CARICOM

DRAFT REGIONAL INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR DEVELOPMENT STRATEGY

The Regional Information and Communication Technology (ICT) for Development Strategy is more appropriately named the Regional Digital Development Strategy (RDds)), to acknowledge the vision for the Region.

The Report is presented in two parts:

Part 1: **which outlines the Proposed Draft Strategy, and**

Part 2: **which gives the background and establishes the process for and the framework within the Regional Digital Development Strategy was developed.**

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The development of this proposal was facilitated by the Information and Communication Technology for Development (ICT4D) Programme of the Caribbean Community (CARICOM) Secretariat. The report benefitted greatly from the guidance and discussions of stakeholders from a broad representation of Member States of the CARIFORUM Region. The Author wishes to thank those persons who shared experiences and information, offered opinions, and otherwise made recommendations to strengthen the document. Their guidance was greatly appreciated and assured a broader ownership of the strategic development process.

- The CARICOM Secretariat
- The Regional ICT4D Steering Committee
- The Officials of the Ministers with responsibility for Information and Communication Technology (ICT)
- Stakeholders from the public sector, private sector, academia, and civil society in:
  - Antigua and Barbuda
  - Barbados
  - Belize
  - Dominican Republic
  - Grenada
  - Guyana
  - Haiti
  - Jamaica
  - St. Lucia
  - Suriname
  - Trinidad and Tobago

LIST OF ACRONYMS

ACS	Association of Caribbean States
ADSL	Asymmetric Digital Subscriber Line (also DSL)
BOP	Balance of Payments
BPM5	5th edition of the Balance of Payments Manual
CAIC	Caribbean Association of Industry and Commerce
CARADOL	Caribbean Association for Distance and Open Learning
CARIB-IS	Caribbean Information Society
C@RIBNET	Caribbean Research and Education Network
CARICAD	Caribbean Centre for Development Administration (CARICAD)
CARICOM	Caribbean Community
CARINFO	Caribbean Information Action Group
CARIFORUM	Caribbean Forum of African, Caribbean and Pacific State
CASE	College of Agriculture, Science and Education
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CIC	Community Information Center
CIVIC	Caribbean ICT Stakeholders Virtual Community
CKLN	Caribbean Knowledge and Learning Network
CKLNA	Caribbean Knowledge and Learning Network Agency
CMC	Caribbean Media Corporation
CMC	Community Media Center
CREMIS	Caribbean Regional Education Management Information System
CRNM	Caribbean Regional Negotiating Machinery (CRNM)
CTU	Caribbean Telecommunications Union
CUPIDE	Caribbean Universities Project for Integrated Distance Education
CXC	Caribbean Examination Council
DFID	Department for International Development United Kingdom
DAI	Digital Access Index
DOI	Development Opportunity Index
EC	European Commission
ECLAC	Economic Commission for Latin America and the Caribbean
ECTEL	Eastern Caribbean Telecommunications Authority
EDI	Electronic Data Exchange
EU	European Union
EDF	European Development Fund
EEC	Education Evaluation Center
EFA	Education For All
EBOPS	Extended Balance of Payments Services Classification
EU	European Union
FATS	Foreign Affiliates Trade in Services
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIS	Government Information Services
GIS	Geographic Information System

HDI	Human Development Index (UNDP)
HEART Trust/NTA	The Human Employment and Resource Training Trust/National Training Agency
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
ICT	Information and communication technologies
ICT4D	Information and communication technologies for development
ICSE-93	International Classification of Status in Employment
IDB	InterAmerican Development Bank
IDRC	International Development Research Centre
IDI	Information Digital Index
ILO	International Labour Organisation
INSEAD	European Institute of Business Administration
IPR	Intellectual property rights
ISCO-88	International Standard Classification of Occupations
ISIC Rev.3	International Standard Industrial Classification of all Economic Activities, Revision 3
ISP	Internet service provider
ISIC	International Standard Industrial Classification
IT	Information technology
ITES	IT-enabled services
ITRS	International transactions reporting system
ITU	International Telecommunication Union
MDG	Millenium Development Goals
MSITS	Manual on Statistics of International Trade in Services
OECD	Organisation for Economic Co-operation and Development
OECS	Organisation of Eastern Caribbean States
SMEs	Small and Medium Enterprises
TLI	Tertiary Level Institution
TPD	Teacher Professional Development
TVET	Technical and Vocational Education and Training
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNCTAD	United Nations Conference on Trade and Development
UNDP-APDIP	United Nations Development Programme-Asia Pacific Development Information Programme
US	United States of America
USAID	United States Agency for International Development
UTech	University of Technology
UWI	University of the West Indies
UWIDEC	University of the West Indies Distance Education Centre
UWISCS	UWI School of Continuing Studies
UWI/CARIMAC	UWI Caribbean Mass Communication Programme
VOIP	Voice Over Internet Protocol
VSAT	Very Small Aperture Terminal

