

The Federal Democratic Republic of
Ethiopia



**The National Information and
Communication Technology
(ICT) Policy and Strategy**

Final Draft

Addis Ababa
September 2016

Table of Contents

	Pages
PREAMBLE.....	3
1 INTRODUCTION	4
2 CONTEXT FOR ICT IN ETHIOPIA	6
3 STRATEGIC OVERVIEW.....	7
3.1 National Vision	7
3.2 ICT Vision.....	7
3.3 Mission.....	7
3.4 The Broad Objectives.....	7
3.5 Implementation Strategies	7
3.6 Principles.....	8
3.6.1 Fiscal Measures	8
3.6.2 Electronic Commerce	8
3.6.3 Information Technology Standards	8
3.6.4 Universal Access	9
3.6.5 Market Monitoring.....	9
4 FOUNDATION	10
4.1 ICT Infrastructure	10
4.1.1 Overview	10
4.1.2 Desired Outcomes and Targets	10
4.1.3 Objectives.....	10
4.1.4 Strategies.....	10
4.2 ICT Human Capital	11
4.2.1 Overview	11
4.2.2 Desired Outcomes	11
4.2.3 Objectives.....	11
4.2.4 Strategies.....	11
4.3 ICT Legal and Regulatory Environment.....	12
4.3.1 Overview	12
4.3.2 Desired Outcomes	12
4.3.3 Objectives.....	12
4.3.4 Strategies.....	13
5 STRATEGIC PILLARS	14
5.1 Government	14
5.1.1 Goal	15
5.1.2 Objectives.....	15
5.1.3 Strategies.....	15
5.2 Agriculture	15
5.2.1 Goal	16
5.2.2 Objectives.....	16
5.2.3 Strategies.....	16
5.3 Education	16
5.3.1 Goal	17

5.3.2	Objectives	17
5.3.3	Strategies.....	17
5.4	Health	18
5.4.1	Goal	18
5.4.2	Objective	18
5.4.3	Strategies.....	18
5.5	ICT Manufacturing and Computer and Related Services	18
5.5.1	ICT Manufacturing.....	19
5.5.2	Computer and Related Services	19
5.6	Entrepreneurship and Innovation	20
5.6.1	Goal	20
5.6.2	Objectives.....	20
5.6.3	Strategies.....	21
5.7	Youth and Women.....	21
5.7.1	Goal	21
5.7.2	Objectives.....	21
5.7.3	Strategies.....	21
6	FRAMEWORK FOR POLICY DEVELOPMENT.....	23
6.1	Introduction	23
6.2	Institutional Arrangements.....	23
6.2.1	Government	23
6.2.2	Development Partners	24
6.2.3	Civil Society.....	24
6.2.4	Service Providers	24
6.2.5	Private Sector	24
6.2.6	Consumers.....	24
6.2.7	ICT Professional Bodies	24
6.3	Continuous Re-alignment of the Sector.....	25
6.4	Monitoring and Evaluation	25
6.5	Conclusion and Way Forward	26

PREAMBLE

Although digital technologies have spread rapidly in much of the world, digital dividends—that is, the broader developmental benefits from using these technologies—have lagged behind. In many instances, digital technologies have boosted economic growth, expanded opportunities, and improved service delivery. Yet, for digital technologies to benefit everyone everywhere requires ending the digital divide. But even expanded digital adoption will not be enough to get the full benefits of the digital revolution; countries also need to work on the “analog complements”—by strengthening strategies that allow tech-enabled businesses to compete with traditional industries, by adapting workers’ skills to the demands of the new economy, and by ensuring that institutions are accountable.

This policy document is drawn from a review of the 2009 policy and is inspired, firstly, by the desire to leverage Information and Communication Technologies (ICT) to play a stronger role in Ethiopia's aspiration to become a middle-income economy and transforming the country into a leading tech hub in the region.

Secondly, the policy provides a pro-active strategy and regulatory framework that is not only in sync with contemporary technological realities and dynamics, but also seeks to guide the orderly development of the ICT sector in such a way as to ensure maximum developmental impact for the benefit of all Ethiopians.

Thirdly, while the Ministry assigned responsibility for the ICT sector will carry out the coordinating function of this policy, implementation will involve the efforts of all the various ministries and agencies that make use of digital technologies to fulfill their objectives.

Fourthly, this policy takes cognizance of the tremendous impact of globalization and rapid technological change since the first policy was implemented. These developments have invariably affected the traditional approach to the management of public affairs and delivery of services, which increasingly informs the need for a more pro-active policy and response from the government. Due to the dynamic nature of the sector, ICT policies need to be reviewed on a regular and systematic basis to benefit from these rapid technological advances. In order to realize the benefits and impact of ICT, emphasis will be placed on policy implementation initiatives, programs and projects. The overarching policy focus will be to provide access to ICT, especially broadband, to all Ethiopians and seamless connectivity, backed up by strengthened collaboration at regional and international levels. Due to the convergences in the sector, ICT and broadcasting shares a wide range of communality and this national ICT Policy and Strategy doesn't focus specifically to the broadcasting sector.

In conclusion, this updated policy instrument, which is the product of an extensive stakeholder consultation process carried in the first half of 2016, shall set the direction and pace for the further development of Ethiopia's ICT sector in particular, and the digital economy in general, while ensuring that all stakeholders benefit fully from the expected impacts.

1 INTRODUCTION

Information and Communication Technologies (ICTs) are one of the key drivers of globalization and development in the current age. By facilitating the creation, distribution and application of knowledge in digital form, ICTs serve as a major source of wealth creation and improvement in the quality of life in countries and for people across the world. The growing impact of ICT and the application of advances in new technological products and processes have elicited a high rate of innovation across various countries, as well as a shift towards more knowledge-intensive industries.

As such the Ethiopian Government has naturally made the development of ICT one of its strategic priorities and has placed a significant emphasis on its role of economic infrastructure as set out in the second *Growth and Transformation Plan* (GTPII). This stems from the recognition that ICT is a key driver and facilitator for transforming Ethiopia's predominantly subsistence-agriculture economy to a knowledge-based economy and information society. ICT will be fundamental for Ethiopia's aspiration to become a middle-income country.

