National Information, Communications and Technology (ICT) Policy

Ministry of Information, Communications and Technology, Kenya

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Abstract

This National ICT policy has been formulated after broad-based public consultations in a number of iterations. It captures the ICT ambitions of our citizens and corporations and creates a framework for their timely realisation. The policy takes close cognisance of our history, social, economic and operational environment, legal and regulatory framework, current capacities and capabilities and existing policies from other arms of government; and develops a carefully thought-through achievable way forward for our country; This policy document is backed by detailed strategic thinking and planning.

As this policy is progressively implemented and supported by all arms of government, ICTs in tandem with other government initiatives will create the prosperous, stable, globally competitive environment that is our joint national aspiration.

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1 Foreword

One of the main priorities of the Government towards the attainment of Kenya Vision 2030 development goals and objectives for wealth and job creation is the achievement of an industrialised information society and knowledge economy. The objective is to facilitate the creation of dignified jobs that provide financial security and independence to allow greater innovation and future thinking. By providing local and international connectivity across the country and region, and developing in-country solutions, the Government will enable creation of online and digital jobs, markets, and quality skills allowing Kenyans to embrace the shared economy. In this way, citizens will transition from traditional ways of working to innovative, digitally enabled forms of work.

This review of the Information and Communications Technology (ICT) Policy of March 2006 is inspired by, first, the need to align the Policy with the new constitutional dispensation in Kenya, and Vision 2030. This review specifically aims to incorporate the lessons learned from the Vision 2030

Medium Term Frameworks and takes into account the three underlying pillars of Vision 2030, (Economic, Social and Political) and the United Nations Sustainable Development Goals (UN SDGs). The overarching focus will be to provide access to ICTs, especially broadband, to all Kenyans and seamless connectivity to the East African Community member states with proactive collaboration at regional and international levels, leveraging our leading position in Fintech and our capital markets.

Secondly, the review is meant to provide a proactive framework that is in tandem with current technological realities and dynamics, and one that will guide the orderly development of the ICT sector so as to ensure maximum developmental impact for the benefit of all Kenyans.

In reviewing this policy, the Government has taken into account the tremendous impact of globalisation and the rapid changes in technology. These changes have invariably affected the traditional approach to the management of public affairs and service delivery, and increasingly inform the need for an adaptive policy and regulatory response.

This revised Policy provides a clear and compelling vision to drive social, economic, cultural and political transformation through the effective use of Information and Communications Technology (ICT) in the years ahead. The Policy provides many of the key strategies essential for achieving Kenya's national development targets. Going forward, the Government will concentrate on speeding up the development of new generation mobile, high-speed, secure and ubiquitous ICT infrastructure, developing a modern technology-enabled industrial system, implementing the national big data strategy and enhancing national cyber-security.

By harnessing the power of ICTs, private and state-owned enterprises are expected to improve their sourcing, sales and logistics systems; streamline operations, track market trends and boost their marketing, research and innovation capabilities. Enterprise operations will become more efficient, translating into productivity gains and the creation of new markets for innovative products and services. The strategies and action plans developed as a result of this policy will continue to bring about the rapid transformation of Kenya.

In conclusion, it is my conviction that this Policy will continue to set the pace and give the right direction to further the development of our economy in general and the ICT sector in particular for the benefit of all stakeholders.

Joe Mucheru, EGH
Cabinet Secretary for Information,
Communications & Technology

2 Preamble

The National ICT policy was last reviewed in 2006. Since then, the sector has experienced rapid technological advancement, changes to the legal and administrative framework and many emerging issues. The latter include increased IT enabled services, increased demand on bandwidth and for Quality of Service (QoS), challenges of cyber-security, integration projects and harmonization of ICT policies regionally and internationally.

This policy is a product of an all-inclusive, participatory and consultative process. It is guided by the following principles; Putting ICT at the centre of the national economic agenda, Improving access to ICT especially broadband, efficient public service delivery and maintaining an open government, Putting the private sector first and Leveraging on ICT to promote Sustainable Development Goals.

The main policy objectives are to (1) Create the infrastructure conditions for use of always-on, high speed, wireless, internet across the country. Provide enabling infrastructure and frameworks that support the growth of data centres, pervasive instrumentation (Internet of Things), machine learning and local manufacturing whilst fostering a secure, innovation ecosystem; (2) Grow the contribution of ICT to the economy to 10% by 2030, by using ICT as a foundation to the creation of a more robust economy, providing secure income and livelihoods to the citizenry; (3) Leverage regional and international cooperation and engagements to ensure that Kenya is able to harness global opportunities; (4) Position the country to take advantage of emerging trends such as the shared and gig economy by enhancing our education institutions and the skills of our people, and fostering an innovation and start-up ecosystem that is able to lead on a global scale; and (5) Gain global recognition for innovation, efficiency and quality in public service delivery. Services will be delivered in a manner that ensures we have a prosperous, free, open and stable society.

These objectives will be actualised through four thematic focus areas: **Mobile first**; which will ensure that every Kenyan can access inexpensive Internet and reasonable access to locally produced devices;

Market; designed to increase the overall size of the digital and traditional economy to 10% of GDP by 2030; **Skills and Innovation**; which outlines a careful plan designed to jump-start a self supporting ecosystem that will produce world-class research, technology products and industries; **Public Service Delivery;** requires that all government services are available online, that every Kenyan has online access and that government services are delivered quickly and fully at the time and place that they are needed.

The government will also continue to play its role in promoting broadcasting and telecommunication services through: provision of infrastructure to enable expansion of digital TV coverage in unserved and underserved areas; encouraging development of high quality, easily accessible, relevant local content; development of a National Language Policy to encourage use of local languages in developing content; ensuring that the radio frequency spectrum is managed in equitable and transparent manner with specific and clear conditions; encouraging sharing of infrastructure and enforcement of quality of services regulations to ensure availability of reliable services by service providers and realization of an effective postal and courier ecosystem to drive the development of e-commerce and the digital economy.

The implementation of the policy will necessitate institutional reforms in some Semi-Autonomous Government Agencies that will result in a more vibrant sector

Finally, to implement this policy effectively, the current legal, institutional and regulatory framework will be reviewed and aligned to the strategic policy focus. A robust monitoring and evaluation system will be put in place to track its implementation and the reviews will be shared annually.

Jerome Ochieng
Principal Secretary for ICT and Innovation and for Broadcasting and Telecommunications

3 Vision and Mission

3.1 Vision

Kenya as a globally competitive knowledge based economy

3.2 Mission

To facilitate universal access to ICT infrastructure and services all over the country

4 Overview of the Policy

This policy is designed to realise the potential of the digital economy by creating an enabling environment for all citizens and stakeholders. A review of the 2006 policy was necessitated by the rapid changes and developments in the ICT sector, evolving global trends and the fast-changing public needs. The Fourth Industrial Revolution is driving automation and massive data exchange, impacting our macro and microenvironments and increasing the level of ICT consumption worldwide. It is for this reason that we are setting up a policy designed to take advantage of these changes and trends that will enable Kenya to become a more prosperous participant in the global economy. The ICT Policy defines the forward-looking position of the Government on various areas of the evolving ICT sector landscape in Kenya.

The policy objectives:

1. Create the infrastructure conditions that enable the use of always-on, high speed, wireless, internet across the country.
2. Facilitate the creation of infrastructure and frameworks that support the growth of data centres, pervasive instrumentation (Internet of Things), machine learning and local manufacturing while fostering a secure, innovation ecosystem.

3. Grow the contribution of ICT to increase the overall size of the digital and traditional economy to 10% of GDP by 2030, by using ICT as a foundation for the creation of a more robust economy, providing secure income and livelihoods to the citizenry. Leverage regional and international cooperation and engagements to ensure that Kenya is able to harness global opportunities.

4. Position the country to take advantage of emerging trends such as the shared and gig economy, by enhancing our education institutions and the skills of our people and by fostering an innovation and start-up ecosystem that is able lead in the adoption of emerging trends on a global scale.

5. Gain global recognition for innovation, efficiency and quality in public service delivery. Government services will be delivered in a manner that ensures we have a prosperous, free, open and stable society.

In light of the policy objectives outlined, this policy will focus on 4 key areas:

1. Mobile First
2. Market
3. Skills and Innovation
4. Public Service Delivery

4.1 Mobile First

The heavy investment by Government in internet connectivity infrastructure has enabled access by 99.9% of our citizenry, mostly via mobile phones. Internet access anywhere and at any time is pivotal to the successful growth of a knowledge economy. The Government will continue to invest in infrastructure for universal, always-on, high speed, wireless data connectivity for every citizen.

The government takes cognisance of the global trend of ubiquitous computing which shows that the world is going mobile people want to access the internet anywhere and at any time. In recognition of this trend, this policy will drive a mobile first approach, ensuring that every Kenyan has reasonable access by focusing on mobile and wireless infrastructure. The government will provide the network; storage and processing infrastructure frameworks and guidelines that will see Kenya successfully compete on a global scale. This will include:

1. Investments in the infrastructure needed for work such as data centres, hardware, software, telecommunications, networks and broadcasting

2. Creating an enabling environment for the local assembly and manufacturing of devices

3. Strengthening of our payments and logistics infrastructure

4. Growth and adoption of local e-commerce platforms with global reach

5. Provision of trusted security and certification infrastructure for all electronic communication and transactions

6. Accessible news and media platforms both offline and online

7. Affordable marketing and advertising platforms with quality audience data

8. Providing an all inclusive ICT environment by encouraging gender equality and accessibility to persons with disabilities

9. Coordination and cooperation with international systems and platforms for global reach

4.2 Market

By the year 2030, Kenya will have an estimated population of 66M, with over 200M devices and sensors connected to the Internet. All aspects of our lives including money, security, governance, agriculture, tourism, education and health will be fully and seamlessly integrated into the digital economy. Technology is and will continue to catapult the growth of globalisation and trade across borders. Through regional and international integration, the market will be global. The Government recognises, and will leverage our youth demographic as our competitive advantage in the global market. Over 1M youth enter the job market every year; the Government will use ICTs as an enabler in providing dignity and financial stability to our youth.

This policy aims to increase the overall size of ICT contribution to the digital and traditional economy to 10% of GDP by 2030. In doing so, this policy will provide a blueprint for creating things, rules and money.

Things: For those who want to develop devices, applications and deliver services to the Kenyan populace, the market will be massive; blocks such as Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), theSmart Africa Alliance and the African Continental Free Trade Area will open up regional, continental and global markets. We will take advantage of the Internet of Things (IoT) and the entire infrastructure laid out in our Mobile First objective to scale our local businesses beyond our borders. The Government will encourage the use of our unique culture and languages to grow our technology ecosystem and elevate our businesses to compete at a global level. It will promote the adoption and use of the dot KE country level domain name and set up the frameworks needed to ensure that Kenyan goods and services are of quality and in high demand globally in order to attract superior prices.

Rules: This policy will form the basis for the regulation of converged industry; the rules that we set up will provide an enabling environment that is secure, open and transparent. It will define a competition framework to encourage and protect investments, enforce employment and taxation rules to drive growth and define the supporting business infrastructure that allows citizens and the world to do business with Kenyans. This includes such things as identity management, cryptography and block chain, and the extension of traditional laws, regulations and norms to the online space. As we move towards a knowledge-based economy, the Government will enable access to information to every citizen by encouraging the private sector to publish statistics that will enable the SME market to take advantage of trends. This policy will promote the availability of relevant audience and demographic data to inform the marketing strategies of businesses, and labour market information to inform educators and employers. Due to the convergence of infrastructure and services, the Government will restructure the regulator to enable convergence in the regulation of the ICT industry, allowing for diversity in infrastructure, content and services offerings all in line with the Constitution. This will allow for the early adoption of emerging trends, such as over-the-top providers (OTTs), convergence and rapid changes in the sector. This area highlights the guidance of government on practice and procedure, and the creation of an overarching architecture for the industry.

