of graduates having been trained in Advanced Digital skills and demonstrate required competencies for the digital economy.

7.4 INDICATORS

The table below is a summary of the Digital Skills Pillar:

Digital Skills Focus Areas	Digital Skills Indicators
Training for Digital Skills and Values that are integrated into institutions of learning, Inclusive and Relevant	<ul style="list-style-type: none"> ▪ Number of ICT Graduates having been trained in Advanced Digital skills with proven competencies in the identified focus areas ▪ National Curriculum that promotes ICT skills and values ▪ Harmonisation of curriculum to industry requirements every 5 years ▪ No. of digital literacy projects
Experiential Learning and Mentorship that is Integrated to institutions of learning, Inclusive and Relevant	<ul style="list-style-type: none"> ▪ No. of sustainable mentorship programs ▪ Post-graduation Internship programs ▪ Experiential government sponsored programs in National and International institutions of higher learning

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7.5 CASE STUDIES FROM KENYA

- i. **Moringa school:** Moringa School is a multi-disciplinary coding school committed to closing the skills gap in Africa's job market by offering high-potential students the necessary technical and professional training in order to compete in a digital, global economy. Founded in 2014 by Audrey Cheng, a Taiwanese-American entrepreneur, Moringa School is creating world-class developers by providing a comprehensive curriculum and an outcome-driven program to motivated young people in Africa. Website: <https://www.moringa-school.com>
- ii. **AkiraChix** is a Nairobi-based organization that aims to provide young women and girls from poor social and economic backgrounds with training in technology and entrepreneurship. AkiraChix's objective is to tackle the underrepresentation of women in STEM (Science, Technology, Engineering and Mathematics) subjects. Website: <http://akirachix.com/>
- iii. **Andela** trains Africa's tech talents on its campuses in Lagos, Nairobi, and Kampala. Andela builds high-performing engineering teams and connects them with employers looking to grow. It runs a four-year fellowship in software development aiming to provide the skills needed for Africa's digital economies. Website: <https://andela.com/>
- iv. **Tunapanda Institute** aims to bring technological, design, and entrepreneurial skills to students from the Kibera slum in Nairobi. Its three-month training program also connects graduates with local employers. The institute hosts e-learning and school management platforms through its own unique data center. Website: <http://www.tunapanda.org/>

7.6 UNIVERSITIES OFFERING DIGITAL SKILLS COURSES

i. Kenyatta University Digital School

The Kenyatta University Digital School of Virtual and Open Learning works in collaboration with various institutes that offer online courses; and is aimed at providing students with the same skills as their school-based counterparts. It is open to students who are not able to take up full time on-campus programs. Fully equipped with new programs, the Kenyatta University Digital School offers diplomas, degrees and even masters degrees.

ii. The University of Nairobi Center for Open and Distance Learning

The Center for Distance Learning at The University of Nairobi aims at providing alternative opportunities for accessing relevant and quality university education through media. If you are looking for online courses you should pursue, they offer both undergraduate and graduate courses.

iii. Kenya Institute of Open Learning

Not all people can afford to enroll for school-based program and the Kenya Institute of Open Learning which targets diploma and certificate students who have no financial means of accessing education any other way. If you are looking to enroll in a diploma or certificate courses, this is the place to start.

iv. Egerton University E-learning Self Sponsored Programmes

The Egerton University E-learning programme is open to both undergraduate and postgraduate students who cannot enroll for on-campus programmes.

v. USIU Online University Courses

This is yet another great place to get quality online education for both undergraduates and post graduates. USIU has created a name for itself as one of the top private universities in Kenya, which makes it an ideal place to try distance learning.

vi. Moi University Institute for Open and Distance Learning

Open learning is fast becoming a preferred mode of

learning and Moi University has not been left behind. Its Institute of Open and Distance Learning offers students affordable university education in a setting that is ideal for those who cannot enroll for their school-based programmes.

vii. JKUAT Distance Learning and Continuing Education

The JKUAT distance learning programme is open to diploma and certificate courses, undergraduate and postgraduate programmes. Distance learning had revolutionized education and now more than ever students who can't afford school-based programmes due to finance or work commitments can enroll and learn online. These mentioned universities both private and public offer accredited online university courses that you can be sure to complete in the shortest time possible.

viii. Kenya Institute of Advanced Technology, KAIST

This state of the art postgraduate university is under development in Konza Technopolis and will be an industry scientific research centre that will train students on industry specific courses to enable Kenya to develop adequate manpower that will provide technological solutions that will support the digital economy.

7.7 RECOMMENDATIONS

The ICT skills gap among youth is a primary barrier to youth employment in the digital jobs sector. The following recommendations, namely curriculum review, Re-tooling of faculty and implementation, internship and apprenticeship programs, and mentorship opportunities, and use of MOOCs, are some avenues that may help bridge this gap. The following will be considered;

1. Curriculum Review and Development for ICT-related training programmes
2. Retooling of advanced digital skills trainers
3. Internship and Apprenticeship Programs in advanced digital skills
4. Mentorship Opportunities in the area of advanced digital skills
5. Leveraging existing online training resources e.g. MOOCs and
6. Online Work opportunities for graduates with advanced digital skills

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Kenya Digital Economy





CHAPTER 8.0
CROSS-CUTTING ISSUES

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Kenya Digital Economy

8.0 CROSS-CUTTING ISSUES

These have been identified in regards to the impact they have across the different pillars: Infrastructure, Skills, Digital Government and Digital Business. The cross-cutting issues that have been identified as critical in the development of the digital economy are:

1. An Integrated Ecosystem
2. Data
3. Emerging Trends
4. Green ICT
5. Security
6. Policy and Regulatory Framework

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8.1 INTEGRATED ECOSYSTEM:

The Internet is a major component of the digital economy because it offers firms, individuals and governments an electronic network that enables the creation of virtual auction markets for goods and services where they previously did not exist.

Goal: Seamless flow of information across the entire ecosystem.

For this goal to be achieved two key areas that require attention are:

- i. **Inter-connection of the systems:** The need to encourage the interconnection of systems that are serving public interest to avail end-users' benefits of better communication experiences and reduced latency. It is expected that the Single Window System, Commodity Exchange Platforms and any other platforms will be interconnected at the KIXP to serve Kenyans effectively and efficiently.

