FINAL DRAFT

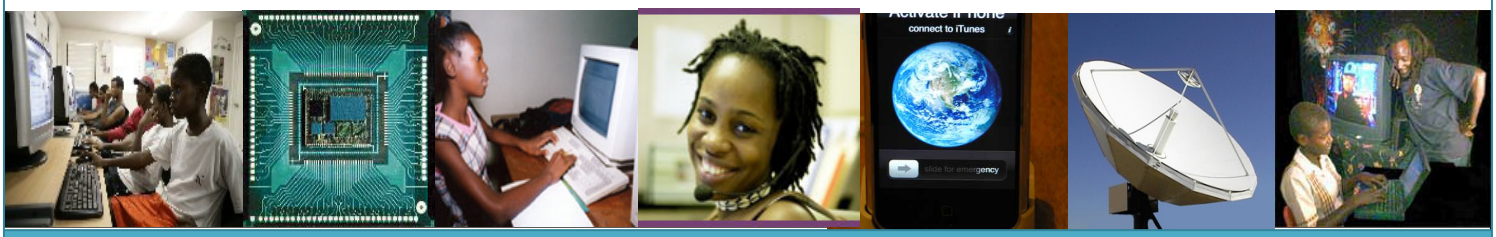
VISION 2030 JAMAICA

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)

SECTOR PLAN 2009 - 2030

ICT Task Force

September 2009



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1. Introduction

1.1 Vision 2030 Jamaica – National Development Plan

1.1.1 Background to Planning Process

In 2006, the Government of Jamaica (GOJ) mandated the Planning Institute of Jamaica (PIOJ) to lead the preparation of a comprehensive long-term National Development Plan (NDP) which would place Jamaica in a position to achieve developed country status by 2030. Development of the Plan began in January 2007 and thirty-one Task Forces (TFs) including the Information and Communications Technology (ICT) Task Force were established thereafter. The TFs represented sectors and areas critical to the achievement of the national goals and were charged with the responsibility for developing the relevant long-term sector plans.

The ICT Task Force commenced the Plan preparation exercise in April 2007, leading to the completion and submission of a 1st draft report for the long-term development of the ICT sector in Jamaica. Following review and stakeholder consultation, and preparation of an action plan for the sector, the ICT Sector Plan for Vision 2030 Jamaica was completed in 2009.

This Sector Plan for ICT is one of the strategic priority areas of the ***Vision 2030 Jamaica - National Development Plan***. It is one of thirty-one sector plans that form the foundation for Vision 2030 Jamaica – a 21-year plan based on a fundamental vision to make *'Jamaica the place of choice to live, work, raise families, and do business,'* and on guiding principles which put the Jamaican people at the centre of the nation's transformation.

The preparation of Vision 2030 Jamaica was supported by a quantitative systems dynamics computer model – Threshold 21 Jamaica (T21 Jamaica) – which supports comprehensive, integrated planning that enables the consideration of a broad range of interconnected economic, social and environmental factors. The T21 Jamaica model is used to project future consequences of different strategies across a wide range of indicators, and enables planners to trace causes of changes in any variable or indicator back to the relevant assumptions and policy choices.

This sector plan was developed using the following processes:

- Participation of Task Force Members[1] through Task Force Meetings[2] that were used to solicit ideas and views on ICT issues and challenges facing Jamaica as well as identifying a vision for ICT in Jamaica, and determining key goals, objectives and strategies for the sector
- Task Force working groups on various dimensions of the ICT sector
- Research on international best practices in ICT that could be adopted in the Jamaican context
- Review of relevant documentation on the ICT sector

[1] See Appendix 1 for List of Members of the ICT Task Force

[2] See Appendix 2 for Listing of Task Force Meetings

- Development of a detailed Action Plan with responsible agencies and time-frames for implementation.

The Sector Plan is structured in the following main sections:

- Situational Analysis
- SWOT Analysis
- Strategic Vision and Planning Framework
- Implementation, Monitoring & Evaluation Framework and
- Action Plan
- Framework

1.1.2 Overview of the ICT Sector Plan

The ICT Sector Plan considers ICT under two (2) main aspects:
i) ICT as a sector in its own right; and
ii) ICT as an enabler of all other sectors, including economic, social, environmental and governance sectors. This enabling role of ICT encompasses the concept of ICT for development (ICT4D), reflecting the contribution that ICTs can make to national development in all sectors. The ICT Sector Plan in particular includes linkages with a number of other sectors including education, governance, science, technology and innovation and the cultural/creative industries.

During the period 2006 to 2007, the Ministry with responsibility for the ICT portfolio and the Central Information Technology Office conducted extensive research and consultations, to develop a revised policy and strategic framework for the sector. The Vision 2030 Jamaica ICT Sector Plan seeks to build on the existing policy and development framework for the sector to ensure compatibility and continuity of the long-term planning for the sector. In particular the Vision 2030 Jamaica ICT Sector Plan is based on the eight (8) dimensions employed by the National ICT Strategy as set out below:

1. e-Inclusion
2. Education and Training
3. Network Readiness and Infrastructure Development
4. e-Business and Industry Structure
5. e-Government
6. Cultural Content and Creativity
7. Research and Innovation
8. Policy and Legal Framework

The SWOT Analysis and the Action Plan (with Goals, Objectives, Strategies and Actions) are also structured along these eight dimensions.

1.1.3 Vision 2030 Jamaica and ICT

There can be no doubt that the development of the ICT sector has transformed life in Jamaica in many ways over the past two decades. This period which has seen the introduction and spread in use of mobile phones, personal computers and the Internet, dramatic expansion in the number and range of telecommunications and broadcast media providers, and growth of applications of ICTs in businesses, schools and households.

The Vision 2030 Jamaica – National Development Plan sees the ICT sector as playing a central role in the transformation of Jamaica over the next two decades on the path toward making the transition to becoming a developed country.

Information and Communications Technologies have become engines for social and economic growth globally. Their appropriate utilization can improve the lives of all Jamaicans and the vision is for Jamaica is to utilize ICTs to attain developed country status by 2030. This will involve growth of the ICT sector and the application of ICT in all sectors and at all levels to achieve rapid and sustained development. The vision for ICT includes the following:

1. The attainment of the Millennium Development Goals

2. The integration of ICT at all levels and processes in the education system, thereby producing a knowledge-based and educated society. This will include the early childhood, primary, secondary, tertiary and life-long learning institutions as well as teacher training colleges. The average Jamaican will be ICT literate.

3. Attainment of affordable universal broadband access for all citizens, private sector, government and civil society, thereby eliminating the digital divide. Universal access will extend beyond voice to include internet, computing devices, information literacy and access to telecommunications services.

4. The establishment of internationally renowned Technology Parks and Research centres to foster innovation in society.

5. Attraction of international companies to establish software development companies or manufacturing plants in Jamaica.

6. Continued enhancement of the legal and regulatory framework to promote industry development, transparency, true competition, consumer protection and quality standards, based on the dynamic nature of the sector. The enhanced support for competition will attract local and international investors.

7. The establishment of a networked society and economy in which all citizens use ICT in all aspects of their lives, including school, work, home and church. The private sector, public sector and civil society will utilize ICT to conduct business and to interact with each other. There will be pervasive availability and use of electronic commerce, electronic government, electronic procurement and other internet-related services.

8. ICT will contribute to the fostering of niche markets in which Jamaica has competitive advantage and the opportunity to be a world leader. These niches will be located within a range of sectors including:

   Services
   - Financial Services (Offshore Banking, Insurance)
   - Hospitality Industry (Travel & Vacation Sectors)
   - Business Process Outsourcing
   - Offshore Education
   - Logistics / Transshipment Points

- Creative Industries (Music, Movies, Fashion, Internet Content)

Manufacturing
- Agro processing
- Light manufacturing

Mining and Energy
- Limestone and limestone derivatives (cement, lime, GCC & PCC)
- Renewable energy

Agriculture
- Orchard tree crops
- Herbals /nutraceuticals
- Food processing
- Pharmaceuticals/wellness industries

Tourism
- High end boutique resorts
- Mixed use developments

Infrastructure
- Housing for the tourism sector
- Sewage and water
- High end shopping centres

9. The establishment of i) digital broadcasting networks; and ii) video and audio content delivery on an end-user demand basis.

10. Jamaica will be a main contributor to internet content given our rich heritage and culture. The content will focus on our much strength such as folklore, art, craft, music, history, culture, fashion and success in sport. Jamaican content will be widely available through all distribution media including the Internet, broadband access devices and cable.

11. There will be wide availability of electronic (e-) services for all the major sectors. This will include the e-health, e-education, e-tourism, e-security, e-agriculture and e-commerce services. Investors and consumers will be able to access information and services readily over the internet. Example: Jamaica's Tourism Industry will utilize ICTs to improve competitiveness through promotion over the Internet and the integration of local tourism providers into Destination Management Systems.

12. ICTs will have transformed the Trade and Export Sector through computerizing trade logistics and customs systems, making them more efficient and transparent, and increasing trade flows.

It is important to note that given the dynamic nature of the ICT sector, Vision 2030 Jamaica provides for the periodic review of the ICT Sector Plan and renewal of the vision based on the evolution of the sector and progress in the implementation of the plan.

1.2 ICT and National Development

Information and Communications Technology (ICT) has emerged over the past decades as one of the most visible representations of modern development, profoundly influencing production processes and social life. Information and Communication Technologies (ICTs) form the basis for the transition

to the Information Society that represents the model for developed economies in the 21st century. As such it may be said that "development can no longer be understood without full consideration of the widespread effects of ICTs"[3].

The speed and depth of the changes resulting from ICTs have been termed the second Industrial Revolution. As examples, the growth of ICTs has led to revolutionary developments in personal computing, automated manufacturing industries, telecommunication and mobile telephony. There has been rapid expansion of the Internet and its defining applications such as Yahoo, Amazon, e-Bay, Google and YouTube, and the increasingly ubiquitous presence of ICTs in commercial and household appliances.

1.2.1 Growth of Global ICT

There are many indicators of the growth of ICT and its impact on national development. Between 1995 and 2004, computer and information services exports grew six times faster than total services exports. Total ICT sector employment grew by over 8% annually between 1995 and 2003 in developed countries, and represented 5.5% of total business employment in these countries by 2003. In 2003 the total value of ICT-enabled services exports was valued at US$836 billion, representing 45% of total services exports in 2003, up from 37% in 1995.[4]

ICT based interactions, such as e-mail, have increased 32 times from 20 million electronic mail users worldwide in 1994 to 651 million in 2005.[5] Total global ICT spending is estimated at over US$3 trillion in 2006, growing by an annual average of 8.9% from 2001 to 2005 and representing an average of 6.8 % of global Gross Domestic Product over the same period.[6]

The application of ICTs has led to reduction in transaction costs between businesses and consumers, and is credited with contributing to increased productivity in recent years. Research suggests a strong linkage between the levels of ICT advancement of a country and growth in per capita GDP for both developed and developing countries.[7] Studies also indicate that firms that use ICTs grow faster, invest more, and are more productive and profitable than those that do not.[8] ICTs also have profound implications for poverty reduction and social well-being.[9]

ICTs can foster the development of business and social networks which enhance competitiveness and individual freedoms. E-inclusion becomes an important aspect of the information revolution, as "harnessing the full potential of the benefits of the global information society is possible only if all nations and the peoples of the world share this opportunity equally".[10]

[3] UNCTAD (2006)
[4] Ibid.
[5] UNDESA (2005)
[6] WITSA (2006)
[7] UNCTAD (2006)
[8] World Bank (2006)
[9] For example, research from a 'Village Pay Phone' project in Bangladesh indicated that the introduction of telephones to the village allowed the villagers to eat well all year round compared to only 9.9 months when there were no phones (UNDESA 2005).
[10] UNDESA (2005)

Access to information technologies is one of the targets listed in the Millennium Development Goals (MDGs) and is considered important by itself as well as for the achievement of all the MDGs.

While developed countries continue to dominate global ICT industries (accounting for 83% world ICT-enabled service exports in 2003), developing countries such as India and China have emerged in recent years as major players at the global level. It is also relevant to recognize that developing countries that have targeted ICT as a strategic priority (such as Malaysia, South Korea and the Philippines) have actually achieved higher levels of ICT value-added in their business sectors than the levels achieved by developed countries.[11] Jamaica has the potential to achieve similar gains from strategic focus on the long-term development of its own ICT sector.

1.2.2 International Context

The development of the ICT sector in Jamaica has been influenced by the World Summit on the Information Society (WSIS) Declaration of Principles (2003), in which countries involved in the WSIS, including Jamaica, affirmed a commitment to building a "people-centred, inclusive and development oriented Information Society".

The Geneva Phase of WSIS established a number of targets to be achieved by 2015. These include: to connect villages with ICTs and establish community access points; and to connect a range of facilities with ICTs including universities, colleges, secondary and primary schools, scientific research centers, public libraries, cultural centres, museums, post offices, archives, health centers and hospitals.

The WSIS Declaration of Principles and Plan of Action include: to connect all local and central government departments and establish websites and email addresses; to adapt all primary and secondary school curricula and meet the challenges of the Information Society; to ensure that all of the world's population have access to television and radio services; to encourage the development of content and put in place the technical conditions in order to facilitate the presence and use of all world languages on the internet; and to ensure that more than half of the world's inhabitants have access to ICTs within their reach. The primary objectives of the Tunis Phase of WSIS were to evaluate and assess the progress made towards bridging the digital divide, and to develop action plans for financial mechanisms and internet governance.

[11] UNCTAD (2006)

2. Situational Analysis – Jamaica's ICT Sector

2.1 Overview of ICT Sector

2.1.1 Definition of ICT Sector

The information and communications technology (ICT) sector in Jamaica may be considered to include the information technology industries (computer hardware and software, systems and training), telecommunications industries (telephone, cable and internet), and the broadcast media (television and radio)[12].

The postal service also forms part of the overall sector. The main components of the ICT sector have seen considerable dynamism in their development over the past decade. However there is limited data to measure the aggregate economic performance of the sector. In 2008, Communication represented approximately 6.3% of Jamaica's Gross Domestic Product (GDP)[13]. However the full economic contribution of ICT also is reflected as part of the contribution to GDP by other economic sectors.

2.1.2 Performance of the ICT Sector

The ICT sector continues to experience growth with respect to investment within the various industries, including Information Technology, business processing outsourcing (BPO) and telecommunications. One indicator of the performance of the sector in recent years comes from the data for investment and earnings in the sector.

Foreign direct investment inflows to the ICT sector have averaged US$80.9 million per annum over the period 2001-2007. These represent 11.7% of total foreign direct investment inflows to Jamaica over the period, and primarily reflect the levels of new investment since the liberalization of the telecommunications industry in 1999.

Annual inflows of earnings from communication services and computer and information services have averaged US$193.9 million over the period 2001-2007, while annual outflows from these services have averaged US$83.4 million. The sector has generated average net foreign exchange earnings of US$110.4 million annually over the seven (7) year period 2001-2007 from ICT services including ICT-related professional services and net international call settlements.[14]
Jamaica Trade and Invest (JTI) estimates that the ICT projects it has facilitated in the telecommunications and call centre industries employ over 14,000 persons, many of whom are engaged in the exportation of services, and represent capital investments in excess of $4 billion.

Jamaica also has developed as an outsourcing destination for service providers looking to the Caribbean for a near shore outsourcing location. This is largely due to the large English speaking, trainable labor pool, proximity to the US outsourcing market (the largest

[12] For OECD definition of the ICT sector see Appendix 5
[13] Statistical Institute of Jamaica
[14] Bank of Jamaica

in the world), and competitive cost.[15] There are currently 26 contact centers in the sector with 3 being local companies and 23 multinationals.

Net imports of office machines, automatic data processing equipment and telecommunications equipment to Jamaica increased from J$7.0 billion in 2000 to J$18.3 billion in 2006, indicating increased use of ICTs in the domestic economy.[16]

Telecommunications

The telecommunications industry has experienced among the highest levels of expansion and investment in the Jamaican economy, particularly since the year 1999 which saw the lifting of the monopoly on telephone services previously enjoyed by Cable and Wireless Jamaica Limited (C&W) and by Telecommunications of Jamaica prior to 1998. This period has seen the highly successful entry of Mossel Jamaica Limited (Digicel) into the local and regional mobile telephone market in 2001, followed by Centennial Jamaica in the same year (subsequently acquired by Oceanic Digital Jamaica and now branded as Claro).