Money: The medium of exchange for goods and services is digital and traditional forms of money. Kenya is currently the global leader in mobile money with over 70% of the adult population using these services. This policy aims to promote Kenya as the fintech infrastructure hub for the region, and use money strategically to direct the market towards the attainment of national goals. This policy seeks to create a digital environment where money creates value quickly by moving rapidly and efficiently through the business transaction cycle. The fintech opportunities

and infrastructure will provide an enabling environment for businesses to raise capital, list on the Nairobi Securities Exchange and attract foreign direct investment. The policy will also encourage both local and international businesses to be domiciled in Kenya, and get high returns. This will in turn attract and retain global talent in Kenya.

The Government will leverage our skills and innovations to grow our businesses and provide a strong intellectual property infrastructure to ensure innovations are protected. It will enable a 24hr economy, enforce the use of the National Public Key Infrastructure and ensure all safety nets are in place to protect our money and investments.

4.3 Skills and Innovation

This policy outlines a careful plan designed to jump-start a self-supporting ecosystem that will produce world-class research, technology products and industries. The technology environment is changing fast and Kenya needs to not just keep up but to lead the charge. In order to ensure that we are always on the right track, every two years we will reassess research and development priorities and set five new technology goals. The government will fund investment in the selected new technologies, encourage the private sector to focus on the identified research and investment priority areas and help create skills in those technologies by funding scholarships, grants, challenges and innovation awards.

Our people need gainful work, by ensuring incentive and educational alignment with global market requirements; Kenyans will be in demand both locally and internationally for technical work. We want to be leaders and innovators in the fourth industrial revolution and so we want to attract and create the best educational institutions in the world. We will continue to encourage partnerships such as the International Space Program in Malindi and ensure that our curriculum takes into account the gig economy, generating a skilled workforce that is attractive globally.

By 2020, there will be over 5 billion connected people worldwide; the average internet user will be from the emerging markets and we want to connect with them on all digital platforms. Our unique culture and languages put our Country in a strategic position to innovate for the emerging markets, forming partnerships and strategies that guide our training and skills generation.

The Government will support and enable the development of a robust technology entrepreneurship ecosystem in the country through an ICT Co-Fund that will unlock requisite capital, avail easy access to critical technical assistance and actively promote the adoption and utilisation of local innovations. Public long-term funds will be incentivised to set aside 5% of their investments for the local ICT ecosystem.

The Government will work to encourage early Initial Public Offerings in the Growth Enterprise Market Segment of the Capital Market (GEMS) and support the growth of Permanent Listed Vehicles that build bridges between investors and the businesses that need investment to grow.

Government ICT procurement, including security and defence, will prioritise award of tenders to new and innovative local businesses to permit greater participation by emerging enterprises and preferentially adopt home grown solutions. Kenyan built solutions will be preferred over any other solution; where there are no local businesses that meet the tender requirements, skills transfer to local firms and personnel will be a mandatory requirement.

4.4 Public Service Delivery

It is our policy that all government services must be available online, that every Kenyan has online access and that government services are delivered quickly and fully at the time and place that they are needed. This ICT policy requires all arms of government to build, deploy, operate and manage locally built back-end and front end systems to deliver services. This policy also requires that Kenyan data remains in Kenya, and that it is stored safely and in a manner that protects the privacy of citizens to the utmost. Government services will be delivered in a manner that ensures we have a prosperous, free, open and stable society.

This policy aims to promote the collaboration of the National and County governments to ensure that all services, both physical and digital reach every citizen at a guaranteed high level of quality. The ICT policy requires that:

- Service charters be published by the public sector and citizens sensitised about them.

- Government services be easily accessible to all citizens using their mobile devices anywhere and anytime.

- All procurement and tender processes be electronically published and open to all.

- Revenue collection to be transparent and accountable.

- All arms of government implement and manage locally built back-end and front-end systems to deliver services.

- E-services are provided on platforms that are secure from fraud and breach of privacy of personal information.

- All government systems currently developed and all future systems be integrated with each other.

- All government services be available online. Every citizen to have online access and that government services are delivered quickly and fully at the time and place that they are needed.

- Kenyan data remains in Kenya, and that it is stored safely and in a manner that protects the privacy of citizens.

The Government will be efficient, secure and open. It will be recognised internationally for its innovations and quality in public service delivery. This policy requires and mandates the use of Universal Personal Identifier (UPI) for all civil servants and citizens and a local payment scheme for Government transactions.

5 Background

5.1 ICT and Vision 2030

The Vision 2030, Kenya's Long Term Development Blueprint aims to create a globally competitive and prosperous nation, transforming Kenya into a newly industrialising, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Vision 2030 three pillars, namely the Economic, Social and Political are anchored on macroeconomic stability; continuity in governance reforms; enhanced equity and wealth creation opportunities for the poor. The Economic Pillar that captures the expectations of the ICT market seeks to improve the prosperity of all regions of the country and all Kenyans by achieving a 10% GDP growth rate by 2017.

ICT is identified as enabler or foundation for socio economic transformation. The Vision recognises the role of Science, Technology and Innovation in modern economy in which new knowledge plays a central role in boosting wealth creation, social welfare and international competitiveness. This will be done through: economic and institutional regime that utilises existing knowledge; creation of new knowledge and entrepreneurship; educated and skilled population; dynamic information and communication infrastructure that facilitate processing and dissemination; and effective innovation system and research.

5.2 Rationale for Policy Review

The review of the policy has been necessitated by the rapid changes and developments since 2006 in order to keep abreast with development of emerging technologies. The review is therefore necessary to cater for the changes in legal and regulatory frameworks, technology advancement and emerging issues. These developments include:

- **Legal and Regulatory Frameworks:** Enactment of Constitution of Kenya 2010, Kenya Information and Communication Act 2013, Media Act 2013 and restructuring of Government functions.

- **Technological Advancement:** There have been many changes in the technological and competitive space since 2006, some of these include the convergence of ICT technologies, Migration from analogue to digital TV broadcasting and its effect on broadcasting market segment and radio spectrum, and advancement of mobile technology enabling new services.

- **Emerging Issues:** Increased IT enabled services, increased demand on bandwidth and for Quality of Service (QoS), Challenges of cyber security, Regional integration projects and Harmonisation of ICT policies in the international and regional fore, Content in the era of media convergence and globalisation; Global partnership on Child Online Protection and changing consumer preferences.

5.3 Guiding Principles of the ICT Policy

In the development of this policy, these principles were taken into account:

Economic Agenda

Put ICT at the centre of the national economic agenda, recognising the role of the ICT sector as a critical pillar in national development and the attainment of the goal of becoming and remaining a global leader in the knowledge-based economy.

Ubiquitous Access

Fulfil the goal of giving every Kenyan access to reliable, affordable, high-speed broadband connectivity

Constitutional Principles

Improve government accountability, efficiency, service delivery and maintain an open government. Develop and protect citizen rights and duties as enshrined in the constitution of our republic.

Private Sector

Give the interests of the private sector top priority in order to foster entrepreneurship, innovation, investment and growth.

Sustainable Development

Leverage ICT to promote sustainable development, accelerate human development, bridge the digital divide and develop a knowledge society.

5.4   Situational Analysis and Highlights

5.4.1 Regulatory Background

The Constitution of Kenya, 2010, the Kenya Communications Act (No. 2 of 1998) and as amended by the Kenya Communications (Amendment) Act, 2009, and the Kenya Information and Communications (Amendment Act) 2013 provide the main framework for regulating the communications sector in Kenya. Other statutes include the Media Act, 2013 and the Kenya Information and Communications Technology (ICTA) Order 2013; among others.

5.4.2 Operational Environment

Kenya is currently one of Africa's fastest growing ICT markets where ICTs have increased productivity in all spheres of production process and enabled expansion of skills, contributing to improved standards of living for Kenyans. The Economic Survey 2018 report provides an overview of the ICT sector performance and development trends, recognizing that ICT output increased by 10.9% to Ksh 354.1 billion in 2017.

- Fibre Optic Coverage: Every county headquarters has been reached by the National Optic Fibre Broadband Infrastructure (NOFBI) in addition to other fibre-optic cables owned by private companies, Kenya Electricity Transmission Company (KETRACO) and Kenya Power and Lighting Company (KPLC).

- 2G Coverage: Geographical coverage is 45% of Kenya's land area, with 94.4% of the population covered.

- 3G Coverage: Geographical coverage is 17%, with 78% of the population covered

- 4G Coverage: Reaches 37% of the population and 15% of the surface area.

- Internet Domains: The total number of Internet domains grew by 13.08 per cent to 83,646 in 2018. The number of ".co.ke" domains increased by 13.72% to account for 92.5% of the total registered domains in 2017. Enhanced uptake and use of sub-domain names as a result of awareness on the benefits of use, led to the doubling of domains under information content, mobile content and those used in network devices to 374, 126 and 466, respectively.

- Broadcast Services and Subscriptions: The number of Frequency Modulation (FM) radio stations stood at 173 while Free To Air television stations were 75 in 2018. The number of digital signal distributors in the country remained at 5 Digital Terrestrial Televisions   Set-Top   Box   (STB) subscriptions stood at 4.5 million in 2018 while cable TV and direct to home satellite subscriptions stood at 1.28M.

- Newspaper   Circulation   and   online Newspaper Readership: In 2017, the circulation of daily English and Kiswahili newspapers declined by 4.9 per cent and 9.9 per cent, respectively due to online readership of newspapers. Similarly, the number of weekly English newspapers in circulation decreased by 5.9 per cent over the same period. However, the average online readership went up by 20.1 per cent in 2017.

- The value of mobile commerce transactions expanded by 85.5 per cent to Ksh 3.2 trillion in 2017. The growth was spurred by customer's preference for mobile commerce and the availability of these services across the country.

5.4.3 Technology Trends

Gigabit and Petabit Wireless: Networks at the edge are going wireless. We observe the development of NBase-T, Terahertz wireless and other high-speed communications developments, and anticipate their wholesale adoption across all sectors of Kenya. Kenya will standardise on Gigabit/Ethernet speed wireless networks.

Ubiquitous Communications: Internet access is available everywhere, all the time to everybody and everything via mobile phone, Wi-Fi, cable and other means. The internet protocol has become the de-facto means of communication. This trend will intensify and increase as available speeds improve.

Pervasive Instrumentation: As more and more devices and elements of our environment become network enabled, from electric power meters, industrial equipment to household appliances we are entering an era where everything is producing data continuously and everything can talk to everything else. This is the Internet of Things (IoT) or to use more recent nomenclature the Internet of Everything (IoE). The ability to remotely effect physical change inherently poses significant challenges and provides enormous advantages. You can now remotely monitor, manage and change processes and states without having to physically be present, but it also means you can do damage, destroy facilities and injure people remotely.

Big Data: Every person, device and instrument has become a data emitter. The aggregation and storage of these enormous data volumes has led to a technical phenomenon called big data. The storage, analysis and interpretation of big data requires specialised techniques and equipment for which we must be prepared. Kenya is currently a net emitter of data and the facilities, capability and interest in being a sink need to be developed. We need to develop the capacity to store and use our own data.

Deep Learning: Machine learning is a branch of artificial intelligence focusing on data classification, trend identification and predictive analytics. Using big data for machine learning is called deep learning. Deep learning has led to fundamentally useful outcomes such as accurate speech recognition, automated expert level medical diagnosis, better-than-human computer vision, holistic systems like self-driving cars and self guiding drones, and more mundanely improved purchase recommendation systems, customer credit rating and epidemic outbreak prediction.

Blockchain and Digital Currency: A peer-to-peer distributed digital ledger that provides an immutable time-sequenced record of all transactions (blockchain) is a peer-to-peer distributed digital ledger that provides an immutable time sequenced record of all transactions, does not require trust between parties and facilitates electronic "smart contracts". Blockchain can be used to track digital assets, assets whose ownership can be verified digitally such as land, equities, shares and derivatives, votes and currency. It's most famous implementation is in Bitcoin, but it not limited to those domains. A blockchain's integrity hinges on strong cryptography that validates and chains together blocks of transactions, making it nearly impossible to tamper with any individual transaction record without being detected.

The Sharing Economy: The Sharing Economy is a socio-economic ecosystem built around the sharing of human, physical and intellectual resources. A sharing economy is an economic model in which individuals are able to borrow or rent assets owned by someone else. The sharing economy model is most likely to be used when the price of a particular asset is high, and the asset is not fully utilised all the time.

