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MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION**

NATIONAL INFORMATION AND COMMUNICATIONS TECHNOLOGY POLICY

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LIST OF ACRONYMS

ATU	African Telecommunications Union
ASO	Analogue Switch-off
BPO	Business Process Outsourcing
BRELA	Business Registration and Licensing Agency
ccTLD	country code Top-Level Domain
CAS	Central Admission System
CEIR	Central Equipment Identification Register
CERT	Computer Emergency Response Team
CLF	Converged Licensing Framework
CO₂	Carbon Dioxide
COSTECH	Tanzania Commission for Science and Technology
CSO	Civil Society Organization
CTO	Commonwealth Telecommunications Organization
DSM	Dar es Salaam
DTBi	Dar Teknohama Business Incubator
EAC	East African Community
EASSy	Eastern Africa Submarine Cable System
ECH	Electronic Clearing House
eGA	e-Government Agency
ERB	Engineers Registration Board
FDI	Foreign Direct Investment
FYDP	Five Year Development Plan
Gbps	Gigabits per second
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IFMS	Integrated Financial Management System
ISDN	Integrated Services Digital Network
ITES	Information Technology Enabled Services
ITSO	International Telecommunications Satellite Organization
ITU	International Telecommunication Union
IXP	Internet Exchange Point
KPI	Key Performance Indicator
LGAs	Local Government Authorities
M&E	Monitoring and Evaluation
MDAs	Ministries Departments and Agencies
MP	Member of Parliament
NACTE	National Council for Technical Education
NGO	Non-Government Organization
NICTBB	National ICT Broadband Backbone

NICTP	National ICT Policy
NPS	National Payment System
OLAS	Online Loan Application System
PhD	Doctor of Philosophy
PPP	Public Private Partnership
R&D	Research and Development
RALG	Regional Administration and Local Government
RASCOM	Regional African Satellite Communications
RPS	Retail Payment System
SADC	Southern African Development Community
SEACOM	Southern and Eastern Communications Network
SMEs	Micro and Small and Medium Enterprise
Tbps	Terabits per second
TCO	Total Cost Ownership
TCRA	Tanzania Communications Regulatory Authority
TCU	Tanzania Commission for Universities
TISS	Tanzania Interbank Settlement System
TTCL	Tanzania Telecommunication Company Limited
UCSAF	Universal Communications Service Access Fund
VETA	Vocational Educational Training Authority

GLOSSARY

- Broadband** Transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 2.0 Megabits per second (Mbps).
- Broadcasting:** A term referring to the distribution of information using Radio, Television, Internet and Intranet or webcasting.
- Cybersquatting:** Registering, selling or using a domain name with the intent of profiting from the goodwill of someone else's trademark.
- Digital Divide:** The technological gap between countries that have fully exploited ICT and those that have not. The digital divide is often associated with the resulting gap in terms of economic development.
- e-commerce/e-transaction:** Business activities involving consumers, manufacturers, suppliers, service providers and intermediaries using computer networks such as the Internet.
- e-service:** e-service represents one prominent application of utilizing the use of information and communication technologies in different areas. It includes among others e-commerce and other non-commercial services.
- e-government:** The use of information and communications technology by the government to transform relations with citizens, businesses, and within different arms of government.
- e-waste:** Discarded ICT equipment including computers, office electronic equipment, entertainment device electronics, mobile phones, television sets, and refrigerators.
- Information and Communications Technologies:** Is a generic term used to express the convergence of information technology, broadcasting and communication. One prominent example is the Internet.
- Information-Based Economy:** A country or region where ICT is used to develop an economic foundation and market transactions.
- Information Society:** A country or region where information technology has been fully exploited and is part of everyday life as an enabler of information sharing, communication and diffusion.
- Information Technology:** Embraces the use of computers, telecommunications and office systems technologies for the collection, processing, storing, packaging and dissemination of information.

Internet Exchange Point: A “peering point” for interconnecting ISPs and/or other IXPs for the purpose of localizing national traffic routing as opposed to using international routes to accomplish Inter-ISP traffic flow.

Internet Service Provider: Also known as Internet Access Provider. A company that provides infrastructure for access to the Internet, or for interconnecting other ISPs and content-based or application-based services on the Internet.

Knowledge-Based Economy: An economy which is directly based on the production, distribution and use of knowledge and information.

Knowledge-Based Society: A society with capabilities to identify, produce, process, transform, disseminate and use information to build and apply knowledge for human development.

Local Area Network: A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves.

Local Content: Expression and communication of a community’s locally generated, owned and adapted knowledge and experience that is relevant to the community’s situation and is characterised by location, culture, language and area of interest.

Open Access: Principle that gives any licensee right for access to any facility and/or service of the ICT Broadband Infrastructure Network on terms and conditions that are non-discriminatory, transparent and Affordable.

Productive Sectors: Consist of Agriculture, Tourism, Mining, Oil and Gas, Natural Resources and Energy, Manufacturing, as well as Small and Medium Enterprises (SMEs)..

Public Institutions: Entities such as Ministries, Departments and Executive Agencies (MDAs); Local Government Authorities (LGAs) and any other state owned institution.

Tele-Density: The number of telephones per 100 people in a region.

PREFACE

Information and Communication Technology (ICT) is the bedrock for national economic development in a rapidly changing global environment. Nations that have embraced ICT and made it an important aspect of their national agenda have reaped benefits in terms of social economic development. The Government of the United Republic of Tanzania recognizes that effective use of information and knowledge is a critical factor for rapid socio-economic growth, in its aspiration to become a middle-income country by 2025.

To guide Tanzania in the utilization of ICTs, the Government has been setting policy frameworks. The National ICT Policy formulated in 2003 has enabled Tanzania to attain successes in the areas of telecommunications, infrastructure development, human capital development and use of ICT in service delivery to citizens.

Despite these successes, the ICT landscape has changed since 2003, requiring a relook at the Policy framework to reposition Tanzania to better meet emerging opportunities while contending with their associated threats. These developments challenge us to devise bold and courageous initiatives to address issues such as reliable infrastructure, skilled human resources, open governance, security as well as legal and institutional frameworks. Pursuant to realizing significant ICT potential for development and addressing its challenges, the Government has reviewed the National ICT Policy of 2003 (NICTP 2003) and came up with the National ICT Policy 2016, which provides a comprehensive framework for guiding the development and growth of the industry to ensure optimal benefits to the nation and its citizens.

The National ICT Policy 2016 is formulated within the context of national vision statements guided by the Tanzania Development Vision 2025, which recognizes that ICT is central to a competitive social and economic transformation by stating:

“These technologies are a major driving force for the realization of the Vision. They should be harnessed persistently in all sectors of the economy...”

“...This task demands that adequate investments are made to improve the quality of science-based education and to create a knowledge-based society in general.”

The policy formulation process was participatory, benefiting from contributions from a wide spectrum of stakeholders, including government ministries, departments and agencies, the private sector, ICT operators, research organizations, academia, development partners, non-governmental organizations, public institutions and the general public. Let me use this opportunity to extend my sincere appreciation to all stakeholders who participated in the preparation of this policy.

May I also take this opportunity to reiterate the government's commitment towards continued improvement of the enabling environment for the ICT industry. The success of this policy framework relies to a great extent on the cooperation of all stakeholders. I welcome continued support for and participation of all stakeholders in its implementation in order to realize the objectives of Tanzania's sustained social economic development and transformation into a knowledge society.

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Minister for Works, Transport and Communication

May 2016

CHAPTER ONE

INTRODUCTION AND STATUS

1.0 Introduction

The National ICT Policy 2016 (NICTP 2016) is a result of the revision of the NICTP 2003. The NICTP 2003 has provided a national framework for ICTs to contribute effectively towards achieving national development goals and transform Tanzania into a knowledge-based society through the application of ICT. This policy has facilitated the development of the Tanzanian ICT industry over the past decade and created a broad range of economic and social activities. These developments have led to job creation, enhanced productivity and efficiency that led to increased ICT contribution to the Gross Domestic Product (GDP) from 1.5% in 2004 to 2.4% in 2013. Moreover, sector growth has increased from 17.4% of GDP in 2004 to 22.8% by 2013.

This policy has been implemented for a period of more than ten years, a period in which the industry has witnessed major technological changes. The government has been making efforts to accommodate these changes. These include introduction of Converged Licensing Framework (CLF), migration from terrestrial analogue to digital television broadcasting, putting in place a National ICT Broadband Backbone, extension of telecommunication networks to rural communities and financial inclusion through mobile money innovation. One of the major initiatives that the government has pursued is the improvement of the ICT infrastructure to bridge the digital divide and lower the cost of communications.

It is acknowledged that the development, deployment and utilization of ICTs within the economy and society, raise a number of challenges in infrastructure, safety, security, standardization, electronic service, local content development and Business Process Outsourcing (BPO). However, legal framework to attract investments in the sector under public private partnership (PPP) arrangement as well as skills and leadership to champion the integration of ICTs in the socio-economic development process is also a challenge. To address the above challenges, the Government is reviewing the NICTP 2003 to spearhead the development of ICT in the country through a process that resulted in the formulation of NICTP 2016. The NICTP 2016 will make a desirable and appreciable impact on the country's developmental process. This policy is based on the basic premise that: Tanzania's accelerated development within the emerging information and digital age will not be possible without an ICT-driven development agenda.