In April 2004 the government also granted a cellular licence to AT&T Wireless, however it was later revoked because the company failed to operate within the time established in the licence.

The joint publication of the International Telecommunications Union and the United Nations World Information Society 2007 Report cites Jamaica as an example to the Caribbean in the development of its mobile telephony. According to the report, "Jamaica's mobile penetration is significantly above where it should be, given its average per capita income.

Jamaica has achieved this success thanks to a market liberalization process that began in 1999…Jamaica's success is significant, as it disproved a long-established theory that small island economies were too small to sustain competition."[17] Based on the information available from the Office of Utilities Regulation (OUR), the phone penetration rate in Jamaica has reached 106% of the population by 2006 based on both fixed and mobile phones.

The global trend of increasing mobile penetration coupled by decreasing fixed line penetration has also been evident in Jamaica. C&W has seen a decline in its fixed line customers from a high of 503,890 in 2001 to 349,047 in 2008. Mobile penetration has surpassed fixed-line penetration primarily due to a number of factors, such as innovative pricing strategies (namely, prepaid subscriptions), lower deployment costs for mobile networks and competition in the provision of mobile services.

Since the liberalization of the telecommunications regime in 1999 there has been an explosion in the number of telecommunications licences granted in Jamaica, increasing from a total of 2 licences in 2000 to 441 by

[15] In a recent survey Jamaica ranked 7th in competitive cost for call centres - the lower cost locations included the Dominican Republic, Romania and Malaysia with India and the Philippines as the lowest cost locations. China was not included in the survey (see Location Consultants 2006).

[16] Statistical Institute of Jamaica

[17] ITU and UNCTAD (2007) p. 31

2008. Similarly the number of internet service provider (ISP) licences in Jamaica has increased from 45 in 2001 to 82 by 2008.

The formalization of the cable industry in 1998 eventually has seen a total of 42 cable companies operating by 2009 for provision of subscriber television (STV) services islandwide.

The development of the cable industry also has seen some degree of consolidation among cable operators over the years, and the recent entry of Columbus Communications Inc. (Flow) has signaled the beginning of a new phase in the evolution of the industry.

Flow has commenced the roll-out of a fiber optic cable network, offering combined cable, internet and telephone service, services which had already been introduced by some local cable companies on a smaller scale. Flow was awarded an island-wide cable licence in August 2007.

The liberalization has brought significant capital investment in the sector. Total spectrum fees collected since the beginning of the liberalization process in April 2000 up to the end of March 2007 is estimated at $4.74 billion (cellular licences – $4.364 billion and other mobile spectrum licences – $380 million).

Total GCT collected since liberalization is approximately $40 billion. It is estimated that the total revenue realized by the Government from the sale of cellular licenses to Digicel, Oceanic Digital (Miphone) and ATT Wireless is US$98.5 million.

Information Technology (IT)

The provision of hardware and software product and services started approximately forty five years ago in the 1960's. The early developers of the local IT industry included such multinational companies as Burroughs, IBM, ICL and NCR who all had established offices in Jamaica. Since that time the local industry has evolved rapidly with the global acceleration of developments in hardware, software, communications technology and services.

Just about all the major international information technology brands are represented or are present in Jamaica. These include Apple, Dell, Cisco, HP, Fujitsu, IBM, Lenovo, Microsoft, Oracle and Sun. International organizations such as Fujitsu, IBM and Microsoft have established branches in Jamaica and the Caribbean.

Several local organizations are operating in the sector, these include Advanced Digital Systems, Commnett, Comtech, Digital Transtec, Illuminat, Innovative Corporate Solutions, Innovative Systems Limited, Management Control Systems, SSP Aptec and Syncon. Companies that offer consulting services include Price Waterhouse Coopers, KPMG and Adjoined. The various organizations provide a truly diverse set of products and services and operate in a highly competitive environment.

The industry provides a wide range of hardware, software, networking and services to the private and public sectors. The banking, telecommunications, insurance and general financial services industries lead the way in the use and integration of technology in business.

Within the public sector the Ministry of Finance and its related agencies are the heaviest users of technology in government. Other sectors that rely heavily on their information technology systems include the utilities, mining and medium to large manufacturing and distribution companies.

Wide area networks have become the norm for multi-location entities and voice over internet protocol (VoIP) implementations are increasing as old telephony infrastructure is being changed out. The latest technology in storage, blade technology, virtualization and databases is being installed in the larger and more advanced entities.

Typically software solution offerings are from the broad array of pre-packaged software that apply to industry specific areas or cross industry solutions, such as enterprise resource planning (ERP). These applications are typically customized and adapted to the local business environment. While there exists a software developers' association in Jamaica, software development is still a small part of the sector with only a few companies doing significant software development for sale on the open market.

Challenges in the industry include the ability to measure the benefits of IT investments and the impact on productivity. At the same time the sector also has a responsibility to help the users of technology effectively assess, select and manage their technology investment.

Current trends in the use of IT locally include an increased interest in outsourced operations and hosted or managed services; more companies are embarking on establishing e-commerce capabilities for their customers; the education sector is embarking on a multimillion dollar e-learning initiative; the public sector is accelerating it's e-Government programs; a progression to third or fourth generation industry applications in the banking, telecommunications, insurance and distribution sectors; innovation in music and digital media for entertainment.

Postal Services

The Post and Telecommunications Department of Government is responsible for the operation of post offices island-wide. Their range of services offered has been expanded beyond the receipt and delivery of ordinary, registered and parcel mail, sale of stamps and encashment of postal and money orders, to include: payment of pensions on behalf of the Ministry of Labour and Social Security; registration of births and deaths on behalf of the Registrar General; and bill payment services.

In addition a number of post offices have been included in the on-line Tax Portal System which facilitates the payment of taxes electronically. However the increasing development of alternative communications media in Jamaica has constrained growth in the total volume of mail being handled by the post office system, which fell by 21% from 83.9 million letters, parcels and other mail in 2000 to 66.6 million in 2005 before rebounding to 83.7 million in 2006.

The rebound was attributed to increased parcels from e-commerce activities and the commercial services, such as courier services, implemented by the

Department. However, since 2006 there was a 6.7% decline in mail handled by the post office system to 78.1 million in 2008.

2.1.3 Indicators on Current Status of Jamaica's ICT Sector

Within the liberalization of the telecommunication system, ICTs are seen as tools to achieve national goals. Under the e-Readiness ranking produced by the Economist Intelligence Unit (EIU), which provides an assessment of a country's status in terms of connectivity and its ICT environment in relation to other countries, Jamaica's 2008 rank is 49 with a score of 5.17.

Table 1 provides a summary comparison of the current status of Jamaica's ICT sector, based on a range of international indices. These indicate that Jamaica has generally achieved a position midway among the nations of the world in the development of its ICT sector, and has the potential to increase the contribution of its ICT sector to national development through the successful implementation of its plans for the sector
A detailed assessment of Jamaica's status on a wide range of ICT indicators is also included as Appendix 7 of this plan, including ICT indicators relating to access, quality, affordability, institutional efficiency and sustainability, and ICT applications.

This table also includes a comparison of the relative standing of Jamaica's ICT sector on these indicators with the Latin American and Caribbean region for 2006. As the table shows, Jamaica compared favourably on a number of indicators relating to access, including numbers of mobile subscribers and Internet subscribers per 1,000 persons, but was behind the region in telephone main lines and personal computers per 1,000 persons and percentage of households with television. Jamaica also compared favourably on indicators relating to affordability, institutional efficiency and sustainability, and ICT applications, but trailed in level of broadband subscribers at 1.7 per 100 persons compared to 2.95 per 100 persons for the region.

Table 1: Status of Jamaica's ICT Sector

International Index	Status/Ranking	Score/Index	Year	Indicators
Economics Intelligence Unit (EIU) e-Readiness	49th of 70 countries	Score 5.17	2008	Connectivity Business environment Consumer and business adoption Legal and policy environment Social and cultural environment Supporting e-services
World Economic Forum Network Readiness Index	46th of 122 countries	Score 4.09	2007-2008	ICT environment Readiness Usage of ICT
Orbicom Digital Divide Index	60th of 139 countries	Infostate 88.1	2003	Number of users Knowledge levels Skills and infrastructure
Human Development Report Technology Achievement Index (TAI)	49th of 72 countries	Score 0.26	2001	Creation of technology Diffusion of technology Human skills
International Telecommunications Union (ITU) Digital Access Index (DAI)	54th of 178 countries	Score .53	2007	Infrastructure Affordability Knowledge Quality and actual usage of ICTs
UNCTAD Index of ICT Diffusion	57th of 180 countries	Access index .598	2005	Access Connectivity
UN Global E-Government Readiness Report	85th of 192 countries	Score .468	2008	Web measure Telecom index Human capital index

2.1.4 Policy, Regulatory and Institutional Framework for ICT Sector

The Ministry with portfolio responsibility for the ICT Sector, currently the Office of the Prime Minister**,** has responsibility for providing the overall policy framework to guide the development of the ICT sector in Jamaica**.**[18] The Ministry was responsible for the Telecommunications Act 2000 which governed the liberalization of the sector and also the National ICT Strategy 2001.

The Ministry recently led the development of the revised draft Telecommunications Policy 2007 to provide an updated policy framework for the sector. The goals of the new policy are the improved productivity of the national economy, attraction of local and international investments, and support for all sectors (including health, education, tourism, security and agriculture). The policy has declared as its mandate the establishment of an island-wide modern telecommunications network, universal service for all Jamaicans, and wide deployment of broadband services. The Policy Principles include the recognition of telecommunications as a development instrument, establishment of universal service and access, respect for technology neutrality, and fostering competition.

[18] Ministries with portfolio responsibility for the ICT Sector prior to 2009 were formerly the Ministry of Industry, Technology, Energy and Commerce, and subsequently the Ministry of Energy, Mining and Telecommunications.

The development framework for the ICT sector also includes the National ICT Strategy 2012 prepared under the leadership of the Ministry and the Central Information Technology Office (CITO). The ***Vision 2030 Jamaica ICT Sector Plan*** seeks to build on the existing policy and development framework for the sector to ensure compatibility and continuity of the long-term planning for the sector.

The government has realized the importance of ICT to all sectors, therefore a number of Ministries are currently developing ICT plans. These include the Ministry of Education and the Ministry of National Security. It is anticipated that other Ministries will develop ICT Plans in the near future.

Several agencies, projects and initiatives have been established by the government arising from the elements in the policy and strategic plans. These include the E-learning Project, the Information and Communications Technology Project, the Universal Access Company Limited and the Jamaica Intellectual Property Office (JIPO).

The principal telecommunications regulator under the Telecommunications Act, 2000 is the Office of Utilities Regulation (OUR). The Spectrum Management Authority regulates the radio frequency spectrum on behalf of the Minister, while the broadcasting and subscriber television industry is regulated by the Broadcasting Commission.

As of 2008 there were a total of 20 broadcast licenses for radio and television. Indeed the licences already granted have occupied most of the FM

frequencies available for broadcast services in Jamaica. It is planned that amendments to the Broadcasting and Radio Rediffusion Act will permit further liberalization of the industry to encourage the development of differentiated services and the local content industry.

The Electronic Transactions Act 2006 was enacted in April 2007 to promote confidence and security in electronic transactions. The government is also developing other companion legislations to further enhance the development of the sector, including the Data Protection Bill and the Cyber Crime Bill.

In May 2002, the Government established the Central Information Technology Office (CITO). The main purpose of CITO is to monitor the implementation of the ICT strategy, including coordinating ICT plans by the different ministries and developing domestic and international partnerships to promote ICT.

CITO's main mandate is strategic planning, while the different ministries and agencies carry out the implementation of projects and programs. CITO in conjunction with the Ministry led the development of the National ICT Strategic Plan 2007-2012.

Jamaica Trade and Invest (JTI) is an autonomous agency under the Ministry with portfolio responsibility for Investment. The main purpose of JTI is to attract foreign direct investment to Jamaica, including investment in the ICT sector, and to facilitate trade. JTI has attracted several telecommunications and call centre operators in the sector as highlighted above.

Another agency under the same Ministry is the Trade Board Limited (TBL). The TBL is the certifying authority for the importation and exportation of goods under various trade agreements. In 2006, a Trade Board Information System was implemented to offer on-line import and export services. The TBL is also the Certifying Authority under the Electronic Transactions Act 2006.

The Ministry of Finance (MOF) has been the leading user of ICT in the public sector. Fiscal Services Limited (FSL), a limited liability company under MOF, has been successful in automating the business processes of several of the fiscal agencies.

These include the trade facilitation system for the Customs Department, JTI and Trade Board Limited, the implementation of a Customs Brokers System and the development of an On-line Tax portal for the Customs Department and the Inland Revenue Department respectively.

2.1.5 Human Resource Development to Support ICT

Human resource development for the ICT sector includes the contributions from the formal educational system at the secondary and tertiary levels, the role of a range of private training institutions, and the training undertaken by HEART-NTA.

Secondary Level

The E-learning Project is a joint project between the Ministry of Education and the Ministry with responsibility for ICT. The objective is to utilize current state-of-the-art ICTs in Jamaica's high schools, grades 7-11, to improve the quality of education, enhance the learning experience and improve the level of passes in the CXC CSEC exam in 180 institutions. These institutions include: 166 Public high schools, 6 Public Special Schools and 8 Colleges that train teachers for the high schools. The E-learning Project was designed in 2003 to address five (5) specific constraints which impact adversely on the quality of education in the high schools. These constraints are:

(i) lack of a comprehensive set of standard instructional materials for both teachers (especially young and experienced teachers) and students;
(ii) inadequate equipment in schools to enhance teaching and learning using modern technologies; lack of a proper Educational Management Information system in the MOE to facilitate effective administration of the education sector;
(iii) low level of skills among some teachers in the use of certain technologies such as interactive software in the teaching of "hard to grasp" topics and to stimulate interest among students, especially boys;
(iv) inadequate remedial programme at Grade 7 to enable weak students who have been promoted to high school to cope with high school work especially among the newly upgraded high schools; and
(v) lack of a standard system of assessing performance at each grade for students, teachers and schools

The project was launched in February 2006 and will be implemented over three years, with the first year being a pilot phase involving twenty (20) schools. The other schools would be addressed in years two and three. Learning from the pilot phase will inform the second phase.

Tertiary Level

The providers of ICT related education at the tertiary level include the main tertiary educational institutions including the University of the West Indies (UWI), the University of Technology (UTECH), and Northern Caribbean University (NCU), and the Community Colleges.

Three major universities provide Computer Science degrees: the University of the West Indies (UWI), Northern Caribbean University and the University of Technology (UTECH). UWI offers both bachelors and master degrees, while UTECH offers courses only at the undergraduate level. Both face resource limitations (space and trained teaching staff) that prevent them from taking in more qualified students applying to the program. Mona School of Business also has implemented a Telecommunications Policy and Management Programme.

The potential of the technical skills of Jamaica's human resources in ICT also has been demonstrated by the successes of the students from the Department of Computer and Information Sciences at

Northern Caribbean University (NCU) in the Imagine Cup, an annual global competition sponsored by Microsoft to provide students with a platform to showcase their software development and technical skills.

The NCU team has reached the regional finals in Software Design in the past three years, winning in 2005 and 2007 while placing second in 2006. The 2007 team also placed third at the global level, in a year when the finalists were chosen from a pool of more than 100,000 students from over 100 countries. Utech also has competed in the Computer Olympics where students from various schools compete against one another with computer games that challenge their math and reading skills.

Other initiatives include the Minister's Award for Innovation, and grants to UWI and UTech for business plans for technology parks and research, support from private sector, and the UWI contract with Boeing.

HEART Trust/National Technical and Vocational Training Agency

HEART/NTA is a statutory organization of the Government of Jamaica whose mission is to support technical and vocational training in both the public and the private sectors. It is funded largely by contributions of 3% of the total payroll. It has developed an expertise in training management, including selection, contracting and evaluation of courses; financial management of training related activities; and recruitment and selection of course participants.