Sitting in any large parking lot are dozens of cars, which represent hundreds of millions of shillings of non-performing depreciating capital assets. Putting those assets to use, when the owner is not using them, is the basic operating model of ride-sharing and online taxi companies.

Communities of people have shared the use of assets for thousands of years, but the advent of the Internet has made it easier for asset owners and those seeking to use those assets to find each other. This sort of lending is sometimes referred to as a peer-to-peer (P2P) rental market.

Sharing economies allow individuals and groups to make money from underused assets. In this way, physical assets are shared as services. For example, a car owner may allow someone to rent out their vehicle while they are not using it, or a homeowner may rent out their home while they are on vacation.

The Gig Economy: The gig economy is a labour market characterised by the prevalence of short-term contracts or freelance work as opposed to permanent jobs. In order to be successful in the gig economy, each individual needs to manage their time and finances as if they were a one-man company.

The mobility of white-collar work, the emergence of freelancing platforms and the drive for operational efficiency have transformed the nature of work. The fastest job growth globally is in "nonemployee" firm's i.e. self-employed, short term contract (measured in hours), remote and telecommuting workers. These participants in what is called the gig-economy, where people eschew formal salaried employment for freelancing work are a growing and significant proportion of the workforce.

Adaptive Security Architecture: The complexities of digital business and the algorithmic economy, combined with an emerging "hacker industry," significantly increase the threat surface for our nation. We need to develop the capacity to detect and respond to threats, secure our communications and data, protect our people and infrastructure, and develop resilience in the face of disaster.

Mass Personalisation and Personalised Manufacturing: The widespread availability of experience individuation by such services as Facebook and Google has created an expectation of personalised custom public service delivery. Cost effective small-run manufacturing technologies such as 3D printing have transformed marketplace dynamics making a marketplace of one economically feasible. This evolution in the calculus of economies of scale will have a significant impact on Kenyan industry.

5.5 Challenges

There are significant challenges to be overcome in achieving the goals of this policy in the short term. Some of these challenges, addressed in this policy, include:

1. Unequal investment and access to ICTs in un-served and under-served areas within Kenya

2. The under-utilisation of ICTs in the provision of government services and the underdevelopment of opportunities for economic growth and job creation

3. Cultural and attitudinal resistance to the implementation of ICT-based services and offerings

4. Cybercrime and cyber-security vulnerabilities

5. Inadequate policies, legal and institutional frameworks at the national and devolved county levels of government

6. A dearth of competent and skilled human capacity due to inadequately and inappropriately equipped universities and tertiary institutions

7. An underdeveloped innovation ecosystem that hinders the development and growth of Kenyan corporations and industry

8. Structural and legal inadequacies that hinder the development and evolution of online transactions, such as a National Addressing System (NAS)

6 Policy Focus Areas

The Kenya National ICT Policy outlines the policy of the Government of Kenya in relation to the design, development, acquisition, deployment, operation, support and evolution of public and private ICTS. It defines the current and forward looking position of the government on various areas of the evolving and emerging technology landscape in Kenya.

6.1 Mobile First

6.1.1 Background

The government recognises that to become and remain globally competitive in the emerging order, it is necessary to invest in and provide the conditions for always-on, high speed, wireless data connectivity for every citizen, everywhere in Kenya. In order to support this goal it is necessary that there be a robust, capable backbone to back haul traffic, and that the conditions in the marketplace are conducive to the provision of competitively priced, affordable last-mile connectivity for every citizen. This policy outlines the conditions required for the private sector led provision of services, and provides for the regulation and incentives for affordable high-

speed wireless access across the length and breadth of Kenya. To balance the principle of open access with the need to provide commercial incentives that foster investment, the Communications Authority (CA) will license county-based service providers to offer last mile access solutions and provide equitable and affordable access to NOFBI for such licensed providers.

6.1.2 ICT Infrastructure and Access

The Constitution of Kenya establishes a devolved system of government and provides inter alia that broadcasting, postal and telecommunications services shall be the mandate of the national government. In fulfilment of this mandate the national government has invested and continues to invest in a National Optic Fibre Backbone Infrastructure (NOFBI). Counties are encouraged to provide ICT infrastructure and skills development as will permit them to take advantage of this national ICT policy. The national government will provide such technical and knowledge support as the counties may require to give regional effect to this policy.

This policy mandates the deployment of the following services and systems:

Infrastructure Sharing: Infrastructure development and deployment is a capital-intensive undertaking and should be managed on a prudential basis nationally. The government will continue, as it has, to invest in common, publicly available high capital undertakings such as a national data transport backbone, central and regional data centres, and carefully managed shared radio frequencies. The Communications Authority will oversee access, license operators, and regulate and price commercial access to infrastructure built with public funds. All infrastructure built with public funds will be available for use by Kenyan private and commercial operators on fair, affordable and equitable terms without prejudice to their size, location or composition. A legal framework will be developed to provide for a fair use policy, by which privately established infrastructure may on fair commercial terms be made available by one operator to others. The Communications Authority will ensure that the arrangements between operators and service providers provide national resilience to disasters, equitable access to naturally limited resources and sites, and that collocation of services and equipment is encouraged, while ensuring

optimal service reliability, redundancy, carrier and net neutrality, and the security of data both at rest and in transit. To this end:

1. The National Government will develop a National Integrated Infrastructure plan. Each County Government will also develop a County Integrated Infrastructure Plan. These integrated plans will be designed to facilitate rational, cost-effective, sustainable and easily maintained ICT infrastructure by multiple stakeholders

2. The National Government will develop a central publicly available registry of the ICT infrastructure and resources of government agencies, operators, utility companies and infrastructure building companies to which reference may be made to prevent unnecessary duplication and waste of scarce ICT resources. Regulations will be promulgated to ensure that regular and accurate reports are made by government agencies, licensees and utility companies.

3. Government will strictly enforce quality of service regulations to ensure reliability and availability of services

4. Government will provide industry players with equitable access to publicly owned infrastructure

5. Government will review the National Broadband Strategy to ensure provision of high-speed affordable connectivity to all citizens in all places. Where it is not commercially viable for operators to invest in infrastructure, the government will promptly build and develop publicly owned supporting infrastructure to facilitate commercial last mile service provision.

6. The Government will adopt an Enterprise Architecture to govern the implementation and deployment of infrastructure, hardware, software, systems and services across the public sector in a coherent, cost-effective and sustainable manner. In order to ensure efficient use of funds and limited resources, the Government shall reach agreements for economic bulk purchase of software licenses and standard ICT equipment. All government Ministries, Departments, Agencies and bodies are required to acquire such licenses and equipment, as they need, at the reduced government negotiated price. These prices will be submitted to the Public Procurement

Oversight Authority for inclusion in the Market Price Index.

7. The Government will liaise with all relevant government agencies to require that all new commercial and private developments are designed and adequately provided with facilities for high-speed connectivity

8. The Government will be open to, support and encourage the development of new business models that provide for infrastructure sharing or the provision of services in under-served and unserved areas. The government will design incentives, or provide funding on such terms and in such manner as will best achieve ubiquitous broadband access.

Internet Exchange Points: Internet Exchange Points (IXP) help strengthen the local Internet ecosystem, develop the local Internet industry. Their benefits include:

- Improve Internet quality and affordability in local communities;

- Improved local Internet connectivity;

- Improve competitiveness;

- Serve as a hub for technical activity; and

- Encourage local service hosting and local content development and applications.

The Government encourages partnerships that seek to enhance peering and interconnection through deploying additional IXPs and use of deployed infrastructure, including national and international fibre cables, and local data centre development.

Data Centres: The Government will develop guidelines for current and future data centres to avoid inefficient public and private ad-hoc investments.

With the mandated requirement for the licensing of county based last-mile service providers, County governments are encouraged to create shared data centres for local peering and internet traffic exchange. In support of this policy objective:

1. All government Ministries, Departments and Agencies shall share and optimise data centre infrastructure. All government data centres, not specifically designated for national security purposes, shall be approved by the Ministry of ICT, which will not permit new investment where there is available capacity in any other ministry that may be used, thus providing a cost efficient, scalable and secure environment for government data and information storage;

2. The government will promote, encourage and license private sector investment in neutral data centres by companies incorporated for that purpose;

3. Encourage Kenyan businesses and County governments to share data centre infrastructure to minimise network duplication;

4. This policy mandates the development of standards for data centres, providing legal and regulatory coherence with Kenyan safety and environmental protection standards. The standards will take cognisance of national disaster recovery and resilience frameworks, and the constitutional requirements of devolution and diversity;

5. Regulations and laws will be enacted that specifically ensure that data is processed fairly and lawfully in accordance with the rights of citizens and obtained only for specific, lawful purposes, and that clearly establish that all data on a person is owned by the person;

6. The government will ensure the availability of basic infrastructure for approved data centers, such as reliable grid power, subsidised or discounted electric power costs, access to the national publicly-owned data transport backbone, security within the context of the national cyber-security framework, physical policing plans, and the national data classification guidelines. All centres that hold public data must be a minimum of a level 2 Data Centre.

Rights of Way/Way Leaves: Rights of way, way leaves, permits and clearances have been a persistent and recurring challenge to the deployment of cabling plant, towers and other infrastructure. The Government will:

1. Work with County Governments to develop harmonised way leave guidelines and charges that protect the ICT infrastructure, optimise usage, protect the environment and roads, and prevent multiple charges;

2. Require that all current and future road, rail and underground power grid designs incorporate common crossing ducts to prevent damage wherever crossing is needed and provide commonly available fiber ducts along their length;

3. Take direct corrective measures to protect against way leave encroachment by developers especially land owners whose properties front major highways and other access roads;

4. Where there are no pre-existing ducts, to require infrastructure sharing on new builds as a pre-requisite condition for licensing. The government will where appropriate provide fee breaks, incentives, discounts, government cost-sharing and grants to the primary duct developer and require the provision of equitable access to other service providers, government agencies and utility companies.

Wireless Data Infrastructure: The Government will facilitate the ubiquitous deployment of new-generation high-speed wireless broadband connectivity infrastructure, in order to reduce from- the-curb and in-building deployment costs, improve the cost effectiveness of broadband delivery and access, and provide effective, reliable, secure internet infrastructure. All new government network builds and deployments will consider a wireless-first approach. This requirement especially applies to village, small community and government building networks.

Broadcast Signal Distribution: The Government will continue to license broadcast signal distribution services depending on the market growth and the availability of the required radio frequency spectrum resources to ensure that the use of broadcasting infrastructure is maximised and frequencies are utilised efficiently. All licensed signal distributors will be required to provide services to licensees on an open access and non-discriminatory basis.

IPv6: The Government will support and encourage the migration to modern internet protocols that provide functional efficiency and sufficient scope for future technological developments. All national government installations will use IPv6 at a minimum. All new national government installations must use IPv6.

Complementary Infrastructure: The Government recognises that the economic impact of ICT is contextual and dependent on other complementary infrastructure such as energy, transport and communications. The Government will:

1. Provide incentives that enable the development of infrastructure for the public good

2. Strengthen mechanisms that ensure open access for all players and users

3. Provide support infrastructure such as roads, power grid access, and security to support ICT development

Domiciliation of Manufacture: It is the government's aim and policy to establish the manufacture of ICT equipment and infrastructure components in Kenya. To this end, the government has provided in various sections of this policy, incentives and various measures to achieve this objective, such as:

1. Ensuring that a percentage of rare earths mined in Kenya are kept for domestic consumption and manufacture

2. Providing fiscal incentives for the creation of local manufacturing plants

3. Providing for technology licensing assistance to Kenyan enterprises

4. The provision of free government funded consultancy and mentoring services especially to the ICT manufacturing sector

5. Regional and continental trade assistance and market access, amongst others

6.1.3 Universal Access

It is the policy of Government to ensure that ICT services both public and private, and the requisite knowledge to deploy and use them are available to our citizens at the time, place and manner that they are required, and also that all citizens can and will participate in the knowledge economy.