ICT is also a key element in achieving the seventeen UN Sustainable Development Goals (SDGs). Goal 9, and its targets, places an emphasis on the role of technological progress and bridging the digital divide to find lasting solutions for both economic and environmental challenges. Target 9c sets 2020 as the deadline for achieving affordable broadband access for all. Moreover, the achievement of the other SDGs is greatly facilitated by digital technologies.

Improved public service delivery and greater government openness are other important benefits arising from the application of ICT as highlighted in the *eGovernment Vision for 2020*.

The Ethiopian government established the Ministry of Communication and Information Technology (MCIT) in 2010 recognizing this critical role of ICT to national development and along with the Proclamation No. 916/2015 gave the MCIT a comprehensive mandate to promote the expansion and development of ICT.

Ethiopia's ICT infrastructure has seen significant improvements in the past few years. Mobile telecommunications alone grew from a mere 1 million subscribers in 2007 to 39 million in 2014/15. The country has made equally impressive strides in spreading ICTs across the government, education and health sectors and developing the computer software and ICT manufacturing sectors.

Nevertheless, the adoption of ICT in Ethiopia remains low in comparison with regional and global peers. The major constraints that are preventing Ethiopia from achieving its full digital potential include:

- The need to update legal and regulatory frameworks to deal with new technological advances and, with recent infrastructure growth, to enhance monitoring of service affordability and quality;
- The need to increase the usage of of broadband service in the country;
- Constraints in take up of ICT services in rural areas by citizens, businesses and health and educational institutions due to awareness issues;
- The need to avail affordable ICT devices and services for some elements of the population;

- An under developed ICT sector with limited private sector involvement;
- Challenges boosting locally relevant applications and services and scaling up innovative entrepreneurs; and
- Low levels of Internet penetration, as compared with take-up of mobile services, and low levels of fixed broadband penetration, as compared with take-up of mobile broadband.

These constraints present challenges, but also opportunities, for accelerated development of ICT in Ethiopia. Thus, the Government of Ethiopia has recognized the importance of ICT development to support the national development plan.

The scope of this policy covers both using ICT as a tool for socio-economic development and ICT as a sector in its own right, with a direct contribution to GDP growth. Apart from being an enabler of socio-economic development, ICT also supports Ethiopia's on-going process of democratization and good governance. ICT will furthermore be at the heart of modernizing the major sector of agriculture and strengthening the on-going process of sustainable development and poverty reduction.

The policy articulates guidelines and describes critical strategic issues for the development of ICT in Ethiopia. It is organized into six chapters inclusive of the introduction. Chapter two analyses the current state of ICT in Ethiopia and the commitments made towards its development. Chapter three outlines the basic principles of the national ICT policy, in terms of the vision, mission, goals, implementation strategies, objectives and principles. The fourth chapter outlines the three foundational action areas. The fifth chapter builds on the foundational action areas and outlines the key pillars of the ICT policy. The last chapter discusses a framework for policy development.

The full effect of these policy guidelines is dependent on the implementation of the coordination of all ministries and agencies, which will roll out the different programs and projects to achieve the outlined objectives. An effective Monitoring and Evaluation (M&E) mechanism will accordingly be developed to track policy implementation, in order to achieve the objectives of this policy.

2 CONTEXT FOR ICT IN ETHIOPIA

Achieving rapid, broad-based, sustained and equitable economic growth to eradicate poverty is a key objective of the government of Ethiopia with the overall objective of Ethiopia becoming a lower middle-income country by 2025. In this vein, the telecommunications sector was identified as a fundamental Economic Infrastructure in the government's first Growth and Transformation Plan (GTP I).

During the five-year period of GTP I (2009/10-2014/15), access to ICT networks expanded significantly. The number of mobile subscribers increased from 6 million to 39 million. Similarly, the percentage of the rural population within 5 kilometers radius to telephone service increased from 62 per cent to 96 per cent. The number of Internet usage rose from fewer than a million to almost more than 4 million. Growth was also experienced in networks connecting government and social institutions such as secondary schools and hospitals.

However, the ICT sector in Ethiopia still faces substantial challenges including amongst others:

- Differences in the extent of usage of broadband services and availability of the latest broadband technologies
- Cost of broadband connectivity impeding its widespread diffusion;
- Incomplete connectivity of all institutions in government, education and health networks;
- Need for ICT legislation and regulation to adjust to the rapidly evolving ICT sector;
- Insufficient locally relevant ICT services and applications for economic and social development and poverty reduction;
- Need for ICT to provide a valuable contribution to monitoring, mitigating and adapting to climate change and for ICT to play an enhanced role in emergency communications and disaster relief;
- Lack of digital literacy and awareness to enable all citizens to access and contribute to sharing of information, ideas and knowledge to create an inclusive information society; and
- Constraints to fully unleash the potential of small innovative entrepreneurs for transforming the economy.

This policy framework addresses these challenges.

3 STRATEGIC OVERVIEW

3.1 National Vision

To transform Ethiopia from a country associated with poverty to a middle- income economy and society with deep-rooted participatory democracy and good governance based on the mutual aspirations of its peoples.

3.2 ICT Vision

Every aspect of Ethiopian life is ICT assisted.

3.3 Mission

To develop, deploy and use information and communication technologies to improve the livelihood of every Ethiopian, and optimize their contribution to the development of the country.

3.4 The Broad Objectives

To address the challenges faced by the sector, the broad objectives of this National ICT Policy are to:

- Deploy ICT Infrastructure throughout the country and make it universal, affordable, open and safe;
- Create the necessary skilled human resources required for the proper development and application of ICT and expand the society's basic knowledge and usage of it;
- Develop the necessary legal framework to support the widespread application of ICT and implement appropriate cyber security measures for the prevention of unlawful practices;
- Promote the use of ICT for modernizing government including the delivery of public services to promote good governance;
- Expand and strengthen the role of the private sector to enhance the rapid development of ICT goods, services and applications;
- Enhance the use of ICT across the economy for increased productivity and efficiency;
- Expand the reach of ICT networks across important sectors including agriculture, education and health; and
- Implement the use of ICT in applications relating to climate change, emergency communications and climate change.