While it owns a network of Academies and Vocational Training Centers, it uses private sector training institutions for ICT training. HEART's mandate is to train and certify at least half of the Jamaican workforce by 2008. In the fiscal year 2005/2006, ICT accounted for 18% of the 87,812 persons enrolled for that period, and represented the 3rd largest sector, after Hospitality and Commercial Skills. Training programmes range from basic ICT skills to web-design, programming, computer repairs and maintenance and networking.

Other ICT Training Institutions

The Caribbean Institute of Technology (CIT) also plays an important role in the development of higher-level ICT skills in Jamaica. CIT offers a twelve-month course for the preparation of proficient entry-level computer programmers and software designers. It was initially started in February 1999, as a result of a partnership among the University of West Indies, Fuhrman University (Greenville, South Carolina), HEART/NTA, MICT, the Montego Bay Free Zone, the International Development Consortium (affiliated with the University of Hertsfordshire in London), and a software company, Indusa (Atlanta, Georgia).

Training has been funded by the Government of Jamaica, through the Information Technology Employment Creation Project of the Ministry, and has been administered by HEART/NTA. Graduates have been very successful in obtaining employment after completing the program. Scholarships have been funded by the GOJ using some of the fiscal resources that were generated from

the sale of spectrum through auction to two cellular providers.

The CISCO Networking Academy program (10-month course) prepares students to design, build, and maintain computer networks. This program is a result of an agreement between the GOJ, UNDP and CISCO. CISCO has partnered with HEART to establish a Regional Academy at Stony Hill as well as 10 Local Academies.

UNDP has equipped one computer laboratory in the Regional Academy at Stony Hill, in Kingston, and will equip one more. CISCO has provided the training of four trainers, and software and equipment necessary to use its technology.

The GOJ, through HEART/NTA manages the program and provided the initial physical space and some equipment. The program delivers web-based content, online assessment, student performance tracking, hands-on labs, instructor training and support and preparation for industry-standard certification. It is expected that the CISCO Academy will attract foreign students, mainly from other Caribbean countries.

There are numerous privately owned ICT training centers in Jamaica. These offer high quality training in the main computer applications, and are frequently contracted by HEART/NTA to provide training in the context of governmental programs. Their offer includes programs for computer operators, data entry clerks, application programmers, and programmers/ analysts. Many of these training centers have been certified to offer training by the different software companies such as Microsoft and others.

The Jamaica Computer Society (JCS) was established 25 years ago and its purpose is to promote the effective and efficient use of ICT in Jamaica. The JCS holds an annual conference and periodic seminars and produces a quarterly publication to describe current and future trends in the industry.

The Jamaica Computer Society Education Foundation (JCSEF) was established in 1990 by the Jamaica Computer Society to place computer labs in secondary and tertiary schools, in an effort to facilitate students taking examinations in Computer Science. Subsequently, the mission was expanded to incorporate ‘the use of information technology to improve the quality of education and its contribution to national development’.

The JCSEF has acquired experience and expertise in a wide range of services related to the implementation and appropriate use of technology in education and training, as well as considerable know-how in managing large grants from multi-lateral donor agencies. The JCSEF also provides basic ICT Skills training for organizations, tailoring the courseware for their specific requirements.

The projects designed, implemented and/or managed by the Foundation since 1991 include the following:

- Jamaica 2000 which provided 141 secondary and tertiary institutions with computer labs of varying sizes, teacher and lab administrator training

- Business Partners for Education Programme which encouraged a partnership involving the private, public and education sectors, with wider community and international donor organizations
- Teacher Training in computer science and technology at primary, secondary and tertiary institutions
- Adult Computer Education Pilot Programme which sought to equip adults with skills more applicable to the requirements of business and industries and to enhance their employability
- Implementation of computer labs in primary schools
- Global Teenagers Network (GTP) Project to enable Jamaican students to participate in a network of students from schools located in developing and developed countries

2.2 ICT for Development (ICT4D)

2.2.1 ICT4D Initiatives

An integral part of the role of the ICT sector in national development is to contribute to the growth of other sectors as an enabler of growth through ICT for development (ICT4D). This role has been fostered in Jamaica through a number of initiatives involving the public sector, private sector and non-governmental organizations (NGOs).

One of these NGOs is the ICT4D Jamaica, a non-profit network organization established to define, promote and facilitate the use of Information and Communications Technology in the development process. A recent initiative to foster research and innovation in the ICT sector is the ICT4D Jamaica Think Tank, e-Novation, formed in April 2007 as a vehicle to devise, revise, influence and promote policies and initiatives centred on ICT4D that will affect the life of the Jamaican citizenry and serve as good practice models for other small island developing states.

The specific beneficiaries will be stakeholders in five different ICT4D Jamaica sector areas, namely e-governance and community development, tourism and hospitality, music and entertainment, agriculture and agri-business, education and training, including communities, academia, the public sector and the private sector, and domestic and international NGO policy promotion entities.

Another recent initiative is the Jamaica Digital Arts Festival (JDAF) launched in April 2007 by the Media Technology Institute/CPTC in partnership with ICT4D Jamaica, HEART, International Institute for Communications and Development and other partners. The JDAF is intended to be a bi-annual event designed to unearth creative talent and innovation in the use of ICTs, including web-design, digital photography, film, animation and new media, applied to key economic and social sectors for development purposes.

The potential contribution of ICTs to Jamaica's creative industries is particularly important given the convergence of digital technologies and content and the comparative advantage

that Jamaica has demonstrated internationally in the creative industries including music and the performing arts.

ICT4D Jamaica also has carried out surveys on the Entertainment and Music sector and Agriculture and Agri-business sector to determine the levels of application of ICT in these sectors. The results indicated that while only 39 per cent of respondents in the entertainment and music sector have formal computer skills at the certificate level, basic computer skills, defined as computer literacy and user manipulation are being utilized at a level of 87 per cent.

In the agriculture and agri-business sector less than 10 per cent of respondents use online marketing or utilize tools such as computer graphics and/or digital photography while only 14 per cent use inventory management and databases as tools of enhancing productivity within their respective enterprises. However computers and internet connectivity are perceived by the respondents as the two most important information and communication technologies that will have the greatest impact for the future.

2.2.2 ICT4D by Sector

The following outlines the progress of ICT4D in a number of sectors:

- **Education**
  - The Ministry of Education has recently completed an ICT in Education strategic plan which has seven pillars to be addressed over a five year period.
    1. Generate shared vision of ICT in Education.
    2. Design and implement ICT integrated curriculum and content.
    3. Design and implement an EMIS (Education Management Information System) for schools, teacher training colleges and community colleges.
    4. Implement capacity building initiatives and training programmes for all levels of teachers, administrators, parents and the wider community.
    5. Ensure widely available access to ICT infrastructure – computing and multimedia technology, and network connectivity (both local and wide area and Internet).
    6. Design and implement monitoring and evaluation systems
    7. Develop initiatives to foster sustainability.

- **Health**
  - The Ministry of Health is leading an inclusive process, incorporating public and private sector and civil society partners, to develop a dynamic and comprehensive national Health Information System.

- **Security**
  - The Ministry of National Security along with its sector-wide partner agencies has recently begun the development of an ICT strategy for the sector aimed at effectively solving sector-

wide communication and information sharing challenges in order to radically improve security related analysis and decision making.

- **Agriculture**
  - The Agri-Business Information System (ABIS) has been developed to support the ICT-enabled linkages of farmers to their target markets. More needs to be done in terms of deployment of the system and training of potential users.

- **Tourism**
  - The *E-Powering Jamaica 2012* National ICT Strategy defines a priority initiative, the use of ICTs to gather and access relevant information on tourists requirements and needs, in aid of improving the tourism product, which is a notion at the heart of the sustainable tourism master plan.

- **Labour**
  - The Ministry of Labour is keen to work to expand the capability, reach and usage of the Labour Management Information System (LMIS) portal

2.2.3 Potential of ICT4D

In the Jamaican context, the use of ICTs has the potential to contribute significantly to development of a number of sectors. For example Jamaica has been ranked #1 e-government nation in the Caribbean for the last 3 years by the UN Global E-Government Rankings and has introduced electronic portals for accessing a range of government services and for payment of taxes.

Electronic government will be a driving force in the implementation of national e-strategies, including online services offered by government and e-business and e-payment operations undertaken through the public procurement process, with the potential to broaden access to government services, increase transparency and efficiency, and reduce costs.

ICTs also can significantly improve the operations of the law enforcement and justice systems of government, and also have a role to play in the development of the island's health system, by linking providers at all points of care electronically, and supporting the development of telehealth services domestically and for export.

The future of the educational system will increasingly be driven by the application of ICTs, including through personal devices, intelligent environments, computing infrastructure and advanced pedagogical interfaces.[19] ICTs also can contribute to improving the efficiency of trade and export systems, improving competitiveness in tourism and other services sectors, and increased productivity in the other productive sectors including manufacturing, construction, mining and transport.

[19] See for example Daanen and Facer (2007)

2.3 Issues and Challenges

1. Spectrum Management:

With the rapid emergence of new technologies, there is a general challenge to the traditional ways of managing the radio frequency spectrum. Globally, there is a move from a command and control model of spectrum management towards more modern, market based approaches aimed at encouraging more efficient use of this resource. This move also requires a change in the regulatory and legislative framework which governs spectrum management. Locally, the Spectrum Management Authority since 2001 has adopted the market based approach to licensing specific bands of the radio frequency spectrum.

There has been an exponential growth in the demand for spectrum. In some areas such as broadcasting and mobile broadband, this increased demand has resulted in the limited availability of FM frequencies for analog broadcast and the need to review current allocations to ensure that the spectrum is being utilized for its best purpose.

Challenges in spectrum management includes being able to anticipate the needs of users, to manage the various demands for spectrum to avoid conflict among potential users and to provide the appropriate regulatory framework for the development of wireless communication systems in Jamaica.

The planning for the sector also must address the long-term possibilities for wireless ICT, including aeronautical broadband capabilities, mobile remote learning, mobile town monitoring systems, mobile medical examination systems including remote diagnosis, ultrawideband (UWB), radio frequency identification (RFID), licence-exempt frequency bands, class licences and authorizations, spectrum trading, and harmonized approach to spectrum management on a regional basis.

Whilst it is difficult to predict very far into the future re wireless technologies and spectrum requirements, two areas which require immediate attention are:

- Digitization: Jamaica requires a transition plan to convert its broadcasting systems to digital audio and television. This would result in the more efficient use of broadcast spectrum and facilitate an expansion in the number of broadcasters.
- Mobile Broadband: Using 3G and 4G technologies, the world is moving towards the use of quadruple play technologies, (fixed, mobile, cable and internet). The ability to facilitate these technologies, through the availability of the required spectrum within a conducive regulatory environment will be important.

2. Regulatory and Legislative Framework:

   It is likely that there will be changes in the regulatory framework for the communications sector. As noted above there are currently three (3) main regulatory agencies, the OUR, Spectrum Management Authority and Broadcasting Commission, with different roles.

However the government has expressed an interest in creating a single telecommunications regulator to remove the fragmentation and overlapping jurisdictions in the telecommunications sector, caused by the existence of the multiple regulators, and to implement a simplified and efficient institutional framework for the regulation of the trading of goods and services within the sectors.

The creation of a single telecommunications regulator; this would involve the fusion of the telecommunications regulatory functions of the OUR, the radio spectrum technical functions of the BCJ and the spectrum management functions of the SMA. Content matters would remain within its portfolio Ministry. In the long run the government may consider merging carriage and content regulation under a single regulator for the sector.

The Fair Trading Commission (FTC) also is responsible for ensuring equitable competition among players in the sector. The evolution to the legislative framework for the sector also includes the current revision of the Telecommunications Act, 2000. The development of a regulatory regime that is technology-neutral in respect of allowing the emergence and convergence of ICT technologies, and sector-agnostic in the sense of allowing for the evolution of business models will support the long-term development of the ICT sector.

3. International Telecommunications Industry:

   The telecommunications industry demonstrates the impact of globalization, where sustained technological advances have led, more than in any other industry, to the "death of distance" and the creation of international infrastructure and networks allowing almost instantaneous communication and transfer of voice, data, video and other information around the world.

   This global integration of the telecommunications industry has implications for small open economies such as Jamaica which represent challenges for long-term planning and development, including the following:

   - The potential impact that ongoing negotiations and adjustments to international accounting settlement rates may have on countries such as Jamaica that receive more international telephone calls than they originate
   - Continued evolution of technology will increase difficulties in ensuring regulatory compliance and minimizing by-pass and other evasive techniques
   - Confronting the increasing threats of data interference, identity theft and other forms of cyber-crime
   - Increased openness to the impact of foreign cultural values and practices

4. Role of Government:

   In addition to its role in providing the regulatory and legislative framework the government can play a catalytic role in the development of the sector through the demonstration effect of its adoption of information technology.[20] The Government also can provide impetus through promotion of e-government for online access and provision of government services.

   In planning for the future development of the island's ICT sector the government also should build on the achievements and lessons learnt from previous ICT planning initiatives, both within Jamaica and in other relevant countries. In this regard it will be important to identify clear strategic priorities and an effective implementation framework including strengthening the capacity of lead agencies and securing the participation of key stakeholders.

5. Competition and Technology:

   The level of competition in the communications sector has increased significantly since the liberalization of the telecommunications and broadcast media regimes, and has led to a large increase in the number of providers, a decrease in the cost of international telephone calls and a quantum increase in Jamaica's teledensity.

   However convergence has impacted on the level of competition in the sector. This convergence includes the convergence of services over a single access device (e.g. Blackberry and other mobile telephones) and traditional operators offering bundled services (e.g. triple play of fixed phone, cable and internet).

   This has led to economies of scale (e.g. islandwide wireless licences), and concentration of ownership (e.g. media consolidation and conglomerates). It will be important to balance the long-term development of technology and business models with the maintenance of adequate levels of competition in the sector.

6. Human Resource Development:

   The rapid pace of change and technological advance will require ongoing human resource development to ensure that adequate trained personnel are available to companies and organizations in the sector, including regulatory agencies. This will require a number of modalities, including formal academic programmes, vocational and skills training, in-house training by companies and access to international skills as required.

   However while Jamaica has expanded and deregulated its ICT sector, there is still a lack of adequate of ICT education at the primary, secondary and tertiary levels. ICT deployment and usage is still curtailed by a combination of human resource factors including, high illiteracy rates, loss of ICT skills due to migration, low skill

[20] An example of this role has been provided by the implementation of effective ICT systems in the process of clearing goods at customs

levels and high technology anxiety among the elderly, and high unemployment rates among the general labour force, particularly affecting women and youth.

The development of Jamaica's capacity for research and innovation in ICT is also limited by the relatively low levels of overall expenditure on research and development.[21]

7. Infrastructure:

Jamaica currently has three main mobile providers; Cable and Wireless Jamaica Limited (LIME), Mossel Jamaica Limited (trading as Digicel) and Oceanic Digital Jamaica Limited (trading as MiPhone).

Each mobile provider has established their own network which interconnects the other mobile networks as well as with the fixed line networks (PSTN operated by Cable and Wireless Jamaica and the Fibre Optic network operated by Fibralink in partnership with Flow).

The Government awarded spectrum licences to Digicel and Cable & Wireless to offer broadband services in the 3.5 GHz band. It is expected that companies with spectrum in the 3.5 GHz band will offer WiMax services.

Jamaica's advanced tele-communications infrastructure includes a 100% digital telecommunications network, submarine fiber optic transmission ring around the island and international submarine cable links through the Cayman-Jamaica fiber system and the recently installed Columbus Communications' Fibralink system to the Dominican Republic. The main issues in the long-term development of the communications infrastructure will include:

- Achievement of affordable universal access including services to marginalized communities, remote areas, the disabled and the elderly. This is particularly important as Jamaica's ICT indicators also show that access to ICTs are more limited among rural and low-income households, which has implications for ensuring greater levels of e-inclusion
- Domestic and international connectivity including to the existing fixed line telecommunications operators
- Reductions in cost of internet outbound connectivity
- Equitable access to telecommunications infrastructure systems by other service providers that rely on these infrastructure systems as the basis to provide their services
- Equitable management and allocation of telephone numbers which represent a scarce resource similar to spectrum
- Access to computers and other devices for internet connectivity on affordable basis to help bridge Jamaica's internal "digital divide"

[21] Jamaica spends approximately 0.3% of GDP in R&D which is well below the levels of the rest of the world with an average of 1.7%) and Latin America and the Caribbean with an average of 0.6% of GDP (see Kelly 2005).