Seamless transfers and payments between banks, at both the national and international levels, make it easier to conduct e-commerce. This also attracts more consumers to the formal banking sector, as it would no longer be necessary to open accounts at several establishments.

- ii. **Interoperability of the various systems:** User transaction information should be able to flow seamlessly across different platforms in the shortest time possible. Mobile payments and cashless solutions must be easy-to-use. Payment solutions should reduce operating costs for businesses and platforms. Enhanced interoperability will reduce friction in e-commerce transactions, increase ease-of-use for consumers and reduce costs for platform operators. This allows users freedom of choice and fosters a robust market for innovation. The ability for the various platforms to allow for interoperability shall be a standard that should be encouraged.

8.2 DATA:

Data is the raw material from which information and knowledge can be derived.

The goal is to:

- Establish standards for data handling and sharing
- Ensure data security
- Facilitate universal access to digital services

To achieve this, data needs to be handled under two key approaches:

- i. **Open Data:** In regards to the digital economy,

this is data that anyone can access, use and share. Governments, businesses and individuals can use open data to bring about social, economic and environmental benefits. Kenya has been a leader in the open data initiative by setting up the open data portal. This has ensured data becomes usable when made available in a common, machine-readable format. Promoting technology investment in open, scalable systems allows established companies, start-ups and citizens to innovate. Multiple models are possible, including fully open platforms, pay-gates for access, and free or preferential access for academic or start-up users. Open Data is a standard that should be encouraged within the digital economy. It is important to ensure:

- Clarity on accountabilities among partners in the ecosystem that can help drive compliance.
- Anonymised at the source before entering the data platform.
- Non-discriminatory
- Non-proprietary and license-free
- Complete and timely

Data platforms should be open, secure and respects all privacy regulations to make it possible for citizens and innovators to work with the data and deliver additional value.

- ii. **Big Data:** This refers to the large volume of data, both structured and unstructured, that inundates a business on a day-to-day basis. In an environment where open data is encouraged, there is a higher likelihood of transacting high volumes of varied data within short time frames. Interconnectivity and interoperability of systems is a key enabler in achieving an environment that creates big data.

8.3 EMERGING TRENDS:

General methodology for governments in addressing emerging technologies will consider how to best protect citizens, ensure fair markets and enforce regulations while allowing new technologies and business to thrive. This requires considering the implementa-

tion of:

- i. **Adaptive regulation.** Shift from “regulate and forget” to a responsive, interactive approach.
- ii. **Regulatory sandboxes.** Prototype and test new approaches by creating sandboxes and accelerators.
- iii. **Outcome-based regulation.** Focus on results and performance rather than form.
- iv. **Risk-weighted regulation.** Move from one-size-fits-all regulation to a data-driven, segmented approach.
- v. **Collaborative regulation.** Align regulation nationally and internationally by engaging a broader set of players across the ecosystem.

Goals:

- To drive digital business and government in a way that is locally relevant
- To safeguard the communities benefiting from the services

Emerging technologies / trends with regards to digital economy emphasizes the emerging activities that have a significant impact on the digital ecosystem.

- i. **Gaming:** While gaming has taken root in Kenya, it provides access to platforms that are handling significant amounts of digital transactions. The gaming scene can no longer be ignored in so far as it is contributing to the digital ecosystem. The different gaming platforms and consoles that exist have evolved over time to facilitate payment transactions on a variety of platforms. Attention has to be paid on how the gaming environment impacts the digital economy with regards to the volumes of transactions and interoperability of platforms.
- ii. **Internet of Things:** The ever-growing network of physical everyday objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems is becoming a reality of the digital ecosystem. More devices are being manufactured IP-ready and can

be connected to platforms that enable them to collect and send data. The ability to transfer data over a network without requiring human-to-human or human-to-computer interaction is to be planned for in the development of a digital economy.

iii. Artificial Intelligence: The theory and actual development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages is evolving over time and already exists in some parts of the world. In the area of health, agriculture and the retail environment, machine intelligence has been known to effectively guide and make decisions on a variety of issues.

iv. Distributed ledger and Blockchain technology - Distributed Ledger Technology (DLT) has developed very rapidly over the last few years and has challenged traditional systems of creating, holding and sharing information and records. The applications of DLT have ranged from creation of Crypto-currencies such as Bitcoins and others, to the development of “smart contracts” and other forms of record keeping.

The applications have both been productive and put to good economic use, but similarly, DLT and Blockchains have been used for criminal activity as DLT and Blockchains allow people’s identity to be concealed. It is recommended that countries explore ways in which DLT and Blockchains technologies can be harnessed to support a digital economy, while building the requisite skills and legal framework to protect users and the economy at large. For Kenya, it would be important to consider the work and recommendations of the Taskforce on Distributed Ledgers Technology and Artificial Intelligence Taskforce.

8.4 GREEN ICT

This refers to the end to end management of ICT from design to disposal:

- Managing emissions during ICT product manufacture/disposal
- Utilizing ICT to minimize pollution (soil, water etc.)
- Reducing carbon emissions by reducing consumption of energy by ICTs
- Using ICT for energy efficiency

Goals:

- To put in place mechanisms to minimize e-waste
- To ensure efficacy of ICT equipment

Regulatory authorities can cooperate to help minimize negative impacts and promote the positive benefits that ICTs can contribute. From the factories that manufacture equipment, to the permanently running transmission networks, to the servers, computers, phones, video displays, and more; that all depend upon electricity (or rechargeable batteries). To some extent, the energy utilized to power communications may be offset by energy savings in other respects. In particular, there are many instances where extensive use of ICT resources can have a direct impact in reducing energy use and emissions from transportation: by facilitating long distance contacts through e-mail, telephone, and even video conferencing.

As more is learned about the options for reducing energy consumption, pollution, radiation, and other hazards, public authorities may consider incorporating green ICT mandates in new or revised licenses and regulations. Environmentally responsible policies can be adopted at every level of the manufacturing and delivery of ICT products and services. In factories and assembly plants, energy efficient and low emissions machinery should be employed. Land use policies, cell tower construction, data processing cen-

ters, and even retail sales outlets, the benefits of Green conscious approaches to doing business can have a strong influence on the overall impact of the sector.