The government will seek to ensure that:

1. The Universal Service Fund is prudently managed to drive universal access and that service is provided in areas service

providers do not consider economically viable;

2. High quality internet access is available everywhere in Kenya;

3. Every Kenyan can afford a device that they can use to access the Internet;

4. Every Kenyan has access to free advice about appropriate digital technology choices for their needs;

5. Every Kenyan has the skills they need to use their choice of digital technology appropriately;

6. Kenya receives global recognition as a safe place to do digital business.

This requires a multidimensional approach to the tri-fold challenge of ubiquity, utility and participation.

Ubiquity: The challenge of equipping the entire geography of our nation with the infrastructure and connectivity to make data everywhere available is variously addressed in this policy document. It is the government's policy to treat all populated areas of our country equally and provide equivalent infrastructure per capita.

Participation: To achieve the full participation of every Kenyan it is the government's policy to provide every citizen with the Tools, Attitudinal change support, Skills and Knowledge (TASK) necessary to participate in our joint digital future. The plan is to ensure that a significant proportion of Kenyans' life, work and play will be digital.

Tools: The tools provide the environment through which people can access, use and enjoy the technology in their work, community and recreational activities. These include services, devices, access and applications. It is the government's policy to provide:

1. A Digital Identity (Universal Personal Identifier) for every citizen: for the safe and lawful use of services;

2. Public Key Infrastructure: To provide for security of transactional data, party recognition and contractual validity

3. Legal framework and technical support for blockchain: to securely record all transactions

4. Regulatory and Legal support for digital payments: to enable safe financial transactions

5. A delivery services framework for the delivery of physical goods and services

6. Recognition and enforcement of digital contracts to build confidence in online transactions

7. Cyber and computer crime and Critical Infrastructure legislation.

The policy envisages that citizens will use a wide variety of devices: smartphones, tablets, computers and Internet of Things devices. However, the basic properties required of all these devices are that they should be affordable, secure, internet-enabled, identifiable and should promote mobility.

Since internet-enablement is a basic principle of participation this policy seeks to facilitate connection to the network with a secure digital identifier and the delivery of a mandated minimum bandwidth (defined in the Broadband Strategy) to enable reasonable quality of interaction.

Attitudinal Change: Support Purely online transactions for non-digital goods foundationally require a degree of trust and trustworthiness combined with an openness to change and innovation. This policy recognizes that there are certain attitudes and behaviours that should be encouraged in order for Kenya to maintain and grow it's leadership in the African and global digital space.

It is the government and people of Kenya's confident viewpoint that Kenya is a leader and not a follower in this realm. We have observed what this confident attitude has done for Kenya in the world of sports, especially athletics and team sports, and we believe that it can have similar a dramatic result in the realm of technology.

This policy seeks to promulgate a digital culture wherein citizens have a preference for activities, goods and services that are channelled and / or facilitated through technology and where all strata of society integrate digital technologies into their lives as a natural way of performing all the activities necessary for life and happiness. The policy will

encourage integration of digital technologies into the educational and vocational system at all levels to ensure that our current and future workforce is prepared for the changes that are happening now.

Skills: It is the Government's position that all Kenyans should become proficient users of appropriate digital technology so that they can benefit from the sea-change currently underway. This policy seeks to build on the already universal use of mobile digital money and inculcate widespread adoption of cognate digital services, goods and activities.

6.1.4 Accessibility

The Government will provide an ICT environment fully accessible to persons with disabilities. The Government of Kenya is fully committed to providing equal treatment to people with disabilities with respect to the use and benefit of ICT services, programs, goods and facilities in a manner that respects their dignity and that is equitable in relation to the broader public.

Kenya is a signatory to the United Nations Convention on the Rights of Persons with Disabilities (CRPD), adopted by the UN General Assembly on 13th December 2006. The Convention stipulates that Persons with Disabilities have a right to access to information through different mediums with Article 9 covering accessibility including ICTs while Article 30 covers television programmes, films, theatre and other cultural activities. The World Health Organization estimates that about ten per cent of the world's population has some type of disability.

This policy mandates full accessibility for persons with disabilities. All public and government communications will be suitably instrumented.

The Government will take measures to:

1. Ensure that ICT services and emergency communications made available to the public are provided in alternative accessible formats for persons with disabilities (PWD);

2. Review existing legislation and regulations to promote ICT accessibility for PWDs in consultation with organisations representing PWDs among others;

3. Promote the design, production and distribution of accessible ICT at an early stage;

4. Ensure that persons with disabilities can exercise the right to access to information, freedom of expression and opinion;

5. Require both public and private entities that render services to the public to provide information and services in accessible and usable formats for persons with disabilities;

6. Require content producers for distribution and public consumption in Kenya to produce such content in accessible format;

7. Ensure that websites of government departments and agencies comply with international web accessibility standards and are accessible for persons with disabilities;

8. Provide incentives to providers of accessible technology solutions including software, hardware and applications;

9. Take such measures as will lessen the burden of acquisition of accessible technologies and associated devices for PWDs through fiscal means such as funding acquisitions, etc.;

10. Ensure that licensed providers of telecommunications services make available services and supporting technologies for persons with disabilities including emergency services, accessible public phones and relay services to enable persons with speech, hearing and seeing disabilities to communicate with the rest of society;

11. Ensure existing works in print format to be adapted into accessible format transformative forms which can be used by the blind without any liability; and

12. Promote Research and Development for ICT access for Persons with Disabilities.

6.2 The Market

6.2.1 Background

This ICT policy has been formulated to spur economic growth, recognising ICTs as an enabler. The contributions of the ICT policy to The Market are in three domains, namely:

Money: We want to use ICT to enable more people to make more money faster. It is our goal to give every Kenyan the opportunity to

earn a good living by utilising the digital infrastructure that the government is investing in.

Rules: This policy requires carefully crafted rules that ensure that there is fairness in the market place, that transactions are honoured, contracts and agreements are enforced, and that that scarce national resources such as spectrum and rights-of-way are fairly allocated.

Things: For the Market to work efficiently and provide a platform for sellers and buyers, it needs infrastructure. It is our policy to judiciously use public funds to build state-of-the art infrastructure at the best possible price and make it available to the largest possible number of people.

6.2.2 Money

Money, technology and people are the drivers of the digital economy. By mirroring the physical entities used in business, such as bank notes, land titles, certificates and so on with digital equivalents, business can be assisted to move much faster since it is no longer limited by the time it physically takes to move a business item from one geographic location to another. We call the process of designing digital equivalents for physical things "informatisation."

Digitisation is the state where some thing, state or process in the real world can be completely simulated in the digital space – and of course this requires maintenance of exactly the same legal protections that exist in the physical world. To speed up business and accelerate prosperity, financial instruments, including cash, must be fully "informatised" and "digitised."

==The digital and sharing economies are predicated on the legal recognition of digital contracts for digital analogues.==

Knowledge Economy: The Government will enable the move from minimal value economic activities such as the export of unfinished, raw materials to higher value economic activities such as manufacturing, export of finished goods and a digital economy. However, we recognise that high value artefacts such as phones or cars require a complex manufacturing ecosystem involving many interrelated manufacturers, so for instance, to create a computer it is necessary to have metal forming, plastic extrusion, integrated circuit design, silicon fabrication, silicon packaging, specialty bonding materials, microelectromechanical fabrication, circuit

layout, all the way up to operating system and application software development and hundreds of other specialty capabilities, each most likely in a different firm. This ecosystem of self-supporting and dependent industries and technologies is referred as the techonomy in this policy.

This policy is designed to move the Kenyan ICT sector beyond mere trade in technological items, system deployment and software development. This move is intimately connected to our country's capacity to do fundamental research in the physical sciences and our capacity to discover, engineer, realise, productise, and mass produce for global sale, technological artefacts, systems and processes. This will take time to achieve in full, but we start now, as follows:

1. **Set Biennial Research Priorities:** Every two years the Government will set five (5) research priority areas and provide funding to institutions of higher learning and private enterprise in the form of research grants, bonded scholarships, equipment purchase grants and postgraduate course recommendations and certifications in the priority areas.

2. **Set Challenges:** The government in consultation will define challenges and prizes in the priority areas. The solution to the challenges will become the intellectual property of the Government of Kenya, and may be licensed to indigenous Kenyan companies for productisation and manufacture.

3. ==**Protect Intellectual Property:** It is and will continue to be the policy of the government to provide robust protection and enforcement of Kenyan-developed intellectual property rights, and facilitate the rapid and advantageous acquisition of non-Kenyan intellectual property rights.==

4. **Provide Financial Incentives:** Research and fundamental knowledge generation in Kenya has hitherto been the preserve of government agencies and institutions of higher learning. The Government believes that it is time for the private sector to get in on the act.

5. ==**Innovation Hubs:** The Government, in partnership with other arms will assist in the creation of innovation hubs across the country. Initially there will be 290 constituency innovation hubs which==

provide work and maker spaces for the local community. Each innovation hub may be associated with a nearby university or technical vocational education and training institution (TVET) and provide an opportunity for the community to access knowledge, create local solutions to problems, explore with expert guidance improvements to traditional solutions and enter the enterprise pipeline to mass production.

6. **Competitions:** To provide an avenue to showcase locally developed ICT products, the Ministry of ICT will hold annual county and national ICT shows where locally developed products can be showcased, the shows will provide a platform for developers to meet industry and financial partners.

Entrepreneurship: The nature of enterprise is changing rapidly, and the traditional format of corporation, established over 400 years ago of multidivisional functional silos with ownership and management separated, is being superseded by new shapes of organisation based on fluid highly networked, asset light, sharing economy forms. It is our assessment that organisations that span the entire supply chain with a vast array of products are harder to create and have doubtful viability in our environment we posit as policy assumption that small, agile, highly specialised companies seamlessly integrating into a product or service delivery pipeline of global scale are going to gain in prevalence. The top of the food chain will be organisations in a coordination or platform role the service aggregators and arbitrators as it were. In light of this assessment, the Government has encouraged the formation of small companies; agencies such as the Youth Fund and others provide small loans for the establishment and support of small and micro enterprises by the youth.

The public sector ICT business environment is almost by definition geared against the majority of local companies, precisely because the procurement rules and risk minimisation strategy of most government procurement processes favour the award of contracts and tenders to already large and successful companies. This creates an unfortunate chicken and egg scenario where government wants to encourage the emergence and growth of Kenyan enterprise, but precisely because of the perceived risk does not give

Kenyan enterprises a fair turn at the wheel. The Access to Government Procurement Opportunities (AGPO) presidential directive seeks to ameliorate this unfortunate feedback loop by guaranteeing that 30% of government business goes to youth and PWD-owned businesses.

This policy specifically encourages new business models and service delivery paradigms built around freelancing, online-work and opportunity swarming. An example of such a model (in no way prescriptive) would be a consortium of individual workers that form an ad-hoc company around a specific government or service delivery opportunity and share risks and profits, then disband on completion. A subset of whose members subsequently or concurrently join yet another opportunity focused organisation built just in time. These fluid, swarming organisations are an expected element of the future entrepreneurial environment, and are specifically encouraged. The enactment of the Companies Act of 2015 provides wide latitude in the nature and shape of Kenyan corporations.

It is the aim of this policy to ensure that in the next 5 years, there are new firms:

1. 20 Kenyan Multi-national ICT Companies

2. 300 Mid-sized Companies

3. 5000 Small and Medium Enterprises

4. 20,000 Start-ups

This policy provides that:

Contract swarming: Government ICT procurement will consider awards of tenders to new and innovative organisational forms to permit greater participation by emerging enterprises, and adopt home grown solutions.

Buying Kenyan: In every instance where there is a Kenyan solution that meets up to 70% of stated requirements, the Kenyan built solution will be accepted in preference to any other solution from anywhere else. In a selection between Kenyan built solutions the usual beauty-contest evaluation criteria will be used. In government defined priority areas, a 50% solution will be accepted in order to grow Kenyan capacity in those areas.