- The island's telecommunications infrastructure needs to be adapted on an ongoing basis to address vulnerabilities and build increasing levels of resilience including establishment of an ICT disaster management programme.

8. Research and Innovation and Protection of Intellectual Property:

   The long-term development of the sector also will require enhancement of the island's capacity in research and innovation in communications technology and new ICT products and services.

   In the short and medium term Jamaica should use an adaptive approach to identifying appropriate research and technology from international sources in developed and developing countries and customizing them for Jamaican conditions and requirements. The framework for protection of intellectual property rights in Jamaica requires strengthening including increasing public awareness of the importance of intellectual property rights.

9. Inadequate Data on ICT sector

   The ICT sector also suffers from the absence of quantitative measure both at the micro and macro levels. There is also inadequate information on the status of ICT4D and the application of ICT in other sectors. Financial support and attention will need to be placed on obtaining the necessary data to better inform the decisions that must guide the planning and development of the sector in accordance with the vision and goals.

10. Strengthening of Industry Structure and Capacity

    The industry structure and capacity of the ICT sector also must be strengthened including the following aspects:

    - While there has been significant progress to date, the continued development of the outsourcing industry will require addressing a number of problems, including inadequate office space, poor English standards of students leaving the various levels of the education system and the low take-up of the opportunities presented by outsourcing by local investors
    - National capacity needs to be developed in the manufacturing of hardware components and the creation of software that has both domestic and international market potential. In so doing existing creativity and innovation in the ICT sector will not only expand but also thrive. This national capacity will require among other things the strengthening of tertiary level institutions in related disciples such as mathematics, engineering and the sciences so as to create the necessary profile and critical mass to support an advanced and integrated ICT sector
    - In Jamaica e-commerce is still in its infancy, and e-commerce activity is concentrated in product and service delivery to consumers (B2C), with limited attention paid to business-to-business (B2B) operations,

brokerage/intermediary services, online shopping malls, virtual communities, and content and service provision. Furthermore the ICT sector in Jamaica currently exhibits little presence of electronic document management systems, knowledge management technologies and processes, groupware, business intelligence through data warehousing and data mining, content management systems, or environmental scanning for emerging ICT technologies.

11. Development of ICT sector

The country must overcome specific issues and challenges to ensure the long-term development of the sector. These include:

- Gaps in the levels of required skills and capabilities for ICT among the work force
- Existing focus of local ICT companies on low value-added services for export
- Limited access to capital for new ventures in the ICT sector
- Relatively low levels of computer usage and affordable internet access among households and schools with limited access to affordable hardware
- Inadequate public awareness toward the importance of technology
- Importance of information literacy for all Jamaicans
- Development of environmentally sustainable methods of disposing of increasing levels of waste generated by the ICT sector

3. SWOT Analysis

ICT is an essential component in the industrialization and sustainable development of nations. A standard tool of strategic analysis is SWOT analysis, which seeks to identify the main strengths, weaknesses, opportunities and threats for a given entity, ranging from a nation to a sector to an individual enterprise.

For the ICT Sector in Jamaica the identification of strengths and weaknesses represents the internal assessment of the sector while the consideration of opportunities and threats represents the analysis of the external environment for the sector.

The SWOT analysis, along with the Situational Analysis, form the basis for identifying goals, objectives and strategies that may be employed to apply the strengths and address the weaknesses of the sector, and capitalize on the opportunities and mitigate the threats to the long-term development of the sector.

The SWOT analysis for Jamaica's ICT sector is presented in Table 2 below. The SWOT analysis is presented for each of the following eight (8) dimensions identified in Section 1.2 above:

1. e-Inclusion
2. Education and Training
3. Network Readiness and Infrastructure Development
4. e-Business and Industry Structure
5. e-Government
6. Cultural Content and Creativity
7. Research and Innovation
8. Policy and Legal Framework

Table 2: SWOT Analysis – ICT Sector

Internal Analysis	
Strengths	**Weaknesses**
e-Inclusion • ICT recognized as a driver for economic growth • Jamaican populace not averse to technology. (Mobile phone penetration) • Local products and services exist that can be marketed overseas • 'Demand' for faster turnaround by the public from businesses and government	• Low PC/Internet penetration • High cost of computers and Internet services • Trust of online transactions is limited • Electricity not available island-wide • Absence of an island-wide network that can offer ubiquitous Internet service
Education and Training • Foundation provided by establishment of computer labs in many schools • E-learning project as well as other initiatives in place • Tertiary and training institutions offering ICT training/degrees/diplomas • Availability of local online courses • CIT – specialized ICT training institution • Number of good private training institutions • English-speaking • Focus on change and willingness to transform the education system as indicated by Education Transformation Task Force Report • Growing recognition of the need to integrate TVET into the secondary system • 38% of computers in schools funded through private	• Students exiting the educational system without functional literacy • Low levels of CSEC passes especially in English, Mathematics and the Sciences • Curricula not well aligned with the needs of industry, especially regarding ICT • Curricula in high schools for grades 7 to 9 vary from school to school • Private sector support is uncoordinated and sometimes results in duplication of effort and/or varying standards • Insufficient trained and specialist teachers in the system • Overcrowding of schools • Teachers have no access to computers in 53% of schools, 39% of teachers cannot use a computer and only 14% use computers in the classroom (survey conducted by MOEY, 2006) • High costs of equipment maintenance • Very limited ICT technical support within schools

sources/private sector (MOEY study, 2006) • Increased number of students sitting and passing CSEC IT between 2002 – 2005 • Teachers colleges across the country have been connected via a dedicated wireless network	• Underdeveloped software engineering sector • Little research and development funding from private or public sector • Dominance of Computer Science versus Information Technology and Information Systems courses of studies • Few innovative projects being developed in education
Network Readiness and Infrastructure Development • A multiplicity of ICT networks with some providing over 90% population coverage • Strong competition driving further network development • Interconnectivity of most ICT networks • Availability of diverse high capacity fibre cable networks • General regulatory and policy acceptance that deregulation promotes competition and choice creating an incentive for private sector development • Developing experience in locating ICT in private and public institutions e.g. schools, libraries, post offices and other public institutions	• Legacy networks are largely voice centric • Existing levels of consumer demand for ICT militates against further infrastructure development • Infrastructure has not reached critical mass in number of network nodes • Higher levels of taxation than regional competitors discourages private sector investment in ICT • Import friction increases cost of infrastructure development in ICT • Shortage of high-skilled IP engineers limits growth of ICT sector • Low PC penetration limits opportunities for wide scale broadband deployment • High interest rate structure discourages investment in ICT
e-Government • Jamaica has been ranked #1 e-government nation in the Caribbean for the last 3 years by the UN Global E-Government Rankings • Competition between government ministries, departments and agencies (MDAs) for implementation of e-services • Trainable human resources	• Lack of cohesion at the governance level, with lack of a properly defined e-governance framework • Lack of integration of services across government entities; e.g. hindrances to TRN linkages • Limited number of local sources of e-government solutions with high level of external dependency • Lack of adequate ICT-related training and professional development in

• Good technical expertise in place • Available infrastructure in some areas • Ability to identify inefficiencies in current operations • Good National ICT Strategic Plan as base on which to build Govnet	government • Current local environment does not adequately support the development of innovations • Inadequate infrastructure with geographical limitations • Limited internet penetration • Limited PC/access device penetration • Burden on citizens to transact business with multiple agencies • Competition between MDAs may lead to inadequate coordination and fragmentation of resources • Lack of policy on e-governance to support integration and buy-in from policy makers • Information technology is not positioned in a strategic position in corporate structures within government • Poor implementation of e-related projects, with need to revamp business processes • CITO is under resourced and lacks teeth, indicating limited level of commitment to e-government • Lack of data protection and privacy laws to protect citizens against abuse of state power • Lack of alignment between IT strategies and business strategies • Limited financial resources for implementation of e-governance initiatives
e-Business and Industry Structure • Strong interest by Government in promoting economic growth including role of ICT • Major ICT brands represented on island • Good fibre connectivity driving down Internet costs • Duty free regime for computer imports • Good interconnectivity for business markets • Training for ICT is available at all levels	• Low share of high-technology products output • Modest efficiency and relatively low share of business and financial services in GDP. • No ICT manufacturing • Non consolidated ICT sector • Lack of ICT experts with managerial experience and skills

• Dynamic growth of Services sectors • Solid level of ICT investment by consumers and service providers • Improved competitiveness of telecommunications and computer services • Services driven growth of ICT sector and ICT market size	

Research and Innovation
• Existing incentives for research & innovation in ICT e.g.:
  • The National Award for Science & Technology,
  • National Quality Awards for Science & Technology
  • Technology Investment Fund and Tax Incentives Scheme
  • MITEC gave grants to UWI and UTECH to promote research
• Evidence of innovation in ICT – National Awards 2003 and 2005
• Continued expansion of ICT infrastructure
• Growth of SMEs in ICT which drives Research and Innovation
• Liberalized ICT sector
• International ranking – telephone penetration, progress in the sector, e-readiness
• Proximity to major ICT markets
	• No explicit understanding of or established role for ICT in national vision and development objectives
	• No structured national ICT R&D programme geared towards national priority needs and yield high impact output
	• Low levels of funding and investment - e.g. budget expenditure
	• Low level of ICT innovation in the public sector, private sector and tertiary level
	• Inadequate creativity and capacity to manufacture software and hardware due to ready access to off the shelf products
	• Inadequate Private/Public/University support for ICT research
	• The culture does not promote/reward innovation and research
	• Significant gap between ICT education and skills capacity necessary to advance ICT
	• Weak problem solving skills in ICT hinged on low performance in Mathematics and Information Technology

Cultural Content and Creativity • Well developed linkage industries such as tourism and sports • Developing awareness of the role of culture by	• Excessive sexually charged lyrics and depictions as well as lyrical and visual content advocating violence • Not enough industry knowledge and activity in e-commerce and online

academic institutions • Inclusion of elements of Jamaican and Caribbean culture in the curriculum at both tertiary level institutions and high schools • Local media acting as a conduit for cultural content • International success of local artists acting as ambassadors for national culture • Increased thrust towards the international marketing of Brand Jamaica through the adoption of ICT tools. • Jamaica's cultural diversity • Jamaican culture has benefited from other closely connected products such as beer, spices and coffee • Jamaica has consolidated its place in culturally diverse and heritage based festivals such as CARIFESTA, PANAFEST and Sumfest • More than 60 recording studios most with state of the art digital audio technology • A strong Jamaican diaspora as a first base market for our cultural products • Large and diverse range of cultural content available • Focus on culture enhanced by direct Ministerial portfolio	marketing • Lack of widespread access to ICTs and broadband by Jamaica's creative youth and other potential contributors • Particular aspects of the cultural expression elicit conflictual response among social groups • Perception and reality of crime and violence • Loss of cultural content and continuity over time • Recording on obsolete media and lack of archiving and heritage retention • Quality challenges • Lack of interest and awareness by creators of their IP rights • Limited pre-tertiary educational programmes to develop careers in creative industries
Policy and Legal Framework • Appreciation at the policy level of the important role to be played by law and policy, for example the development of a new Telecommunications Policy (draft) • Electronic Transactions Act was enacted in April 2007 • Local expertise exists to help shape and guide the development of the legislative and policy framework	• Over-emphasis from a policy & legislative perspective on digital transactions with little attention to use of ICTs to ensure the speedy delivery of justice • Laws of Jamaica online are not regularly updated • Lack of a cohesive public policy to govern the convergence in the ICT sector which undermines the sector and poses increased risks for private investments

• Laws of Jamaica are available in digital format	• Neither the decisions of the Jamaican courts nor the Jamaican Gazette are available online • Failure to use common databases within the Government to track down criminal offenders and enforce judgments • Lack of overarching ICT Policy • Absence of legislation to protect personal information and privacy • Limited capacity of judiciary in ICT-related matters
External Analysis	
Opportunities	**Threats**
e-Inclusion • Three major ICT players in a competitive market • Extensive cable TV network which can be utilized to offer Internet service at a reduced cost • Interest from overseas governments & cooperation to establish island wide networks • Geographically close to large overseas markets • Foreign Direct Investment is on the increase	• No legal means to compel ICT players to provide service in 'unprofitable' areas • Government of Jamaica may have to pay service fees for access to network • The topology of Jamaica mitigates the roll out of wireless networks which are cheaper and quicker to implement • Other Caribbean or South American countries maybe able to take advantage of opportunities based on their advanced technologies, skill sets and cheaper labour costs
Education and Training • Private sector partnerships, including the Diaspora – start up of new Public Private Partnership (JCUTE) for Universal Technology Education • International support for ICT in education interventions • Growing body of knowledge in respect to ICTs in Education • Greater competition in the ICT sector which is decreasing connectivity costs • Growing variety of connectivity options and	• Migration of skilled teachers/professionals • Rapid obsolescence of ICTs • Low literacy rates in general population • Techno phobia among specific population groups • Economic feasibility to accomplish goals • Graduates not having the necessary skills to innovate or create value in organizations • Infrastructure limitations and cost of providing universal access

'connecting' devices • Funding sources such as Universal Access Fund to support connectivity costs	
Network Readiness and Infrastructure Development • Availability of upgrade paths to broadband for most networks • USP as an enabler towards a state of the art ICT broadband network • Low broadband penetration creates investment opportunities • Common networking standards and /or the availability of integration software will enable ubiquity • Development of low cost access devices could enhance infrastructure affordability	• The pace and cost of technology development could hinder ability to be truly competitive from an infrastructural standpoint • Most competing regional nations are also aggressively promoting ICT investment • Located in the hurricane belt, components of Jamaica's ICT infrastructure are subject to periodic catastrophic failures
e-Government • Current dissatisfaction of the public with current services will drive e-government adoption • Other countries are available for reference and lessons learnt in implementation of e-governance	• Other regional countries are now building e-government services on a cohesive platform, which will result in greater regional competition • Brain drain, leading to affordability challenge to retain the best persons in Jamaica • Increased cyber crimes • Increased capital and maintenance costs for systems • Potential for abuse of power arising from better integrated databases across government • Invasion of privacy • Resistance to change among public sector workers
e-Business and Industry Structure • FDI inflow to the ICT sector may boost supply of advanced ICT solutions	• Inadequate supply of knowledge intensive business services • Slow development of domestic consumer market

• Competitive business environment • Export demand for telecommunications skill and computer services	• Global economic downturn which may reduce the demand for ICT services and lead to contraction in the local industry
Research and Innovation • Global growth in ICTs to support development of knowledge economies/societies • Collaboration among local and regional experts and regional institutions • Knowledge sharing from the Diaspora to stimulate research and innovation • Expansion in areas for marketable science and application to solve real problems • Potential latecomer advantage for adoption, adaptation and creation of ICT • Increasing competition among industries propelling innovation in and use of ICTs • Interest by private sector in promoting Private/Public/University partnerships to foster innovation for critical sectors including SME and manufacturing	• Funding for research and innovation in ICT do not target high impact output • Results from R&I may have short shelf life • Weak intellectual property rights system • Recruitment abroad of highly qualified Jamaican ICT professionals • Limited appreciation of the value of ICT as the cornerstone in building knowledge economy • Funding provided by overseas entities who then own the IP
Cultural Content and Creativity • Worldwide recognition of Jamaican music and culture • Existence of a policy framework to guide ICT development in Jamaica • More capabilities for cultural content and creativity through the acquisition of easily accessible ICTs • The CSM provides an avenue for the spread of Jamaican culture throughout the region by virtue of the free movement of artistic professionals	• Limited resources available to protect the intellectual property rights of artists and cultural practitioners • Increased use of the Internet on social networking sites to download and share music/movies files thereby violating intellectual property rights • Disproportionate infiltration of foreign culture through local media programming • Widespread duplication and imitation of Jamaican culture in economies with cutting edge technology

• Jamaican missions abroad can act as key points in the dissemination of cultural content globally • A very large and geographically diverse Jamaican Diaspora, capable of contributing to the overall development of Jamaican culture through ICTs. • Clear Governmental support for cultural expression through the development and support of cultural institutions such as Edna Manley College, the CPTC, JTI, TPDCO, Jamaica National Heritage Trust • Access international markets • Application of new tools and technologies to produce new cultural forms • Opportunity to create strengthened support mechanisms to get artistes into formal system • Potential for expansion of tourism and leisure industries in support of cultural industries	• A major segment among cultural practitioners are unable to speak another language • Local cultural institutions lack adequate resources to be more engaged in Caribbean film and video production geared at showcasing regional and Jamaican culture nationally and globally. • Poor artiste management and business skills particularly in the music industry • Poor communication skills among Jamaican cultural, sporting and music sector managers and artistes • Unwillingness or inability to appreciate the culture and lifestyle practices in other countries
Policy and Legal Framework • Foundation established for CARICOM-wide ICT policy-making with the Georgetown Declaration	• CARICOM ICT policy-making has not moved forward since 2004 • Moving at a glacial pace while global events, treaties and countries bold enough to embrace legal, regulatory and policy changes, overtake Jamaica

4. Strategic Vision and Planning Framework

The long-term process of planning for the ICT Sector is guided by a Vision that describes a future for the sector that is desirable for its stakeholders and that can be achieved through their own efforts within a realistic time frame. The Sector Plan contains an overall Vision for the ICT sector, which is based on the National ICT Policy and also reflects the contributions of the stakeholders represented on the ICT Task Force during the Vision 2030 Jamaica planning process.