8.5 E-WASTE

There's an increasing levels of cyber waste (or e-waste): discarded phones, computers, printers, and other digital trash which not only cannot biodegrade but is generally hazardous to the environment.

Governments from the national to local levels, as well as international organizations, need to provide guidance and resources to both require and encourage proper recycling and safe disposal of ICT waste.

Many used items such as mobile phones and computers cannot always be easily recycled directly for reuse or refurbishing; and with dropping prices, the markets for second-hand equipment are small. But many of the internal materials, including rare and hazardous metals, can be recycled and utilized in the manufacture of new ICT products.

However, extracting these resources from discarded cyber trash can be a costly and complex process, not necessarily more cost-effective than using newly mined materials. Government and industry cooperation can help reduce these costs and ensure sector-wide compliance with recycling mandates. The regulations would empower the government to investigate and prevent illegal waste dumping, including inspecting imported equipment to determine if it may be actually for sale and use, or is merely intended to be disposed illegally within Kenya.

8.6 SECURITY:

The security of communication technology provides confidence to both the businesses and the customers to trust the systems and platforms that create the digital market.

Goal:

- To foster Confidence, Trust and Security of the digital

The threats of third-party misuse and sharing of confidential data; malware attacks and disruption of business processes; data breaches; and attacks on IT infrastructure, resulting in downtime continue to be of concerned to all stakeholders and at various levels of the digital ecosystem. It is expected that secure infrastructure on the Internet will allow users to encrypt information, such as credit card data, thus facilitating e-commerce and providing an indication of the size and distribution of e-commerce. Measures must be taken to ensure security of; infrastructure, platforms, services, innovations and the digital market as a whole. In 2014, African Union (AU) members adopted the African Union Convention on Cyber Security and Personal Data Protection. Kenya being a member of the AU should align to the guidelines of this convention.

Data Security: Data security and privacy are fundamental to building consumer trust in digital services. The necessary safeguards should be derived from a combination of internationally agreed approaches, national legislation and industry action. Governments should ensure legislation is service and technology neutral, so that rules are applied consistently to all entities that collect, store and process data.

Child Online Safety: Abuse and exploitation of children is unacceptable and should generally not be protected even by free speech principles. This includes child pornography, even where adult pornography is tolerated, and any other coercion or misuse of children's images or identities that may compromise their safety, development, or innocence. In the Internet world, further protections are also needed to shield children from predators who may contact them through deceptive enticements in online forums. For many governments and law enforcement agencies,

this area may represent the highest priority of prevention, investigation, and prosecution, given the vulnerability of the victims and the scope of the perceived risk they face.

Filtering web access, which requires placing such filters strategically within the network of web servers that connect a given group of users to the Internet, must be considered. Such a system is relatively straightforward, for example, for a school or a business or government office, which utilizes a local area network and a single server behind a firewall, through which all connections must pass. The filtering system can be installed on this server, containing algorithms for preventing access to designated web sites, e.g., those with obscene or hate-filled content. The difficulty, of course, is defining and identifying the prohibited content, and maintaining up-to-date registers of URLs that are to be censored.

When applied at a country-wide level, this challenge is far greater, as the filters must be applied simultaneously to all web servers of all Internet Service Providers. This requires a degree of state control over the country's entire Internet industry, whether through enforced cooperation of commercial ISPs, or even direct state monopoly ownership of the ISP sector.

While such a policy can be relatively effective in limiting public access to outlawed web content, much of the material will still inevitably slip through – while some inoffensive content will be accidentally blocked as well – and the required development, maintenance, and control of ISP web filtering imposes substantial costs on the industry. Nevertheless, this method of Internet censorship is applied with considerable effect in many countries, especially to restrict access to pornographic sites, among other objectives.

8.7 POLICY AND REGULATORY FRAMEWORK:

The convergence of technology is leading to a dynamic and fast changing environment that requires an equally dynamic legal framework.

Goals:

- Ensure digital business is conducted with integrity in a manner that results in safety, confidence and trust.
- Powering the digital economy environment to secure customers' privacy, trust and security

The current regulatory systems in many countries were developed for outdated technologies and markets; they are not only obsolete, they can also actually do harm by slowing innovation and technological and market advances.

Convergence in telecommunications is driving changes in regulatory approaches and regulators and governments will need to undertake convergence reviews to reform regulation. In addition, legacy regulation is discriminatory, particularly the legacy regulation of communications services and service providers, which is far more intrusive and prescriptive than regulation of other elements of the digital ecosystem.

Regulatory discrimination can harm competition and reduce consumer welfare. Regulations should recognize the dynamism of the digital ecosystem hence implement regulations that are both dynamic and flexible. Forward looking governments will;

- Update regulatory regimes, adapting regulations to current times and market circumstances.
- Promulgate policies that promote their digital economies—with specific actions to meet the needs of companies, consumers and the workforce.
- Demonstrate digital leadership, pushing their services online and furthering citizen participation in the digital world.

As they move forward, policymakers should stay focused on three priorities:

- i. Regulatory objectives can best be met by focusing on the services delivered to consumers, not the type of company or technology that delivers them. Regulation should be designed to achieve its objective in the most efficient way, without regard

to technologies, industry structures, or legacy regulatory regimes.

- ii. Measurable, performance-based approaches should be favoured over prescriptive regulations, promoting market dynamism and driving consumer welfare. Regulatory systems need to accommodate rapidly changing markets and technologies and also create enough regulatory confidence for companies to take risks. Static regulation needs to be replaced by dynamic regulation.
- iii. Policymakers should take a fresh look at legacy rules and discard those that are no longer relevant, applying a consistent set of criteria throughout the digital ecosystem. In many cases, intense competition in the ecosystem means that regulation is no longer needed, or can be significantly scaled back.

Legislative gaps that need to be addressed are:

- 1. Build capacity of lawmakers and the judiciary:** Capacity building would help governments formulate informed policies and laws in the area of e-commerce and equally strengthen enforcement of such laws. Members of Parliament who adopt relevant legislation should be included.
- 2. Legal framework to enforce contracts, resolve disputes and protect consumers:** The current framework should be adopted to establish a level playing field between providers and customers and advance consumer protection through improved supervision, transparency and digital/financial literacy.
- 3. Develop tax policies adapted to the digital economy.** Governments shall endeavor to strike a balance between ease of collection and fairness, and to be neutral with regard to different sectors of the economy. They should encourage unregistered businesses to register to broaden the taxable base. While some governments are looking to digital service providers as a means of collecting taxes, for example, by taxing internet data communication, mobile money transactions or social media use; care must be taken to avoid unintended consequences arising from tax policies on entrepreneurs, small businesses and the poorest members of society.