Start-up ecosystem: Kenya has a healthy and growing start-up ecosystem centred on

universities and innovation hubs. The government will expand this ecosystem outside of Nairobi and it's environs and into the counties. To this end this government supports the development of innovation hubs and hackerspaces across the country at National and County level

The Ministry of ICT will develop and update regularly, and make available online guidelines, best practices, open source software and supporting materials for the creation, operation, management and maintenance of innovation hubs, hackerspaces, chama-based start-up funds and incentives,

Innovation Funding: Very early stage start-ups, in the pre-prototype phase of development, need funding, management and technical support. These firms and individuals are the very life-blood of the start-up ecosystem. To support them the government encourages the establishment of crowd-funding and mentoring networks.

Venture capital: Seed and growth funding for promising start-ups remain a continuing challenge in Kenya. The government will establish an anchor fund that will invest in qualifying ventures for a proportionate equity consideration on a first-loss basis. Co-funders will then be more willing to commit significant capital to qualified entities. By catalysing and unlocking capital into the sector from co-funding partners Private Equity, Venture Capital, Angels, Debt Funders, Guarantors, Development Financing Institutions the Government aims to leverage its anchor fund several-fold leading to a multiplier effect in capital availability.

The Government will also explore innovative ways of raising risk capital for startups by creating incentives for long-term funds to invest in early stage Kenyan enterprises; pension funds are encouraged to set aside 5% of their investments for the local ICT start-up ecosystem.

Capital Markets: The government will work to encourage early Initial Public Offerings in the Growth Enterprise Market Segment (GEMS). The Government will support the growth of Permanent Listed Vehicles that build a bridge between investors and the businesses that need investment to grow.

Leveraging Our Geopolitical Position: Kenya sits at the nexus of East African commerce, but the reach of our ICT companies tends to be limited to Kenya. The Government will make such arrangements with other African countries as is possible to permit the mutual recognition of Kenyan corporations without further registration to facilitate seamless trade and commerce in and between Kenya and signatory countries.

Enterprise Creation Opportunities: The government will work closely with the private sector to informatise and digitise Government services and operations and subsequently to develop new service delivery paradigms and opportunities, which can quickly be converted into thriving enterprises that serve the Government and/or the private sector.

3D Printing and Physibles: Personalised manufacture is a growing and important development in the ICT and manufacturing ecosystem. In order to make this technology more accessible to the broad public, the government will encourage all tertiary and secondary schools to acquire 3D printing capabilities. All innovation hubs and maker labs will be provided with a grant to acquire additive manufacturing capabilities. Physibles (data objects that are capable of being manufactured as a physical object using additive manufacturing processes) will be protected as intellectual property and the physical realisation of physibles will be similarly protected. This policy explicitly and specifically encourages the emergence of new enterprises around the creation of physibles.

Fiscal Measures: The Government will introduce fiscal measures to stimulate increased investment and growth in the ICT sector in order to create a favourable investment climate for the development of a globally competitive ICT sector and knowledge economy. This policy seeks to mobilise internal and external investment in the national ICT ecosystem with a specific focus on the private sector. The government will take the following measures:

Taxes: The Government will review the taxation regime to better align to the requirement for affordable computing, broadband access, financial inclusion and online work.

Incentives: The government will provide incentives for majority Kenyan owned ICT device, component and infrastructure manufacturers

Training: Incentives will be provided for the development of online computer based training services and companies in Kenya.

Incubation Centres: Designated ICT incubation centres in each county will be duty free zones.

Venture Fund: The government will create from existing and new fund pools a rotating venture capital fund. The management and priorities of the fund will be determined by

guidelines to be established. The fund will be chaired by the a person to be determined by the Cabinet Secretary for ICT with membership of a representative of the Kenya Sovereign Fund, the Kenya Private Sector Alliance, the CEOs of the three largest private sector pension funds at any one time, and four other members with ICT expertise as the Cabinet Secretary for ICT may from time to time determine.

Financial Technology The Government will:

1. Facilitate and support the development and adoption of new and innovative financial technology services so as to drive financial inclusion

2. Encourage financial technology service providers to share infrastructure and networks in transparent fair and non-discriminatory ways

3. Through the Ministry of ICT, in collaboration with the Central Bank of Kenya, develop a financial technology interoperability policy that fosters competition

4. Promote innovation in financial technology services

5. Ensure that financial technology services infrastructure sharing is efficient, cost-effective for the consumer, protects the public interest and guarantees high security and quality of service

In the domain of mobile money, the Government will:

1. Provide an open and level playing field for mobile money service providers

2. Provide for the protection of intermediaries offering mobile money transfer services

3. Require interoperability between operators and service providers offering mobile financial services, taking into account differing commercial and technical models

4. Facilitate dialogue between operators and financial service providers, ensuring that mobile money transfer services bring value to the customer, make commercial sense and are available at the right time, and that regulatory risks are minimised.

5. Put in place measures and mechanisms to address the risk of money laundering and terrorist financing in mobile money services

6. Encourage relevant government agencies to develop legislation and regulations that embrace local innovation and allow a new class of mobile financial service providers to sustainability provide digital payments and transfer services.

6.2.3 Things

The nature and manner of design, creation, production, acquisition, distribution, use and disposal of material goods is changing dramatically. The advent of the asset-light sharing economy will evolve our role as consumers of physical artefacts and products of technology.

In the technology design and creation space the emergence of open source hardware designs has changed who has access to the designs of and can make complex technological products. It is now possible for Kenyans to manufacture from the ground up such things as computers, printers or even cars. Open-source hardware and software creates products driven by capitalism rather than monopolies it provides a powerful and lucrative opportunity for companies and individuals to learn from each other. It is our policy to encourage the local design, development, manufacture and global distribution of high-value technological artefacts.

It is the governments aim to grow and develop:

Broadband Penetration: Grow broadband penetration and universal access though promoting availability of smart devices.

Device Manufacture: Support the development of a comprehensive Kenyan supply chain for the local manufacture, assembly and global distribution of smart devices and complex technological artefacts

Capacity: Develop and nurture local capacity for computing and communication device and infrastructure manufacture, building on and contributing to open source hardware designs and local and licensed proprietary designs. Encourage the development of Kenyan professionals in related fields such as system architecture, design and engineering able to design and manufacture products and use the emerging technologies effectively.

Rare Earths: Develop a strategic Kenyan silicon fabrication capability to leverage the mining of rare earths found in Kenya

Buy Kenya, Build Kenya: Government will preferentially and exclusively buy Kenyan produced devices, software and solutions.

Engineering: Encourage the Kenyan development of technology solutions to Kenyan problems

Scale: Build Kenyan industry and ICT sector scale to rival the best and largest in the world.

Devices

The achievement of government's aims with regard to universal broadband access carries with it the implication of universal access to individual devices. Kenyans and Africans will regularly buy millions of devices. Kenyan owned companies should make these devices in Kenya. To achieve this, this policy mandates that:

Strategic Designation: The development of silicon fabrication capabilities, device manufacture and machine intelligence are hereby designated as national strategic imperatives.

Advisory: The government particularly the Ministry of ICT will provide or arrange for the provision of consulting, technical advice and mentoring to universities, state owned corporations, private companies and individual entrepreneurs in pursuit of national strategic imperatives. It is the governments aim to make corporations in this domain successful.

Technology Acquisition: Relevant government agencies are mandated to provide assistance in negotiating technology acquisition agreements with foreign companies or entities

Knowledge Diffusion Framework: The government in wide consultation with the private sector and academia will create a knowledge diffusion framework wherein the conditions for university-industry-government-military collaboration will be enhanced, providing for the rapid diffusion of new technologies to a wide variety of sectors.

Upgrading Human Capacity: The government will provide competitively selected universities and technical institutions with take-off grants to procure silicon fabrication, micro-electronic, microelectromechanical and nano-technology equipment.

Content and Applications:

This policy intends to promote the development of high quality, easily accessible, relevant local digital content. The stature and relevance of a country, in these highly networked times, is conditioned upon the size and relevance of it's internet footprint. It is our purpose to increase the total amount of locally produced Kenyan content hosted in Kenya available on the Internet, and to make Kenya the destination for African content. It is critical, that globally, we tell our story ourselves.

This policy mandates :

Local Development: Support locally based development of ICT applications and multimedia content;

Use of Kenyan Languages: The Government shall encourage the use of Kiswahili as the national language and local languages in developing content, and leverage on Kenyans' good knowledge of English to develop content for the international community;

Cultural Preservation: Encourage the development of content that captures and preserves knowledge and culture of Kenya's diverse communities;

Removal of Barriers: The Government shall work to remove barriers to local content creation and distribution such as exorbitant classification fees and broadcasting fees;

Promotion of Electronic Media: The Government shall promote collection, preservation, digitisation, distribution and publishing of historical community materials;

Information as a National Heritage: The Government shall encourage the development and management of information and knowledge resources as a national heritage.

Local Content:
It is the objective of this policy to promote the production of local digital content and create employment for citizens.

To this end, the government will:

Digitisation: All government Ministries, Departments and Agencies are required to move to all digital systems of communication, document generation, document storage and archiving. This policy mandates that all MDAs will digitise all their historical records and make the same available to the National Archives in an acceptable electronic format.

Open Data: All historical and archival data in government possession will be available online to Kenyans. This data can be a rich

source for the creative and broadcast industry and spur digital innovations around public data held by county and national governments.

Animation Labs: The government will support incubation labs focused on computer generated animation and film production.

National Values: The government will create and enforce policies and legislation that protects children from inappropriate content and upholds national values.

Gaming

The development of game software can be an important source of employment and revenue for Kenyans, in order to promote the industry, the government with the participation of the private sector will develop:

Certification Programs: Work with industry to develop training and certification programs to create a cadre of persons skilled in game programming.

Incentives: Introduce appropriate fiscal incentives to promote this sector of the industry

Safety: Sensitise the public on security concerns around personal information and the adverse social impact of internet and gaming addictions.

Challenge Fund: Develop a mechanism to address the negative cultural and behavioural challenges due to gaming. fight challenges.

Information Management

Knowledge has long been an important factor in economic growth, and this policy seeks to maximise the value of data and information held by government for the common good. Government has a keen appreciation of the role of knowledge and technology in driving productivity and economic growth knowledge distribution, then, is essential to our economic performance.

In light of this, this policy mandates access to:

Government Data: All government data, except as exempt by section 6 of the Access to Information Act, 2016, will be made available to all Kenyans online. The general policy is "Open by default".

Research Findings and Papers: Research findings from all government ministries, agencies, institutions and institutes will besides being made available on their websites, also be made promptly available on a single common website determined by the Cabinet Secretary of the Ministry of ICT. All government research

and papers will be in the public domain, except for those, which the cabinet secretary has specifically, on written request, classified for restricted circulation for a determined and stated time.

Government Websites: All government websites and portals will conform to best practices in terms of accessibility for persons with disabilities, colours, layout and editorial style. Government websites will be updated daily, at a minimum.

Government Search Engine: All public government content will be indexed and searchable through a public common interface. All government sites and data to be crawled daily, at a minimum.

.ke Domain: National and county government websites will exclusively use the designated government domain. The Communications Authority (CA), Kenya Network Information Centre (KENIC) and other stakeholders will take measures to proactively promote the .ke domain. The CA shall also proactively protect Kenyan names that have historical, cultural or intellectual value on the Internet.

Social Media: The Government will seek to promote the right of the use of social media as an extension of the protection of freedom of expression guaranteed under Article 33 and 34 of the Constitution.

However, the right to use social media does not extend to propaganda or war-like purposes; incitement to violence; hate speech or advocacy of hatred that constitutes ethnic incitement, vilification of others or incitement to cause harm; or is based on any ground of discrimination or that promulgates falsehoods. In the exercise of the right to freedom of expression, every person shall respect the rights and reputation of others.

Broadcasting: The overall policy objective for the broadcasting sector is to create, within the framework of the Constitution, an environment that enables broadcasting services to be provided in the public interest and to contribute to the socioeconomic and cultural development of Kenya. This policy continues the emphasis on promoting the development of local content and establishing a market structure that attracts and protects national and international investment in broadcasting content and services.