4.1 Vision Statement

The Vision Statement for the ICT Sector for Vision 2030 Jamaica is:

"A globally competitive ICT sector that is widely accessible and makes the greatest possible contribution to the social and economic development of Jamaica"

4.1.1 Strategic Vision

The long-term strategic vision for the ICT sector in Jamaica is built on a number of fundamental elements, including the following:

i) An ICT sector that achieves sustained global competitiveness in industry and market segments where Jamaica has competitive advantages;

ii) An ICT sector that is driven by private sector investment within a policy and regulatory framework that fosters competition and transparency;

iii) An ICT sector that is accessible to all Jamaicans and contributes to greater ICT literacy;

iv) An ICT sector that enhances the productivity and competitiveness of Jamaica's productive sectors;

v) An ICT sector that is environmentally sustainable with minimal harmful environmental impacts;

vi) An ICT sector that supports improved governance at all levels;

vii) An ICT sector that contributes to the science, research and innovation capabilities of the country.

This strategic vision is expressed in the strategic framework for the ICT Sector for Vision 2030 Jamaica presented below.

4.2 Strategic Planning Framework

4.2.1 Strategic Approach

The strategic planning for Jamaica's ICT sector is based on strengthening the

international competitiveness of the ICT sector itself, as well as the application of ICT in all areas of national development. The strategic approach to strengthening the competitiveness of the sector is based on: improving the business environment for ICT-based enterprises; establishing Jamaica as a regional investment centre for ICT companies and ICT-reliant service industries; and increasing the role of the ICT sector in the Jamaican economy.

The Plan does not seek to target specific areas within these industries for preferential treatment, but provides for an efficient and enabling business environment and infrastructure which can support the development of value-added production in a range of ICT industries where competitive advantages already exist or may be built in the future.

Some of the specific strategies to be employed include to: improve the bureaucratic processes and investment promotion for development of the ICT sector; create a national partnership with a high services demand nation and/or a mentoring nation that has a highly developed ICT services/software industry; encourage innovative use of ICT by Jamaican private enterprise and government; support Micro, Small and Medium Enterprises (MSMEs) and NGOs in taking greater advantage of ICTs; strengthen the capacity to measure the contribution of ICTs to the national economy; and encourage the increased use of e-commerce operations.

The strategic approach to strengthening the application of ICT in all areas of national development is based on: ensuring universal and open access to ICTs; developing a populace and workforce that can function optimally in a knowledge–based society; providing widely accessible ICT networks and e-government services; promoting research and innovation in ICT and application of ICT to Jamaica's creative industries; and establishing a national ICT policy and legal framework which promotes the use of ICTs for the benefit of the entire society.

Some of the specific strategies to be employed include to: promote greater use of Free and Open Source Software (FOSS)**;** facilitate greater computing device ownership; promoting lifelong learning in ICTs; establish full integration of ICT into the teaching and learning processes at all levels; expand ICT infrastructure and broadband penetration to cover entire island; harmonize ICT infrastructure and systems across the public sector; increase commercial funding and grants for ICT research and innovation; protect, preserve and market Jamaica's indigenous cultural resources through ICT; strengthen and modify the policy, legislative and regulatory framework governing the ICT sector; and integrate ICT in the administration of justice and law enforcement.

4.2.2 Goals and Outcomes

The two (2) main goals and the associated outcomes of the ICT Sector Plan are presented below. The Sector Goals represent the ultimate desired state of the ICT sector through which we realize the Sector Vision. The Sector Outcomes represent the desired results which we seek to achieve under each goal. A range of indicators and targets

aligned to the Sector Outcomes provide quantitative milestones against which progress in implementing the ICT Sector Plan over time may be measured.

4.2.3 Integration with the National Development Plan

Under Vision 2030 Jamaica, each Sector Plan is integrated with the strategic framework of the National Development Plan. The ICT Sector Plan is aligned with the National Development Plan under a number of National Goals and National Outcomes, due to the role of the ICT sector as a productive sector in its own right, as well as an enabler of other sectors. The ICT Sector Plan is aligned primarily under the following National Goal and National Outcomes:

National Goal #3:
Jamaica's Economy is Prosperous

National Outcome #9:
Strong Economic Infrastructure
National Outcome #11:
A Technology-Enabled Society
National Outcome #12:
Internationally Competitive Industry Structures

Consequently the implementation of the ICT Sector Plan will contribute primarily to the achievement of National Goal #3 and National Outcomes #9, #11and #12 of the National Development Plan.

Under its role as an enabler of other sectors (ICT4D), the ICT Sector Plan also is aligned with the following National Goal and National Outcomes:

National Goal #1:
Jamaicans are Empowered to Achieve their Fullest Potential

National Outcome #2:
World-Class Education and Training
National Outcome #4:
Authentic and Transformational Culture

National Goal #2:
The Jamaican Society is Secure, Cohesive and Just

National Outcome #3:
Security and Safety
National Outcome #4:
Effective Governance

National Goal #3:
Jamaica's Economy is Prosperous

National Outcome #8:
An Enabling Business Environment

Consequently the implementation of the ICT Sector Plan also will contribute to the achievement of these National Goals and National Outcomes.

Table 3: ICT Sector Goals and Outcomes

GOALS	OUTCOMES
1. A strong and competitive ICT sector	**1.1:- A business environment which is conducive to the development of the ICT sector**
	1.2:- Jamaica is established as a regional investment centre for ICT companies and ICT reliant service industries
	1.3:- ICT becomes a major contributor to the country's GDP
2. Jamaica's national development is advanced by widespread adoption and application of ICT	**2.1:- Universal and open access to ICTs**
	2.2:- A populace that knows and values the capability of ICTs and their potential impact on economic and social life
	2.3:- An educated and trained workforce and citizenry that can function optimally in a knowledge –based society
	2.4:- Widely accessible, affordable and efficient ICT networks
	2.5:- E-government services are widely provided by government and used by citizens
	2.6:- Enabling environment for research and innovation in ICT
	2.7:- Culture and creative industries enhanced by application of ICT
	2.8:- A national ICT policy and legal framework which promotes the use of ICTs for the benefit of the entire society

4.3 *Sector Indicators and Targets*

The proposed indicators and targets for the ICT Sector Plan over the period 2009 -2030 are presented in Table 4.

Table 4: ICT Sector Plan – Proposed Indicators and Targets

ICT Sector Plan					
PROPOSED OUTCOME INDICATORS	**BASELINE**	**PROPOSED TARGETS**			**COMMENTS**
	2007 or Most current	**2012**	**2015**	**2030**	
Average growth rate of communication sub-sector	2.1%	2.9%	3.9%	≥ 4.7%	The target for 2015 is to return to the average annual growth rate of 3.9% achieved by the sub-sector during the period 2005-2007, and to increase to no less than 4.7% by 2030.
E-readiness Index	5.05	≥ 5.50	≥ 6	≥ 8	Targets set to meet the global average by 2015 and the average score for the top twenty countries by 2030.
Direct Investment in ICT as a % of GDP (2006)					
Connectivity and technology infrastructure Index (E-Readiness Index- scored from 10)	3.8	4.35	4.88	7.5	Target for 2030 is set at the minimum score for the top 20 countries, which are 7.5 in 2008.
Connectivity and technology infrastructure index					
percentage of population covered by mobile cellular telephony					
International Internet bandwidth per inhabitant (Mbits) (2005)					
Mobile penetration (subscribers)/100 population					
Fixed line penetration per 100 population					
Broadband subscribers per 100 population					
E-Readiness Index					
Personal computers ownership per 100 population					
# of government services available on-line					
% change in value of online collections by government (%)					
Proportion of households with a fixed line telephone (%)					
Proportion of households with a mobile cellular telephone (%)					
Proportion of households with a fixed cellular telephone (%)					

ICT Sector Plan					
PROPOSED OUTCOME INDICATORS	**BASELINE**	**PROPOSED TARGETS**			**COMMENTS**
	2007 or Most current	**2012**	**2015**	**2030**	
Proportion of households with a computer (%)					
Proportion of households with Internet/broadband access – by type of access e.g. dial-up, ADSL, wireless (%)					
ICT use indicators??					
ICT business indicators??					
% of labour force in ICT sector?					
Value added, imports, exports of ICT sector					

5. Implementation, Monitoring & Evaluation Framework for the ICT Sector

5.1 Implementation Framework

The implementation of the ICT Sector Plan is an essential component of the implementation, monitoring and evaluation framework for the Vision 2030 Jamaica – National Development Plan. The Plan is implemented at the sectoral level by ministries, departments and agencies (MDAs) of Government as well as non-state stakeholders including the private sector, NGOs and CBOs. The involvement of stakeholders is fundamental to the successful implementation of the National Development Plan and the ICT Sector Plan.

5.1.1 Accountability for Implementation and Coordination

The Cabinet, as the principal body with responsibility for policy and the direction of the Government, has ultimate responsibility for implementation of the National Development Plan. Each ministry and agency will be accountable for implementing the National Development Plan (NDP) through various policies, programmes and interventions that are aligned with the strategies and actions of the NDP and the sector plans. A robust results-based monitoring and evaluation system will be established to ensure that goals and outcomes of the Plan are achieved. This system will build on existing national and sectoral monitoring and evaluation frameworks and will be highly participatory.

Components of Vision 2030 Jamaica

The Vision 2030 Jamaica – National Development Plan has three (3) components:

1. **Integrated National Development Plan:**
   The integrated National Development Plan presents the overall plan for Vision 2030 Jamaica, integrating all 31 sector plans into a single comprehensive plan for long-term national development. The integrated National Development Plan presents the National Vision, the four National Goals and fifteen National Outcomes, and the National Strategies required to achieve the national goals and outcomes.
2. **Medium Term Socio-Economic Policy Framework (MTF):**
   The Medium Term Socio-Economic Policy Framework (MTF) is a 3-yearly plan which summarizes the national priorities and targets for the country and identifies the key actions to achieve those targets over each 3-year period from FY2009/2010 to FY2029/2030.
3. **Thirty-one (31) Sector Plans:**
   At the sectoral level Vision 2030 Jamaica will be implemented through the strategic frameworks and action plans for each sector as contained in the respective sector plans. Vision 2030 Jamaica includes a total of thirty-one (31) sector plans covering the main economic, social, environmental and governance sectors relevant to national development.

5.1.2 Resource Allocation for Implementation

Vision 2030 Jamaica places great emphasis on ensuring that resource allocation mechanisms are successfully aligned and integrated with the implementation phase of the National Development Plan and sector plans. The requirements to ensure resource allocation for implementation will include alignment of organizational plans in the public sector, private sector and civil society with the National Development Plan, MTF and sector plans; coherence between the various agency plans with the National Budget; rationalization of the prioritization process for public sector expenditure; and increased coordination between corporate planners, project managers and financial officers across ministries and agencies.

5.2 Monitoring and Evaluation Framework

5.2.1 Institutional Arrangements

A number of institutions and agencies, including the following, will be involved in the monitoring and evaluation framework for the National Development Plan and the ICT Sector Plan:

1. **Parliament**: The Vision 2030 Jamaica Annual Progress Report will be presented to the Parliament for deliberations and discussion.

2. The **Economic Development Committee (EDC)** is a committee of Cabinet chaired by the Prime Minister. The EDC will review progress and emerging policy implications on the implementation of Vision 2030 Jamaica and the relevant sector plans.

3. The **Vision 2030 Jamaica Technical Monitoring Committee (TMC)**, or Steering Committee, is to be chaired by the Office of the Prime Minister and will provide oversight for the technical coordination and monitoring of the Plan and reporting on the progress of implementation.

4. The **Vision 2030 Jamaica Technical Secretariat** to be institutionalized within the PIOJ will play a leading role in coordinating implementation, analyzing social and economic data and information, consolidating sectoral information into comprehensive reports on Vision 2030 Jamaica's achievements and results, maintaining liaisons with sectoral focal points in MDAs, and supporting the establishment and operation of Thematic Working Groups.

5. **Ministries, Departments and Agencies (MDAs)** represent very important bodies within the implementation, monitoring and evaluation system. They are the Sectoral Focal Points that will provide data/information on a timely basis on the selected sector indicators and action plans, and be responsible for the

timely preparation of sector reports that will feed into the Vision 2030 Jamaica Annual Progress Report.

For the ICT Sector Plan, the main MDAs comprising the relevant Sectoral Focal Point will include the Office of the Prime Minister, the Central Information Technology Office and the Spectrum Management Authority.

6. **Thematic Working Groups (TWGs)** are consultative bodies aimed at providing multi-stakeholder participation in improving the coordination, planning, implementation and monitoring of programmes and projects relevant to the NDP and sector plans, including the ICT Sector Plan. TWGs will be chaired by Permanent Secretaries or senior Government officials and shall comprise technical representatives of MDAs, National Focal Points, the private sector, Civil Society Organizations and International Development Partners. TWGs will meet a minimum of twice annually.

5.2.2 Indicator Framework and Data Sources

Appropriate indicators are the basic building blocks of monitoring and evaluation systems. A series of results-based monitoring policy matrices will be used to monitor and track progress towards achieving the targets for the NDP and sector plans, including the ICT Sector Plan. The performance monitoring and evaluation framework will be heavily dependent on line/sector ministries for quality and timely sectoral data and monitoring progress.
The results-based performance matrices at the national and sector levels comprise:

- At the national level, 60 proposed indicators aligned to the 15 National Outcomes
- At the sector level, a range of proposed indicators aligned to the sector goals and outcomes
- Baseline values for 2007 or the most recent past year
- Targets which outline the proposed values for the national and sector indicators for the years 2012, 2015 and 2030
- Data sources which identify the MDAs or institutions that are primarily responsible for the collection of data to measure and report on national and sector indicators
- Sources of targets
- Links to existing local and international monitoring frameworks such as the MDGs

Some gaps still exist within the performance matrix and a process of review to validate the proposed indicators and targets is being undertaken. This process is very technical and time consuming and requires significant cooperation and support from stakeholders and partners. The performance monitoring and evaluation framework will be heavily dependent on ministries for quality and timely sectoral data and monitoring progress. The system will benefit from our existing and relatively large and reliable statistical databases within the

Statistical Institute of Jamaica (STATIN) and the PIOJ.

5.2.3 Reporting

The timely preparation and submission of progress reports and other monitoring and evaluation outputs form an integral part of the monitoring process.

The main reports/outputs of the performance monitoring system are:

1. **The Vision 2030 Jamaica Annual Progress Report** will be the main output of the performance monitoring and evaluation system.

2. **The annual sectoral reports** compiled by the Sectoral Focal Points for submission to the Vision 2030 Jamaica Technical Monitoring Committee. These will be integrated into the Annual Progress Report.

3. **Other products** of the performance monitoring system include issues/sector briefs and research reports.

5.2.4 Capacity Development

There is recognition that building and strengthening technical and institutional capacity for the effective implementation, monitoring and evaluation of the NDP and the ICT Sector Plan is critical for success. This calls for substantial resources, partnership and long-term commitment to training MDA staff.