VTC	Video teleconference
WITSA	World Information Technology and Services Alliance
WSIS	World Summit on the Information Services
WTO	World Trade Organisation
WWW	World Wide Web
WAN	Wide Area Network
WTO	World Trade Organization

SUMMARY

The global economy is changing and affecting the way the Region needs to plan its economic and social growth in that new economy. The shift in the economy from manufacturing to services places 'knowledge work' and the human resource as key factors of production in sustainable development. Global statistics show productivity gains in all sectors resulting from use of ICT, and further evidence shows the relationship between productivity and broadband availability.[1] In this regard, ICT infrastructure underpins the knowledge economy of the so-called 'Information Society'.

The information society is seen as an inclusive, collective, and collaborative digital environment where individuals, organizations, and communities are empowered by the availability of information, access to it, and the means to share, analyze, and to generate knowledge through such interaction. Such a digital state promotes innovation and a creative environment, and enables the generation of wealth based on knowledge, skills, open competition, increased capacity, and efficiency.

Several issues in the global environment have impacted and will continue to shape the regional environment. These issues include, but are not necessarily confined to:

Understanding the dynamics of the Knowledge Economy and the process of creating new assets (digital development).
Implications of treaties, regulations, standards and trade agreements, and international development/digital divide issues, e.g., World Summit on the Information Society (WSIS), World Trade Organisation/General Agreement on Trade in Services (WTO/GATS)
Defining the ICT industry, including classifications within the ICT market; the reach of the sector, and the opportunities provided by new and emerging technologies to bridge the digital development divide
Learning from the successes and failures of the global environment

CARIFORUM Countries

The countries in the CARIFORUM[2] Region are characterized by small size and the attendant constraints of economic, social, and environmental vulnerabilities. Such vulnerabilities are manifested as fiscal deficits and high debt to Gross Domestic Product (GDP) ratios, unemployment, increasing crime and social deviance, susceptibility to natural disasters (hurricanes, earthquakes, volcanic activity), a high reliance on international trade, and economies that did not respond with flexibility to changes in domestic and international circumstances.

The countries have recognized that application of ICT solutions, can be to their advantage, and as a result have invested a significant amount of time and financial resources in this regard.

[1] See www.euklems.net

[2] CARIFORUM Member States (15): Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, the Dominican Republic, Jamaica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.

Isolated and development gains have been cited in Member States like Jamaica, Trinidad and Tobago, Barbados, but the expectation that there would be positive impact on the region as a whole, has not materialized as the return on this investment continues to fall below regional expectations[3]. In addition, the absence of verifiable indicators of success, and a general disconnect between a country's development policy and its ICT strategy, have made it difficult to properly measure gains at a regional level.

In keeping with the WSIS and the Regional Plan of Action, eLAC2007, the region has indicated four (4) pillars of regional integration that should be facilitated by ICTs:

1. Foreign policy coordination
2. Economic integration
3. Functional cooperation
4. Security

There is not however a broad coordinated regional strategy to effect implementation in this regard, nor any coordination agency to ensure timely and effective results. Such a Regional ICT strategy for Development (The Regional Digital Development Strategy (RDdS)), would serve to build the sustainable knowledge society in the shortest possible time. It would rely on:

Collaborative leadership: to reduce the fragmentation that exists at the regional level, and the financial burden on governments that are currently required to support a number of regional organizations with related and overlapping responsibilities in ICT 4D. Such a single process would be able to affect synergies and facilitate collaboration to benefit from economies of scale wit supporting regional integration.