1.1 ICT Situation Analysis

For the period of implementation of the National ICT Policy 2003, Tanzania has made substantial progress in the deployment and utilization of ICT. The government's guiding plan, the Tanzania Five Year Development Plan (FYDP) of 2011/12-2015/16, highlights the central role of ICTs. It states that:

“It is widely accepted that productivity growth is driven by adoption of technology. ICTs will play a crucial role in the transformation process from a resource-based to a skill-based and technology-based economy in order to transform the country’s production structure...in the current information age, rapid access to data and other new technologies is essential to national socio-economic development.”

Against this backdrop of clear and well-defined vision, strategy and plans, Tanzania has made commendable strides in the right direction. For example, the cost of accessing the internet in the country dropped by more than 50 percent in 2010 due to the deployment of the National ICT Broadband Backbone (NICTBB) and landing of two submarine cables in Dar es Salaam, namely Eastern Africa Submarine cable System (EASSy) and Southern and Eastern Africa Communication Network (SEACOM).

ICT development in Tanzania has contributed to bringing social economic development to majority of citizens. For example, the introduction of mobile money platforms in Tanzania has created new banking avenues for people who previously did not have access to banking services. As a positive ripple, the number of SMEs acting as mobile banking agents has created new forms of employment and livelihood. Moreover, ICT has contributed to improvements in both public and private sector service delivery. These include healthcare, formal and informal education and various e-services contributing to manifestation of e-government. The following sections illustrate some aspects of the progress made:

1.1.1 Communication Infrastructure

The NICTP 2003 envisioned making Tanzania a hub of ICT infrastructure and ICT solutions in Eastern and Southern African region. In 2003, Tanzania entirely depended on low capacity and expensive satellite bandwidth for local and international communication. To realize this vision, two focus areas namely ICT Infrastructure and Universal Access were set out in the policy document so as to ensure availability of reliable and inter-operable ICT infrastructure and extension of ICT coverage to underserved areas, respectively. As of the year 2015, Tanzania has high capacity broadband connection to the rest of the world through EASSy, with capacity of 4.72Tbps, SEACOM with capacity of 1.28 Tbps, and coverage of 7,560 Km long NICTBB Optic Fibre Cable with capacity of 4.8Tbps. The NICTBB and submarine cables have reduced the cost of backhaul transport bandwidth by about 99% compared to the situation in 2009. By leveraging its unique geographical position, Tanzania now serves neighbouring landlocked countries by extending the benefits of high-capacity submarine cables through the NICTBB infrastructure – in the process, fulfilling its aspirations of being a regional ICT hub.

The investment done by the government in the National ICT Broadband Backbone which has networked almost all regional headquarters within the country and provided connectivity to six

neighbouring countries, namely; Kenya, Uganda, Rwanda, Burundi, Zambia, and Malawi has catalysed new interest among telecommunication operators resulting in willingness to invest in infrastructure to facilitate exploitation of the available long distance terrestrial broadband infrastructure. The government currently lays down the ICT infrastructure in collaboration with both public and private telecommunication operators. Other achievements include deployment of six Internet Exchange Points (IXPs) located in Dar es Salaam, Arusha, Mwanza, Zanzibar, Mbeya and Dodoma and establishment of country code top-level domain (ccTLD).

In 2012 Tanzania started the Analogue Switchoff (ASO) exercise to migrate from terrestrial analogue to digital broadcasting, becoming the first country in eastern and southern Africa to embark on implementation of the ITU goal. Tanzania achieved full migration from analogue to digital before June 2015, which was the deadline for phasing out all the analogue technology worldwide as per ITU agreement.

Tanzania's tele-density has increased from 1.22 subscribers per 100 people in 2002 to 67 subscribers per 100 people in 2014. Furthermore, telecommunication subscriber base has risen from 2.96 million in 2005 to 32 million in December 2014 which is equivalent to an average increase of 3.23 million subscribers per year. Even though the industry enjoys tremendous growth of telecommunications in general which is mostly contributed by the mobile industry, the fixed telephony subscription has experienced a declining trend from 154,420 in 2005 to 151,274 in 2014. Internet usage has not grown at a desirable pace. For instance, number of Internet users by subscription increased from 3.56 million in 2005 to 11.34 million in 2014.

Statistics from TCRA show that 68% of Internet users registered in 2014 was household/ individual whereas Internet users by household/ individual in 2005 were 28% only. Internet cafés have contributed to some degree to enhanced Internet usage, but in terms of Internet penetration Tanzania still lags behind other countries in the region with similar GDP per capita and literacy levels. Mobile network operators are picking up the slack and becoming key players in Internet service provision with their extensive national coverage following the introduction of mobile data and broadband services.

Despite the above-mentioned achievements, most citizens still cannot access broadband services. This in turn calls for a re-examination of the policy focus so as to accommodate these developments. Moreover, the development of communication infrastructure still faces challenges due to the absence of a supportive framework for acquisition of right of way for construction of telecommunication infrastructure, lack of mechanism to facilitate broadband penetration agenda to all, absence of ICT standardization policy and national data centre framework, vandalism of ICT infrastructure, high cost of provision of rural telecommunication and unreliable or absence of power supply.

While the NICTP 2003 is silent on spectrum issues, the industry has witnessed an increasing demand for wireless communication spectrum following the liberalization of the communication sector in the country. There has been a challenge of spectrum acquisition for various uses and a big chunk of allocated spectrum is underutilized while implementation of critical services is affected.

The use of finite telecommunications and ICT resources including spectrum, internet numbering and country code Top Level Domain (ccTLD) namely dot tz (.tz) which is a national resource in the cyber-space, has been increasing in recent years. For instance, a cumulative number of dot tz domains registration increased from 1,703 in June 2005 to 9,558 in April 2015. Despite this achievement, the NICTP 2003 was silent on dot tz domain protection, which is among key national resources. This is a result of establishment of the Tanzania Network Information Centre (tzNIC) in 2006 under public private partnership arrangement. To ensure efficient and effective utilization of this scarce national resource, there is a need to have policy provisions so that the country can reap maximum benefits for a sustainable telecommunications industry.

1.1.2 Legal and Regulatory Environment

The main objective of the legal and regulatory framework focus area in the NICTP 2003 was to establish an enabling legal framework for promotion of ICT in the country. To achieve this objective, the government has been undertaking reforms in the legal framework, by putting in place cyber and other related laws. The Government acknowledges the landmark legal amendments which introduced the legal provisions that allow and recognize the admissibility of electronic evidence through the amendments of Evidence Act No. 15 of 2007, Act No. 3 of 2011 and other amendments. Further, the Government enacted the Electronic and Postal Communications Act No. 3 of 2010 and the Universal Communications Service Access Act. No. 11 of 2006. Various other Regulations were made under these Acts to promote electronic communications, consumer protection, and to address cyber security issues.

With regard to the regulatory environment, Tanzania has liberalized the communications and broadcasting sector in order, among other things, to attract investment and increase competition. The Government through the Tanzania Communication Regulatory Authority Act No. 12 of 2003, established a converged regulatory authority named TCRA to regulate the communications sector, which includes telecommunication, broadcasting and postal services. Following the establishment of TCRA, Tanzania marked a new era in the communication sector, which led to introduction of Converged Licensing Framework (CLF) in 2005. At the end of 2013; 21 network facility operators, 17 network service operators, 91 application service operators, 85 radio content service operators and 30 television content service operators had been licensed under CLF.

Despite the achievements mentioned above, a major challenge is the inability to maintain a proactive legal framework that can keep pace with the rapidly changing technology. Among the

areas that need attention include data access rights, privacy protection, computer fraud & crime, security and privacy of e-transactions, establishment of rules governing e-transactions, and delivery of e-opportunities to the wider population. Other regulatory challenges facing ICT sector in Tanzania include lack of mechanism for ICT standardization.

1.1.3 ICT Industry Development

ICT Industry is another focus area in the NICTP 2003 whose objective was to promote local manufacturing of ICTs as well as enhancing Research and Development (R&D), innovation and entrepreneurship. Over the last decade, Tanzania has experienced a slow-growing local ICT development industry and most software and hardware used by both public and private sectors are imported at considerable cost. Production of software for local market is still a challenge in Tanzania and the use of open-source software is on small scale. In terms of the hardware, there are no local manufacturers of ICT equipment in Tanzania. Invariably, local dealers or agents import ICT products from abroad. In addition, there are no standards guiding the importation of both hardware and software. Overall, Tanzania has a small emerging skilled capacity to support the ICT industry in terms of developing or supporting hardware and software.

1.1.4 Access to ICT in the Education System

The intention of the Service Sectors focus area in the NICTP 2003 was to promote the use of ICT in various sectors including education. ICT has the potential to enhance effective delivery of both formal and informal education. However, given the current situation, this benefit is only evident in some schools and higher learning institutions in urban areas. Currently, few educational institutions, mostly private, have incorporated the use of ICT in education delivery. Universities and other higher learning institutions do not have adequate ICT facilities and bandwidth to meet real demand. There are various initiatives that the Government in collaboration with other stakeholders has been taking to promote the use of ICT in education.

Though cyber cafés have tried to fill the availability gap, they do not offer a viable alternative for e-learning due to prices being unaffordable. In addition, the inadequacy of effective programmes for teachers' training particularly in computer and other multi-media utilization has been identified as a major reason for slow take-up of ICT in education. Furthermore, the desire to unleash the potential of ICT in education delivery may cause Tanzania to precipitate numerous pitfalls as seen in other African countries. Experiences drawn from other countries' attempts to utilize ICT in education should provide Tanzania with useful lessons and reasons for exercising prudence in how it deploys ICT in education.