Training needs will have to be identified at all levels of the system; a reorientation of work processes, instruments, procedures and systems development will have to be undertaken; and staffing and institutional arrangements will need to be put in place.

Partnership with the Management Institute for National Development (MIND) and other institutions also will be required to provide training to public sector staff and others in critical areas such as results-based project management and analysis, monitoring and evaluation, and data management.

5.3 The Way Forward

The ICT Sector Plan will represent the basis for implementation of the Vision 2030 Jamaica – National Development Plan in the ICT sector. Some key steps in the implementation process for the ICT Sector Plan include:

1. Undertake consultations with stakeholders in the sector to present and review the ICT Sector Plan for Vision 2030 Jamaica;

2. Engage with key stakeholders including relevant Ministries, Departments and Agencies (MDAs) to finalize sector-level indicators and targets for the ICT Sector Plan for 2012, 2015 and 2030;

3. Mainstream the ICT Sector Strategic Framework and Action

Plan into the Corporate/Business and Operational Plans of the relevant MDAs as the mechanism for implementation in the public sector;

4. Ensure participation by key ICT sector stakeholders in the establishment and ongoing operation of the implementation, monitoring and evaluation framework for Vision 2030 Jamaica, including the Sectoral Focal Point and Thematic Working Group for the ICT Sector Plan.

6. Action Plan for the ICT Sector

The Action Plan represents the main framework for the implementation of the ICT Sector Plan for Vision 2030 Jamaica. The tracking of implementation of the ICT Sector Plan will take place through the Action Plan as well as the framework of sector indicators and targets.

The Action Plan contains the elements listed below.

i. Sector Goals
ii. Sector Outcomes
iii. Sector Strategies
iv. Sector Actions
v. Responsible Agencies
vi. Time-Frame

VISION 2030 JAMAICA
INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) SECTOR PLAN
REVISED DRAFT STRATEGIC FRAMEWORK AND ACTION PLAN

Sector Outcomes	Strategies	Actions	Responsible Agencies and Stakeholders	Time-Frame
Goal # 1: A strong and competitive ICT sector				
1.1:- A business environment which is conducive to the development of the ICT sector	**1.1.1:-** Improve the efficiency and responsiveness of bureaucratic processes for ICT businesses	**1.1.1.1:-** Stream line processes at docks and ports of entry to mitigate corruption and facilitate efficient operations	Port Authority Jamaica Customs	Years 1-3
		1.1.1.2:- Revise and improve the GOJ procurement process for ICT goods and services.	MFPS, OPM	Years 1-3
		1.1.1.3:- Establish systems and competences within the GOJ procurement process to ensure appropriate valuation of ICT-related products and services	MFPS, OPM	Years 1-3
		1.1.1.4:- Provide all/potential investors and contractors with a regularly updated online Business Directory containing procedures and contact information for responsible government officials	JTI	Year 1

	1.1.2:- Develop investment and support framework for development of the ICT sector	**1.1.2.1:-** Review and improve tax and duty policies for ICT	MFPS, OPM	Years 1-3
		1.1.2.2:- Re-establish an advisory body with public / private sector representation which will focus on strategic ICT related issues and activities to promote investment in the sector.	OPM	Years 1-3
		1.1.2.3:- Establish effective measures to safeguard the ICT sector against anti-competitive behaviour	OPM	Year 1
		1.1.2.4:- Implement National ICT Strategy and Action Plan	MEMT, CITO	Years 1-5
		1.1.2.5:- Develop National e-Readiness Status	CITO	Years 1-3
	1.1.3:- Promote top level advocacy for ICT	**1.1.3.1:-** Encourage the Minister and the Prime Minister to play an active role in attracting key investors	OPM	Years 1-3
1.2:- Jamaica is established as a regional investment centre for ICT companies and ICT reliant service industries	**1.2.1:-** Create a national partnership with a high services demand nation and/or a mentoring nation that has a highly developed ICT services/software	**1.2.1.1:-** Periodically (annually) identify areas for collaboration/partnerships and country that has the leading competencies and develop a framework for national partnership	JTI, OPM, MIIC, MFAFT	Years 1-3

	industry			
		1.2.1.2:- Establish framework to monitor and evaluate partnerships to ensure that Jamaica receives the maximum benefits	JTI, OPM, MIIC, MFAFT, MFPS	Years 1-3
	1.2.3:- Expand ICT focused business parks for major service providers	**1.2.3.1:-** Develop and execute a planned campaign to seek and attract global ICT players and major ICT corporations to invest in Jamaica	JTI, OPM, MIIC	Years 1-3
		1.2.3.2:- Establish partnerships (public / private / academia) to promote research and innovation applicable to the Jamaican context	JTI, OPM, MIIC, NCST, MOE	Years 1-3
		1.2.3.3:- Provide incentives for the establishment of research institutes	MFPS, JTI, MIIC, NCST, MOE	Years 1-3
		1.2.3.4:- Undertake feasibility/planning studies for establishment of ICT complexes in proximity to population centres, including ICT Park in Portmore	JTI, OPM, MIIC	Years 1-3
1.3:- ICT becomes a major contributor to the country's GDP	**1.3.1:-** Promote investment in ICT sector	**1.3.1.1:-** Develop appropriate financial and non-financial incentives and resource pools for domestic and foreign investment in the ICT sector	MFPS, JTI, MIIC, OPM, MFAFT	Years 1-3

	1.3.2:- Encourage innovative use and application of ICT by Jamaican private enterprise and government	**1.3.2.1:-** Establish a national IT Governance training and development program for senior executives	MIND, OPM, Cabinet Office	Years 1-3
		1.3.2.2:- Use ICT to leverage the value of knowledge on Jamaica's customer and target market segments in key sectors.	JTI, OPM, MICYS, JTB, STATIN, PIOJ	Years 1-3
	1.3.3:- Encourage Government to become an exemplar user of ICT applications	**1.3.3.1: -** Develop a government wide operational ICT policy	OPM, CITO	Years 1-3
		1.3.3.2: - Develop and implement a government wide corporate ICT acquisition plan that is linked to the procurement procedure and annual budgetary allocation	CITO, MFPS, OPM	Years 1-3 (Development) Years 4-6 (Implementation)
	1.3.4:- Support Micro, Small and Medium Enterprises (MSMEs) and NGOs in taking greater advantage of ICTs for strategic and operational effectiveness	**1.3.4.1:-** Form strategic alliances with MSME preferred partners	JTI, MIIC, JBDC, CITO, MSME Alliance	Years 1-3
		1.3.4.2:- Collaborate with international partners to provide training to reorient MSMEs and NGOs to become more globally competitive	MIIC, MFAFT, JBDC, JTI	Years 3-6
		1.3.4.3:- Provide incentives for MSMEs to adopt ICT solutions	MFPS, JTI, MIIC, OPM	Years 1-3
	1.3.5:- Establish mechanisms of funding ICT ventures	**1.3.5.1:-** Establish framework and incentives for banking sector to offer venture capital funding including for ICT ventures	MFPS, JTI, MIIC, OPM	Years 1-3

		1.3.5.2:- Promote participation of ICT enterprises on the Junior Stock Exchange	MFPS, JTI, MIIC, OPM, JSE	Years 1-3 Ongoing
		1.3.5.3:- Support development of framework for intellectual property (IP) including patents and copyrights to serve as collateral for provision of financing for ICT ventures	MFPS, JTI, MIIC, JBA, JIPO	Years 1-3
	1.3.6:- Build an effective indigenous ICT industry	**1.3.6.1:-** Establish database of registered/certified website designers who are capable of and have experience with developing secure e-commerce sites	CITO	Year 1
		1.3.6.2:- Establish a framework for exchange of ideas between business groups and e-commerce practitioners	CITO, PSOJ, JCC, JCS	Year 1
		1.3.6.3:- Identify and support key ICT niche markets for export of products and services to Global market	JTI, JEA, PSOJ, OPM, MIIC	Years 1-3 (Identification) Years 4-6 (Support)
		1.3.6.4:- Develop and implement higher value-added services and products that will exploit the indigenous capabilities and resources of the country	JTI, OPM, MIIC, PSOJ, JMA	Years 1-9

		1.3.6.5:- Encourage ICT enterprises to adopt relevant international quality and environmental standards	OPM, MIIC, JTI, BSJ, JCS, PSOJ, JCSI	Years 1-3 Ongoing
		1.3.6.5:- Strengthen capacity of and collaboration between ICT sector associations and organizations	JCS, PSOJ, JCSI, JTI, OPM, MIIC	Years 1-3 Ongoing
	1.3.7:- Measure the contribution of the use of ICTs and the ICT industry to the national economy	**1.3.7.1:-** Form strategic alliance with Planning Institute of Jamaica for measurement and planning of ICT contribution using the Threshold 21 (T21) integrated development model, STATIN and national financial data	OPM, OUR, PIOJ, STATIN	Years 1-6
		1.3.7.2:- Develop public/private/academia partnership to develop indicators and measure gaps and contribution on a sustained basis	MSB (TPM), Universities, PIOJ, PSOJ	Years 1-3 (Development) Ongoing (Measurement)
		1.3.7.3:- Encourage use of data warehouses and data management tools to facilitate planning and decision-making	OPM, Cabinet Office, Universities, PIOJ, PSOJ, private sector	Years 1-3 Ongoing
	1.3.8:- Encourage the increased use of online business to business and business to consumer e-commerce operations	**1.3.8.1:-** Establish baseline for number of businesses with websites and active e-commerce operations	CITO	Years 1-3
		1.3.8.2:- Encourage businesses to establish e-commerc e websites including through the	OPM, CITO, PSOJ, MIIC	Ongoing

		provision of templates		
		1.3.8.3:- Implement a Brand Jamaica portal organized in product streams	JTI, FSL	Years 1-6
		1.3.8.4:- Conduct public education campaigns for e-commerce and other ICT elements	JIS, OPM	Ongoing
Goal # 2: Jamaica's national development is advanced by widespread adoption and application of ICT				
2.1:- Universal and open access to ICTs	**2.1.1:-** Expand ICT infrastructure and broadband penetration to cover entire island	**2.1.1.1:-** Form strategic alliance with public sector, private sector and IFI sponsors to accelerate broadband connectivity in public accessible locations, including libraries, post offices, schools and community centres	OPM, UAF, OUR, BCJ, MICYS. JLS, libraries	Years 1-5
		2.1.1.2: - Utilize the Universal Service Obligations resources to provide incentives to increase broadband penetration	UAF	Ongoing
	2.1.2:- Promote greater use of Free and Open Source Software (FOSS)	**2.1.2.1:-** Promote deployment of FOSS in the public and private sectors through pilot projects	CITO, OPM	Years 1-3
		2.1.2.2:- Develop and update standard FOSS packages for distribution to homes and offices	CITO, JaLUG	Ongoing
		2.1.2.3:- Utilize results from FOSS pilot projects to develop an	CITO, OPM	Years 3-5

		appropriate policy framework for government use of FOSS		
		2.1.2.4:- Develop strategic plan for FOSS implementation	CITO, OPM, MDAs, Private Sector	Years 3-5 (Development) Years 6-9 (Implementation)
	2.1.3:- Encourage public and private sector partnerships to establish Internet connectivity and access	**2.1.3.1:-** Expand the deployment of Community Access Points (CAPs) and community multi-media centres within publicly accessible spaces	OPM, UAF, ICT Project (GOJ/IDB), CITO, telecoms, JLS, libraries, Local Government	Year 1 Ongoing
		2.1.3.2:- Promote the establishment of cybercentres by private entities to facilitate business development and job dispersion and creation across the country	JTI, Private Sector, PSOJ	Year 1 Ongoing
		2.1.3.3:- Foster the establishment of community-owned cybercafés and telecentres for learning and earning	OPM, JTI, SDC, Local Government	Year 1 Ongoing
		2.1.3.4:- Expand deployment of mobile CAPs	JLS,	Years 1-3 Ongoing
		2.1.3.5: - Promote access to and utilization of ICT by marginalized groups, including the elderly, poor and rural households, and persons with disabilities	OPM, MLSS, UAF, Private Sector, Local Government, SDC	Ongoing

	2.1.4:- Facilitate greater computing device ownership and improved penetration of computing devices throughout homes and businesses	**2.1.4.1:-** Ensure Government policies to facilitate availability of affordable access devices	OPM, MFPS, MIIC	Ongoing
		2.1.4.2:- Develop alternate and affordable means of access to ICTs including cell phones and PDAs	Telecoms, Retailers	Years 1-3
		2.1.4.3:- Establish baseline for penetration rate by conducting an island wide survey with segmentation for public sector, private sector and residential utilization with regular updates	OPM, STATIN, PIOJ, IFIs	Years 3-5
		2.1.4.4:- Expand the current government computer loan scheme to include all eligible categories of workers and lend at lowest possible interest rate.	MFPS (Next MOU)	Year 1 Ongoing
		2.1.4.5:- Encourage financial institutions to offer attractive loan schemes for purchase of access devices at lowest possible interest rates	MFPS, MIIC, JBA	Year 1 (Development) Ongoing
2.2:- A populace that knows and values the capability of ICTs and their potential impact on economic and	**2.2.1:-** Promote and facilitate increased use of ICTs	**2.2.1.1:-** Develop and implement a nation-wide public education campaign about ICTs	CITO, JIS, Private Sector	Ongoing
		2.2.1.2:- Promote local adoption of ICT in government, businesses and homes	CITO, OPM	Years 3-5
		2.2.1.3: - Introduce Government policy and guidelines to encourage	OPM, CITO	

social life		increased teleworking as a viable work life option		
				Years 1-3
2.3:- An educated and trained workforce and citizenry that can function optimally in a knowledge – based society	**2.3.1:-** Promote lifelong learning in ICTs	**2.3.1.1:-** Facilitate the provision of internationally recognized certification and accreditation programmes for ICT including through local, regional and global strategic alliances with internationally acclaimed high-end ICT training providers and accrediting bodies	HEART/NTA, ITIL, Council of Community Colleges, Universities, other relevant educational institutions	Ongoing
		2.3.1.2:- Facilitate training in information literacy	MOE, OPM, JLS, UNESCO	Years 1-6
		2.3.1.3:- Support programmes to improve the literacy and numeracy skills at all levels	MOE, JFLL, E-Learning Project, HEART/NTA, Council of Community Colleges, Universities, other relevant educational institutions	Years 1-5
	2.3.2:- Establish full integration of ICT into the teaching and learning processes at all levels	**2.3.2.1:-** Revise the curriculum to ensure that ICT is integrated in the teaching and learning processes	MOE, E-Learning Project, JBTE	Years 1-5 (Development) Ongoing
		2.3.2.2:- Ensure that the education policy supports the availability of ICT training at all levels in the educational system	MOE, OPM, CITO	Years 3-6