3.5 Implementation Strategies

The major implementation strategies set for ICT include:

- Develop and implement plans for the ICT sector including broadband and manufacturing;
- Develop and implement sector based ICT plans for government, education and health;
- Create a monitoring system to measure the reliability and quality of ICT infrastructure services made available to the public;
- Provide support and facilitate the development of local content and services; and
- Provide support and facilitate the development of widespread digital literacy and a labor force with appropriate ICT skills.

3.6 Principles

The implementation of this policy will be guided by the following principles:

3.6.1 Fiscal Measures

Enhance policy measures to stimulate increased investment and growth in the ICT sector. The overall objective will be to:

- Promote favorable fiscal policies to ensure that ICT facilitates internal economic growth;
- Develop fiscal mechanisms that respond to the fast changing needs of the information economy;
- Promote duty free zones to attract ICT investment; and
- Make budgetary provision to spur the growth of ICT.

3.6.2 Electronic Commerce

In recognition of the important role that e-commerce plays in economic development, its use shall be promoted in local businesses as well as a means of integrating Ethiopia into the global economy. To this end:

- Support the development of e-commerce by ensuring legislation meets requirements such as validity of electronic transactions, legislation against computer crime and laws for protection of consumer personal data and privacy. Relevant commercial laws protecting consumers against fraudulent claims and merchandize shall be extended to e-commerce;
- Develop appropriate e-payment options to make them widely available to the general public and businesses;
- Enhance the critical role of postal and logistical services for dispatch and delivery of goods.
- Support promotional campaigns to raise public awareness on the potential opportunities presented by e-commerce; and
- Promote collaboration with the international community in developing an appropriate framework for international e-commerce.

3.6.2.1 Postal Services

The development of e-commerce introduces a new dimension into postal services as it creates demand for parcel delivery and the need for logistics solutions. To that end, all citizens should have the ability to access postal services. This will be achieved by, among others, ensuring universal, affordable and efficient universal postal services. This policy aims to achieve the following objectives:

- Universal access to high quality and affordable postal services; and
- Transform postal service to play a leading role in promoting e-commerce and developing appropriate delivery and logistics solutions.

3.6.3 Information Technology Standards

In order to ensure utmost quality and safety of ICT goods and services, internationally recognized standards for ICT goods and services will be adhered to. Objectives include:

- Ensuring high standards of ICT equipment to promote optimal network operation;
- Protecting consumers from unsafe and/or illegal ICT goods; and
- Enhancing the reputation of Ethiopian produced ICT goods and services.

3.6.4 Universal Access

All Ethiopian citizens must be able to benefit from ICTs. ICT services must be universally available, throughout the country and to all segments of society. Universal access policy objectives include:

- Ensuring universal, affordable, open and safe coverage of broadband internet to all;
- Ensuring that ICT services are of the highest quality; and
- Ensuring that relevant education and training programs allow everyone to maximize the opportunities afforded by ICT to improve the quality of their lives and to encourage life-long learning.

3.6.5 Market Monitoring

Ensuring the highest quality of ICT network services as well as their affordability. To that end, the quality and prices of Ethiopia's ICT network services will be regularly monitored and benchmarked to peer countries as well as to international standards and recommendations.

4 FOUNDATION

Ethiopia's ICT policy is one of the fundamental components of the country's socio-economic development goals and objectives. In order to pave the way for a transition towards a knowledge-based economy, three foundational elements are essential for underpinning all other aspects of the policy:

ICT Infrastructure– This critical foundation is the backbone for increasing the penetration and access to affordable ICT services across all regions in Ethiopia.

ICT Human Capital– This involves developing human capital both in terms of skilled ICT professionals who will be able to sustain and grow the sector and digital literacy across the whole population so that citizens can use ICT effectively.

ICT Legal and Regulatory Environment– This is essential for ensuring orderly adaptation to rapid technological evolution, protecting the safety and security of consumers and providing an enabling setting for the ICT sector to grow.

To implement the three foundations of ICT policy, desired outcomes and targets, objectives as well as strategies are articulated below.

4.1 ICT Infrastructure

4.1.1 Overview

Deploying modern, reliable and affordable ICT infrastructure throughout the country in an equitable manner is a major objective to optimize the benefits provided by ICT. The Government will adopt appropriate mechanisms to facilitate universal access to affordable ICT-based broadband services, with particular attention to children, women, and persons with disabilities.

One of the most fundamental facets of ICT infrastructure is broadband network connectivity. The penetration of networks has to be high enough to derive the optimum benefits for the economy.

4.1.2 Desired Outcomes and Targets

The development of telecommunications infrastructure in all regions of the country in view of promoting the development of ICT services and encouraging extensive utilization by the public.

4.1.3 Objectives

- Modernize and expand the country's communications and telecommunications infrastructure and services aimed at improving both coverage and quality;
- Ensure nationwide coverage and universal access to ICT infrastructure;
- Enhanced information infrastructure with multi-media services to cater to the needs of key sectors of the economy and the delivery of government services;
- Promote broadband as an instrument of economic development, and accelerate uptake of broadband among government institutions, businesses and citizens; and
- Ensure affordable ICT service prices for consumers, businesses and institutions such as schools and health facilities;

4.1.4 Strategies

The government will undertake the following key measures:

- Create an enabling framework dealing with both supply and demand issues in order to accelerate the deployment of broadband infrastructure across the country;
- Ensure the availability, reliability and quality of broadband networks through the establishment of a monitoring system; and
- Implement initiatives to spread the availability of electricity in rural areas, which has hampered provision of ICT.

4.2 ICT Human Capital

4.2.1 Overview

A society that can use and apply basic ICT applications and services to their needs (i.e., digital literacy), and a skilled labor force that can develop and manage ICT applications, services and hardware (i.e., ICT workforce), are essential if the full benefits of ICTs are to be realized.