1.1.5 Strategic ICT Leadership and Workforce

NICTP 2003 prioritized Strategic ICT leadership focus area because of its importance in providing visionary guidance in the sector. The main goal of this pillar was to create an authoritative national organization to effect, coordinate and review the ICT policy. Over the past ten years, the sector has witnessed major developments in putting an appropriate institutional framework in place. Some of the successes include establishment of TCRA to regulate the ICT sector, e-Government Agency (eGA) to promote the use of ICT in the Public Service and the Universal Communications Service Access Fund (UCSAF) to bridge the digital divide between urban and rural areas. Other initiatives include the setting up of ICT Units in MDA's and the decision by the Government in July 2012, to establish the ICT Commission, which is the National ICT think-tank responsible also for Research and Development to accelerate ICT industry in the country. To a great extent, the objective in this focus area has been attained. However, the challenge to leaders at various levels remains that of ensuring that the objectives of the policy i.e. the anticipated benefits, reach as many people as possible in both urban and rural areas.

With regard to the workforce, the objective of the 2003 National ICT Policy, under Human Capital Development, was to increase the size and quality of ICT-skilled human resource base in Tanzania. To-date the industry has produced a number of tertiary colleges and higher learning institutions that in turn produce ICT-skilled personnel at different levels of professionalism e.g. technicians, engineers, software developers, network administrators, and system analysts.

Government institutions which regulate the education sectors such as VETA, NACTE and TCU monitor the quality of education in ICT and the Engineers Registration Board (ERB) now recognizes ICT related professions such as software engineering, telecommunication engineering and systems engineering. In recent years, TCRA and other public and private institutions are providing scholarship to bachelor, masters and PhD degree programmes related to ICT in various higher institutions of learning. In addition, the Government has developed an ICT scheme of service for ICT cadres. However, there is a real challenge of shortage of qualified ICT professionals compared to actual demand, and their profiles are not well defined and established. The process of standardization in terms of evaluation and certification of different courses offered by various training centres is also inadequate.

1.1.6 ICT in Everyday Life

There has been an improvement in adopting and using ICT in day-to-day activities. This is a result of the realization of the productive sectors focus area of the NICTP 2003, which envisioned enabling ICT to contribute towards the reduction of poverty and improvement of the quality of life. A good example is the uptake of mobile money services. The introduction of mobile money services such as M-Pesa, Tigo Pesa, Airtel Money and Ezy Pesa, has enabled people to save, send and spend money including payment of bills for utilities through mobile platforms. In addition, banks have started offering banking services through mobile platforms, which allow their customers to use mobile phones for banking transactions.

The number of mobile money transaction for the period July 2013 to April 2014 alone reached 972,641,606 amounting to Tanzania Shillings 28.3 trillion. Moreover, the use of social media applications such as Facebook, Twitter, Instagram, WhatsApp, LinkedIn, YouTube and Blogs is increasing in Tanzania just as the trend in the world is. Social media now constitute dominant forms through which society communicates using different languages including Kiswahili. While recognising the advantages of these social media, it is also evident that they pose security challenges, and a lot of online content is detrimental to national culture and poses particular threat to children. It cannot be overemphasized, therefore, that there is need for strategies/mechanisms to regulate against the abuses of social media. Others are the capacity to manage ICT quality and electronic waste including availability of frameworks to ensure electronic safety.

1.1.7 ICT at the Workplace

There is sufficient evidence that many large organizations and companies make extensive use of networked computers with Internet access. The workplace has been embracing the use of ICT in its daily operations. This applies to Government, SMEs and other institutions. These organizations have appreciated the potential of ICT in workplaces. The use of ICT in Government institutions has improved and is coordinated following the Government decision to establish ICT Units in MDAs and LGAs.

Besides other initiatives taken by public and private institutions, in 2013 the Government acquired the 1.55Gbps international Internet bandwidth for Government use and provided video conferencing facilities to regional headquarters in Tanzania mainland and Zanzibar. The use of ICT in various independent departments and authorities is high which has helped to further improve public services delivery.

Despite these achievements, evidence suggests that smaller companies and many institutions make marginal use of ICT in their daily operations to enhance efficiency and increase productivity. Other challenges include improper use of ICT at workplaces, which affects staff productivity, cyber security, network management and spiralling cost that need special intervention. The greatest obstacle to effective use of ICT at the workplace in Tanzania, according to the e-Readiness Report, is the low capacity of human capital in the use and maintenance of ICT.

1.1.8 Local Content and Hosting

The ninth objective of the NICTP 2003 aimed to promote local creation and development of ICT applications and multi-media content for productivity, as well as for social interactions, culture and entertainment. A study conducted by the Ministry of Communication, Science and Technology in 2014 showed that there had been little progress in developing local content over the last ten years of NICTP 2003 implementation. The country still depends on foreign importation of content,

software and hardware. Development of local content is still a challenge as there is limited level of local expertise in content development.

Migration from analogue to digital terrestrial broadcasting, on the other hand, has brought about the challenge of inadequate local television content. Currently, Tanzania faces shortage of locally made English and Kiswahili television programs for local service demands. Dependency on the imported content hinders opportunities for domestic economic empowerment as well as capacity development within the context of ICT.

The Tanzania ICT industry has been taking a number of initiatives to address the challenge of language as a barrier to ICT adoption and usage in the country. In 2008, for instance, the first open source Kiswahili application software called Jambo Office was developed and introduced in Tanzania by the University of Dar es Salaam in collaboration with the Royal Swedish IT Consultancy Company. These efforts, however, lacked supportive framework to become operational. Necessary actions need to be taken to improve domestic value added and local content development in the ICT industry.

Tanzania as a country has not been able to maximize the economic benefit created by the proliferation of ICT utilization which creates opportunities in terms of value chain activities required in the provision of ICT services, including; software development, hardware manufacturing, hosting activities and training, amongst others. As a result, the country continues to be dependent on foreign imports in the process denying itself opportunities for domestic economic empowerment and capacity building.

While local content and development of electronic services face a number of challenges, prevalence of Information Technology Enabled Services/ Business Process Outsourcing (ITES/ BPO), which is a global multi-billion dollar ICT industry has potentials in job creation and significant contribution to gross domestic product (GDP). This is a new focus area of concern and calls for a proper policy framework and promotion strategy as the current environment is supportive for ITES/ BPO uptake. Challenges to be addressed in order to promote ITES/ BPO include creation of a robust framework, address security concerns, development of local skills and expertise that if not addressed will likely prevent Tanzanian organizations from benefitting from growing ITES/ BPO opportunities in many developing countries. Digital content and ITES/ BPO require competence and significant investment resources from both public and private sectors.

1.1.9 ICT Employment Opportunities

The supply of ICT professionals in Tanzania is considerably less than current demand, especially in the areas of higher skills and experience. In the past four years, The Tanzania Commission for Science and Technology (COSTECH) has embarked on supporting ICT innovation through Dar Teknohama Business Incubator (DTBi). This initiative has provided small local entrepreneurial

start-ups to partner with their counterparts from other countries and thereby assisting in job creation. Replication of business incubators, which has been proved successful in Dar es Salaam to other areas of the country, encounters a number of challenges such as lack of incentives. Nevertheless innovation has been increasing over years especially in the private sector through development of ICT solutions, which has helped in job creation; for example, the mobile money innovation in telecommunication companies has facilitated financial inclusion of the majority of Tanzanians and created job avenues. However, job mobility in the ICT industry is high and poses a challenge for local industry.

1.1.10 E-Government

The NICTP 2003 under a focus area of Public Services addressed the issue of using ICT to enhance service delivery to the general public. Cognizant of the fact that there were fragmented e-Government initiatives, the-Government in 2010 made a remarkable step of establishing the e-Government Agency (e-GA) to coordinate, oversee and promote e- Government initiatives and enforcement of e-Government standards to Public Institutions. Other strides include the use of integrated HR and Payroll systems covering about 280,000 public servants and also adoption of organizational web portal in the Government. Other ICT services particularly those, which allow interaction and/or transaction with MDAs, are still rare in the public sector in Tanzania.

Today, various arms of government are making progress in transforming their operations by deploying ICT solutions. Successful deployment of e-government systems include the National Payment System (NPS) which comprises of the Tanzania Interbank Settlement System (TISS), Electronic Clearing House (ECH), Integrated Financial Management System (IFMS) and Retail Payment System (RPS). Through NPS values of transactions increased in March 2013 by 4.2% to Tanzania shillings 16,482.6 billion from Tanzanian shillings 15,818.7 billion recorded in March 2012. Other successes are establishment of the Central Admission System (CAS) for higher learning students' placement and the Online Loan Application System (OLAS). Despite these achievements, Tanzania could benefit even more from potential benefits of ICTs to improve efficiency and effectiveness by furthering information sharing, transparency and accountability as well as through improvement of citizens' ICT literacy. . Based on the baseline study on e-Government, it has been indicated that there is low level of application of ICT services in the public sector in Tanzania. The language of Internet content also poses a significant challenge, underscoring the importance of having Internet content in languages that the citizens can read and understand.