		2.3.2.3:- Provide incentives and exchange programmes to attract and retain the relevant ICT specialists to provide appropriate training	MOE, MF&PS	Years 1-2
		2.3.2.4:- Encourage the development of digital educational content and the utilization of electronic media to offer courses including on-line courses	MOE, MICYS, UCJ, BCJ	Years 1-3
		2.3.2.5:- Complete E-Learning Project and assess the development impact	MOE, OPM, E-Learning Project	Year 1 Ongoing
	2.3.4:- Ensure equitable access of all educational and training institutions to low cost, reliable high-speed internet and computer facilities	**2.3.4.1:-** Implement a policy for the equitable deployment of broadband and affordable access in educational facilities at all levels	MOE, OPM, MICYS, SMA	Years 1-3 Years 1-6 (Primary)
	2.3.5:- Develop education and skills capacity to support research and innovation in ICT	**2.3.5.1:-** Encourage increased development of science and technology education in schools to provide a more useful platform for future research and development	MOE, MIIC, OPM, NCST	Years 1-6
	2.3.6:- Facilitate quality education and training	**2.3.6.1:-** Develop a primary, secondary and tertiary school competition that will use ICT to solve issues	MOE, CITO, UCJ, Private sector	Ongoing

	opportunities to facilitate the expansion of highly educated and trained Jamaicans	related to school life, such as homework assistance, discipline and personal security		
		2.3.6.2:- Develop and institutionalize a teacher education system that provides a technology integrated learning environment and graduates who are equipped to prepare students with the requisite skill sets mandated by local and global requirements	MOE, E-Learning Project, JBTE, IOE, UWI	Ongoing
		2.3.6.3:- Foster the development of public private partnerships at a national level to align education training for ICT with requirements of the private sector as well as for financial collaboration	MOE, OPM, HEART/NTA, Universities, Private Sector	
	2.3.7:- Encourage the development of knowledge networks and communities of practice to foster continuous learning and improvement amongst practitioners	**2.3.7.1:-** Expand opportunities internationally for faculty and post-graduate student exchanges, conferences, seminars, and workshops	MOE, MFAFT, Cabinet Office, Universities	Years 1-6
				Years 1-2
2.4:- Widely accessible,	**2.4.1:-** Create an appropriate policy	**2.4.1.1:-** Provide incentives for rapid adoption and use of next	MFPS, OPM, OUR, SMA	Years 1-6

affordable and efficient ICT networks	and regulatory environment conducive to investments in ICT and network development, governed by an independent regulatory institution	generation networks		
		2.4.1.2:- Ensure applications and award process for spectrum, permits and licenses for regulator defined standards and guidelines which are fully transparent and open to public scrutiny, including through inclusion in secondary legislation	OPM, MICYS, OUR, SMA, BCJ	Years 1-6
		2.4.1.3:- Remove regulatory bottlenecks and establish timelines for decisions at regulatory and policy levels for network deployment	OPM, OUR, Cabinet Office, SMA, BCJ	Years 1-9
		2.4.1.4:- Establish efficient and effective competition adjudication processes	MIIC, FTC, MOJ	Years 1-3
	2.4.2:- Enhance the ICT infrastructure to ensure the support and security of the nation's information assets and minimize vulnerabilities of ICT networks	**2.4.2.1:-** Ensure high capacity four-quadrant geographic diversity of international submarine fiber optic connectivity to increase redundancy and mitigate against disaster threats	Telecom private sector, ODPEM, OPM, OUR	Years 1-9
		2.4.2.2:- Include ICT risk as a portfolio consideration for the ODPEM and incorporate ICT support for recovery from natural disasters into ODPEM plans	ODPEM, OPM	Years 1-3
		2.4.2.3:- Invest in reliable and consistent electrical power supply from	Energy Ministry, PCJ, JPSCo, IPPs, OUR	Years 1-6

		renewable and non renewable sources		
		2.4.2.4:- Promote national awareness of threats to information security from malware, cyber-crimes, and disasters and their impact on business continuity	OPM, MOJ, ODPEM, CITO, Private Sector	Years 1-6
	2.4.3:- Promote multiple modes of information delivery systems and networks including new wireless and wired technologies	**2.4.3.1:-** Facilitate cross-platform competition in the provision of converged multi-media services	OUR, MICYS, BCJ, SMA, OPM	Ongoing
		2.4.3.2:- Develop efficient (DNS, NXX, etc) number and address allocation administrative system	OUR, OPM, UWI	Years 1-9
		2.4.3.3:- Ensure efficient allocation of spectrum to promote the introduction of new technologies and services.	SMA, OPM	Years 1-9
		2.4.3.4:- Develop domestic and regional telecommunications traffic exchange points	OPM, OUR	Years 1-3
		2.4.3.5:- Ensure high capacity terrestrial and near-shore (festoon) fiber optic grid for efficient ICT transport	Telecom private sector, MTW, OUR, OPM	Years 1-6
		2.4.3.6:- Provide framework to private sector for expansion and diversification of wired and wireless ICT networks with specific emphasis on last mile connectivity, at affordable rates	OUR, SMA, BCJ, OPM	Years 1-6

		2.4.3.7:- Prepare and facilitate transition to digital broadcasting network	BCJ, SMA, OPM, MICYS	
		2.4.3.8:- Facilitate development of wireless communications	SMA	Years 1-3
				Years 1-9
2.5:- E-government services are widely provided by government and used by citizens	**2.5.1:-** Ensure that all ministries and agencies include e-government service development in their respective corporate plans	**2.5.1.1:-** Ensure all corporate and operational plans developed by ministries and government agencies include ICT-supportive strategies especially the development of e-government services	Cabinet Office, MFPS, CITO	Years 1-9
	2.5.2:- Use ICTs to reduce inefficiency in bureaucratic processes	**2.5.2.1:-** Re-engineer and automate key government processes to improve business facilitation and service delivery.	Cabinet Office, relevant MDAs, FSL, CITO	Years 1-5
		2.5.2.2:- Increase application of ICT to delivery of government services including health services, education, security, etc.	Cabinet Office, relevant MDAs, FSL, CITO	Ongoing
	2.5.3:- Harmonize ICT infrastructure and systems across the public sector ensuring fully integrated, interoperable, efficient and effective service	**2.5.3.1:-** Develop cross-ministry and interoperable communication networks to reduce silo approaches and foster joined-up government	Cabinet Office, CITO	Years 1-3
		2.5.3.2:- Establish stable and secure local area networks (LANs) in all key government agencies	CITO, MDAs	Years 1-3
		2.5.3.3:- Align all MIS/ICT strategies for	Cabinet Office, CITO,	Years 1-3

		government ministries and agencies to encompass the NICT Strategy and Vision 2030 Jamaica Plan	PIOJ	
		2.5.3.4:- Establish GovNet as the Government WAN infrastructure	CITO, OPM	Years 1-3
		2.5.3.5:- Ensure all government institutions adopt enterprise standards for example websites, Internet access and email access	CITO, OPM	Ongoing
		2.5.3.6:- Establish portal for payment for all government services	MFPS, FSL	Years 1 - 3
	2.5.4:- Improve ICT competencies across the public sector to enhance the delivery of ICT-enabled services	**2.5.4.1:-** Offer ICT competencies training to all public sector employees	MIND, HEART/NTA, CIT	Year 1 - 3
		2.5.4.2:- Establish courses at MIND on ensuring incorporation of ICT-related goals and strategies into policy-making and strategic-planning	MIND, Cabinet Office, OPM	Year 1 – 2 Ongoing
	2.5.5:- Proliferate and promote the delivery of first class easily accessible and secure e-government services	**2.5.5.1:-** Establish a single, secure identification for Jamaicans from birth	NRU, MOH, RGD, CITO	Ongoing
		2.5.5.2:- Create a listing of all government services, documenting expected timeline for approval, demand for services and high level work flow	JTI, MIIC, Cabinet Office, MDAs	Years 1-2
		2.5.5.3:- Develop strategies, public awareness programmes and facilities to increase confidence	CITO, Cabinet Office, MDAs, JIS	Ongoing

		in and motivate the adoption of e-government services		
		2.5.5.4:- Ensure that e-government services and website standards address the specific needs of persons with disabilities and senior citizens	CITO, Cabinet Office	Years 1-3
		2.5.5.5:- Develop more efficient electronic systems for engagement in government-to-government (G2G), government-to-business (G2B) and government-to-citizens (G2C) transactions	FSL, OPM, CITO	Years 1-3
		2.5.5.6:- Establish formal Record Management Systems in ministries, departments and agencies (MDAs)	OPM, Cabinet Office, CITO	Years 1-6
		2.5.5.7:- Establish policy framework for the exchange of information within MDAs including data sharing and cost of information sharing	OPM, Cabinet Office, CITO	Years 1-3
	2.5.6:- Actively leverage ICTs in the reform of the public service, in relation to the Public Sector Modernization	**2.5.6.1:-** Review, revise and monitor the implementation of the Public Sector Modernization targets relevant to e-Government	Cabinet Office, relevant MDAs	Years 1-3
		2.5.6.2:- Establish the position of Chief Information Officer (CIO) in MDAs	OPM, Cabinet Office, MFPS, CITO	Years 1-3

	Programme	**2.5.6.3:-** Establish network of public sector CIOs and MIS Officers	CITO, CIOs	Years 1-6
2.6:- Enabling environment for research and innovation in ICT	**2.6.1:-** Establish policy and legal framework to support research and innovation in ICT	**2.6.1.1:-** Promote an increase in patent registration for ICT innovations	JIPO, JIS, OPM, Universities	Ongoing
		2.6.1.2:- Establish incentives for the development of ICT research and innovation	MFPS, NCST, OPM	Ongoing
	2.6.2:- Promote public/private/ civil society collaboration in ICT research and innovation at the local, regional and international levels	**2.6.2.1:-** Facilitate exchange programmes to other countries to develop research and innovation capacities	MOE, MFAFT, Universities, Cabinet Office	Ongoing
		2.6.2.2:- Facilitate the participation of local specialists in regional and global networks for research and development	MOE, MFAFT, Universities, Cabinet Office	Years 1-3
		2.6.2.3:- Encourage collaboration among local and regional experts and research institutions through the provision of grants for major research and development activities	MFPS, Private Sector, IDPs	Years 1-6
		2.6.2.4:- Develop public education programmes to promote ICT research and innovation	JIS, OPM, CITO, Universities	Years 1-6
		2.6.2.5:- Develop incubators for ICT research and innovations	MIIC, JBDC, TIC, Universities	Ongoing
		2.6.2.6:- Support application of ICT to new research in Design Science	Universities	Ongoing

	2.6.3:- Increase commercial funding and grants for ICT research and innovation	**2.6.3.1:-** Provide favourable tax treatment for commercial funding and grants for ICT research and innovation	MFPS, OPM, Private sector, NCST	Years 1-3
	2.6.4:- Develop and reward innovative thinking and research skills at all level of the educational system and in the general society	**2.6.4.1:-** Increase number of competitions and awards for ICT research and innovation	NCST, Private sector, Universities	Years 1-9
		2.6.4.2:- Develop inter university competition to solve Government's issues using ICT, focusing on service to the public	CIT, MOE, Private sector, UCJ	Years 10-21
		2.6.4.3:- Encourage the development of research at the post-secondary level	MOE, Universities, community colleges	Years 1-9
		2.6.4.4:- Systematically develop advanced research and innovation capacity through investment in research institutes and centres of excellence with private sector linkages	Universities, Private Sector	
	2.6.5:- Develop mechanisms for storing and disseminating information on ICT research and innovations projects	**2.6.5.1:-** Establish a database of ICT research projects and innovations produced by such projects	NCST, CITO	Years 1-3
				Years 1-3

2.7:- Culture and creative industries enhanced by application of ICT	**2.7.1:-** Use ICT to build and develop Brand Jamaica/ Jamaica's Nation Brand	**2.7.1.1:-** Utilize ICT to promote Brand Jamaica through advertisement on the internet and social website, e-commerce sites	JTI, MIIC, MICYS	Ongoing
		2.7.1.2:- Use ICT to support Brand Jamaica Strategy	JTI, MIIC, MICYS	Years 1-5
	2.7.2:- Develop ICT capabilities to support the availability and expansion of cultural and creativity content	**2.7.2.1:-** Provide ICT support for the development of media production facilities island wide	Private sector, MICYS, OPM	Years 1-9
		2.7.2.2:- Provide more opportunities for training in the use of ICTs including video production and web design and hosting	CPTC/MTI, CARIMAC/UWI, NCU	Years 1-9
		2.7.2.3:- Utilize ICT for the improvement of infrastructure at cultural venues	JCDC, MICYS	Years 1-3
		2.7.2.4:- Develop high-technology Cultural Performing Centres with facilities for live streaming of concerts and online delivery of cultural programmes	JCDC, MICYS, private sector	Years 1-3
		2.7.2.5:- Ensure systematic marketing and distribution of Jamaica's cultural content to our Diaspora community using ICTs	CPTC, JCDC, PBCJ, MICYS	Years 1-6 Ongoing
		2.7.2.6:- Establish a strong online component for showcasing Jamaica creativity in such areas as fashion, film, music, cooking, and writing	CPTC, JCDC, PBCJ, MICYS	Years 1-6 Ongoing

	2.7.3:- Protect, preserve and market Jamaica's indigenous cultural resources through ICT	**2.7.3.1:-** Promote the electronic documentation of Jamaican culture	IOJ, JLS, MICYS	Years 1-6 Ongoing
		2.7.3.2:- Draw on existing sources to create a digitized encyclopedia of 'Jamaicana' for local and global references	IOJ, JLS, MICYS	Years 1-6 Ongoing
		2.7.3.3:- Convert national symbols and cultural and historical information from legacy storage media to digital format	IOJ, JLS, MICYS	
		2.7.3.4:- Expand the digitization and electronic access to the national information catalogue and other heritage and cultural artifacts	IOJ, JLS, MICYS	Years 1-5
				Years 1-3
	2.7.4:- Develop a strong and sustainable public broadcasting system	**2.7.4.1:-** Facilitate and encourage digital broadcasting for greater efficiency in public and private broadcasting	BCJ, SMA, MICYS	
		2.7.4.2:- Develop a strategy to link all public broadcasting initiatives	MICYS, PBCJ, BCJ	YEARS 1-3 EVRY 3 YEARS
				Years 1 -3
2.8:- A national ICT policy and legal framework which promotes the use of ICTs	**2.8.1:-** Strengthen and modify the policy, legislative and regulatory framework governing the ICT sector in a	**2.8.1.1:-** Establish and maintain an up-to-date national ICT policy, through public and industry consultation with private sector and civil society emphasising universal access, affordability & e-inclusion	OPM	

for the benefit of the entire society	transparent, effective and efficient way that protects ICT users and creators of ICT-related products and service and encourages ICT-related business	**2.8.1.2:-** Establish a framework to update Telecommunications legislation and regulations	OPM, CPC, Cabinet Office	Years 1 - 3
		Develop and promulgate new Telecommunications Policy and Act	OPM	Years 1 – 3 Ongoing
		2.8.1.3:- Establish industry consultative body to gain consensus on common interests	OPM	Years 1 – 3 Ongoing
		2.8.1.4:- Fulfill all obligations under the Paris Convention and all other relevant conventions	MIIC, JIPO, MFAFT	Years 1 – 3 Ongoing
		2.8.1.5:- Join the Patent Co-operation Treaty	MIIC, JIPO, MFAFT	Years 1 - 3
		2.8.1.6:- Establish a framework to update Patent Act	MIIC, JIPO, MFAFT	Years 1 – 3 Ongoing
		2.8.1.7:- Establish framework to review and update existing relevant legislation for ICT-appropriateness	MOJ, OPM, Cabinet Office,	Years 1-3
		2.8.1.8:- Protect national content, local innovations and cultural products by promoting awareness of, updating and enforcing existing Copyright and Intellectual Property laws	MIIC, JIPO, JAPA, Rights Associations and Agencies	Year 1 -2
		2.8.1.9:- Update the Evidence Act, and pass the Cyber Crimes and Data Protection Act and other relevant legislation, that will ensure the	MOJ, OPM, MNS	Years 1 - 6

		criminalization of computer hacking, phishing and other cyber crimes		
	2.8.2:- Ensure effective and full participation by Jamaica in regional and international ICT policy-making	**2.8.2.1:-** Provide Jamaican leadership to resuscitate the Georgetown Declaration and the CARICOM Committee of Information Ministers	OPM,MFAFT	Years 1 – 3 Ongoing
	2.8.3:- Integrate ICT in the administration of justice and law enforcement	**2.8.3.1:-** Create a specialized court to handle complex ICT-related litigation expeditiously	MOJ, OPM, CPC	Years 1 - 6
		2.8.3.2:- Expand and maintain a specialist Police department dealing with ICT related crimes	MNS, JCF	Years 1 - 6
		2.8.3.3:- Enhance the use of ICT as part of expanded application of forensic science in Police investigations	MNS, JCF	Years 1 - 9
		2.8.3.4:- Establish an electronic court filing system	MOJ, Supreme Court	Years 1 - 9
		2.8.3.5:- Establish fully digital courtrooms including judges using computers for recording judgments and legal research	MOJ, Supreme Court, CITO	Years 1 - 9
		2.8.3.6:- Provide public on-line access opportunities to offer accurate real-time information about cases	MOJ, Supreme Court, FSL	Years 1 -6
		2.8.3.7:- Make all judgments of courts of record and primary laws	MOJ, Supreme Court, FSL	Years 1 -9

		available on-line		
	2.8.4:- Create user confidence through an enabling and equitable legal and policy framework	**2.8.4.1:-** Partner to ensure the implementation of the recommendations contained in Jamaican Justice System Reform Task Force -Summary of Recommendations namely sections 4.2, 4.6, 4.7, 4.8, 4.18, 4.19, 4.33,4.34, 6.1, 6.25, 8.7, 8.21	MOJ, Attorney General	
		2.8.4.2:- Develop a program to build capacity in the judiciary and legal fraternity to effectively handle matters related to e-legislations	MOJ, MIND, Cabinet Office, Bar Association and Council of Legal Education	