With the emergence of online media The Government will: The Government will:-

1. Ensure the development of broadcasting services that reflect a sense of Kenyan

identity, character, National Values, cultural diversity and expression through the development of appropriate local content;

2. Promote diversity in ownership, control and programming of broadcasting services and availability throughout Kenya;

3. Review the role, viability, availability and protection of public broadcasting services;

4. Promote fair competition, innovation, protection of intellectual property rights and investment in the broadcasting content industry;

5. Ensure adherence to social responsibility by encouraging the development of and respect for the Programming Code and other codes of practice by all broadcasting licensees;

6. Use innovative methodologies to rapidly expand media training in Kenya.

7. Ensure universal access to, and viability of the public broadcasting service; and

8. Encourage media training institutions in conjunction with the broadcasting industry to pursue research into aspects of programming and curriculum development in the industry. Government media training institutions are specifically mandated to develop and provide curriculum and training on animation, computer graphics, and online media and games;

9. Require government agencies and private sector to promote local production of advertisements and create an enabling environment for the production and export of local broadcast and media products that will contribute towards job creation.

10. Promote subtitling and dubbing to increase the reach of local programmes.

The National Public Broadcasting: Service The Kenya Broadcasting Corporation (KBC) will be restructured to ensure its relevance and viability as the public broadcaster. KBC, operating commercially, with universal service obligations, and with Government support to sustain its universal service obligations will provide national public broadcasting and county broadcasting services in collaboration with County Governments. KBC may also establish a subsidiary to provide commercial broadcasting services subject to fulfilment of licensing and regulatory requirements.

Private/Commercial Broadcasting Services: The main objective of the granting of licenses for private broadcasting services will be the development of a diverse broadcasting landscape, while taking into account the viability of individual enterprises as well as the industry as a whole. Private broadcasting service providers will be expected to provide a diversity of programming content, contribute to job creation and human resource development.

Private broadcast licenses will not be granted to any political party, or affiliate of a political party. To avoid hoarding of scarce frequency resources, CA will develop guidelines with appropriate regulatory safeguards to ensure broadcast licensees start operations within time frames stipulated in their licenses upon being granted broadcast licenses.

Community Broadcasting Services: Community broadcasting service providers, who are fully controlled by a non-profit entity, will be licensed to offer non-profit services that serve a particular community. They will be required to:

1. Offer a distinct broadcasting service dealing specifically with community issues, which are not usually dealt with by private or public broadcasting service covering the same area; and

2. Focus on the provision of programmes that highlight community issues, including, but not limited to; developmental issues, health care, basic information and general education, environmental affairs and local culture.

Licensing of community broadcasters will follow an approach where prospective service providers will make application to CA. The licenses will be granted after evaluation based on clear conditions and availability of frequencies in the service area. In order to promote the development of community broadcasting services, the CA will endeavour to reserve broadcast frequencies and/or television channels for this purpose. Community broadcast licenses will not be granted to any political party, or affiliate of a political party.

Radio Frequency Spectrum: Spectrum is a scarce public resource that can go to waste if not used optimally. It will, therefore, be managed in line with public policy objectives, with a view to making it available to all users under equitable, transparent, specific and clear conditions. The Government will from time to time review plans for the use of specific frequency bands to ensure optimal utilisation of the frequency spectrum.

The use of frequency bands will maintain a balance between the public and private interest and in the event of conflict, public interest will prevail. In planning and allocating radio frequency spectrum as well as developing policies, laws and regulations relating to spectrum, Kenya will take into account the outcomes of the International Telecommunications Union (ITU) World Radio-communication Conferences (WRCs).

Use of the radio frequency spectrum should contribute to the promotion of national interests, development and diversity, including increasing the amount of spectrum available for assignment, improving sharing conditions among different radio communication services and increasing the number of licences dedicated to community services.

1. To enhance public safety, security and emergency preparedness, spectrum fees may be waived for provision of ICT services in unserved and under-served areas and public institutions that provide critical life-line support services. The institutions may also include those that provide critical public services such as national security, public safety and emergency services. Such institutions will be determined by the ICT regulator;

2. A Wireless Broadband Spectrum policy will be developed to promote the acceleration of uptake of Broadband services as enshrined in the National Broadband Strategy; and

3. Measures outlined in the National Broadband
   Strategy will be taken to ascertain that:-
   - Broadband penetration reaches a critical mass nationally for its impact to be felt in the economy;
   - Universal access to broadband is affordable;
   - Capacity and skills are developed for optimal and effective use of broadband services by end users;

- Supply-side skills are developed so that Kenyans can exploit economic and innovative potential of broadband.

6.2.4 Rules

The Government recognises that the ICT ecosystem is complex, fragile and not understood with mathematical precision, and that transformative innovations are emergent and dependent to some degree on serendipity and a web of interrelated stakeholders who interact unpredictably. In this policy, Government is careful not to weigh in with a blunt instrument and damage one part of the ecosystem while trying to promote another part.

Policy Actions: This policy recognises four principal motivational instruments, which we call policy actions. Policy actions can communicate, regulate, incentivise, or demonstrate:

Communication: The policy can communicate government positions, articulate priority areas, and disseminate best practices

Regulation: The government has the mandate and obligation to regulate and arbitrate the use of limited resources, enhance competition, promulgate and enforce anti-trust legislation, establish and maintain standards, and create a level playing field for all actors.

Incentives: Create incentives to push or pull the private sector in certain directions using taxation, challenges, and investment of public funds in R&D, internal and foreign demand creation and other mechanisms.

Demonstrate: The government can invest in forward looking activities that do not have immediate commercial value to demonstrate technology, processes and viability.

Competition
This policy considers competition in two perspectives, encouraging healthy competition within the ICT sector in Kenya, and making Kenyan products globally competitive. These are not mutually exclusive goals, by ensuring that the market competition in Kenya is intense, we can ensure that bad products, services and ideas die quickly and that good ideas, products and services survive and improve. In brief, it should be that if a product is good enough to survive in Kenya, then it is world class and conversely, that if it is not world class it will not long survive in Kenya. The need for intense competition must be balanced with the need to prevent distortion of the market by the emergence of monopolies and anti-competitive

practices. The Government seeks to enhance the evolutionary velocity of the market and enhance the continuous adaptation of products, services and offerings to local and global pressures.

It is the goal of this policy to:

1. Increase the population of competing companies by creating incentives for play, lowering the barriers to entry, reducing the cost of failure, and encouraging the trial of new ideas.

2. Encourage efficient and equitable access to public infrastructure to enable enhanced competition

3. Review the competitive environment for fair trade practices. Prevent unhealthy competitive practices through clear and strategically consistent regulations enacted in a timely and transparent manner.

4. Facilitate access to government business through non-discriminatory tendering criteria, and a deliberate preference for Kenyan owned business entities.

5. Maintain market integrity and competitive honesty by preventing and promptly punishing unfair and/or misleading market conduct.

6. Facilitate an open, responsive, regular and continuous dialogue between government, regulatory authorities and market players with a view to maintaining a responsive competitive environment.

7. Create a liberal licensing and registration regime to permit companies and entrepreneurs to fail quickly, with low cost. This will take the form of rules that allow companies to be licensed for certain services and only pay for the licenses when they commence operations or achieve benchmark goals within predefined time frames. There will be deliberate over-allocation of provisional licenses to increase the number of license holders with the subsequent upgrade of provisional licenses to substantive licenses when defined targets are achieved. The regulatory authority will predefine and make public the total number of substantive licenses intended, when that target is achieved provisional licenses will be revoked.

Equity Participation

The government strongly encourages Kenyans to participate in the ICT and Science & Technology sector through equity participation. It is the policy that only companies with at least 30% substantive Kenyan ownership, either corporate or individual will be licensed to provide ICT services. For purposes of this rule, companies without majority Kenyan ownership will not be considered Kenyan, and may thus not be calculated as part of the 30% Kenyan ownership calculus. Licensees will have 3 years to meet the local equity ownership threshold they may apply to the Cabinet Secretary for a one year extension with appropriate acceptable justifications.

For listed companies the equity participation rules will conform to the then extant rules of the Capital Markets Authority.

Consumer Protection

The Government will:

1. Protect all Kenyan citizens from unfair, deceptive or fraudulent business practices,

2. investigate and promptly resolve complaints ,

3. enforce the law and punish violators,

4. restore the rights, property and privileges of citizens where they have been violated,

5. Develop rules and regulations that maintain and ensure a free and fair marketplace

6. Educate consumers about their rights, duties and responsibilities.

The consumer protection policy is intended to:

1. Protect consumers from hazards to their health and safety;

2. Promote and protect the economic interests of consumers;

3. Provide consumers with adequate information to enable them to make informed choices according to individual wishes and needs;

4. Consumer Education;

5. Provide a means for effective consumer redress and restoration of data, rights, property and privileges;

6. Ensure and facilitate the freedom to form consumer and other relevant groups or organisations, and provide the opportunity for such organisations to present their views government and decision-making processes affecting them.

7. Create a monitoring and regulatory capacity to maintain consumer protection policies in a rapidly changing environment.

8. Create, maintain and evolve standards for the safety and quality of consumer goods and services.

9. Ensure equitable nationwide access to goods and services of general utility, and to develop appropriate incentives and support for nationwide access.

10. Develop, review, maintain or strengthen, as appropriate, mechanisms for the exchange of information on national and regional policies and measures in the field of consumer protection;

11. Develop and strengthen information regarding products which have been banned, withdrawn or severely restricted in other jurisdictions in order protect our citizens adequately against the harmful effects of such products.

Environmental Protection

The Government of Kenya has made a special commitment to environmental protection and environmental sustainability. ICTs are fundamental in all areas of society today, including in caring for the environment and providing assistance in the wake of natural disasters. The rapid evolution of new technologies generates a large amount of e-waste, which can be either totally or partially recycled or reused. As Kenya begins to mass produce devices and ICT infrastructure, the issue of environmental protection becomes particularly important, as such, the government undertakes to prudently regulate the disposal of e-waste, promote the use of ICT to mitigate the impact of climate change and broaden the use of technologies for natural disaster and emergency monitoring, prevention, mitigation and response.

Specifically, among other measures, the government will:

1. Promote the use of ICT to monitor and protect the environment. The government will design, develop and deploy an environmental early warning system.

2. Enhance climate change modelling, adaptation, mitigation, monitoring, and response through the appropriate use of relevant ICTs.

3. Encourage the development of energy efficient facilities which minimise negative environmental impact

4. The Government will ensure that ICT players and consumers minimise the effect of infrastructure, appliances, machines, devices and tools on the environment.

5. Develop comprehensive policies on electric and electronic waste management, based on a positive relationship with stakeholders and the development of mechanisms of coordination between the public, private and decentralised sectors and civil society. The government will develop an inventory of e-waste production, collection and recycling in the country and work to identify and eliminate the main bottlenecks in the recycling chain;

6. The Government will provide incentives for the adoption of best practices to encourage reduction of carbon footprint, efficient energy management, e-waste recycling, water tower restoration, afforestation and recycling of ICT products;

7. Provide incentives for investors and innovators who develop ICT waste disposal and recycling facilities that meet agreed global safety and environment standards;

8. Promote cooperation and policy making in the region for the use of ICT in natural disasters, and for prevention of and response to climate change and emergencies, based on common standards and best practices, since natural disasters transcend the national sphere

Language Policy

Language is a key component in ensuring access to information, fostering national unity and economic growth. To this end, the Government will:

1. Promote national unity through the proper management of Kenya's linguistic heritage

2. Facilitate equitable access to public services, knowledge and information for development and self-actualisation

3. Promote public participation in development by all citizens

4. Promote Kiswahili, the national language of Kenya

5. Promote the equitable treatment of Kiswahili and English, the official languages of Kenya

6. Promote and develop the use of community languages, Kenyan Sign Language, Braille and other communication formats and technologies accessible to persons with disabilities

7. Generate substantial wealth by harnessing Kenya's multilingualism and the creation of innovative linguistic technologies with a reach beyond Kenya's borders

8. Help Kenya to become the African media giant by creatively using her linguistic facility in broadcasting

9. Initiate and sustain dialogue on multilingualism with all language communities

In support of this language policy, the government will:

1. Expound the language policy in a separate policy statement

2. Draft legislation necessary for the full implementation of the policy

Open Source Software:

Efficient use of public resources is a key consideration in government expenditure and procurement. The Government of Kenya encourages the use of and already uses open source software and systems for many purposes, this policy formalises the position of the government on open source software. Where an open source alternative exists to proprietary software, the government shall choose the open source solution. All commissioned software development by the government shall be delivered with the source code and made publicly available for use by any government agency that needs similar or close functionality. The government will maintain and publish a guide for use by government agencies listing solutions available, and publishing the source code of all government procured software.