Research and Innovation for Sustainability: Research in the region has uncovered and exploited some innovation initiatives in the region, in key and potential growth sectors – healthcare, education; robotics, that should be supported and widened to become truly regional projects. Such cross-sector solutions, that are scalable across several sectors and countries, and have already proven the technologies in critical sectors locally and in the international community, should form the basis for developing a regional research and new industry centre.

Key social and economic development measures as follows:

1. ICTs used to provide a supportive environment (business, regulatory, soft and hard infrastructure), for learning, working and social development;
2. Education and lifelong learning environment established to support use of ICTs at levels of community, business and government; and
3. Creative use of ICT and a framework that is anchored in cultural industries, to encourage innovation.

The Plan of Action addresses, among other things:

[3] Caribbean Policy Makers Seminar, 2006, Barbados.

- Access, connectivity and Internet governance
- Capacity-building and sustainability
- Business, trade, culture and disaster management
- Policy formulation and the legal and regulatory framework for implementation
- ICT4D statistics

Implementation of the plan would depend on establishing an appropriate and supportive regional infrastructure to build the foundations for more rapid diffusion of modern ICTs as the enabler for collaboration and access for the knowledge based community. This would include:

- The appropriate technology infrastructure to deepen connectivity, through the increased diffusion (affordability and reach), and adoption of ICTs for use both as a tool in social and economic development and as an industry sector.
- Policies and regulations that support competition and technology adoption (including convergence around IP),
- Encouraging innovation through sustainable research, support for entrepreneurial activity, based on applications, content and skill development, and
- Targeted extensive public and private sector investment in infrastructure, and the use of government ICT budgets for effective support of ICT use and adoption
- A unified regional Vision and Mission to guide implementation.

The Vision:
An inclusive Regional Knowledge Society, driving sustainable development

The Mission:
Use ICT and other appropriate technologies to leverage and deepen the Region's cultural resources, through high-speed ICT networks and trained human resources, and within good governance and sound operating partnership networks; in order to add social and economic value, for the benefit of the Region.

The Broad Regional Strategic Objectives

- *To fully establish modern regional regulatory and open telecommunications infrastructures with affordable networks using converged technologies, to provide affordable and ubiquitous access.*
- *Build a digital Community culture and increase the value and volume of the regions trained ICT workforce that can create with, develop and use ICT to improve life style and otherwise add personal and economic value.*
- *To manage and use ICT to demonstrate good governance and increase efficiency in operations*
- *To establish a culture of innovation and quality, and to enable sustainable production of Regional digital goods and services, the development of cultural industries and the inclusion of local content in delivery of information.*
- *To guide businesses and governments to use ICT for sustainable growth and support social development objectives through partnerships that use networked technologies.*

Governance Issues and Functional Cooperation

The effective implementation of the RDdS and Plan will rely on sound governance at the highest levels, and a focused effort by the many partners. A collaborative process based on the principles of functional cooperation will support partnership groupings and the direct intervention of specific interest areas with the broad oversight of the CARIFORUM/CARICOM Secretariats.

For the regional plan to be successful, governance procedures should allow for Directives from the governing body of the Regions' Heads, with assurance that such directives would be implemented at national levels. The RDdS should form the base framework that should be adopted by the Member States. It will provide guidance on the areas that would need the support of all partners for regional implementation.

It will be necessary for CARICOM to direct the Regional Strategy and Planning function, which will, as Secretariat of the RDdS Committee, be responsible for coordination with governments to support development of the national ICT plans, for budgeting as well as to measure and follow up on progress, and to encourage Member States to use the Regional ICT Strategy to reform and develop their ICT infrastructure. The existingICT4D Steering Committee will guide implementation of the Regional Strategy and Plan, through interventions at the national level, as it is expected that every Member State would expand their National ICT plan in accordance with the RDdS.