4. Critical Infrastructure Protection: Critical information infrastructure requires robust security in order to protect them against malicious attacks. There should be complete oversight and control to prevent the occurrence of such issues. The regulations should ensure compatibility and privacy concerns are mitigated. One of the key challenges experienced in relation to infrastructure is vandalism of mobile phone towers, especially in the rural and remote areas. Regulation that issues high penalties for vandalism as a deterrent is required. Majority of the costs in relation to access of infrastructure, rights of way and licenses for deployment at the local and municipal level are usually deemed as excessive. These local and municipal Policies should be implemented to ensure that fees are lowered and are made reasonable in order to drive innovation and growth.

5. Environmental regulations which specify the technology to be used in order to reduce emissions or to define consumer protection rules in relation to the use of a specific type of safety device should be put in place.

6. Spectrum Policy: The spectrum allocation and use, is one of the most powerful levers governments can pull to further connectivity. But many governments regard spectrum as an asset whose financial value to the state should be maximized rather than as a potent means of expanding coverage and use.

High auction prices can also limit successful bidders' ability to make the capital investments that are necessary to put their newly acquired purchases to use, turning a scarce resource into a wasted one. The primary goal for policymakers and regulators should be to maximize the use — rather than the revenue to the state from spectrum. This can be best achieved by making sufficient spectrum available for mobile networks resulted in sufficient spectrum availability for all players and prices that allowed for infrastructure build-out after the auction, due to an open and transparent system, early consultation with the critical participants and consideration of local market dynamics.

Some governments are also addressing spectrum shortages by permitting spectrum sharing under certain circumstances. India, for example, allows spectrum sharing in situations where both the licensees own rights to spectrum in the same band. Regulations that encourage the sharing of passive infrastructure, such as cell towers, are another way that governments can further network investment. The primary goal for policymakers and regulators is to maximize the use — rather than the revenue to the state from spectrum. This can be best achieved by making sufficient spectrum available for mobile networks. The 2015 auction by Germany's Bundesnetzagentur (which awarded spectrum in the 700 MHz, 900 MHz and 1800 MHz bands) is an example of a process that resulted in sufficient spectrum availability for all players and prices that allowed for infrastructure build-out after the auction, due to an open and transparent system, early consultation with the critical participants and consideration of local market dynamics.

7. Accessibility for people with disabilities: The Government must take measures to ensure that digital services are accessible by visually and hearing impaired persons.

8. Innovation: Regulators should promote permissionless innovation to enable companies or start-ups to develop/create new products without being required to seek permission from regulators. The requirement by regulators that approvals must be sought before introduction of innovations or at the point of discontinuing them slows down innovation.

Procedural costs including delay associated with waiting for approval from regulators are harmful to innovation and competition. Regulators should reduce barriers to entry and exit to foster innovation. With regard to mergers, all standards and processes should be nondiscriminatory in substance and procedurally — Communications providers should not be subjected to more onerous standards or more burdensome processes than other compa-

nies in the digital ecosystem. Policies above the agreed threshold have the effect of increasing costs of fixed and mobile connectivity.

9. Copyright and Intellectual Property: Digital piracy is itself a matter of considerable controversy, but by any measure, the sums are immense. While it is possible to estimate the order of magnitude of unlicensed software and unauthorized copies of media in use in various countries, it is far more difficult to determine how many of these pirate versions would actually have been sold if the users had to pay full retail prices. This is especially the case with the lowest income countries, where piracy is most widespread in terms of the percentage of illicit versus authentic uses. Unless rights owners were to offer their products for a fraction of their prevailing international prices, it is likely that most private users, and even most companies and governments in these countries (which also frequently use pirated software) would be unable to purchase more than a fraction of the material that they currently obtain through the black market.

10. Demonstrating Digital Leadership: Governments should implement technology neutral subsidies to operators regardless of the nature of technology they employ. This would lower deployment costs for operators. Leading digital economies have leading digital governments.

- These countries are creating digital citizens and providing government-issued digital IDs that enable people to do more online and coordinate a wide range of activities.
- They are also supporting the adoption of digital financial infrastructures and are putting their services online, which both facilitates access and use and promotes digital engagement in their populations. In the area of digital identity, Estonia has gone further than most, but other governments also offer their own form of e-IDs. French users can access some 30 government services with a single username and password. The Australian government offers federated authentication processes with one

user name and password that links existing accounts and connections to new services. Some 9 million Australians now have a myGov account. Singapore's SingPass programme provides a single online authentication system through which users can access 270 different services from 58 government agencies using one identifier and password, starting from a single online portal. SingPass has a more than 90% utilization rate, with better than 80% satisfaction among users. The government of India has issued more than 1 billion 12-digit "Aadhaar" identity numbers to the country's residents.

- Recent (BCG) research into digital government services has shown that governments have continued to lift their game in recent years, with plenty of picking up the pace of improvement. In countries around the world, citizen satisfaction with public sector digital performance is catching up with—or sometimes even surpassing—the private sector. Users have responded enthusiastically.

There are, however, still some considerable room for improvement. In most countries, most of the services offered and accessed online are relatively simple interactions — registering or searching for information, filing an application, or paying a fee, for example. More complex social services, such as those related to health care, education and social welfare, still require substantial offline engagement.

As technologies advance, user expectations rise and new applications and models keep coming to the market, governments can't rest on their success. They need to continue to push more services online and enable more complex and intensive online interactions. A growing number of governments, for example; New Zealand, the United Arab Emirates, Finland and Singapore, are establishing centralized digital service or digital transformation offices to lead the effort.