The main way that the government provides an opportunity for Ethiopians to acquire digital literacy and ICT skills is through the educational system. Progress has been made in implementing school networks with the goal of connecting all schools to high-speed Internet. This needs to be complemented with the incorporation of computer skills as a component of the primary and secondary school curriculum. Further, it is essential to equip citizens across the regions, particularly those out of school with a basic knowledge and awareness of digital technologies in order to ensure all communities benefit from ICT.

As the ICT sector grows, the need for ICT professionals will see a commensurate growth. Having a technologically knowledgeable workforce is critical for developing needed content and applications and to ensure the growth of the ICT manufacturing and computer software sectors as well as across other businesses and government.

Ethiopia's ICT policy, therefore, places a great emphasis on the strategic role of human capital development along the following objectives and strategies.

4.2.2 Desired Outcomes

- Produce a knowledgeable and highly skilled ICT labor force for enabling the country to develop and use ICT more effectively; and
- Create a digitally literate population capable of using ICT to transform their standards of living and of not only consuming but also producing digital content.

4.2.3 Objectives

- To strengthen institutions offering ICT education and training;
- To increase the supply of adequately trained ICT professionals; and
- To develop digital literacy amongst all citizens.

4.2.4 Strategies

- Develop and implement short, medium, and long-term ICT human capital development plans;
- Enhance ICT technical skills development in the educational system with the aim of increasing the supply and diversity of ICT skills, to eliminate shortages of personnel and to meet future growth requirements;
- Encourage private sector initiatives both in educational institutions and industrial establishments, to enable them to strengthen the delivery of ICT training;

- Identify ICT human capital requirements in key areas of the economy to ensure appropriate ICT courses and degrees; and
- Leverage community institutions to provide digital literacy training to the public, particularly digitally disadvantaged groups such as the elderly, women and unemployed.

4.3 ICT Legal and Regulatory Environment

4.3.1 Overview

The successful exploitation and full-scale application of ICT requires an enabling legal and regulatory environment. The ICT legal and regulatory environment needs to keep pace with the challenges of the ever evolving and rapidly developing ICT sector as well as its specific conditions in Ethiopia.

The government recognizes that ICT development needs to be well coordinated and guided by appropriate standards and best practices.

The rising use of ICTs, notably the Internet, has brought attention to the need for proper care and due protection to minimize risks. For instance, inaccurate or false information can be rapidly disseminated through ICT networks feeding misleading information to individuals, firms and public organizations. Furthermore, there are ever increasing threats from hackers, attackers and other malicious online behavior. These factors erode the confidence of users in adopting new services and applications and furthermore can have serious consequences for government and business networks. Thus, in order to increase confidence in the wide application of ICTs requires the implementation of the necessary standards and creation of a safe and secure environment.

Therefore, the government is committed to guiding the development of ICT, and facilitating its application, by implementing the following objectives as an integral part of the legal systems and regulatory framework.

4.3.2 Desired Outcomes

To safeguard national, institutional and individual security concerns, as well as providing an enabling legal and regulatory environment, in order to support the development of ICT in the country.

4.3.3 Objectives

- To establish standards and guidelines harmonized at national and regional levels for the deployment and exploitation of ICT throughout the country;
- To ensure intellectual property rights protection in ICT;
- To ensure that ICT policies, laws and regulations accommodate the needs of disadvantaged members of society;
- To facilitate domestic and foreign investment in the development of the ICT manufacturing and software and services industries by creating a conducive legal and regulatory environment;
- To safeguard national electronic communications networks including preventing, detecting and responding to cybercrime and misuse of ICT; and
- To enhance user confidence and trust, as well as to protect both data and network integrity.