Regional Integration of the ICT Ecosystem

As a member state of the East African Community (EAC) and a signatory to the East African Common Market Protocol, the Government is committed to implement policies and programmes to promote regional integration. The Government will remain proactive in exploring new areas of collaboration with EAC member states on ICT policy and regulatory issues and related matters that serve to advance the objectives of the EAC Common Market Protocol for the benefit of the citizens of the East African region. Specifically but not exclusively, this policy mandates that the government:

1. Secure cross border broadband connectivity to enhance cross border trade in goods and services;

2. Promote high speed broadband connectivity between the Capital and major cities of the East African Community, COMESA and Africa to facilitate electronic transactions between the African Union Member States;

3. Harmonise ICT policy, legal and regulatory frameworks with the other East African Community member states;

4. Ensure universal, fair and open access to reliable and affordable broadband infrastructure by all citizens and for other EAC member states that are landlocked; and

5. Promote Inclusion of ICTs as components of all on-going and upcoming regional projects.

Policy, Legal and Regulatory Framework

In order to fully implement this policy it is will be necessary to review the legal, institutional and regulatory framework to align with this policy. The Government will:

1. Ensure policy, legal, regulatory and institutional framework is reviewed and amended to enable implementation of the policy;

2. Ensure the legislation provides for the creation of institutions that will implement the requirements of this policy;

3. Provide regulations and guidelines for the implementations and enforcement of the laws in the sector; and

4. Ensure effectiveness of the laws and the corresponding institutions.

Current Institutional Arrangements:
Some of the current stakeholders in the ICT ecosystem are:

1. Ministry of ICT and all it's agencies

2. County Governments

3. National Communications Secretariat

4. Communications Authority of Kenya

5. Kenya ICT Authority

6. Konza Technopolis Development Authority

7. East Africa Marine Cable System Ltd.

8. Postal Corporation of Kenya

9. Kenya Broadcasting Corporation (KBC)

10. Kenya Institute of Mass Communication (KIMC)

11. Kenya News Agency (KNA)

12. Government Advertising Agency

13. Kenya Year Book

14. Communications and Multimedia Appeals Tribunal

15. Media Council of Kenya

16. Kenya Film Commission

17. Kenya Film Classification Board

18. Kenya Film School

19. Development partners

20. Civil Society

21. Investors and Operators

22. Consumers/users

23. ICT Professional Bodies

24. Relevant government agencies

Ministry of ICT: The Government's role in the sector will include:

1. Strengthen existing institutions and assign appropriate ICT priority areas to them to champion and deliver on the objectives of the policy. In particular, specific targets will be agreed upon and reviews made to determine the extent to which they are being realised;

2. Develop, coordinate and implement both the ICT policy and the monitoring and evaluation (M&E) framework across all sectors of the economy to ensure that the implementation of ICT programmes and projects is effective to support the social and economic sectors of the economy; and

3. Creation of an enabling environment for investment in the sector.

County Governments: County governments should invest in and promote the adoption of ICT whilst embracing the sharing of infrastructure and enterprise applications for efficiency and transparency.

Konza Technopolis Development Authority: In 2008, the Government of Kenya approved the creation of Konza Technology City as a flagship Kenya Vision 2030 project. Konza will be a sustainable, world class technology hub and major economic driver for Kenya. Konza is conceived to capture the growing global Business Processing Outsourcing and Information Technology Enabled Services (BPO/ITES) sectors in Kenya.

National Communications Secretariat (NCS): The National Communications Secretariat, which is the ICT Policy Advisory Secretariat, established through the Kenya Communications Act of 1998. It will continue to be the policy advisory arm of the Government on all matters pertaining to the ICT sector. NCS will carry out research and monitoring related to ICT policy and will publish reports and results of the research.

Communications Authority of Kenya(CA): The CA as the Sector Regulator, will play its role as the converged regulatory body for the sector in accordance with the relevant provisions of the Constitution of Kenya, 2010.

ICT Authority: The ICT Authority will continue to play its broad mandate of fostering the development of ICTs in Kenya (including businesses, innovation and capacity building), implement and maintain systems and technology for the Government and oversee the development of integrated ICT projects in addition to being responsible for computing devices within the government. The Authority is also tasked with coordination and management of National ICT Core infrastructure, Applications Project and Complex ICT Projects, formulation and enforcement of ICT Standards, coordination of Government ICT HR capacity development, facilitation of ICT Innovations and management of National ICT Security. It is also the implementing agency for the following key areas; Disaster Recovery Centres, ICT Capacity Building, Government ICT Security ICT Standards and Government Shared Infrastructure.

Communications and Multimedia Appeals Tribunal: Disputes arising between parties in the ICT sector will be heard and settled by the Communications and Multimedia Appeals Tribunal (formerly the Communications Appeals Tribunal), which was reconstituted through the Kenya Communications (Amendment) Act, 2013.

Postal Corporation of Kenya: The Postal Corporation of Kenya is a Public Commercial Enterprise operating under the PCK Act of Parliament 1998. The Corporation's mandate includes provision of accessible, affordable and reliable Postal Services to all parts of Kenya as the Public Postal Licensee.

Media Council of Kenya: The Media Council of Kenya established through the Media Council Act, 2013 will play its role of promoting and protecting the freedom and independence of the media, prescribing standards of media practitioners and media enterprises, facilitating resolution of disputes between the government and the media and between the public and the media and intra media and establish media standards and regulate and monitor compliance with the media standards.

Development Partners: Development partners will play a complementary role towards realisation of development of the goals and objectives of this policy. Within the ICT policy framework, the Government will foster linkages with various development partners to provide financial, material, technical assistance as well as build capacity for sustainability

Civil Society: The role of the Civil Society will be to inform the policy making process by making relevant contributions

Investors and Operators: Investors, operators and service providers play an important role in the sector, and will be required to:-

1. Participate in the provision of universal service/access;

2. Operate with efficiency, credibility, commercial integrity and good corporate governance;

3. Provide quality and sustainable service with pluralism of choice to consumers; and

4. Keep abreast with and participate in ICTs development both regionally and internationally.

Consumers: Are the principal drivers of service delivery, and are encouraged to use services delivered in new ways, complain and seek redress if services are of inferior quality and vote wisely with their wallets.

ICT Professional Bodies: The Government encourages the formation of national ICT non-statutory professional bodies registered under the laws of Kenya to foster professional ethics, standards and human resource development in the sector.

6.3 Skills and Innovation

This policy extends and amplifies the Government of Kenya Framework for Science, Technology and Innovation sessional paper of 2012 by adopting a viewpoint called the knowledge triangle (KT), which holistically examines the interaction between Research and Technology, Education and National Innovation systems. Higher Education Institutions (HEIs), Public Research Organisations (PROs) are central actors in the national innovation system, and industry is a principal consumer of research output. Innovation, in this view, is a systemic output based on the synergy between robust identifiable consumer demand, a responsive industry, government, the military, educational

institutions, and corporate research components.

6.3.1 Science Technology and Innovation

This policy will cause to be created and maintained an ecosystem of world-class research, technology development and industry. The government will create incentives, provide funding support for research and innovation, recognise and reward outstanding contributions, create and fund challenges and bounties. It is the intent of this policy to mainstream the application of science, technology and innovation in all sectors and processes of the economy to ensure that Kenyans benefit from Science, Technology and Innovation (ST and I) investments.

In the ICT domain the government specifically commits to:

Biennial Research Priorities: Every two years the Ministry after industry wide consultation will set and review 5 research and investment priority areas. These 5 areas will be renewed and reviewed every 2 years. Government will fund capacity building in Higher Education Institutions (HEIs), create and award scholarships in the priority areas, build research facilities in support of the priority areas in HEIs on a competitive basis, support and subsidize corporate research in the priority areas.

National ICT Research Lab System: The government will establish a public research organisation called the National ICT Research Laboratory (NIRL) with the specific goal of developing publicly available technology for use by and in Kenya. This laboratory system, established at multiple locations around the republic, will provide computing support to all other PROs (KEMRI, KARI etc.), conduct research in matters of national interest in computational biology, genomics, defence, intelligence, energy, environmental security, high performance computing, physics and the life sciences and science and engineering modelling. The NIRL will maintain a close relationship with industry, academia and government, and provide special capacity building to HEIs on national research priority areas.

Kenya National Innovation System Administration: The government will create a new Kenya National Innovation System Administration (KNISA), which will create, operate, maintain and evolve a digital platform to connect and mediate the interactions of ST and I, stakeholders. The administrations task will be to orchestrate the interactions between stakeholders dynamically and effectively respond to national needs. These stakeholders will include academia at all levels, public research organizations, corporate research departments, government, enterprise (corporate and individual), venture capital and equity funds, and civil society.

National Research Medal: The government will recognise and reward outstanding contributions to Science, Technology, Engineering, Mathematics, Business Innovation and Software Development with a yearly medal.

6.3.2 The Council for the Future

The Cabinet Secretary shall appoint an advisory group known as The Council for the Future. The Council shall consist of industry leaders, cutting edge entrepreneurs, academia and global thinkers as key participants dedicated to the generation and development of new thinking and strengthening of new ideas that can be brought to bear on challenges of globalisation in the 21st century and shape the role and future of the ICT landscape in Kenya in the next 50 years.

The National Communications Secretariat will be provided with resources to enable it serve as the Secretariat to the Council.

6.3.3 Emerging Technologies

The technology landscape is changing fast, and the rate of change will accelerate. We think it is impossible to prognosticate every change, and thus it is not possible to formulate clear plans for things unknown we can however develop a coherent and consistent approach to the emergence of new trends and technologies as they emerge. In the short-term technology trends in section 5.4.3, we give an overview of immediate trends. These trends point to likely changes in the following areas:

Networks: Networks will get faster and faster, we expect wireless peta and terabit networks in the next 5 years. We expect everything to be network enabled and to be a data emitter.

Ubiquity: We expect everybody and everything to be connected to the network everywhere in Kenya. We expect all our environments to have network connected sensors and continuous monitoring.

Data Volumes: We expect an exponential increase in data volumes on the networks. Data

Analysis at scale, and Knowledge engineering will progressively become the value differentiators in business.

New Architectures: We can expect a disaggregation and a de-colocation of functionality in every device and service. Maybe screens will not have to be in the same place as the computer, maybe all storage will be cloud based and local storage no longer necessary.

Near Intelligence: With the rapid improvement in big data machine learning, in the very near term we can expect to see better than human performance of from networked machines on many tasks.

Changing Ownership Models: Extreme sharing (compared to now) will become the norm, people will pay less for and own less of each device and have more connected devices in every part of their lives.

Informatisation: All aspects of our lives will be digital or digitally mediated, from payments, asset use and rental, work, manufacturing, agricultural, health and mining will all be digitally controlled.

We anticipate several challenges to emerge from these developments:

Carrying Capacity: As network carrying capacity demands increase, we will constantly have to update our core network. Thankfully physics does not evolve, and we will not in the short term have to put new cables in the ground, just change the routing/switching devices.

Interoperability: We need to develop national policies on data sharing and interoperability to ensure that all systems in Kenya can work synergistically to yield the operational and administrative benefits from a coherent national instrumentation.

Balkanisation of Systems: Companies will try to lock their customers in my defining proprietary protocols and data formats to try increase the barriers to entry for the competition. These data silos are inimical to our national progress and are strongly discouraged.

Data Superpowers: Current and future data sinks will become significant holders of identity, transactional and profile data of the Kenyan citizenry, and will have inordinate power over the analysis, partitioning, understanding, discrimination and fine grained manipulation of public perception. Policy subsidiary to this will create rules and guidelines for equitable sharing and access to profile data by all legitimate and licensed players with the need, and establish principles for the use, disclosure and storage of personally identifiable data.