1.1.11 E-Transactions

Currently, there are limited e-transaction services such as e-commerce due to lack of local credit cards and supportive legal framework appropriate for e-business promotion. Most significantly, the legal framework does not provide adequate safeguards to create an environment of trust for e-

business transactions to take place. Consequently, financial institutions and businesses at large are not able to set up provisions for supporting e-transactions for their own, and each other's clients.

1.1.12 Foreign Direct Investment

The communications sector in Tanzania has grown to a great extent because of Foreign Direct Investment (FDI). FDI has been important not only for the investment it brings, but also for the operational expertise, which accompanies the investment. If the communications sector is to continue to grow and expand, the challenge is the knowledge transfer through technology transfer. Attractive investment opportunities are based not only on the provision and management/operation of new technological infrastructure but also on the development and launching of value-adding services supported by these agreements.

1.1.13 Research, Development & Innovation

The international ICT sector is an Intellectual Property driven and supported industry through R&D. Tanzania has little intellectual property registration and publications among its ICT companies/ people. There is a profound need to identify what latent intellectual property already exists within industry, harvest what exists among Tanzanians and publish the intellectual property. Intellectual Property publication will leverage the results of where existing ICT companies have been historically focusing their efforts (fragmented and opportunistic technical efforts). Intellectual Property publishing will help communicate and develop an international awareness of Tanzania's technical capability and competence. There is a dire need to develop awareness of hidden and under-promoted conceptual and technical assets. As such it is important to create awareness among ICT companies and management about the importance of Intellectual Property. Paired with awareness is also the need for training which explains the procedure for Intellectual Property searches and registration, including whom and where such services can be obtained in Tanzania, in addition to Business Registration and Licensing Agency (BRELA).

1.2 Challenges

- i) Non recognition of the ICT profession, inadequacy of skilled and competent human resources base and illiteracy amongst citizens to effectively participate in a knowledge society;
- ii) Ineffective leadership framework at different levels to champion the integration of ICTs in the socio-economic development process;
- iii) Lack of appropriate frameworks for deployment and utilization of ICT infrastructures including data centres, right of way, e-readiness and availability of electricity in most rural areas;
- iv) Underutilization of the deployed radio-communication frequency spectrum and other scarce ICT resources due to lack of policy framework;

- v) Most ICTs used in the country lack or contain minimal local content components, online content language is foreign predominantly English which is not accessible to most citizen and no framework for promotion of the competitive ITES/BPO Industry in the country;
- vi) Relative increase in ICT infrastructure vandalism and unsafe/unsecure use of communication services which lead to cybercrime, infringement of privacy and detriment to national culture including child abuse online;
- vii) Unsupportive policy framework for National ICT standardization and e-waste management;
- viii) Weak research & development (R&D) in the sector and high dependency on ICT importation which negatively impact innovation within ICT start-ups and the industry;
- ix) Low negotiation capacity and ineffective participation in regional and international integration ICT initiatives which hinder opportunities for network creation, collaboration and linkage to Foreign Direct Investment (FDI) and technology transfer;
- x) Dire need to develop awareness of hidden and under-promoted conceptual and technical assets on Intellectual Property rights;
- xi) Ineffective integration of ICTs for increased productivity and value addition in the production chain; and
- xii) Increased gender inequality in ICT initiatives and ineffective application of ICT in key / potential crosscutting sectors.

CHAPTER TWO POLICY RATIONALE

The emergence of the information age emphasizes the important role that ICT can play in facilitating a nation's socio-economic development. The effective use of ICT is becoming the most critical factor for rapid economic growth and wealth creation, and for improving socio-economic well being. ICT's are, therefore, increasingly becoming the key drivers for socio-economic development worldwide. It is now acknowledged that a nation's capability to accelerate its socio-economic development process and gain global competitiveness depend very much on the extent to which it can develop, use, and exploit ICT in one form or another.

For Tanzania to move away from its industrially weak and subsistence agriculture-based economy towards a knowledge-based economy, there is a need to leverage ICTs as a catalyst for wholesale development of all economic endeavours. To aid this process the Government, in 2003, developed the National ICT Policy with a vision for *“Tanzania to become a hub of ICT infrastructure and ICT solution that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally”*. The National ICT Policy 2003 was based on ten main focus areas namely: Strategic ICT Leadership; ICT Infrastructure; ICT Industry; Human Capital; Legal and Regulatory Framework; Productive Sectors; Service Sectors; Public Service; Local Content; and Universal Access. This policy made it possible for Tanzania to achieve milestones in the ICT industry and in facilitating the deployment and exploitation of ICTs within key sectors of the Tanzanian economy. To a great extent, the policy vision of Tanzania being a regional ICT hub has been attained as Tanzania now serves neighbouring countries by extending the benefits of high capacity submarine cable through the NICTBB.

Since 2003 a number of policy objectives have been attained and the industry has witnessed major technological changes. These include construction of infrastructures, implementation of universal service obligations and successful migration from analogue to digital terrestrial television broadcasting which has further improved quality and also helped to rescue spectrum resources (digital dividend) suitable for mobile broadband particularly in the last mile connectivity. Other development includes advancement of communication technology from GSM to LTE and transmission systems from microwave to optical fibre technology. These technological advancements and successes have brought challenges as well as opportunities in the ICT industry including spectrum and other ICT resources, broadband, BPO, e-waste, local content and standardization which require policy framework.

The National ICT Policy 2016 recognizes the crucial role that the development, deployment and the exploitation of ICTs within the economy and the society can play towards the achievement of the nation's socio-economic goals enshrined in the National Development Vision 2025. It intends to put in place measures and mechanisms to accelerate broadband penetration and access,

strengthen ICT security and standardization, enhance management and efficient utilization of spectrum and other scarce ICT resources, promote business process outsourcing industry, enhance innovation in e-service and promote local content development and hosting, strengthening national capacity in protection of cyberspace users. Other areas are establishment of frameworks for e-waste management, promoting the use of ICT for disaster management and inclusion of other crosscutting issues. Therefore, the National ICT Policy 2016 is comprehensive enough to address key challenges facing the country in the emerging information age.

2.1 Policy Vision, Mission and Objective

2.1.1 Vision

Tanzania with economically, socially and culturally enriched people in ICT-enabled knowledge society.

2.1.2 Mission

To transform Tanzania into an ICT-enabled knowledge-based economy through development, deployment and sustainable exploitation of ICT to benefit every citizen and business.

2.1.3 Objectives

2.1.3.1 Main Objective

To accelerate socio-economic development with potentials to transform Tanzania into ICT driven middle-income economy and society.

2.1.3.2 Specific Objectives

- i. To develop and enhance human capital that is capable of championing ICT in the creation of Tanzania's knowledge society;
- ii. To enhance public participation and understanding of potentials of ICT for effective transformation towards a knowledge based society;
- iii. To strengthen strategic ICT leadership at all levels to effectively champion exploitation of ICT in all sectors of economy;
- iv. To enhance access and availability of affordable and reliable broadband services to accelerate socio-economic development of the society;
- v. To have reliable, interoperable and sustainable ICT infrastructure that supports ubiquitous national connectivity;
- vi. To have universal access to ICT products and services in order to bridge the digital divide;
- vii. To strengthen management and promote efficiency in spectrum allocation and utilization that guarantees its availability and competition in both urban and rural areas;
- viii. To promote and strengthen management of scarce ICT resources for sustainable ICT industry;
- ix. To enhance local content in all aspects of ICT value chain and local hosting of electronic services;

- x. To promote a competitive ITES/ BPO industry and development of electronic services in all aspects of ICT value chain activities;
- xi. To strengthen cooperation and collaboration in regional and international ICT development initiatives that promote knowledge transfer and attract foreign direct investment;
- xii. To strengthen legal and regulatory environment that facilitates acquisition, utilization and development of ICT in Tanzania;
- xiii. To have secure environment that builds confidence and trust in the use of ICT products and services;
- xiv. To promote safety on use of ICT products and services;
- xv. To strengthen quality control and standardization in the ICT industry;
- xvi. To have sustainable ICT industry;
- xvii. To promotes effective use of ICT in the productive sectors for increased productivity;
- xviii. To enhance participation of gender and social diversity groups in ICT;
- xix. To promote use of ICT in disaster management;
- xx. To promote use of ICT in environmental conservation;
- xxi. To have Good Governance enhanced by ICT; and
- xxii. To promote investment in ICT under PPP arrangement.

CHAPTER THREE POLICY ISSUES AND STATEMENTS

3.1 Strategic ICT Leadership and Human Capital Development

3.1.1 Issue: Strategic ICT Leadership

Leadership is critical to economic and institutional transformation, including ICT-enabled transformation. Whereas the NICTP 2003 observed that in 2003 Tanzania's ICT environment lacked focused ownership and visionary leadership, the current situation shows that things have much changed and ICT now is focused. This argument is supported by Government's efforts in the last decade to putting more emphasis on establishing an appropriate institutional framework for sector development with a great success. Implementation of policy statements under this focus area has been successful to a great extent. Some of the notable successes include establishment of TCRA in 2003 to regulate the sector, establishment of the e-Government Agency (eGA) to promote the use of ICT in public services and establishment of UCSAF to bridge the digital divide between urban and rural communities. Other successes include Government's decision in June 2012 to establish the ICT Commission, which is the National ICT think-tank that will be responsible for Research and Development in ICT to accelerate the ICT industry. These efforts have contributed to supportive business environment which has resulted in sector growth in terms of fixed and mobile phone subscription from 2.7m in 2004 to 32m in 2014, increased contribution to GDP from 1.5% in 2004 to 2.1% in 2014 and successful switchover to terrestrial digital from analogue television broadcasting which has expanded avenues for business development.