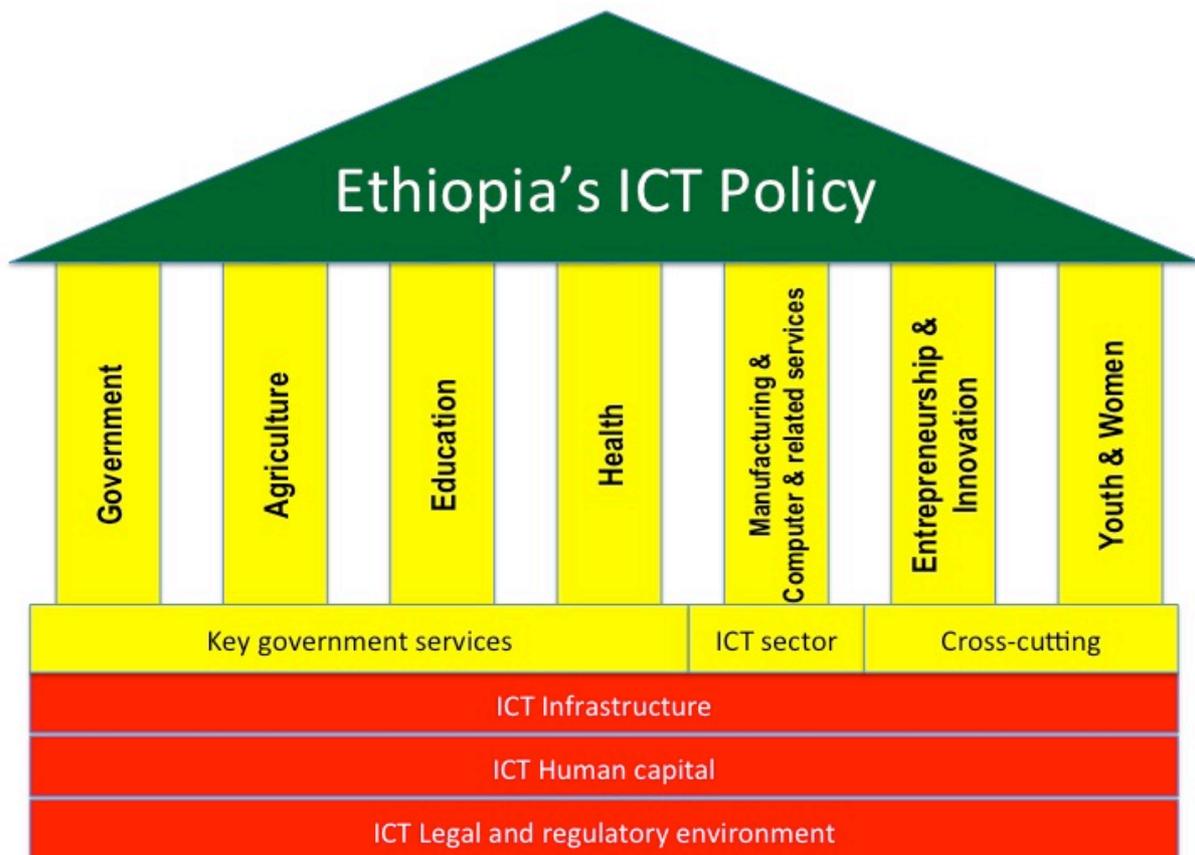
4.3.4 Strategies

- Review and enhance existing laws and regulations to facilitate the exploitation and widespread use of ICT including, as appropriate, regional and international standards;
- Develop a legal base for electronic archives;
- Develop ICT and related regulatory frameworks, in order to address socially undesirable activities;
- Implement guidelines and standards for quality control in ICT products and service delivery;
- Facilitate the enactment legislative instruments to for data protection, security and freedom of access to information;
- Protect networks, data and information systems against attacks and unauthorized access and strengthen the National Information Security Policy.
- Promote information security awareness by ICT users.

5 STRATEGIC PILLARS

The foundational action areas mentioned in the previous chapter are a prerequisite for the growth of the ICT sector in Ethiopia and for the transformation of Ethiopian society to one that is knowledge based. With the foundation in place, Ethiopia will be in a better position to exploit the potential of ICT in the country's key social sectors, boost ICT-related industries and leverage ICT to promote progress in cross cutting areas. The following key sectors, industries and cross cutting issues constitute the pillars of this policy and are intended to highlight and guide the use of ICT in the transformation of Ethiopian economy and society:

1. Government
2. Agriculture
3. Education
4. Health
5. ICT industries including Manufacturing and Computer and related services
6. Entrepreneurship and Innovation
7. Youth and Women



5.1 Government

The application of ICT in government and more specifically e-Government is an effective way of improving public service delivery to citizens as well as substantially improving the ease of doing business for enterprises. In recognition of this, the Government of Ethiopia developed and implemented an e-Government Strategy between 2011 and 2015. This strategy resulted in the implementation of 168 services on the national portal. In addition,

WoredaNet, the government network connecting federal and state agencies and Woredas, connects around one thousand institutions.

In 2015, a new strategy was developed focusing on enhancing use of ICT in government. The *Ethiopian eGovernment Implementation Strategic Plan 2020* aims ‘to realize the economic growth of Ethiopia and provide affordable & quality services to all stakeholders thereby delivering effective, efficient and transparent governance, through innovation in everything we do, creating a culture of entrepreneurship thereby affecting the lives of all Ethiopians leveraging smart government initiatives.’

The roll out of the *Ethiopian eGovernment Implementation Strategic Plan 2020* relies on the success of the foundational action areas articulated in the previous chapter. Indeed, the plan puts a key emphasis on the success of the e-Government program being supported by a strong ICT environment and a comprehensive regulatory framework. The ICT environment is improved through enhanced infrastructure and digital literacy and the regulatory framework is achieved through legislation and legal arrangements. Therefore, the *Ethiopian eGovernment Implementation Strategic Plan 2020* and the foundational action areas detailed in this document must be implemented in unison for success.

5.1.1 Goal

To modernize the public sector, in order to achieve efficient and effective delivery of public services, through the implementation and utilization of e-Government systems.

5.1.2 Objectives

- To develop and implement a robust, flexible, and scalable information and communications infrastructure that would capably support federal, regional and lower-level administration intra and inter-agency electronic service delivery and information exchange;
- To reduce administrative, operational and transaction costs of federal and regional governments’ activities through extensive use of electronic media for their communications; and
- To facilitate ease of availability of information and government services to enhance good governance and consolidate democratization.

5.1.3 Strategies

The *e-Government Strategic Implementation Plan 2020* provides detailed information about the various objectives and strategies for achieving the goal of enhanced public and civil service delivery with detailed targets along four key categories of enabling environment, e-readiness, usage and operational models.

5.2 Agriculture

Agriculture—including crop farming, livestock raising, fishing and forestry—plays a significant role in the Ethiopian economy both in its overall contribution to Gross Domestic Product (GDP) and exports. Much of the population works in agriculture-based activities and the sector is a fundamental part of rural communities where most of the Ethiopian population lives.

Given the importance of agriculture to the Ethiopian economy and rural livelihoods, the sector merits specific attention in regards to the contribution of ICT applications that can increase the efficiency of the sector. High-speed Internet, and especially mobile phones, can

have many useful impacts in the agricultural sector and boost productivity. Farmers can get detailed access to pricing, livelihood information on crop growing and livestock raising techniques, weather reports, disease prevention tips and leverage e-commerce for both buying and selling agricultural inputs and outputs. Pastoralists and nomads can use Radio Frequency Identification (RFID) chips for tagging and tracking their flocks. ICTs can also transform the agricultural sector to a modern industry with electronically connected value chains and widespread use of the Internet of Things.

5.2.1 Goal

To improve the productivity and modernization of agriculture and enhancement of rural livelihoods through the application of ICT.

5.2.2 Objectives

- Ensure that all populated rural areas are provided with adequate ICT connectivity;
- Improve agricultural productivity through the application of ICT;
- Enhance the livelihoods of rural communities through ICT; and
- Promote sustainable and rapid rural development through the application of ICT.

5.2.3 Strategies

- Develop mechanisms to ensure availability of high quality ICT infrastructure in all populated rural areas;
- Develop and implement an integrated agricultural information database featuring mapping applications and containing data such as land use, production techniques, prices, weather, crop and animal disease prevention, etc. with an electronic dissemination system so farmers and others have access;
- Develop mechanisms for farmers and other rural dwellers to both purchase and advertise their goods over the Internet;
- Establish community based information centers offering basic computer skills to those living in rural areas; and
- Establish electronic animal monitoring system such as RFID that is able to track the entire livestock life cycle thereby enhancing safety and increasing confidence for wholesalers and retail consumers.