7. Appendices

7.1 Appendix 1 – List of Task Force Members

Dr. Jean Dixon (Chairperson)	Permanent Secretary, Ministry of Energy, Mining and Telecommunications
Miss Karlene Francis (Vice-Chair)	Director General, Ministry of Energy, Mining and Telecommunications
Mrs. Debbie Livingston	Administrative Assistant to the Permanent Secretary, Ministry of Energy, Mining and Telecommunications
Mr. Richard Pardy	Chief Executive Officer, Flow
Ms. Sonia Gill	Assistant Director, Broadcasting Commission
Mr. Courtney Jackson	Deputy Director General, Office of Utilities Regulation (OUR)
Mr. Ernest Smith	Managing Director, Spectrum Management Authority
Mr. Hugh Cross	Managing Director, Universal Access Fund
Mrs. Elizabeth Terry	Director, Projects and Partnerships, HEART Trust/NTA Chair, ICT4D Jamaica
Dr. Hopeton Dunn	Director, Telecommunications Policy and Management Programme, Mona School of Business
Mr. Michael Gentles	Postmaster General/CEO, Postal Corporation of Jamaica
Ms. Nicole Foga	Partner, Foga Daley & Co.
Ms. Karlene Black	Acting Head- School of Computing & Information Technology, University of Technology
Mr. Chris McNair	Manager- Information and Communications Technology, Jamaica Trade and Invest (JTI)
Mr. Dainsworth Richards	CEO (Acting), Central Information Technology Office (CITO)
Mr. Chris Hayman	Chairman, PSOJ Technology Committee
Mr. John Riordan	Director, IT, Digicel
Mr. Lawrence McNaughton	Senior Regional VP for Career Service Department, Cable and Wireless Jamaica Ltd.
Mr. Carlton Samuels	Chief Information Officer and University Director of IT, University of the West Indies (UWI)
Mr. Errol Anderson	President, Xsomo International Limited
Mr. Don Gittens	Senior Consultant, Business Development Department, Jamaica Trade & Invest
Mrs. Michele Thomas	Director, Policy and Strategic Planning, Spectrum Management Authority
Ms. Michele English	General Manager/Vice-President, Flow
Ms. Sharma Taylor	Legal Officer, Flow
Mr. Stephen Meghoo	CEO, IBM World Trade Corp. Jamaica
Mrs. Marie Wint-McKenzie	Strategic Planning Officer, Central Information Technology Office (CITO)

Mr. Mervin Eyre	CEO, Fujitsu Transaction Solutions (Jamaica) Ltd.
Dr. Paul Golding	Acting Head, School of Computing and Information Technology, University of Technology
Mrs. Caroline Parkes	Lecturer, School of Computing and Information Technology, University of Technology
Ms. Shawn Ashman	Acting Director, IT, Postal Cooperation of Jamaica
Mr. Colin Innis	Chairman, Jamaica Association of Community Cable Operators
Mr. Alan Bergin	Digicel
Mr. John Clear	Digicel
Ms. Analisa Chapman	Foga, Daley and Company
Ms. Allison Brown	TPM, MSB, UWI, Mona
Ms. Joanne Archibald	MICYS
Ms. Melody Palmer	ICT4D Jamaica
Dr. Peter John Gordon	Director, PIOJ
Mrs. Janelle Cox	Manager, Information Systems, PIOJ
Mr. James Stewart	Manager, PIOJ
Ms. Keisha Tingling	PIOJ
Mrs. Seveline Clarke-King	PIOJ
Mr. Richard Lumsden	PIOJ
Mr. Richard Kelly	PIOJ

Note: Positions of Task Force Members are given as at the time of their appointment to the ICT Task Force.

7.2 Appendix 2 – Listing of Task Force Meetings and Consultations

Task Force Meetings

- April 3, 2007
- April 17, 2007
- May 1, 2007
- May 22, 2007
- May 29, 2007
- June 3, 2009
- June 5, 2007
- June 12, 2007
- June 26, 2007
- July 3, 2007
- July 8, 2007
- July 22, 2007
- July 24, 2007
- August 28, 2007
- September 11, 2007
- October 23, 2007
- November 20, 2007
- December 4, 2007
- January 8, 2008
- February 5, 2008
- March 11, 2008
- March 20, 2008
- June 17, 2008
- August 19, 2008
- September 9, 2008
- September 23, 2008
- November 18, 2008
- January 13, 2009
- January 27, 2009

Consultations

- July 23, 2008 (MIS Officers Consultation)
- July 30, 2008 (Civil Society Stakeholder Consultation)
- October 8, 2008 (Private Sector Consultation)

7.3 Appendix 3 – List of Acronyms and Abbreviations

BCJ	Broadcasting Commission of Jamaica
BOJ	Bank of Jamaica
CARIMAC	Caribbean Institute of Media and Communication
CBO	Community Based Organization
CIT	Caribbean Institute of Technology
CITO	Central Information Technology Office
CO	Cabinet Office
CPC	Chief Parliamentary Counsel
CPTC	Creative Production and Training Centre
DBJ	Development Bank of Jamaica
ENGO	Environmental Non-Governmental Organization
ESSJ	Economic and Social Survey Jamaica
FSL	Fiscal Services Limited
GDP	Gross Domestic Product
GOJ	Government of Jamaica
HEART/NTA	Heart Trust/National Training Agency
IDP	International Development Partner
IFI	International Financial Institution
IOE	Institute of Education
IOJ	Institute of Jamaica
IPP	Independent Power Producer
ISCF	Island Special Constabulary Force
JAPA	Jamaica Agro Processors Association
JAS	Jamaica Agricultural Society
JBDC	Jamaica Business Development Centre
JBTE	Joint Board of Teacher Education
JCC	Jamaica Chamber of Commerce
JCS	Jamaica Computer Society
JCSI	Jamaica Coalition of Service Industries
JCTU	Joint Confederation of Trade Unions
JEA	Jamaica Exporters' Association
JEF	Jamaica Employers' Federation
JFLL	Jamaica Foundation for Lifelong Learning
JHTA	Jamaica Hotel and Tourist Association
JIE	Jamaican Institute of Engineers
JIPO	Jamaica Intellectual Property Organization
JIS	Jamaica Information Service
JLS	Jamaica Library Service
JMA	Jamaica Manufacturers Association Limited
JNHT	Jamaica National Heritage Trust
JSE	Jamaica Stock Exchange
JSIF	Jamaica Social Investment Fund
JTB	Jamaica Tourist Board
JTI	Jamaica Trade and Invest

JUTA	Jamaica Union of Travellers Association
KMA	Kingston Metropolitan Area
MDAs	Ministries, Departments and Agencies
MEM	Ministry of Energy and Mining
MFAFT	Ministry of Foreign Affairs and Foreign Trade
MFPS	Ministry of Finance and the Public Service
MIIC	Ministry of Industry, Investment and Commerce
MIND	Management Institute for National Development
MLSS	Ministry of Labour and Social Security
MNS	Ministry of National Security
MOA	Ministry of Agriculture
MOE	Ministry of Education
MOJ	Ministry of Justice
MOT	Ministry of Tourism
MSB	Mona School of Business
MSMEs	Micro-, Small and Medium-Sized Enterprises
MTW	Ministry of Transport and Works
MWH	Ministry of Water and Housing
MYSC	Ministry of Youth, Sports and Culture,
NCST	National Commission of Science and Technology
NCU	Northern Caribbean University
NEPA	National Environment and Planning Agency
NHT	National Housing Trust
NGO	Non-Governmental Organization
ODPEM	Office of Disaster Preparedness and Emergency Management
OPM	Office of the Prime Minister
OUR	Office of Utilities Regulation
PBCJ	Public Broadcasting Corporation of Jamaica
PCJ	Petroleum Corporation of Jamaica
PDC	Parish Development Committee
PIOJ	Planning Institute of Jamaica
PPP	Public Private Partnership
RADA	Rural Agricultural Development Authority
RGD	Registrar General's Department
SDC	Social Development Commission
SMA	Spectrum Management Authority
STATIN	Statistical Institute of Jamaica
UAF	Universal Access Fund
UCJ	University Council of Jamaica
UDC	Urban Development Corporation
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UWI	University of the West Indies

7.4 Appendix 4 – Millennium Development Goals (MDGs)

The Millennium Development Goals (MDGs) are eight goals to be achieved by 2015 that respond to the world's main development challenges. The MDGs are drawn from the actions and targets contained in the **Millennium Declaration** that was adopted by 189 nations-and signed by 147 heads of state and governments during the **UN Millennium Summit** in September 2000.

Goal 1: Eradicate extreme poverty and hunger
Goal 2: Achieve universal primary education
Goal 3: Promote gender equality and empower women
Goal 4: Reduce child mortality
Goal 5: Improve maternal health
Goal 6: Combat HIV/AIDS, malaria and other diseases
Goal 7: Ensure environmental sustainability
Goal 8: Develop a Global Partnership for Development

The MDGs:

- synthesize, in a single package, many of the most important commitments made separately at the international conferences and summits of the 1990s;
- recognize explicitly the interdependence between growth, poverty reduction and sustainable development;
- acknowledge that development rests on the foundations of democratic governance, the rule of law, respect for human rights and peace and security;
- are based on time-bound and measurable targets accompanied by indicators for monitoring progress; and
- bring together, in the eighth Goal, the responsibilities of developing countries with those of developed countries, founded on a global partnership endorsed at the International Conference on Financing for Development in Monterrey, Mexico in March 2002, and again at the Johannesburg World Summit on Sustainable Development in August 2002.

7.5 Appendix 5 – Definition of ICT Sector (OECD)

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (2002). MEASURING THE INFORMATION ECONOMY

ANNEX 1. THE OECD DEFINITION OF THE ICT SECTOR

In 1998, OECD member countries agreed to define the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. This definition, based on an international standard classification of activities (ISIC Rev. 3), was considered to be a first step towards obtaining some initial measurements of ICT sector core indicators.

The principles underlying the definition are the following:
For *manufacturing* industries, the products of a candidate industry:
- Must be intended to fulfil the function of information processing and communication including transmission and display.
- Must use electronic processing to detect, measure and/or record physical phenomena or control a physical process.

For *services* industries, the products of a candidate industry:
- Must be intended to enable the function of information processing and communication by electronic means.

The ISIC Rev. 3 classes included in the definition are:

Manufacturing: 3000 – Office, accounting and computing machinery; 3130 – Insulated wire and cable; 3210 – Electronic valves and tubes and other electronic components; 3220 – Television and radio transmitters and apparatus for line telephony and line telegraphy; 3230 – Television and radio receivers, sound or video recording or reproducing apparatus and associated goods; 3312 – Instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process equipment; 3313 – Industrial process equipment.

Services: 5150 – Wholesaling of machinery, equipment and supplies (if possible only the wholesaling of ICT goods should be included); 7123 – Renting of office machinery and equipment (including computers); 6420 – Telecommunications; 72 – Computer and related activities.

7.6 Appendix 6 – References and Selected Bibliography

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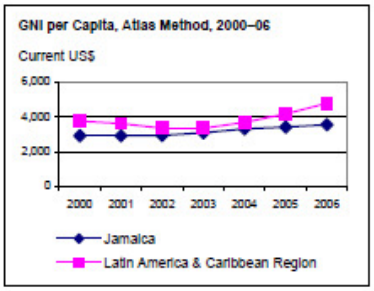
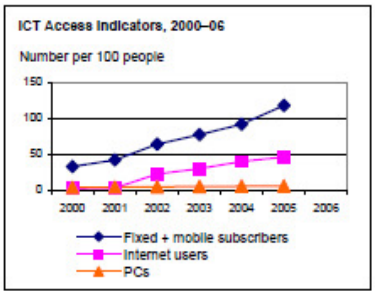
7.7 *Appendix 7 – ICT Indicators for Jamaica*

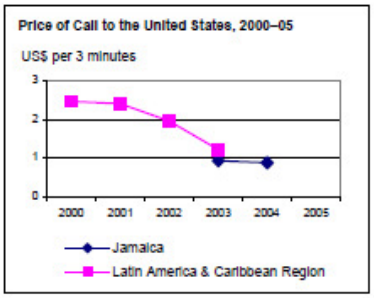
World Bank • ICT at a Glance

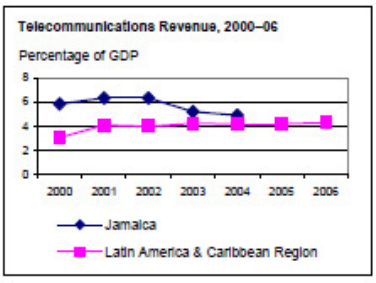
Jamaica

	Jamaica		Lower-middle-income group	Latin America & Caribbean Region
	2000	2006	2006	2006
Economic and social context				
Population (millions)	3	3	2,276	556
Urban population (% of total)	52	53	47	78
GNI per capita, *World Bank Atlas* method ($)	2,930	3,560	2,038	4,785
GDP growth, 1995–2000 and 2000–06 (avg. annual %)	-0.1	1.8	7.6	3.1
Adult literacy rate (% ages 15 and older)	*80*	..	*89*	*90*
Gross primary, secondary, tertiary school enrollment (%)	74	*78*	*71*	*81*
Sector structure				
Separate telecommunications regulator	Yes	Yes		
Status of main fixed-line telephone operator	*Private*	Private		
Level of competition (competition,partial comp.,monopoly)				
International long distance service	*M*	*C*		
Mobile telephone service	*C*	..		
Internet service	*C*	*C*		
Government prioritization of sector (1-7, 7=highest)	..	5.0	4.3	4.2
Sector performance				
Access				
Telephone mainlines (per 100 people)	19.1	*12.0*	21.6	17.8
International voice traffic (minutes per person)[a]	155	*233*	*21*	..
Mobile telephone subscribers (per 100 people)	14.2	*105.6*	38.1	54.9
Population covered by mobile telephony (%)	*80*	*95*	..	*90*
Internet users (per 100 people)	3.1	*46.4*	11.4	18.4
Personal computers (per 100 people)	4.6	*6.7*	*4.3*	*11.3*
Households with a television set (%)	69	*70*	*80*	*79*
Quality				
Telephone faults (per 100 mainlines)	48.0	*31.0*	*22.0*	..
Broadband subscribers (per 100 people)	*0.12*	*1.70*	3.23	2.95
International Internet bandwidth (bits per person)	*28*	*15,822*	189	*269*
Affordability				
Price basket for residential fixed line ($ a month)	5.0	*9.1*	*8.2*	*9.5*
Price basket for mobile telephone service ($ a month)	..	7.5	9.8	10.4
Price basket for Internet service ($ a month)	..	26.5	10.0	12.2
Price of call to United States ($ for 3 minutes)	..	*0.87*	*2.08*	*1.21*
Institutional efficiency and sustainability				
Telecommunications revenue (% of GDP)	5.9	*4.9*	*2.1*	4.3
Telephone subscribers per employee	268	*678*	*599*	*642*
Telecommunications investment (% of revenue)	32.5	*36.7*	*27.1*	..
Applications				
Sector expenditure (% of GDP)	10.3	10.2	5.0	5.3
E-government readiness index (0-1, 1=most ready)	..	0.47	0.45	0.49
Secure Internet servers (per million people, Dec. 2007)	*1.9*	28.4	1.6	15.4









Notes: Figures in italics are for years other than those specified. .. indicates data are not available. C = competition; GDP = gross domestic product; GNI = gross national income; ICT = informatio and communication technology; M = monopoly; MDG = Millennium Development Goal; P = partial competition; and PCs = personal computers.
a. Outgoing and incoming.
Sources: Economic and social context: UIS and World Bank; Sector structure: ITU, WEF; Sector performance: Global Insight/WITSA, ITU, Netcraft, UNDESA, UNPAN, and World Bank. Produced by the Global Information and Communication Technologies Department and the Development Economics Data Group. For complete information, see Definitions and Data Sources.