The new policy focus is anchored on three levels of leadership. These are: political leadership to champion ICT transformation process at national and local government level; senior administrative leadership including Chief Information Officers (CIOs) and managerial officials to spearhead policy implementation at institutional level and technical leadership. Despite notable achievements, reluctance to change of mind set at various levels of leadership with regards to the adoption of ICT's in development plans poses a challenge. There is also ineffective leadership to champion the integration of ICT and to accelerate the nation's socio-economic development efforts in the information age.

3.1.1.1 Policy Objective

To strengthen strategic ICT leadership at all levels to effectively champion exploitation of ICT in all sectors of economy.

3.1.1.2 Policy Statements

The Government shall:-

- i) Ensure a high level of ICT leadership to provide vision and guidance for effective development, deployment and exploitation of ICT for socio-economic advancement in the Country.
- ii) Ensure availability of adequate funds equivalent to a reasonable proportional of GDP to promote ICT for full participation in the knowledge economy.

3.1.2 Issue: ICT Human Capital Development

Human resources are important for sustainable ICT industry. ICT Human Capital Development as one of the pillars in the NICTP 2003 aims at expanding and increasing local skilled and competent ICT human resources in the country. A number of efforts have been taken to develop the ICT Human capital in the country including establishment of ICT colleges in Universities such as dedicated College of ICT at the University of Dar es Salaam; dedicated school of Informatics at the University of Dodoma; introduction of ICT programmes in privately owned and operated Universities and an introduction of ICT subject in primary and secondary school curriculum. As a result, a number of students' enrolment and graduates in ICT in both public and private institutions has increased and more ICT courses are now offered as compared to the situation in 2003. Other efforts include development of appropriate scheme of service for ICT cadres in the Government. Despite the aforementioned achievements, there are still challenges in the development of ICT human capital which need to be addressed for full exploitation of benefits of the ICT sector such as non recognition of ICT professionals, and inadequacy of ICT skilled and competent human resources base to accelerate the nation's socio-economic development efforts in the information age. In this context, appropriate policy mechanism need to be put in place to address the aforementioned challenges.

3.1.2.1 Policy Objective

To develop and enhance human capital that is capable of championing ICT in the creation of Tanzania's knowledge based society.

3.1.2.2 Policy Statements

The Government shall:-

- i) Ensure presence of ICT professional recognition and development framework so as to have human resource base in the country which is ethical and capable of championing ICT initiatives towards creation of knowledge society;
- ii) Create supportive environment for collaboration with the private sector in development of a critical mass of ICT skills and expertise while encouraging lifelong learning through the use of ICT;

- iii) Ensure effective use of ICT in teaching and learning throughout the formal and informal education system.

3.1.3 Issue: ICT literacy of the Public

The NICTP 2003 endeavoured to raise level of public awareness of the role and potential of ICT for transformation of Tanzanian society towards knowledge based society. Since then Tanzania has been implementing a number of public awareness creation programmes and has witnessed notable achievement of this initiative. As a result of these efforts, the level of citizen awareness has increased in some areas of ICTs. Moreover, establishment of TCRA Consumer Consultative Council (TCRA CCC) is another achievement attained in policy implementation. Despite the aforementioned achievement, participation of civil societies and non-government organization in awareness creation is limited due to lack of an appropriate collaborative system that incentivises various groups. As a result, awareness creation efforts have been left to the Government only. This has led to the high illiteracy ratio in ICT among citizens that hinders fruitful exploitation of ICT in daily life.

3.1.3.1 Policy Objective

To enhance public participation and understanding of potentials of ICT for effective transformation towards knowledge based society.

3.1.3.2 Policy Statements

The Government shall:

- i) Ensure that ICT awareness is created among the public;
- ii) Embrace ICT as an integral part of national development and empower citizens to use it to fight poverty, ignorance and disease so as to improve the quality of their lives.

3.2 Broadband Access and Infrastructure Development

3.2.1 Issue: Broadband Services

Since 2003, the ICT industry has witnessed development of NICTBB, which has connected almost all administrative regional headquarters in Tanzania. During this period, participation of Tanzania in regional integration initiatives has been very active and in 2009 the country witnessed the arrival of two international submarine cables, which have connected Tanzania to the rest of the world with high speed and high capacity ICT network. Landlocked countries have now been linked internationally through Dar es Salaam EASSy and SEACOM submarine landing points. This has therefore made Tanzania a continental hub of communications infrastructure as per the UDSM

Bureau for Industrial Cooperation (BICO) 2014 ICT baseline study report. This now calls for a change of policy focus for these infrastructural developments to contribute significantly to socio-economic development of Tanzania. The World Bank report of 2009 acknowledges ICT as a catalyst and enabler for growth of all economic sectors; it can improve efficiency in production and services delivery. It is evidently known that for each 10% penetration of broadband in developing countries, it accounts for 1.38% of GDP growth.

Various efforts have been taken by the government, such as investment in ICT infrastructure, construction of NICTBB and creating enabling environment for other actors to invest in infrastructure like EASSY and SEACOM submarine cables; development of PPP policy and legislation; establishment of the Universal Communications Service Access Fund to facilitate ICT investment in rural and urban underserved areas; development of Internet Exchange Points; and establishment of country code top level domain. These efforts have contributed to cost reduction of backhaul transport bandwidth by about 99% compared to the situation in 2009 and increased telecommunication network coverage to 85% of geographical area. In spite of the above efforts, there are still a number of challenges that need to be addressed. The challenges include low broadband penetration in rural and urban underserved areas; significant level of unaffordability of broadband services and absence of supportive policy framework for universal broadband access.

3.2.1.1 Policy Objective

To enhance access and availability of affordable and reliable broadband services to accelerate socio-economic development of the society.

3.2.1.2 Policy Statements

The Government shall:-

- i) Ensure conducive environment for collaboration of public and private sector in exploring various means of financing access to broadband services;
- ii) Ensure availability and accessibility of reliable and affordable broadband services countrywide.

3.2.2 Issue: Infrastructure Development

Since 2003, the Government has continued its efforts to leverage business environment to support development of infrastructure. The Government has implemented NICTBB and will continue to develop the infrastructure beyond the current reach of more than 7,560 Km of fibre. Other initiatives include construction of national data centre, Internet exchange points, participation of private sector in metro fibre investment through operators' consortium and roll out of telecommunication infrastructure countrywide. Despite above achievements, there exist a number of challenges with regard to infrastructure development. The challenges include lack of appropriate

frameworks for deployment and utilization of ICT infrastructures including data centres, right of way, e-readiness infrastructure; high investment cost of infrastructure and lack of reliable power supply.

3.2.2.1 Policy Objective

To have reliable, interoperable and sustainable ICT infrastructure that supports ubiquitous national connectivity.

3.2.2.2 Policy Statement

The Government shall:-

- i) Ensure conducive environment for collaboration of public and private sector in exploring various means of financing ICT infrastructure;
- ii) Ensure safe and reliable ICT infrastructure developed countrywide;
- iii) Ensure e-ready infrastructure developed countrywide which supports provision of ICT services; and
- iv) Ensure availability of supportive framework to guide deployment of ICT infrastructure including right of way and sharing of such infrastructure.

3.2.3 Issue: Universal Access

The rapid increase in mobile services usage nationwide has mostly covered people in urban areas leaving majority in remote rural and other underprivileged areas without access or with poor access to ICT services. This is still the case despite efforts and measures taken by the Government in promoting access of ICT services to rural and potentially disadvantaged areas through time rollout target as obligatory license requirement to ICT network operators as well as achievement obtained through establishment of UCSAF including extension of communication services to more than 443 wards as of July, 2015 since its establishment. Notwithstanding this, affordability poses a major challenge hampering universal access to ICT services and products to majority of population particularly the low-income earners in rural and economically weak areas. Despite the subsidies provided by the Government through UCSAF, operational cost in rural service provision is too high to attract private sector investment.

3.2.3.1 Policy Objective

To have universal access to ICT products and services in order to bridge the digital divide.

3.2.3.2 Policy Statement

The Government shall:

- i) Ensure availability of funds for supporting rural ICT investment;

- ii) Strengthen collaboration with service providers to participate in rural ICT investments;
- iii) Ensure access to ICT products and services to society;
- iv) Encourage financial institutions and development partners to give particular support on investments in rural ICT services.

3.3 Frequency Spectrum and Other Scarce ICT Resources

3.3.1 Issue: Frequency Spectrum

Mobility is a dominant telecommunications services feature in Tanzania as compared to fixed telecommunications services. As per TCRA, mobile services subscription base in December 2014 reached 99.53% of all telephony subscription in Tanzania. Other services such as access to broadcasting and satellite services in various areas of the country also demand spectrum resources. Spectrum is a bloodline for provisioning of mobile telecommunications services. Existence of both public and private owned telecommunications companies providing mobile services relies on spectrum, a wireless communication resource. Spectrum is a key scarce public ICT resources that goes to waste if not efficiently used and managed, and therefore there is need to recognize it in the sectoral policies for guaranteeing sustainable future of ICT services provisioning in the country.