The Report is presented in two parts:

> *Part 1* elaborates a Regional Vision, Mission, the broad Goals and Objectives which guide the development of the Strategy. Key regional growth sectors are indicated for primary attention, and treated in the form of an Action Plan, the elements of which are expected to jump-start a regional ICT Programme of work that is cross-sectoral and would be of social and economic benefit.
>
> *Part 2* defines the nature of digital technologies and the key global trends. It provides a situation analysis that outlines the level of development in the region and identifies gaps in the development process. It further identifies critical Regional issues to be addressed and the approach to using the technologies in government, business and the community, in order to effectively close the gaps in the regional development divide, to bridge the digital divide, and to build sustainability in the medium to longer term (2015).

Part 1: REGIONAL DIGITAL DEVELOPMENT STRATEGY (RDdS)

Introduction

The global economy is changing and affecting the way the Region needs to plan its economic and social growth in that new economy. There is a shift in the economy from manufacturing, towards services, with 'knowledge work' and, thus, the value of the human resource taking precedence as a factor of production in sustainable development. Global statistics show productivity gains in all sectors resulting from use of ICT, and further evidence shows the relationship between productivity and broadband availability.[4] In this regard, ICT infrastructure underpins the knowledge economy of the so-called 'Information Society'.

This 'Information Society' is seen as an inclusive, collective, and collaborative environment where individuals, organizations, and communities are empowered by the availability of information, access to it, and the means to share, analyze, and generate knowledge from this information to improve their interaction. Such a digital state has been demonstrated to enhance the options and opportunities available to individuals, promotes innovation and a creative environment, and enables the generation of wealth based on knowledge, skills, open competition, increased capacity, and efficiency.

Information technology is a $2.5 trillion–plus global industry, with the United States (US), one of the closest neighbours of the Region, being the largest single customer of IT products and services. Demand continues to grow for skilled Information Technology (IT) professionals and the US Bureau of Labor Statistics (2007) estimates that with a 68% growth in output projected between 2002 and 2012, Information Technology, the fastest-growing sector in the US economy, was expected to add 632,000 new jobs between 2002 and 2012, an increase of 18%, with IT-related jobs, projected to average an employment growth rate of 43%[5].

Several issues in the global environment have impacted and will continue to shape the regional environment. These issues include, but are not necessarily confined to:

1. Understanding the dynamics of the Knowledge Economy and the process of creating new assets (digital development).
2. Implications of treaties, regulations, standards and trade agreements, and international development/digital divide issues, e.g., World Summit on the Information Society (WSIS), World Trade Organisation/General Agreement on Trade in Services (WTO/GATS)
3. The definition of the ICT industry, new and emerging technologies and the opportunities these provide to bridge the digital development divide
4. The ICT market classifications, and reach of the sector

---

[4] See www.euklems.net

[5] Porter, Michael E., and K. Schwab, 2008, The Global Competitiveness Report 2008–2009. World Economic Forum, Geneva

5. Learning from the successes and failures of the global environment

The countries in the CARIFORUM[6] Region have recognised that ICT may be used to their advantage. It is in this context that the Draft Regional ICT for Development Strategy (2015) is being crafted – to provide the stimulus for social wellbeing of the people of the Region, and in support of economic growth and sustainability.

The CARICOM ICT Connectivity Agenda 2003 led to the development of a Draft Plan of Action, which was approved at a meeting of CARICOM ICT Ministers in 2004. This plan of action addressed, among other things:

- E-government (the need for development of national e–strategies)
- Capacity-building (strengthening of secretariat)
- Policy formulation and implementation
- E-Commerce (private sector development)
- E-Learning
- Poverty reduction efforts

The Regional ICT for Development Strategy has been commissioned to give expression to this and other decisions taken by CARICOM and its Member States in:

- Georgetown Declaration
- Declaration of Functional Cooperation
- The WSIS Plan of Action
- Tunis Commitment
- eLAC 2007 and 2010

Elements of a Regional Work plan to deepen the collaboration process are outlined. Specific sectors for elaboration are indicated, and existing projects and activities that could be supported in the short term to demonstrate quick wins are identified.