5.3 Education

The Ethiopian Government acknowledges education as the cornerstone of social progress and economic development. ICT can enhance the educational system in areas such as access to a wealth of information and online courseware. Equally important is the digital skills imparting function of schools teaching students how to use ICT, as well as to develop higher level skills for future employment in computer related occupations. As the vast majority of the Ethiopian population lives in remote areas with shortages of teachers, ICT is crucial in addressing access and quality of education. This pillar also ties into the foundational area of Human Capital Development.

ICT networks currently connect educational institutions across the country. SchoolNet is the secondary school Internet network. The Ethiopian Education and Research Network (EthERNet) is the network for tertiary education interconnecting public universities and educational institutions. These networks will be a major area of intervention under this pillar.

A key challenge faced in deploying ICT in schools is that teachers may not have been trained properly. Maintenance is also an issue as is cost with many rural schools unable to afford the price of an Internet connection. Further ICT is not widely implemented across the curriculum.

Exploitation and application of ICT for education will be enhanced through the following objectives and strategies.

5.3.1 Goal

Ensure that ICT is equally available across all levels of the school system and across all levels of the country, is an integral part of the educational system, and is used to extensively deliver quality online education.

5.3.2 Objectives

- To ensure that all schools are connected to the national schools ICT network;
- To ensure that ICT is an integral part of the national education system and to expand quality ICT education and make it accessible;
- To ensure the implementation of computer literacy courses;
- To develop standards of evaluation and guidelines for the development and exploitation of ICT in schools, colleges and universities;
- To facilitate favorable conditions to women, disabled and other special groups for unhindered access to ICT by providing the necessary training and skills;
- To promote Internet-connected schools and higher education institutions to accelerate and support mass ICT literacy effort in the society;
- To transform the existing public libraries into digitally information systems through widespread application of ICT;
- To broaden access to learning opportunities by promoting tele-education and virtual learning; and
- To collaborate with the private sector, development partners and other institutions in promoting ICT in education initiatives.

5.3.3 Strategies

- Revise existing financing schemes so cost is not a barrier for connecting educational institutions to the nationwide school network;
- Update school curricula to include ICT courses;
- Achieve a critical mass of computer literate teachers;
- Encourage the production, acquisition and distribution of digital educational materials;
- Devise affordable schemes for teachers and students to acquire ICT products and services;
- Facilitate Public Private Partnerships to mobilize resources in order to support e-learning initiatives;
- Expand the on-going electronic education program to embrace all levels of education and training across the country;
- Link academic institutions and libraries electronically to enable both teachers and students to access information resources; and
- Develop special ICT training programs for women and the disabled in order to address gender and social inequalities.

5.4 Health

ICT is a fundamental component for modernizing the health sector. Its specific applications include the delivery of health services in areas such as telemedicine, health information management, access by the public to online health information, use of text messaging for health reminders and online education for health professionals. The application of ICT in support of health service delivery is of particular importance in countries such as Ethiopia where a large proportion of the population lives in rural areas with a shortage of health professionals. Much like with the pillar of education aforementioned, the application of ICT to health can bridge the gap of geographical distances and enhance the delivery of health services and crucial medical information to Ethiopians across all regions.

The Ministry of Health has been developing E-health strategies. A national electronic document center has also been established with the goal of digitizing all health records over the next five years. Broadband is important for supporting many activities of the health sector including health management information systems, telemedicine and tele-education.

The government will continue to commit itself to nationwide application of ICT for health service delivery, with the following specific objectives and strategies.

5.4.1 Goal

Modernize and expand improved health services coverage using ICT.

5.4.2 Objective

- To ensure the effectiveness of the national health policy and strategy through dissemination of medical information using the Internet on ways to prevent contagious diseases such as sexually transmitted diseases, HIV/AIDS, tuberculosis and basic health care;
- To use ICTs to improve health service delivery, coverage and quality across the country including the use of applications such as telemedicine;

5.4.3 Strategies

- Develop and implement the national health information system;
- Create an electronic information network for rapid access by health professionals throughout the country on health, pharmaceutical information, etc.;
- Upgrade and modernize the administration and management of health service across the country using ICT;
- Promote the development of telemedicine applications and improve access to cost effective health care services across the country;
- Use of ICT to disseminate health messages such as alerts, reminders, etc.;
- Optimize the use of ICTs for online education for health professionals; and
- Linking hospitals, health research institutes and health centers with broadband to the lowest health center levels.
- Provide training using ICT, including online education, for health professionals.

5.5 ICT Manufacturing and Computer and Related Services

The ICT sector consists of ICT manufacturing, telecommunications services and computer and related services. The ICT sector is important as industry in its own right with a growing contribution to the economy. Telecommunications services deploy the ICT infrastructure and related applications and services that are widely discussed in this policy. Therefore, ICT manufacturing and computer and related services are included in this pillar.

5.5.1 ICT Manufacturing

There is great potential for further developing the ICT manufacturing industry in Ethiopia. This would open up the potential of an important industry, create jobs, provide opportunities for SMEs, reduce the price of ICT equipment in the country and help to accelerate technology transfer. This topic is further elaborated in a separate policy document for the ICT manufacturing sector.

Even though ICT manufacturing at present is quite small, it has shown dynamic growth in recent years. The potential for an expanded ICT manufacturing industry is promising. The foundational action areas will increase the number of skilled workers and penetration of ICT across the country and thus increase the attractiveness of Ethiopia as a destination for investment in ICT manufacturing. To enhance the viability of Ethiopia as a destination for ICT manufacturing, the Government is committed to removing obstacles constraining its development.

The following goals, objectives and strategies will help to develop the potential of the ICT manufacturing and electronics industry.

5.5.1.1 Goal

To develop an inclusive and globally competitive ICT manufacturing industry that contributes to meeting local demand for ICT products and creates rising exports.