Past efforts made by the Government on this issue include enactment of the Electronic and Postal Communications Act (EPOCA) in 2010 to guide assignment, management and regulation of spectrum resources. TCRA is responsible for management and assignment of spectrum and other telecommunications resources. Despite these achievements, the industry still lacks a policy framework to guide allocation and efficient utilization of this resource including digital dividend. This, therefore, creates the need to address policy challenges facing frequency spectrum in order to be responsive, transparent and predictable so that the country can reap maximum benefits from the deployment of spectrum.

3.3.1.1 Policy Objectives:

To strengthen management and promote efficiency in spectrum allocation and utilization that guarantees availability and competition in both urban and rural areas.

3.3.1.2 Policy Statement

The Government shall:

- i) Ensure availability of spectrum for various uses and allocation that favours public interest; promotes innovation, research and development; strengthens competition and attracts foreign direct investment;

- ii) Ensure allocation and assignment of commercial spectrum resources that is transparent, competitive, does not confer permanent ownership to users and that sees to it that the allocated resources are used efficiently for sustainable provision of affordable and quality ICT services;
- iii) Strengthen national capacity of management of spectrum and enhance contribution to regional and international spectrum planning and harmonization in conformity with international standards;
- iv) Ensure substantial amount of spectrum including digital dividend is dedicated to the government for bridging the digital divide that is necessary for e-service delivery specifically for rural areas.

3.3.2 Issue: ICT Resources

The need for ICT resources such as numbering, Internet protocol addresses, domain names and other identifiers have been increasing in line with the increase of ICT subscription of various ICT services and applications. These resources are finite; therefore they need protection and promotion for sustainable deployment of ICT applications. Value Added Services (VAS) and other electronic and mobile services such as mobile banking, health, agriculture, require these resources, which if not managed properly, go to waste. While the need for these resources increases in the private sector, the demands from the government are also increasing to facilitate implementation of electronic services. To strengthen management of numbering and protection of country codes, the Government has established a sound legal and regulatory framework, and TCRA is responsible for management of these resources on behalf of the Government. Protection of dot tz ccTLD received high attention of the industry, which led to establishment of the Tanzania Network Information Centre (tzNIC) in 2006. This effort helped to raise the interest of local institutions to using the dot tz ccTLD, which is the national symbol of our country in the cyber world. Despite these initiatives, there are no explicit policy frameworks to effectively promote the use of these resources and the dot tz ccTLD is not recognized as the national symbol in the cyber world.

3.3.2.1 Policy Objective

To enhance efficiency and transparency in the management and utilization of scarce ICT resources for sustainable ICT industry

3.3.2.2 Policy Statement

The Government shall:

- i) Ensure ICT resources are allocated on a fair, transparent and non-discriminatory basis for effective competition and promotion of innovation;
- ii) Put in place measures to promote recognition and utilization of country codes in the cyber space to facilitate transformation towards knowledge based society;
- iii) Protect and preserve national symbols and heritage names against cybersquatting.

3.4 E-Services and Local Content Development

3.4.1 Issue: Electronic Services

The use of electronic services to facilitate provision of social and economic services such as tourism, governance, education, health, finance and justice has significantly increased in recent years and the industry has witnessed advancement in the area of Information Technology Enabled Services/ Business Process Outsourcing (ITES/ BPO). Most public institutions have progressively been establishing electronic systems to enhance efficiency and productivity and the use of ITES/ BPO is taking a good and promising pace. ITES/ BPO is renowned as a new area of interest in the sector due to its potential for job creation. Despite these achievements, it is evident that there exist challenges such as fragmentation of resources and non-interoperability of systems between institutions; high importation of software at considerable cost which in turn affect local innovation and development of software for internal consumption. ITES/ BPO suffers from inadequate competence and investment from both public and private sectors.

3.4.1.1 Policy Objective

To promote a competitive ITES/ BPO industry and development of electronic services in all aspects of ICT value chain activities

3.4.1.2 Policy Statements

The Government shall:-

- i) Be a model user of ICT to improve efficiency in service delivery, reduce waste, enhance planning, raise the quality of services and access to global resources;
- ii) Strengthen institutions responsible for coordinating, providing oversight, regulating, promoting and enforcement of e-government and other e-services initiatives;
- iii) Create an enabling environment that nurtures the promotion and development of ITES/BPO ventures in partnership with public and private sector.

3.4.2 Issue: Local Content Development

Availability of local content in ICT products and services is important in order to meet national development goals. Current production capacity of ICT products and services with local content remains minimal with a limited focus, while development of electronic systems for local consumption especially for public service delivery, education, commerce and other service sectors including health as well as for export is still quite low. Furthermore, hosting of content locally is inadequate, as the overwhelming bulk of data is domiciled in overseas data centres. Almost all ICT products and services are imported with very little local content.. That is to say, the majority of the ICT-related companies and service providers trade in products and services with very little or no local content. The key challenges therefore are: lack of policy and legal framework on local traffic and hosting; lack of policy for promotion of local content development in the country; inadequate local skills and predominance of English language in ICT content, a language that is not used by most of citizens. Local content suffer from inadequate competence and investment from both public and private sectors.

3.4.2.1 Policy Objective

To enhance local content in all aspects of ICT value chain and local hosting of electronic services.

3.4.2.2 Policy Statements

The Government shall:-

- i) Ensure a conducive environment to enhance hosting of ICT systems locally and localization of internally generated traffic;
- ii) Create an enabling environment that nurtures the development and promotion of local content in ICT products and services in partnership with public and private sector;
- iii) Put in place an effective mechanism to promote the use of Kiswahili in electronic services for transformation of Tanzania into knowledge society.

3.5 Cooperation and Collaboration

3.5.1 Issue: Regional and International Cooperation

The Government of Tanzania recognizes the benefit of regional and international collaboration and cooperation in the area of ICT. It has, therefore, maintained strategic cooperation at regional and international levels. For the past ten years of NICTP 2003 existence, Tanzania has been in the forefront in regional integration initiatives championed by the New Partnership for African Development (NEPAD); East African Community Broadband ICT Network (EACBIN) and other initiatives under the Southern African Development Community (SADC). These efforts have increased Tanzania's contribution in the region especially linking the landlocked countries to submarine cables and contribution to implementation of international agreements on migration towards digital broadcasting. The successes attained in ICT in terms of infrastructure, migration

to digital terrestrial broadcasting, human capital need to be shared with others regionally and globally, for sector development through realignment of sector policies.

In the last decade Tanzania has strengthened its cooperation and collaboration with the International Telecommunications Union (ITU), African Telecommunications Union (ATU), Commonwealth Telecommunications Organization (CTO), International Telecommunications Satellite Organization (ITSO) and Regional African Satellite Communication (RASCOM), amongst others. The benefits realized through these collaborations include: sharing knowledge and experience; enhancement of human capital and expertise; financing of ICT initiatives; creation of a network for information society; harmonization and realignment of policies; and expanded market for ICT services and products. Despite these achievements, there are challenges that need to be addressed such as low negotiation capacity and ineffective participation in regional and international integration of ICT initiatives, which hinders opportunities for network creation, collaboration and linkage of Foreign Direct Investment (FDI) and technology transfer.

3.5.1.1 Policy Objective

To strengthen cooperation and collaboration in regional and international ICT development initiatives that promote knowledge transfer and attract foreign direct investment.

3.5.1.2 Policy Statements

The Government shall:

- i) Ensure a supportive environment for cooperation and collaboration with regional and international ICT organizations with mutual benefits between Tanzania and collaborators in order to strengthen local ICT capacity;
- ii) Put in place mechanism to strengthen the country's negotiation capacity and enhance collaboration of Tanzanians with other nations to promote local innovation, knowledge transfer and FDI.

3.6 ICT Legal and Regulatory Environment

3.6.1 Issue: ICT Legal and Regulatory Environment

The legal and regulatory environment is an important aspect in the promotion of ICT. There is no doubt that the current development and use of ICTs especially e-commerce and e-transactions globally, poses certain socio-economical and legal challenges to developing countries like Tanzania. The converged regulatory environment established by the Government in 2003 has further promoted the ICT industry and simplified business operations in Tanzania. In recent years, the use of ICT as an enabler in various sectors of the economy has increased, while the legal regime in Tanzania has not been changed to effectively keep pace with these changes and regulate all activities that are happening under cyberspace. For instance, issues like electronic evidence and

computer forensic are among key areas, which raise legal issues and thus need dynamic legal and regulatory framework. Such a framework facilitates the processes that leads to the availability, adoption, use, and disposal of ICT products and services.

It is further acknowledged that current technological developments that pose great challenges to most laws in Tanzania that are related to the criminal laws have not been changed to cope with them. There is, therefore, a great need for a comprehensive, technologically neutral and dynamic policy, legal and regulatory framework, to address issues of privacy, ICT legislation, cybercrimes, ethical and moral conduct as well as intellectual property rights.

3.6.1.1 Policy Objective

To strengthen legal and regulatory environment that facilitates acquisition, utilization and development of ICT in Tanzania.

3.6.1.2 Policy Statements

The Government shall:-

- i) Ensure presence of relevant laws and regulations for acquisition, development, adoption, use and disposal of ICT products and services in Tanzania;
- ii) Ensure that there is appropriate institutional capacity and supportive legal framework for the development of ICT industry that promotes competition under the principle of technology and service neutrality;
- iii) Put in place legal mechanisms to facilitate development of ICT industry and protection of intellectual rights;
- iv) Ensure there is appropriate environment for adoption of relevant regional and international legal instruments to support cooperation in addressing ICT issues.