The Elements of The RDdS

The Regional framework strategy and action plan makes broad recommendations for impact of ICTs on socio-economic issues. A Regional ICT network would be linked across Member States, sectors and into the international community for greatest synergy and benefit. It may thus be regarded as ‘a digital platform for regional development and inclusion’.

It is worth repeating that the Caribbean region enjoys pervasive access to mobile telephony, with some countries having over 100% penetration, but Internet broadband penetration levels are in single digits primarily because of price and capacity limitations. There is common technology

[6] CARIFORUM Member States (15): Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, the Dominican Republic, Jamaica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.

strategy to provide citizens (particularly vulnerable groups) with access to broadband and other ICTs, through the development of community access points, but to date the impact has not been measured.

The several universal challenges previously identified could form the basis of a Regional ICT for a development Strategy that embraces key social and economic development measures as follows:

- ICTs used to provide a supportive environment (business, regulatory, soft and hard infrastructure), for learning, working and social development;
- Education and lifelong learning environment established to support use of ICTs at levels of community, business and government; and
- Creative use of ICT and a framework that is anchored in cultural industries, to encourage innovation.

The Regional Strategic framework is thus built around several areas based on ensuring the Region benefits socially and economically from the opportunities that network connectivity offers. These are:

- The appropriate technology infrastructure to support increased connectivity, through the increased diffusion (affordability and reach) and adoption of ICTs for use both as a tool in social and economic development and as an industry sector.
- Policies and regulations that support competition and technology adoption (including convergence around IP),
- Innovation as supported by sustainable research, entrepreneurship around applications and content, skill development, and
- Targeted extensive public and private sector investment in infrastructure, the use of government ICT budgets for effective support of ICT use and adoption

This framework will be used to build the foundations for more rapid diffusion of modern ICTs as the enabler for collaboration and access for the knowledge based community.

The effective implementation of the Plan will rely on sound governance at the highest levels, and a focused effort by the many partners in the process. Table 6 identifies the partners who have contributed to ICT developments in the region to date, and suggests partnership groupings to direct specific interest areas with broad oversight of the CARIFORUM/CARICOM Secretariats.

For the regional plan to be successful, governance procedures should allow for Directives from the governing body of the Regions' Heads, with assurance that such directives would be implemented at national levels. The Regional ICT Strategy for Development Plan (Digital Development Strategy and Plan (DDS)) should form the base framework that should be adopted by the Member States. It will provide guidance on the areas that would need the support of all partners for regional implementation. It is expected that every Member State would expand their National ICT plan in accordance with the DDS.

It will be necessary for CARICOM to direct a Regional Strategy and Planning function, which will, as Secretariat of the Regional DDS Committee, be responsible for coordination with

governments to support development of the national ICT plans, for budgeting as well as to measure and follow up on progress, and to encourage Member States to use the Regional ICT Strategy to reform and develop their ICT infrastructure.

Key Sections of The Plan

Vision

An inclusive Regional Knowledge Society, driving sustainable development

Mission

Use ICT and other appropriate technologies to leverage and deepen the Region's cultural resources, through high-speed ICT networks and trained human resources, and within good governance and sound operating partnership networks; in order to add social and economic value, for the benefit of the Region.

Broad Regional Strategic Objectives

1. To fully establish modern regional regulatory and open telecommunications infrastructures with affordable networks using converged technologies, to provide affordable and ubiquitous access.
2. Build a digital Community culture and increase the value and volume of the regions trained ICT workforce that can create with, develop and use ICT to improve life style and otherwise add personal and economic value.
3. To manage and use ICT to demonstrate good governance and increase efficiency in operations
4. To establish a culture of innovation and quality, and to enable sustainable production of Regional digital goods and services, the development of cultural industries and the inclusion of local content in delivery of information.
5. To guide businesses and governments to use ICT for sustainable growth and support social development objectives through partnerships that use networked technologies.