8.8 INDICATORS:

Cross Cutting Issues: Focus Areas	Cross Cutting Issues: Indicators
<ul style="list-style-type: none"> ▪ An Integrated Ecosystem ▪ Data ▪ Emerging Trends ▪ Green ICT ▪ Security ▪ Policy and Regulatory Framework 	<ol style="list-style-type: none"> 1. Volume of data and information shared across multiple systems increase by a percentage annually 2. Legal and regulatory framework for data security and standards developed and enacted 3. Legal and regulatory framework for data security and safety enacted 4. Institutional structure to oversee data security and safety set up and operational 5. % decrease in the number of report data breaches 6. % of total volume of digital and electronic payments 7. % of total value of digital and electronic payments



CHAPTER 9.0

IMPLEMENTING THE DIGITAL ECONOMY

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Kenya Digital Economy

9.0 IMPLEMENTING THE DIGITAL ECONOMY

9.1 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION

A multi-stakeholder approach to digital economy implementation exists with various stakeholders who will play important roles. The following are the key roles of stakeholders with regard to the implementation of the digital economy:

- Private sector enterprises as the primary drivers of digital economy across digital infrastructure, financial services, platforms, entrepreneurship, skills and values.
- Government to develop necessary policy and legislation necessary to support the development of the digital economy. An inter-ministerial framework that will monitor implementation through the various State Departments and Agencies; review of the digital economy policy documents.
- Special interest groups including Trade Associations, Lobby Groups, Consumer Organisations.
- Research and Training Institutions including Academia
- Social organisations including those in health, education, community groups, religious, non-profit etc.

To be able to deliver across all the digital economy pillars, a Digital Economy Implementation Secretariat is proposed with membership from each of the key stakeholders listed above. The purpose of this intervention is to provide strategic oversight for the

effective implementation of a digital economy. This Secretariat will achieve this objective by coordinating all necessary inputs and resources necessary for effective delivery of digital economy since its membership will comprise key entities that will be implementing various pillars of the blueprint.

9.2 CREATING A REGULATORY FRAMEWORK FOR MORE INVESTMENT AND INNOVATION

The vision of a digital regulatory policy must take cognizance of the fact that digitization is a business project, and accordingly, room must be provided for the development of enterprising investments, product innovation and new data-based services. At the same time, there is a need to create a reliable and objective framework relating to issues such as liability regulations and copyright law as well as fair competition. All digital business models should be part of open and innovative competition. This requires the need to eliminate isolated solutions, privileges, discrimination and “lock-in” practices. A requirement to push the process of creating binding norms and standards becomes imperative. A maximum degree of market and product transparency creates the base for freedom of choice for business customers and private consumers, who should be able to make informed and independent choices.

The Internet, sometimes termed the network of networks, requires a level playing field. But isolated regulatory or policy solutions based on limited national

and regional interests should be avoided as much as is possible. Examples such as the AU Convention on Cyber Security and European General Data Protection Regulation serve as a good point of reference.. In Kenya’s case, there is an ongoing discussion on Personal Data protection, through the ongoing Privacy and Data Protection Bill that aims to provide assurances and guarantees to our citizens on this important theme. As a region, we can adopt European General Data Protection Regulations model to create our own regulations going forward. We want to build on this approach. If we are to have a successful African Digital Single Market (DSM), it must serve not only consumer interests, but also those of the manufacturers, small and large.

9.3 ENCOURAGING “SMART SOCIETY AND NETWORKS” IN KEY INFRASTRUCTURE

The term “smart networks” stands for comprehensive and systematic use of the possibilities for digitisation in major infrastructure areas, such as energy, transportation, health, education and public administration. Familiar examples are concepts such as smart grid, smart meter, smart home, smart traffic, smart city, e-health, e-learning, e-government and e-participation among others. The term ‘Smart Society’ was first coined by an EU-funded Integrating Project (IP)¹¹ that aimed “*to capture how contemporary techno-social trends can be harnessed towards solving challenges facing modern society. The ‘Smart’ alludes to the enabling capabilities of innovative, social, mobile and sensor based technologies that are in various ways envisaged to create more productive alignments between (growing) demand and (constrained) resources across a number of sectors and application domains.*”¹²

11 Smart Society (FP7/2007–2013) Grant agreement n. 600854, <http://www.smart-society-project.eu/>.

12 M. Hartswood et al., “Towards the Ethical Governance of Smart Society”, Social Collective Intelligence - Combining the Powers of Humans and Machines to Build a Smarter Society, pp. 3-30, Springer, 2014, <http://www.smart-society-project.eu/wp-content/uploads/pdfs/papers/Hartswood14.pdf>.

By leveraging the smart city framework, Konza Technopolis will be able to optimize its city services, creating a sustainable city that responds directly to the needs of its residents, workers, and visitors.

The implementation of a smart city framework at Konza has begun with detailed planning relating to ICT infrastructure. As Konza continues to develop its technology network, it will draw from a range of international best practices, including the Intelligent Community Forum, Smart Cities Council, and International Standards Organization’s methodologies for the sustainable development of communities. Konza will learn from global cities that have successfully incorporated smart city frameworks, including Santander, Spain; Barcelona, Spain; Singapore; Amsterdam, The Netherlands; and Rio de Janeiro, Brazil.

Utilizing existing infrastructure such as power transmission lines and generators to distribute fibre to the home, will catapult the development of smart cities countrywide.

9.4 STRENGTHENING PRIVACY AND DATA SECURITY

The digital transformation of society requires a paradigm shift in data policy. Data is the basic raw material in the digital economy. More and more aspects of business and society are being measured and evaluated, connected and marketed in an increasing degree of complexity and differentiation. Avoiding data collection and storage can no longer be our guiding principle. On the contrary, the prevailing data security issues will involve individual “informational autonomy” in the future..

Private individuals and companies must be confident

that their data is protected from abuse. Users and consumers must be able to make their own decisions on how their data is used. Data security and informational autonomy are important cornerstones of our democracy, and at the same time a prerequisite for the acceptability and success of a data-driven economy.

If Kenya does not have trustworthy and secure ICT infrastructures, we run the danger of losing competitive ability and future economic strength. Without data security, it will be particularly difficult to convince our small and medium-sized enterprises that digitisation of their business is the way of the future. It is the task of the many participants in this technology to work together to guarantee trust, security and data protection in an increasingly digitised world. Not only the government, but also business, the scientific community and ultimately the users themselves must contribute to this.