5.5.1.2 Objectives

- To develop the competitive capacity of the ICT manufacturing sector nationally to ensure it can export products internationally;
- To facilitate the growth of the ICT manufacturing industry in Ethiopia particularly local SMEs;
- To encourage domestic and foreign direct investment for the development of ICT manufacturing; and
- To promote ICT manufacturing as a tool for employment opportunities and entrepreneurial development in small businesses.

5.5.1.3 Strategies

- Develop an ICT manufacturing information system featuring data on production, employment and trade as well as investment and other incentives to market the status and potential of the industry;
- Promote technological industrial zones and provide incentives for ICT manufacturers;
- Boost technical skill development and research and development activities to maximize potential for technology transfer;
- Enhance the enabling legal, regulatory and institutional framework to attract domestic and foreign direct investment in the ICT manufacturing industry and encourage exports;
- Encourage and support the local private sector particularly SMEs with special incentives that would enable them to participate in the ICT manufacturing industry; and
- Establish IT hardware incubators targeted at innovative entrepreneurs.

5.5.2 Computer and Related Services

A robust national software system is essential to maximize effective use of ICT and ensure its sustainability. Applications, services and content all need to be adapted to the local context and languages. At the same time, there are opportunities for Ethiopia to develop

the export potential of the sector. The national software and related services industry can help modernize the economy, contribute to economic growth and create jobs.

Building a strong software and computer services industry requires capacity building, developing quality assurance standards, creating an enabling business environment, enhancing access to finance, ensuring an appropriate legal environment, ensuring availability of e-payment systems and last but not least, boosting domestic demand.

5.5.2.1 Goal

To create a strong national software industry to enhance the development impacts of ICT.

5.5.2.2 Objectives

- Facilitate growth of computer software and services, particularly local SMEs;
- Encourage domestic and foreign investment for the development of computer software and services;
- Develop the competitive capacity of the computer software and services in national and international markets;
- Leverage the computer software and services sector to develop locally relevant applications, software and services that can be exported.

5.5.2.3 Strategies

- Leverage the ICT Village to provide incentives for software developers and for foreign investment;
- Promote certification and quality assurance;
- Facilitate access to finance through steps such as guaranteed loans for micro and SMEs and incentives for the creation of venture capital funds;
- Promote software skills development through the education system and private sector;
- Stimulate demand through public procurement and promotion of greater use by private sector;
- Develop program to grow software exports;
- Facilitate electronic payments; and
- Encourage companies in the mobile sector to support mobile application software developers through mobile labs, competitions, internships, etc.

5.6 Entrepreneurship and Innovation

The emergence of small entrepreneurs developing innovative products is a trend visible throughout the world. Though many fail, those that manage to scale up create jobs at a disproportionate rate. Start-up founders are also young and college educated and thus can help alleviate unemployment among university-educated youth. Successful tech start-ups have a significant impact on business models through the introduction of new goods and services that are typically ICT enabled. Social entrepreneurs are relevant in Ethiopia's context through the application of goods and services with development impacts.

5.6.1 Goal

To enable a vibrant ecosystem for innovative entrepreneurs.

5.6.2 Objectives

- To create a thriving startup ecosystem; and
- To facilitate the growth of social entrepreneurs.

5.6.3 Strategies

- Introduce dedicated funding options for small tech entrepreneurs;
- Leverage the ICT Village for incubation and acceleration of startups;
- Facilitate the startup business environment in areas such as business registration;
- Promote networking among the startup community through events, workshops, and competitions and foster links between startups and larger companies;
- Tap the innovative ideas of social entrepreneurs for their potential in relevant areas such as government, health, education and rural development;
- Encourage and support the local private sector particularly SMEs with special incentives that would enable them to participate in the ICT manufacturing industry; and
- Facilitate e-payment solutions.

5.7 Youth and Women

Across the world technology has played an important role in empowering role for youth and women. It has helped them mobilize, collaborate and given them a voice. It has connected young people and women across geographical divides to respond to social concerns.

ICT can engage and motivate youth and women to get involved in developing and learning about their communities and thus forge increased commitment and empowerment. Targeting girls and young women, in particular, by promoting better and more inclusive access to ICT for enhancing their academic, social and economic development is crucial to closing the gender gap.

Promoting universal, non-discriminatory, equitable and affordable access of youth and women to ICT is central to ensuring digital and social inclusion.

In recognition of these facts, the Government is committed to improving the access of ICT for Youth and Women through the following objectives and strategies.

5.7.1 Goal

Increase the benefit of access to various forms of ICT by youth and women across all the regions.

5.7.2 Objectives

- To ensure the provision of youth and gender friendly and safe access to broadband Internet across the whole country;
- To ensure that IT plays a key role as an empowerment tool, addressing access gaps relating to youth and women; and
- To increase the number of youth and women in the ICT industry.

5.7.3 Strategies

- Provide free or subsidized ICT services for non-profit groups targeting youth and women;
- Ensure that the educational system provides equal opportunities for all students to learn how to use ICTs;
- Ensure that the educational system provides equal opportunities for all students to develop advanced ICT skills and provide equal opportunities for women to work in ICT jobs;
- Support young or female tech innovators and entrepreneurs through special programs, initiatives and competitions; and

- Ensure the proper legal and corresponding computer framework exist to prevent the dissemination of harmful and offensive content or cyber-bullying which disproportionately affects youth and women.

6 FRAMEWORK FOR POLICY DEVELOPMENT

6.1 Introduction

An effective policy implementation process is essential for achieving the Government's objectives and raising the contribution of ICT to economic growth, poverty reduction and wealth creation.

6.2 Institutional Arrangements

The existence of a cohesive and well-functioning institutional framework is essential for effective policy implementation and the attainment of all the objectives of this policy. The aim is to ensure that the key institutions interacting with the ICT sector effectively play their respective but interdependent roles with a view to promoting a vibrant ICT sector and achieving universal access to services. The government will provide leadership and direction in the ICT sector and in the implementation of the policy objectives. In addition, the government will foster broad, investment-friendly rules and regulations. The following stakeholders play important roles in the development of the ICT sector and it is proposed that representatives from each will be part of a National ICT Council (NICTC) to help guide implementation of the policy:

- Government;
- Development Partners;
- Civil Society;
- Service Providers;
- Private Sector;
- Consumers;
- ICT Professional Bodies.