3.7 ICT Security, Safety and Standardization

3.7.1 Issue: ICT Security,

Security of ICT relates to the assurance that the ICT products and services provide a trusted and secured environment for digital participation, which is crucial for facilitating effective use of ICT. Today, ICT is unarguably an integral part of our daily human lives. It plays a pivotal role when it comes to transforming Tanzania into information and knowledge based economy and society. Despite the fact that the use of ICT (e.g. Information systems and mobile applications) plays a great role on facilitating socio-economic development in Tanzania, its associated risks cannot be ignored. With the proliferation of the use of mobile phones in the country, loaded with multitudes

of applications, and an ever increasing use of computer based applications and systems to accomplish numerous business processes, security aspects of this usage become very important. Some efforts that the Government has already taken to address security issues include the establishment of Computer Emergency Response Team (CERT); establishment of Cybercrime Unit under the Tanzania Police Force and establishment of Central Equipment Identification Register (CEIR). Despite these achievements and commitments, there are still challenges facing ICT Security which include relative increase in ICT infrastructure vandalism and unsafe/unsecure use of communication services which lead to cybercrime, infringement of privacy and detriment to national culture including child abuse online.

3.7.1.1 Policy Objective

To have secure environment that builds confidence and trust in the use of ICT products and services

3.7.1.2 Policy Statements

The Government shall:-

- i) Ensure there is a framework for coordination and promotion of ICT security; and
- ii) Put in place mechanism to encourage stakeholders to collaborate and contribute innovative technology to ICT related security activities.

3.7.2 Issue: ICT Safety

The use of ICT has changed the way people do their business. This has contributed to an increased number of ICT equipment and products so that safety issues have become of paramount importance.

In recognizing the importance of safety the Government has taken efforts to address safety issues which include the establishment of Occupational Safety and Health Authority (OSHA) whose main function is to conduct work place inspection for ensuring employers meet minimum requirement on safety issues at work places. More specific initiatives include putting in place Electronic and Postal Communications (Electronic Communications Equipment Standards) Regulations, 2014 and establishment of Central Equipment Identification Register (CEIR) that may assist in addressing safety issues of electronic communication devices. Despite these efforts and commitments, there are still challenges such as public understanding of safety related issues in ICT; lack of appropriate frameworks that address safety issues of ICT equipment, products, services, information systems and mobile applications; managing electronic waste; protecting children online and regulation of online content which is detrimental to national culture.

3.7.2.1 Policy Objective

To promote safety in the use of ICT products and services.

3.7.2.2 Policy Statements

The Government shall:-

- i) Ensure there is framework for coordination and promotion of ICT safety;
- ii) Ensure availability of appropriate technologies and mechanisms for management of online content and protection of children online; and
- iii) Put in place appropriate mechanisms for electronic waste management for safety of people and environmental protection.

3.7.3 Issue: ICT Standardization

In recent years Tanzania has been experiencing rapid technological advancement which has led to convergence of technology and service delivery channels. The use of existing standards and the development of new ones as well as standardized approaches to achieve interoperability should be supported by standards development organizations, with the active participation of industry. Priority areas that need ICT standardization include, but are not limited to: interoperability of technologies and systems; control of electronic gadgets; harmonization of institutional mandates; quality of ICT related service, hardware and software standards. With the proliferation of ICT equipment and devices in the country that are loaded with applications to accomplish various business processes, it stands to reason that there should be need for addressing ICT related standardization aspects. Furthermore, standards encourage economies of scale, interoperability, competition, innovation and safety, which are crucial for the growth of the ICT sector.

The Government has already taken measures to address standardization issues such as: establishment of Tanzania Bureau of Standards (TBS); establishment of Fair Competition Commission that protects players in the industry from misleading market practices and putting in place the Electronic and Postal Communications (Electronic Communications Equipment Standards) Regulations, 2014. Despite these achievement and commitments, Standardization of ICT still faces challenges which include: unsupportive legal framework and uncoordinated mechanism for national ICT standardization that can keep pace with the rapidly changing technology.

3.7.3.1 Policy Objective

To strengthen quality control and standardization in the ICT industry

3.7.3.2 Policy Statements

The Government shall:-

- i) Ensure there are frameworks for coordination, promotion, and development of national ICT standards;
- ii) Ensure interoperability of ICT products and services; and
- iii) Put in place mechanism to encourage stakeholders to adopt and comply with national and other acceptable ICT standards.

3.8 ICT Sector and Industry Development

3.8.1 Issue: ICT Sector and Industry Development

ICT is among the fastest growing industry in the economy and contributes significantly to socio-economic development. Research, Development and Innovation (RDI) activities are of paramount significance for vibrant ICT sector to cope with rapid technological changes. Furthermore, ICT can be a positive enabler of broader development objectives if implemented as a core and interrelated element. As the biggest spenders of ICT products and services, the Government wishes to capitalize on this fact to ensure that it has widespread and positive ripple effects. Finally the ICT industry can become a source of livelihood (also from an entrepreneurial aspect), for a large section of the young population which is entering the workforce at a higher rate than what traditional sectors can employ. The Tanzania ICT industry is still relatively underdeveloped by international standards and majority of the companies are micro and small-to-medium scale with most of them mainly involved in distributive activities such retailing and the distribution of computer products and services. Not much is done in the area of production and development of ICT products for the local and regional markets. Export industry for ICT goods and services is virtually non-existent.

In recognizing the potential of this industry, the government has taken the following initiatives to promote the ICT industry: cultivating a vibrant mobile telecommunication industry and nurturing business incubators to promote start-up companies amongst others. Despite these efforts, there are some challenges constraining the growth of the ICT industry and thus limiting the realization of its full potential to substantially contribute to the nation's development and economic growth. Some of these challenges include: the majority of local companies in the ICT sector and industry are Small and Medium Enterprises (SME's) and most of these are mainly involved in distributive activities like retailing of imported computer products and services. Not much is done in the areas of research and development of ICT products for the local and international markets. The key challenges include lack of incentives to attract investors to invest in ICT products locally; ineffective linkage between foreign direct Investment (FDI) and technology transfer; and a dire need to develop awareness of hidden and under-promoted conceptual and technical assets in intellectual property rights; inadequate support for Research, Development and Innovation limits the growth potential of the local ICT sector and industry

3.8.1.1 Policy Objective

To have sustainable ICT industry.

3.8.1.2 Policy Statements

The Government, in collaboration with stakeholders shall:

- i) Promote and support R&D, innovation and entrepreneurship in ICTs;
- ii) Encourage local ICT development by supporting and providing incentives for innovations in software and hardware;
- iii) Create an enabling environment to attract investment of private sector financial and technical capabilities for the development of ICT sector and industry;
- iv) Put in place requisite mechanisms that encourages the use of renewable energy in ICT investments to promote the green initiatives as a means of minimizing impact of ICT on the environment;
- v) Foster participation of Tanzanians in ICT investment.

3.9 Productive Sectors Development

3.9.1 Issue: Integration of ICT in productive sectors

Development of any nation depends much on effective and modern productive sectors especially agriculture, tourism, natural resources (e.g. minerals, oil and gas), energy, manufacturing and financial services. Currently, ICT has played a major role in supporting these productive sectors. The role that ICTs can play in improving productivity in the key productive sectors of the economy is also acknowledged in the National ICT Policy 2003. The Policy stated Government's commitment to encourage all productive sectors to incorporate ICTs in their development plans as well as its commitment to promote and support the implementation of nation-wide ICT systems for rural development and agriculture sector development activities. In recognizing the role of ICT to support these sectors; the Government has undertaken various efforts to ensure ICT continues to support development of productive sectors. One of these efforts includes creating an enabling environment that facilitates promotion of financial inclusion. Furthermore, Government has invested in a national ICT Backbone which has the potential to provide affordable broadband to productive sectors. However, the use of ICT in the productive sector is facing such challenges as lack of awareness of potentials of ICT; inadequate human capital to facilitate the use of ICTs within the productive sectors; shortage of sectors-specific ICT solutions tailored to local production and operational requirements; lack of linkages between productive sectors, relatively high total cost of ownership of the ICT solutions; and general lack of an enabling and conducive environment for uptake of ICTs in the productive sectors.

3.9.1.1 Policy Objective

To promote effective use of ICT in the productive sectors for increased productivity.

3.9.1.2 Policy Statements

The Government, in collaboration with stakeholders, shall:

- i) Ensure that ICT is effectively integrated and utilized in the productive sectors to accelerate national development;
- ii) Promote linkages between productive sectors to benefit from development of ICT;
- iii) Facilitate development and utilization of ICT skills in the productive sectors.

3.10 Crosscutting Issues

3.10.1 Issue: Gender and Social Diversity

Access to ICT is still a faraway reality for the vast majority of people who are socially diversified. The Government has recognized the gender and social diversity initiatives in Tanzania; such as ICT curricula for different levels of education including primary, secondary, vocation and higher learning institutions, and ICT gadgets for people with special needs has been provided. Despite the outlined Government initiatives, the population in rural and urban underserved areas is experiencing digital divide, shortage of basic infrastructure, high costs of ICT deployment and unfamiliarity with ICTs. These barriers pose greater challenges to social diversified groups who are more likely to be illiterate; do not understand English; lack opportunities for training in ICT and lack equipment that address their needs. Other challenges include unbalanced domestic responsibilities, cultural restrictions on mobility, lesser economic power as well as lack of relevant content for their needs, which marginalise them from participating effectively in the knowledge based economy.