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9.5 ENABLING NEW BUSINESS MODELS FOR SMES

Our goal is to get our small and mid-size companies to actively engage in the digitisation process so they can strengthen their market positions in the future and conquer new markets. There is still a lot to do in order to make this possible, in particular in the area of raising awareness for digital development possibilities.

We must considerably strengthen programmes already in place. For this reason we want to initiate a Digitisation Campaign for SMEs. Overall, the campaign will include the following elements:

- *Setting up a user-friendly portal on digitisation to improve the visibility of available funding programmes and for reaching out to a broader range of prospective recipients.*
- *Provide assistance that will include analysis and consulting, personnel and organisational develop-*

ment activities, development of target-group-specific technologies, and investment grants for spurring investments and IT implementation projects at SMEs, including assistance in the implementation process.

- *These measures should at the same time contribute to developing new Internet-based platforms and business models.*
- *To Enable SMEs to have access to a broad knowledge of ICT solutions, we will expand and intensify our consultation services with Digitisation Guides*
- *Develop new initiatives and funding programmes for non-technical innovations because they are also important drivers of new digital business models.*
- *Strengthen the digitisation process by matching established companies with start-ups and research organisations and with best-practice examples (businesses learning from each other).*

9.6 CREATING EXCELLENCE IN DIGITAL TECHNOLOGY RESEARCH, DEVELOPMENT AND INNOVATION

This Blueprint's vision is for Kenya to become a regional and global Innovation Leader driving a strong sustainable economy and a better society. Research, development, science and technology will all contribute to this goal; and this Blueprint sets out the roadmap to deliver on our vision whilst focusing on excellence, talent and impact in research and development. We remain committed to maintaining and improving standards in the excellence of our research. People are our biggest asset. As one of East African countries with the highest proportion of young people, we have the opportunity to nurture this talent to best serve the needs of our society and economy. We will continue to ensure that research is supported in strategically important areas that have an impact on

the economy and society. This includes research that has direct relevance for the enterprise base, and meets the needs of society, including improving the quality of our public services; protecting the environment, our natural resources and the climate; and ensuring food security and sustainability of energy supply.

Innovation plays a central role in driving productivity growth and fostering competitiveness in a global world where knowledge and innovation are critical factors for the advanced economies. Innovation contributes significantly to employment, export and investment growth; the competitiveness of indigenous enterprise; embedding the Foreign Direct Investment base in Kenya; and the creation and application of

new knowledge and technology spillovers.

Innovation is also crucial for social development. This Blueprint aims also to promote quality research in national and global challenges and to support rapid absorption of innovation into public policy and public service delivery. Developing the talents of our population is an underlying aim of this strategy and will be critical to the successful realization of our national vision, giving Kenya the capacity to exploit opportunities both established and emerging. Our success in delivering on the ambition in this strategy will depend on our people - undertaking the research, working in and creating successful enterprises, and contributing to the society in which we live.



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**WAY FORWARD AND
CONCLUSION**



Kenya Digital Economy

10.0 WAY FORWARD

1. Kenya's Role in Digital Economy of Africa would be to serve as test bed for new ideas enabling multi-sided platforms in emerging digital economy contexts.
 2. Adoption of the Country Checklist for development of digital economy detailed in annex 1
 3. To provide redundant, secure, reliable connectivity, hosting, colocation services and cloud services for the neighboring countries.
 4. Provide a standard access to tried and tested digital platforms currently in use in Kenya.
 5. Give access to the abundantly available skilled digital resources through appropriate platforms.
 6. Give access to logistics infrastructure for our neighbors for intra-Africa trade
 7. Share experience and expertise in the roll-out and management of digital infrastructure to reduce the learning curve.
 8. Plan to receive structured visits for benchmarking tours for installations of specific interest for learning.
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Kenya Digital Economy





Kenya Digital Economy

11.0 CONCLUSION

This blueprint proposes an ICT-centric innovation strategy whose main aim will be to recommend programmes and policies supporting digital markets, infrastructure, digital platforms, digital entrepreneurship, digital skills and values, and identify flagship projects to help unleash the potential of ICT-centric innovation ecosystem.

For the digital market pillar, the blueprint highlights the development of a robust marketplace for digital trade, digital financial services and digital content.

For the infrastructure pillar, the availability of affordable, accessible, resilient and reliable infra-

structure has been identified as a critical factor for the digital economy.

For the digital platforms pillar, the blueprint highlights the presence and use of digital services and platforms to enable digital exchange.

For innovation and entrepreneurship pillar, the presence of an ecosystem that supports home-grown firms to generate world class products and services which help to widen and deepen digital economic transformation.

For the digital skills and values, the development of a digitally skilled workforce that is grounded on sound ethical practices and socio-cultural values.



Kenya Digital Economy





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ANNEX 1: COUNTRY CHECKLIST FOR DEVELOPMENT OF DIGITAL ECONOMY

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ANNEX 1: COUNTRY CHECKLIST FOR DEVELOPMENT OF DIGITAL ECONOMY

Here are considerations to be taken into account in developing capable digital platforms.¹³

DIGITAL ECONOMY POLICY ADVOCACY:

- Survey membership or coalition about the most important or pressing digital economy issues
- Determine and analyze the current laws and regulations that apply to the priority issues
- Define the official position of the membership and/or coalition based on evidence and analysis
- Identify the key decision-makers and influencers (industry sector, government ministry/regulatory body among others.)
- Determine the best method of communication to reach decision-makers and influencers
- Prepare communication materials and messages (radio, social media, etc.) supported by research and facts
- Implement the advocacy campaign and track progress and achievements
- Evaluate the effectiveness of the campaign and assess implementation of policy or regulatory change

DIGITAL PAYMENTS¹⁴:

- **Accessibility:** Can users access different payment instruments in both physical and digital channels with ease?
- **Usefulness:** To what degree do current payment instruments and channels meet the payment related needs of end-users and the market?
- **Affordability:** What is the cost incurred by end users to make and receive payments across different channels?
- **Efficiency:** For end-users, what is the time associated/indirect costs and level of effort required to transact using a particular payment service or instrument? For payment service providers, what is the ease of entering the market, the costs of providing a payment service to their customers' satisfaction and the ability to earn revenue?
- **Trust:** Are consumers confident that they can make and receive transactions without their funds being unduly exposed to risk of loss and that the correct payment will be made?