6.2.1 Government

The Government's role in the sector will be coordinated through the MCIT and through relevant regional ICT agencies. Strategies to achieve this policy include:

- Strengthen existing institutions and assign appropriate ICT priority areas to them to champion and deliver on the objectives of the policy. In particular, specific targets will be agreed upon and reviews made to determine the extent to which they are being realized;
- Develop, coordinate and implement both the ICT policy and the monitoring and evaluation (M&E) framework across all sectors of the economy, and across the region, to ensure that the implementation of ICT programs and projects is effective to support the social and economic sectors of the economy;
- Ensure provision of an enabling environment for investment in the sector;
- Ensure provision on an enabling regulatory environment for market development, by playing the role of sector regulator; and
- Consider establishing a separate eGovernment agency, with a broad mandate to foster the development of ICTs in Ethiopia (including businesses, innovation and capacity building), implement and maintain systems and technology for the government, oversee the development of integrated ICT projects, and develop and enforce government ICT standards.

6.2.2 Development Partners

Multilateral, bilateral, NGOs, International Financial Institutions and other development partners will play a complementary role towards realization of development of the goals and objectives of this policy. Within the ICT policy framework, the Government will foster linkages with various development partners to provide financial, material and technical assistance as well as building capacity and digital literacy to ensure long-term sustainability.

6.2.3 Civil Society

The role of civil society will be to inform the policy-making process by making relevant contributions in regard to, *inter alia*, ICT access, e-Education, poverty reduction and e-Governance. A specific role envisaged for ICT users, and consumer associations, would be in helping to monitor actual broadband speeds in the country and quality of service, through a service quality website based on crowd sourced and automatically monitored information.

6.2.4 Service Providers

The role of the service providers is critical for implementing the national ICT infrastructure elements of this policy with the overall aim of providing broadband access throughout the country using the latest available commercial technologies at an affordable price and with high level of service quality.

6.2.5 Private Sector

The private sector plays an important role in the sector, and its involvement will be required, *inter alia*, to:

- Continue to develop the sector with efficiency, credibility, commercial integrity and good corporate governance;
- Provide quality and sustainable service with a multiplicity of choice to consumers;
- Develop services and applications that run “over the top” of the broadband infrastructure and which provide solutions for end users; and
- Keep abreast of technological change, and participate in the broader ICT sector, both regionally and internationally.

6.2.6 Consumers

Ensuring reliable ICT access to consumers, including both citizens and businesses, is the overarching goal of this policy and their input is essential for its success. To that end, it is expected that consumers will:

- Be provided with mechanisms to provide feedback about access, quality and affordability of ICT services;
- Have procedures for reporting complaints about billing, quality of service, offensive content and other issues with appropriate resolution procedures; and
- Be consulted, and provide input to ICT related policy, strategy and programs in respect to consumer issues, including service prices.

6.2.7 ICT Professional Bodies

The Government will recognize and encourage the formation of national ICT professional bodies registered under the laws of Ethiopia to foster professional ethics, standards and human resource development in the sector. Two specific roles of ICT associations will be to monitor, and report confidentially on, any suspected malpractice in the sector or anti-competitive activities and to champion the use of ICT in the economy.

6.3 Continuous Re-alignment of the Sector

In recognition of the fast pace of technological change, the Government has put in place the necessary institutional building blocks required for the development of a robust ICT sector. This ICT policy thus gives due consideration to the following:

- a) Establishing a National ICT Council (NICTC) whose members will constitute representatives of the academic, professional, civil society and other stakeholder organizations;
- b) Enhancing M&E mechanisms within the MCIT to coordinate with government institutions with national responsibilities to implement the ICT development policy;
- c) Developing adequate and sustainable capacity at all levels of government and across different sectors for formulating and implementing national ICT programs and projects;
- d) Articulating public and private sector partnership modalities for national ICT development; and
- e) Integrating on-going ICT related programs and projects into national ICT development plans and programs.

The Government will further commit itself to making the necessary changes to existing institutions as well as making new arrangements, as and when the need arises, to facilitate implementation of this policy.

6.4 Monitoring and Evaluation

It is important to strengthen mechanisms to ensure that the development and implementation of ICT policies and strategies, as well as plans and programs, are carried out effectively. This requires continuous monitoring and evaluation of the implementation of the policy. The MCIT will create the institutional framework and design mechanisms to ensure that implementation of the policy is on track, and that it is regularly monitored and evaluated. This will ensure that policy goals, objectives and targets are achieved, and that corrective and timely measures are taken when the need arises.

The mechanisms include the following.

- a) Facilitating and coordinating the national ICT policy as well as related plans, programs and strategies;
- b) Ensuring that there is no duplication or overlapping efforts which result in wastage of resources in the process of ICT planning and program development;
- c) Establishing performance indicators and targets to measure effectiveness;
- d) Formalizing monitoring and benchmarking within MCIT to oversee collection and reporting of performance indicators and conduct of regional benchmarking;
- e) Creating a website to allow ICT users, throughout the country, to provide voluntary reports on actual broadband speeds (for instance, by using a speed monitoring app) and on service quality and outages;
- f) Setting standards to ensure effective project management and accountability for national and sector specific programs and projects; and

- g) Strengthening partnership and collaboration with regional and international organizations.

6.5 Conclusion and Way Forward

The implementation of this policy entails the need for coordination with all agencies and ministries as well as regional governments within Ethiopia. The policy further calls for continuous benchmarking and collaboration with international development partners and the private sector in meeting the country's development programs. It is expected that each ministry will align the use of ICT in their strategic plans to meet the policy goals laid out in this policy document.

Finally, it is the wish of the Government, that all citizens are able to make optimal use of ICTs in their day-to-day activities. This policy provides the vision for us to achieve this, both in the near future and in the long term. We look forward to all Ethiopian citizens and stakeholders in making this policy a reality.