Out-dated Laws: As new models of interaction, concepts of operation and norms of conduct emerge our laws, regulations and statutes need to keep track with and fairly arbitrate the rights, obligations and expectations of our citizens. Our laws should not stand in the way of progress, nor should they use outmoded principles that have been superseded by globalised norms. Significant new principles will have to be established around ownership and use of sharing economy devices and data.

Challenges to privacy: As instrumentation increases and the data held about individuals and machines become siloed, enhanced and derived, the data superpowers know more and more about individuals. It is now established as policy, in conformance to the Constitution, that citizens have an indefeasible right to privacy and to ownership of all data about them however and wherever held and to determine how and whether that data is used, distributed, analysed, enhanced or converted to other forms. It is further established as policy that citizens of Kenya may request and will promptly receive a copy of any and all data held on them, by any and all entities public or private, identified or not, and may so dispose, use and store that data as they see fit. The Government of Kenya will retain a copy of such data, and note the demand and establish rules and regulations for the use of such deactivated data.

Skills Scarcity: The new technological landscape brings with it new opportunities and challenges, which we need the skills to manage, operate and understand at scale. Precisely because the skills required are new, there is a shortage. Our training and manpower development infrastructure needs to become responsive to these needs.

Incoherent Approaches: Different aspects of the new economy and technological landscape are managed, regulated and overseen by different government ministries, departments and agencies, with different approaches, understandings, focus areas and concerns. As the environment converges towards a consistent, coherent data-centric approach (informatisation), everything from finance, health, agriculture, work and speech, the approach of government to regulation, almost by definition, becomes Incoherent and inconsistent. This policy and subsequent

subsidiary policy will seek to create a uniform approach to the new data centric landscape, establishing basic principles and rules.

Capacity Development: As economic, interaction and transactional velocity increases, and the geographic reach, transnational flow of data and information increases, the capacity of government to monitor, proactively manage and control outcomes may reduce, unless the capacity is developed right now.

6.3.4 Human Resource Development

Kenyan technical manpower will be among the best in the world and globally competitive in terms of quality, skills and numbers. Kenya will develop a network of world-class technical training institutions producing the highest quality manpower to support the achievement of Vision 2030. Every Kenyan will be computer literate and able to profitably engage in the digital economy and earn a good living.

The government will:

1. Integrate ICT subjects in the curriculum at all levels of education;

2. Develop and deploy a nationwide e-Education system that supports schools, higher education/training facilities across the country by interconnecting them with each other and with relevant knowledge centres, providing curriculum integration while also generating information to better shape policies, strategic plans and tactical decisions for developing education and vocational training in Kenya;

3. Create an environment that is conducive to the return of skilled Kenyans from the diaspora to participate in the economy;

4. Expand and improve adult-education, life-long learning and both general and digital literacy programmes, notably for retraining and reskilling the existing workforce. Making the use of ICT part of everyday life without excluding those that need skills development;

5. Incentivise industry with ICT specialisation to conduct their own training programmes and to contribute to institutional training programmes;

6. Establish educational networks for sharing educational resources and promoting e-learning at all levels including distance education, virtual institutions, and integrate it with other existing resources;

7. Facilitate Public Private Partnerships to mobilise resources in order to support e-learning initiatives;

8. Require skills domiciliation in projects performed by non-national resources.

9. Encourage close collaboration between industry and academia and the exchange of personnel, lecturers should get business and operational experience, and industry should provide internships.

10. Encourage the establishment of ICT Centres of Excellence to promote capacity building and innovation as stipulated in the National ICT Master Plan

11. Government will provide and support online ICT training for decision makers, community and civil society leaders as well as private and public sector executives;

12. Create opportunities and providing assistance for the disadvantaged; people with special needs, women and the youth to acquire ICT skills through e-inclusion and e-accessibility activities and programmes; and

13. Encourage universities to establish postdoctoral research fellow positions on contractual and attractive terms in order to attract world-class researchers In order to have global competitiveness of ICT products and services.

6.4 Public Service Delivery

6.4.1 E-Services/Government

Government ICT is vital for the delivery of efficient, cost-effective public services, which are responsive to the needs of citizens and businesses. We want government ICT to be open: open to the people and organisations that use our services; and open to any provider – regardless of size.

Government will ensure that:

1. Kenyans increasingly appreciate, prefer and use online public services;

2. It is affordable and safe to use an online public service;

3. Online public services work efficiently and effectively all the time

4. All citizen-facing government functions are automated and available online

5. Encourage ICT infrastructure deployment across the country by leveraging on wireless broadband technologies to facilitate e-services to allow for categorisation of systems and data by sensitivity and business impact

6. There is free public Wi-Fi Internet access built around digital primary and secondary schools, Community Innovation Hubs and public spaces.

7. Kenya gains global recognition for innovation and quality in public service delivery.

Public services for the Kenyan people will be **SUPER**: Seamless, Universal, Painless, Effective and Right.

Seamless: means that every service should fit seamlessly into the everyday work and leisure activities of citizens. It should be accessible through the devices that Kenyans own and use, or in nearby, convenient locations. Every service is a one-stop service. All charges and taxes associated with any transaction or service are included in the fee and clearly indicated on the mandatory service transaction record (receipt.) Seamless services are available 24 hours a day, 7 days a week.

Universal means all citizens are:

1. Registered and provided with a single, secure online identity and access code that enables them to access public services;

2. Clearly informed about the public services available to them and equipped with the skills to access and use them.

Painless: means that the service is affordable. It is friendly and pleasant to use. It is secure from financial losses, identity theft or theft or corruption of private information. The processes involved in accessing the service and

the result are transparent and easy to understand.

Effective: means that the service achieves the purpose for which it was designed. Ultimately, public services are designed to ensure that Kenyans achieve the aspirations enshrined in the Constitution and Vision 2030. In the case of Information and Communication Technology it is the goal of the government that the technology is demystified, woven into the fabric of the lives of Kenyans, and that all Kenyan get the opportunity to appreciate, use and innovate with the technology. An effective service is delivered in a timely fashion and does not delay the citizen from doing his or her work or achieving results.

Right: meaning that every service transaction is free of graft, correctly executed in line with regulations, permanently captured and auditable, and will form part of an aggregated record which will be available for public scrutiny. The goal of the Information and Communication Technology policy for public services is to enable this high standard of public service delivery to be achieved.

6.4.2 Postal and Courier Services

An effective postal and courier system is key to the development of e-commerce and the digital economy. The Government recognises 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. This will be achieved by, ensuring that postal operators provide affordable, equitable and efficient universal service.

The Government will:

1. Facilitate the integration of courier and postal services into the digital marketplace, and use the postal and courier network to deliver eservices to citizens;

2. Create an environment that attracts increased investments in the sector and allows the development of postal and courier infrastructure and services that support national development goals;

3. Increased cooperation with sub-regional, regional and global postal and courier service organisations;

4. Ensure a level playing field in the postal and courier industry;

In support of this policy, the government will:

1. Encourage the roll out more postal and courier service points, and business model innovation to bring services closer to the people;

2. Establish a uniform national Addressing System

3. Restructure Postal Corporation of Kenya to align with market/technological changes and to diversify revenue streams so as to remain commercially viable;

4. Promote competition in all postal market segments;

5. Take appropriate measures to ensure a safe and secure mail and courier network by developing security guidelines for operators in the sector;

6. Ensure future road and building incorporate designs such as special access to courier fleet into central urban centres, loading zones, and delivery windows for courier delivery vehicles.

7. Review the exclusive market segments, from time to time to allow for more competition;

8. Support the provision of financial services through the postal system.

6.4.3 Child Online Protection

The government will ensure that there are rules, structures, principles and policies to ensure that children can use the Internet and computers safely. In order to effect this policy the government will:

1. Develop a legislative framework that embraces child online protection comprehensively as a special case of privacy, and security through a practical multilateral, multi-stakeholder approach (Policy, Law, Technical, Education, Awareness);

2. Develop local public awareness information and content targeted at various target audiences;

3. Develop innovative "online values" programmes that ensure that the right online values are instilled in Kenyan children from the moment they begin to use technology;

4. Develop a mechanism to equip relevant stakeholders with appropriate information and skills to respond adequately to child online abuse and exploitation;

5. Development of framework of engagement between local and international organisations and law enforcement agencies; and

6. Foster the development of technical tools and services in the market that minimise the risk of exposure of children by-

- Removal of illegal content from cyberspace such as child sexual abuse materials
- Investigation of child online crimes
- Detection and identification of child victims on online abuse and exploitation
- Prevention of circulation of child sexual abuse materials; and
- Reporting of such content.

7. Better understand the online habits of children and youth and facilitate identification and development of mechanisms to reduce their exposure to risks and vulnerabilities online; understand the context to which a child become vulnerable and how to prevent online protection;

8. Prioritise the equipping of law enforcement agencies and judicial officers to handle Child Online Protection related matters;

9. Establish a database of offenders against children

6.5 Security

As Kenya moves wholly online the security of our infrastructure, resilience in the face of attack, and coherent internal policies to protect citizens from abuse and illegal exploitation become critical to our continued progress. Kenya will develop comprehensive defensive and offensive cyber-capabilities.

The Government will continue to review and implement the Cyber Security Strategy and develop relevant legislation to achieve the cyber security policy objectives.

It is the government's objective to:

1. Recognise cyber security as a key pillar of national security and foster a multi-agency approach in the management of national cyber security;

2. Establish an enabling legal framework, aligned with Kenya's constitutional provisions, legislative and regulatory environment, and consistent with regional and global best practices build capacity skills within law enforcement and the judicial system on the prevailing legal and regulatory frameworks;

3. Support the development of a new generation of technologies that will lead to measurable, available, secure, trustworthy, and sustainable computing and communications systems, as well as associated management and policy tools that enable successful utilisation of the new technologies;

4. Develop information security standards for the ICT sector which are to be adopted and applied by all government agencies and recommended as best practices to private sector business;

5. Sensitise and create awareness to enhance the adoption of information security approaches and new attitudes and culture by citizens;

6. Ensure the efficient mitigation of cyber threats in order to promote trust and confidence with the objective of preserving the openness of the Internet as a platform for innovation and new sources of growth; and

7. Put in place measures to protect vulnerable groups such as children and ensure that they are safe and derive value from cyberspace.

8. Develop intelligence, defensive and offensive capabilities in the cyber-spatial dimension of the battle-space of today and the future.

In support of this policy the government will:

1. Implement Computer and Cyber Crimes Legislation;

2. Promote confidence and trust in the use of ICTs by requiring confidentiality of personal information, integrity and availability of ICT services in Kenya;

3. Enacting specific and effective legislative instruments on privacy, security, cyber-crimes, ethical and moral conduct, encryption, digital signatures, copyrights and fair trade practices;

4. Address any gaps in regulatory capacity, especially in the face of convergence of networks and services;

5. Leverage on the power of ICTs to assist law enforcement agencies and defensive agencies to secure our borders through use of appropriate electronic tools as part of national security;

6. Require ICT Service Providers to provide facilities for emergency communication and prediction, monitoring and early warning of disasters; and

7. Identify institutions, organisations and establishments that are of National strategic importance and classify them as Critical Infrastructure. These will be required to demonstrate strict adherence to IT security management by complying with requirements set out by the Government or relevant regulatory authorities.

7 Monitoring and Evaluation

Monitoring and Evaluation of this policy will be integrated with the national integrated monitoring and evaluation system (NIMES) in order to maintain clear linkages between the implementation of this policy and the Medium Term Plan (MTPIII) of Vision 2030.

The Ministry of ICT will develop a road map to implement the national ICT policy. The road map will inform the Monitoring and Evaluation Framework and Implementation Matrix of the National ICT Policy.

A review of this policy will be conducted every three (3) years and a mid-term review after five years. In addition to these reviews, the Ministry will carry out an annual monitoring and evaluation exercise and report on the implementation of the policy.

List of Acronyms

ICT	Information, Communications and Technology
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
UPI	Universal Personal Identifier
GEMS	Growth Enterprise Market Segment of the Capital Market
STB	Set-Top Box
FM	Frequency Modulation
IoT	Internet of Things
IoE	Internet of Everything
IXP	Internet Exchange Point
ST and I	Science, Technology and Innovation
HEIs	Higher Education Institutions