¹³ Informed by the checklist developed by the Center for International Private Enterprise (CIPE) in Digital Economy Enabling Environment Guide

¹⁴ Informed by the organizing principles of the Central Bank of Kenya's draft National Payment Systems Strategy

- **Stability:** What is the reliability of payment instruments and channels in terms of downtime (of payment channels - i.e. the average duration in a year that they payment channel was unavailable for use) and the percentage of failed transactions (not related to a customer having insufficient funds)

MARKET CONDUCT AND CONSUMER PROTECTION:

- Who regulates online consumer protection in your jurisdiction (ministry, regulatory body, etc.)? Is there a dedicated regulatory body or unit for online consumer protection?
- Has online consumer protection been incorporated into existing consumer protection laws, or does a law specific to online consumer protection exist?
- If not, are there new draft laws, regulations, or policies that address online consumer protection issues?
- Who is responsible for enforcement of consumer protection laws and regulations within your jurisdiction?
- When disputes arise, is the enforcement mechanism in your jurisdiction able to resolve these issues in a fair and timely way?
- Has your country adopted or encouraged an online dispute resolution (ODR) framework? Are ODR mechanisms commonly used within the local business community?
- Do businesses self-regulate to ensure consumer protection?
- Are there existing avenues for public-private dialogue on online consumer protection? Are there currently opportunities for the private sector to work alongside regulators and policymakers to create and uphold consumer protection laws?
- Are businesses notified when a draft law is being developed, and is there an established process for providing comments?
- Have you engaged with frameworks regulating consumer protection at the regional or international level?

DATA PROTECTION:

- Who regulates data protection in your jurisdiction (ministry, regulatory body, etc.)?
- Does your country or territory have data protection laws or regulations?
- If your jurisdiction has a data protection law or laws, do the ministry/regulatory bodies take a more general approach to data protection, or are diverse sectors regulated differently?
- Who is responsible for enforcement of data protection laws and regulations within your jurisdiction?
- Is your sector or industry most concerned with a particular aspect of the data protection lifecycle?
- Is your sector or industry concerned with a particular user demographic?
- Do businesses self-regulate to ensure data protection? Is there a mechanism to rectify data breaches publicly?
- Are there existing avenues for public-private dialogue on data protection? Are there currently opportunities for the private sector to work alongside regulators and policymakers to create and uphold data protection laws?
- Have you engaged with frameworks regulating data protection at the regional or international level?
- Have you experienced issues with respect to cross-border data protection? If so, do you know how they have been approached?

CYBER SECURITY:

- Who regulates cyber security in your jurisdiction (ministry, regulatory body, etc.)? Is there a single regulatory body that manages all issues related to cyber security or are functions split across institutions?
- Does your jurisdiction have laws on (1) cybercrime and/or (2) cyber security more generally? Is there a national security law that addresses aspects of cyber security?
- If not, are there draft laws under consideration to address aspects of cyber security?
- Who is responsible for enforcement of laws and regulations related to cyber security in your jurisdiction? Are penalties appropriate to deter infringement but not too excessive that it deters reporting?
- Are there voluntary guidelines and certification programs that guide industry self-regulation?
- What hardware, software, and organizational requirements for addressing cyber security apply to the local business community?
- Are there existing avenues for public-private dialogues on cost effective approaches to cyber security? Are there currently opportunities for the private sector to work alongside regulators and policymakers to create and uphold cyber security laws?
- Are businesses notified when a draft law is being developed, and is there an established process for providing comments?
- Have you engaged with frameworks regulating cyber security at the regional or international level?
- Increase coverage and use of broadband infrastructure across citizens, businesses and governments

through investment and partnerships in infrastructure for connectivity and devices.

- Increase access and affordability of broadband devices and services particularly through reducing taxation on spectrum, telecommunications services, and devices; the use of innovative business models; and shared access points such as Community Innovation Hubs and postal outlets
- Implement policies for incorporation of broadband into new-build infrastructure, particularly housing and commercial real estate, as well as subsidies for access.
- Improve and enforce policies for appropriate management of digital assets.

DIGITAL GOVERNMENT

- Government CIO in place with right mandate
- Government-wide standards for technology
- Central shared government data center providing cloud services
- Secure reliable Government Network
- Unique digital ID for all citizens
- All government employees have government emails
- Central government portal
- Open Data Portal
- APIs open to private sector to develop apps
- Big data analytics for decision making
- Number of Sector management information systems working (education, agriculture and health among others)