3.10.1.1 Policy Objective

To enhance participation of gender and social diversity groups in ICT.

3.10.1.2 Policy Statement

The Government in collaboration with stakeholders shall:

- i) Ensure equitable participation of gender and social diversity groups in developments and use of ICT;
- ii) Promote use and application of ICT products and services relevant to special group.

3.10.2 Issue: ICT for disaster Management

The Government is prepared for management of disasters that lead to disruption of the functioning of society. The use of ICT is an important step towards reducing disaster impact, correctly analysing potential risk and identifying measures that can prevent, mitigate or prepare for emergencies. Efforts taken by the government include strengthening of meteorology operations in the country; collaboration with the international community in building capacity for prevention, mitigation and preparedness in using ICT for management of disaster. Despite these efforts, there are still challenges to be addressed such as lack of national framework for use of ICT facilities for disaster management; inadequate capacity in using ICT to handle disasters and in accessibility of channels for disaster warning, especially in remote area.

3.10.2.1 Policy Objective

To promote use of ICT in disaster management.

3.10.2.2 Policy Statements

The Government shall:

- i) Ensure a conducive environment for effective use of ICT for disaster management;
- ii) Strengthen cooperation with relevant regional and international organizations in promoting the use of ICT for disaster management.

3.10.3 Environment

The use of ICT in environmental protection is recognized as an important issue to be addressed worldwide. Currently there is increasing interest among nations in conserving the environment against obsolete ICT, and using ICT in conserving the environment. In spite of the benefits of pervasive ICT deployments, there are significant concerns that need to be addressed, with respect to the adverse impact and other consequences associated with ICT infrastructure and equipment including CO₂ emissions, radioactivity and e-waste. Currently, environmental laws and regulations do not adequately address the challenges posed by e-waste.

3.10.3.1 Policy Objective

To promote use of ICT in environmental conservation.

3.10.3.2 Policy Statement

The Government in collaboration with other stakeholders shall ensure that ICT support effort of environmental preservation.

3.10.4 Good Governance

ICT offers concrete opportunities for local and central governments to improve their performance in terms of transparency, accountability, citizen participation and decentralization. At the same time, it offers citizens to know the services they are supposed to/or receive from their contribution through taxes. The mainstreaming of ICTs within planning and design of development strategies helps to strengthen the establishment of efficient, effective and transparent governance systems. Online tools can significantly improve the rendering of services and information flows from administrations to their constituencies; communication between administrations and citizens can be enhanced and ICTs offer unique opportunities for broadened citizen involvement and participation in the decision making process. Various endeavours were made by the Government to ensure that ICT support good Governance. These include provision of online services, which increases transparency, accountability, citizens' participation, and reduced corruption. However, there are challenges that need to be addressed which include mainstreaming the use of ICT in government operations in order to increase government accountability, transparency and reducing corruption.

3.10.4.1 Policy Objective

To have Good Governance enhanced by ICT.

3.10.4.2 Policy Statement

The Government in collaboration with other stakeholders will ensure that ICT is mainstreamed in all arms of the state to support good governance.

3.10.5 Public Private Partnership

PPP is an important instrument for the government to attract investment and improve public services. The past decade has seen the establishment of a multitude of ICT private investors and Non-state Actors in Tanzania. The government acknowledges the role played by the private sector in the service provision in the ICT industry. Efforts were deployed to create a conducive environment for PPP to operate, by developing the national PPP Policy 2010, Legislation and Regulations. However, there are challenges facing PPP in ICT such as low pace of technology transfer and innovation, inadequate negotiating capacity in ICT related investment under PPP arrangement, inadequate financial capability of public institutions to implement PPP projects; inexistence of guidelines and procedures for PPP in ICT sector and inadequate capacity in formulation of ICT related projects.

3.10.5.1 Policy Objective

To promote investment in ICT under PPP arrangement.

3.10.5.2 Policy Statement

The Government shall:

- i) Ensure there is conducive environment to foster linkages for PPP in ICT investment;

ii) Enhance capacity at all levels of ICT PPP investment.

CHAPTER FOUR LEGAL FRAMEWORK

4.0 Introduction

In order to facilitate execution of this National ICT Policy, it is essential that a supporting legal and regulatory framework be defined, which should also include an institutional outline. An appropriate and dynamic legal/regulatory framework is mandatory to act as the foundation for the development of the ICT sector. The development and implementation of effective legal and regulatory framework can, among other things, support the use and deployment of ICT for development and growth of the economy in Tanzania.

To support effective implementation of this policy, the Government will review and update the existing laws to address ICT-related issues.

CHAPTER FIVE INSTITUTIONAL FRAMEWORK

5.0 Introduction

Successful implementation of the ICT policy depends on the institutional framework that is in place to develop tools for operationalizing, enforcing, monitoring and evaluation to ensure desired outcomes. The institutional framework articulates the major roles of key institutions in the direction towards a transformed ICT knowledge society. The key institutions include: Ministry responsible for ICT; Sector Ministries; Regional Administration and Local Government; The Judiciary; Private Sector; Civil Society Organizations (CSO); Education and Research Institutions; Regional and International Organizations.

5.1 Ministry Responsible for ICT

The Ministry is responsible for overall coordinating policy implementation, monitoring, evaluation, periodic review of the policy, strategies; and initiates legislation for policy implementation. Other responsibilities include awareness creation and provision of guidelines. The Ministry will promote ownership and mainstreaming of this policy to all sectors. In implementing this policy, the Ministry through the ICT Commission will facilitate, promote and coordinate implementation of national ICT development projects within the context of social and economic development.

5.2 Ministry Responsible for e-government

The Ministry will be responsible for developing e-government policy and to facilitate its implementation in Government institutions. The e-Government Agency will be responsible for coordinating, overseeing, promoting and enforcing e-government in public institutions.

5.3 Sector Ministries

The Ministries will ensure the integration of ICT in their sector specific policies and development initiatives.

5.4 Ministry responsible for Regional Administration and Local Government

The Regional Administration and Local Government (RALG) is the link between Central Government and communities. This Ministry shall be responsible for implementation of this Policy at local government levels.

5.5 The Judiciary

The Judiciary shall be responsible for interpreting all laws and administering justice in the ICT environment. Therefore, the Judiciary shall ensure that there is an adequate justice and fair legal environment that will facilitate growth of the ICT sector. It will also ensure that ICT is mainstreamed in the justice framework in the country.

5.6 Private Sector

The private sector is an important element in the implementation of ICT initiatives in Tanzania. The private sector shall collaborate with the Government through Private Public Partnerships (PPP) to own, propagate ICT initiatives and utilization in Tanzania. The private sector shall participate in bringing innovations and relevant solutions for the implementation of this policy.

5.7 Non State Actors

Non State Actors play an important role in the social and economic development of the country. In implementing this Policy the civil society shall participate in creation of ICT awareness, transparency and accountability in matters pertaining to ICT sector.

5.8 Education and Research Institutions

Education and research institutions are important for the development of ICT industry. Development of the ICT industry has increased the demand for knowledge and skills. Education and research institution will be responsible for promoting ICT curricula that shall be used in training, developing competent human capital and relevant scientific research outputs for ICT development in Tanzania.

5.9 Sector Regulator

The potential size of the ICT resource in Tanzania and it's expected multiple uses require a robust regulatory authority. The role of the regulator shall be responsible for enforcement of laws and regulations so as promote competition in the ICT sector.

5.10 Development Partners

Development partners are to work closely with the Government for sustainable development programmes related to implementation of this policy. They may also be involved in resource mobilization and provision of support for investing in fundamental areas of infrastructure.

5.11 Monitoring and Evaluation

The implementation of this policy and achievement of its vision, mission and objectives will need to be monitored and evaluated throughout the useful lifetime of the policy. The Ministry responsible for ICT will design an M&E system to meet information needs of different stakeholders including Ministries, Departments and Agencies (MDA's), civil society organizations (CSO's), Private sector, research and academic institutions, development partners, media and the general public. Progress in execution of the activities will be conducted in accordance with the predetermined KPIs and other specific evaluation indicators.

5.12 Conclusion

The National ICT Policy 2016 reflects the commitment to transform Tanzania into an information-rich knowledge-based society and economy, to ensure that Tanzania and its people fully participate in the information age and enjoy the social, cultural and economic benefits of the emerging information revolution. The Government of Tanzania is wholeheartedly committed to the implementation of the provisions of the policy to facilitate the process of establishing a prosperous society. The objective is to have a vibrant economy that is globally competitive, dynamic, robust and resilient with respect to the rapid changes and advances that are taking place in the global economy and become a technology-driven information and knowledge society. It is anticipated that, necessary periodic revisions will be made in relation to its key elements to meet changing developmental objectives and priorities as well as changes in the global economy and advances in the technological environment.

It is recognized that the socio-economic problems and challenges facing Tanzania are likely to be compounded by the new challenges posed by globalization and the information age. For Tanzania to make progress in its developmental process, in addition to taking steps to address these developmental challenges, it will also need to address the additional challenges posed by globalization and the information revolution. The National ICT Policy Statements set out Tanzania's vision in the information age. The Policy also defines the nation's broad vision, and the corresponding missions and strategies designed to serve as a road map for guiding the country's developmental efforts of transforming it into an information and knowledge-based society and economy.