PREMIUM



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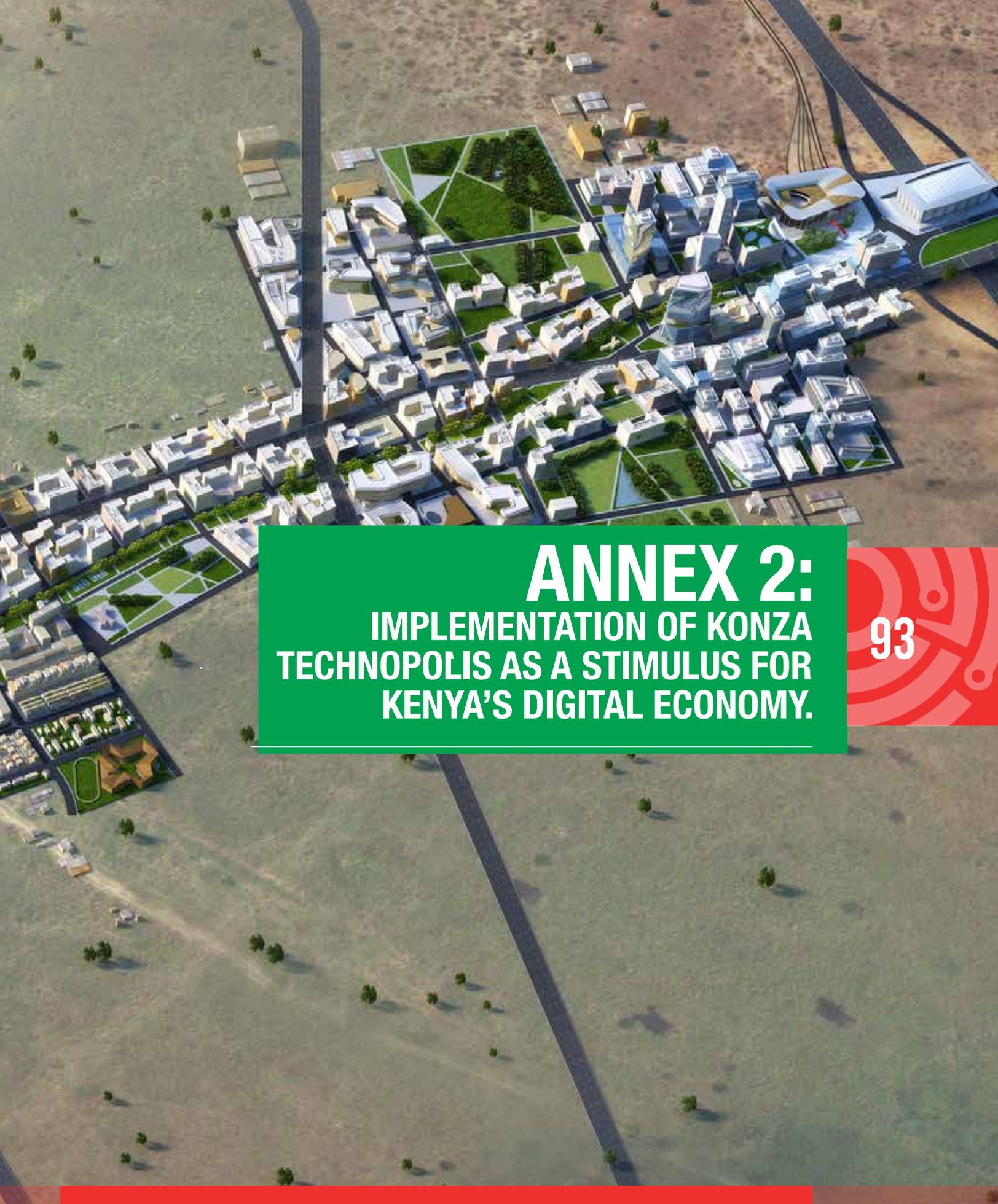
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Kenya Digital Economy



ANNEX 2: **IMPLEMENTATION OF KONZA TECHNOPOLIS AS A STIMULUS FOR KENYA'S DIGITAL ECONOMY.**



Kenya Digital Economy

ANNEX 2: IMPLEMENTATION OF KONZA TECHNOPOLEIS AS A STIMULUS FOR KENYA'S DIGITAL ECONOMY

Konza Technopolis is a smart city designed and implemented by the government of Kenya to enhance Kenya's innovation ecosystem and digital economy by providing the missing infrastructural and technological link.

Phase 1 of the Technopolis is currently under implementation (2017 – 2022) through development of Horizontal Infrastructure and Subsurface Utilities, construction of Konza Complex, construction of Konza National Data Centre and Smart City Facilities, establishment of Kenya Advanced Institute of Science and Technology (KAIST) among other priority projects; as well as attraction and recruitment of investments through the Investor Outreach programme.

The current progress of the Technopolis is as outlined below:

POWER

The city is designed with multiple sources of power for redundancy to reduce downtime issues due to power outages. The city's design guidelines and standards define land use and demand that developers use smart metering, smart-sensor equipped lighting, signage and IoT enabled appliances to create a digitally enabled city environment. The city's master plan has

designated special parcels for generation of green energy to reduce overreliance on the grid.

FIBER

The technopolis is currently connected to the government's National Optical Fiber Backbone Infrastructure II (NOFBI II). The city also lies on the pathway for two other independent fiber infrastructure lines which upon connection to the city will offer consumer alternatives as well as redundancy. The city's Phase I infrastructure design which is currently under construction has provided for Integrated Utility Ducts for dispersion of fiber and other utilities to individual parcels.

DATA CENTRE

The government is currently developing the Konza National Data Centre and Smart City Facilities at Konza Technopolis to enable:

- i. Cloud National Data Centre at Konza Technopolis
- ii. Smart Connection Network for Konza Technopolis
- iii. Citizen and MSE Service as Virtual Desktop Infrastructure

iv. Public Safety City Solution for Konza Technopolis

The Data Centre plays a crucial role in the realisation of Kenya's digital economy ambitions by providing the Cloud National Data Centre which will leverage the provision of digital infrastructure to support the digital transactions, Internet of Things, high-power computing and ubiquitous technologies, cyber security as well as a secure broadband connectivity.

The Data Centre also actuates smart city life for the city's residents and businesses through Smart Connection Network, Citizen and MSE Service as a virtual desktop infrastructure as well as enhancing Public Safety through automated surveillance system, sensors and facial recognition capabilities.

LIGHT INDUSTRIAL PARK

The Konza Technopolis master plan has delineated approximately 84 acres in Phase I for establishment of light industrial zone. This zone will have light industries dealing in light assembly and manufacturing to produce goods for the envisaged digital trade. This zone will also have smart warehousing capabilities for storage, distribution and collection of the digitally traded goods.

INVESTORS

The technopolis has attracted a variety of investment interests including digital trade, digital gaming, digital entertainment and film sector. Examples of inves-

tors who have shown interest in the technopolis include multi-commodity traders, film players, FinTech firms and innovators.

UNIVERSITIES

Higher institutions of learning such as universities play a critical role in building Konza's digital economy and innovation ecosystem. It links the industry to research, development and innovation through attraction and production of smart technologically enabled population that can interact, innovate and drive the country's digital economy and innovation ecosystem.

To this end, the government signed an agreement with the Korean government to develop the Kenya Advanced Institute of Science and Technology (KAIST). The institute is key in producing highly skilled graduates and postgraduates in STEM who will provide technical capacity and skills needed to drive and advance the country's Innovation Ecosystem and Digital Economy.

ESTABLISHMENT OF DIGITAL MEDIA CITY

The government is establishing a Digital Media City at Konza Technopolis which will leverage on services of Konza National Data Centre. The Digital Media city will house various digital gaming entities and players, house various international digital media companies, digital gaming and movie theatres as well as digital gaming companies. All these will boost the country's Digital Economy.





Kenya Digital Economy