Strategic Objective 1

To fully establish modern regional regulatory and open telecommunications infrastructures with affordable networks using converged technologies, to provide affordable and ubiquitous access

1.1	Establish a formal Regional Partnership of Agencies with core interests (e.g., CARICAD,

	CTU, C@ribNET, ECTEL, OCURR, CARIB-IS, OECS, CARIFORUM Member States; CARICOM Regional ICT Steering Committee (RICTSC); CANTO, CTO; INDOTEL) Agree on a process to sustain the collaboration, and appoint one Agency to take ownership and manage the Regional Partnership Network.
1.2	Promote transformation and modernization of regional governments who would use the technology to assure that there is transparency, open access and ongoing collaboration with the partners (civil society and private sector).
1.3	Establish Regional Policies/strategies for freedom of entry to knowledge markets; Provide for access to information through relevant affordable and open technologies.
1.4	Monitor development of the region's Telecommunication markets and new enabling technologies such as wireless spectrum. Manage the spectrum and other such assets as a collective at the regional level for best returns.
1.5	Establish Laws/regulations to support competition and liberalization, sustainable living, working practices, human rights and build trust.
1.6	Collectively negotiate reduced cost of technology and services, including landing rights, etc, that enter the Regional market. Lobby for treatment of the Region as one economic block for cost advantage.

Strategic Objective 2

Build a digital Community culture and increase the value and volume of the regions trained ICT workforce that can create with, develop and use ICT to improve life style and otherwise add personal and economic value

1.1	Establish a formal Regional Partnership of Agencies with core interests (C@ribNET, CARIMAC/UWI; UTT; UTECH; Technology Institute of the Americas (ITLA) Diaspora community through Foreign Affairs; CARIFORUM; CDB, ACS; Red GEALC Cultural and media; CARDICIS; COMNET-IT, National and Regional Universities. Agree on a process to sustain the collaboration, and appoint one Agency to take ownership and manage the Regional Partnership Network.
1.2	Provide technology support at affordable cost, for increased participation in education, knowledge and research networks.
1.3	Provide regional training on design methodology and product development.
1.4	Establish and sustain a regional invention/innovation Centre.
1.5	Seek funding support for key innovations.
1.6	Develop the process for implementing the factors for innovation.
1.7	Implement regional training in design and product development at community level in region.
1.8	Support research on future & emerging technologies by networked research communities for enhanced, academic and industrial collaboration and innovation.
1.9	Adopt a community based Regional strategy approach, with the development of a network of community ICT linked learning centres, and an ICT focus on cultural/indigenous issues.
1.10	Establish financial structures and systems to support e-transactions.

Strategic Objective 3

To manage and use ICT to demonstrate good governance and increase efficiency in operations

1.1	CARICOM to identify a Champion to support rollout of the Regional plan at every level of implementation.
1.2	Establish and advise on an effective structure for implementation supported by monitoring and measuring the results of programmes and aimed at improving accountability.
1.3	Use the regional concept of functional cooperation to strengthening partnerships at sectoral, national and regional network levels.
1.4	CARICOM Secretariat to identify and appoint strong leaders as ICT champions for each critical sector.
1.5	Develop an inclusive strategy with the involvement of, and in consultation with those who would use the infrastructure (a bottom up approach); and one that reflects an understanding of the environment.
1.6	Encourage infusion of ICT in business development.
1.7	Harmonize regional data measurement, collection and classification systems.
1.8	Build an ICT culture of consciousness in business and community and measure level of resulting improvement.

Strategic Objective 4

To establish a culture of innovation and quality, and to enable sustainable production of Regional digital goods and services, the development of cultural industries and the inclusion of local content in delivery of information

1.1	Establish a formal Regional Partnership of Agencies with core interests (C@ribNET, CARIMAC/UWI; UTT; UTECH; Technology Institute of the Americas (ITLA) Diaspora community through Foreign Affairs; CARIFORUM; CDB, ACS; Red GEALC Cultural and media; CARDICIS; COMNET-IT, National and Regional Universities. Agree on a process to sustain the collaboration, and appoint one Agency to take ownership and manage the Regional Partnership Network.
1.2	Provide technology support at affordable cost, for increased participation in education, knowledge and research networks.
1.3	Provide regional training on design methodology and product development.
1.4	Establish and sustain a regional invention/innovation Centre.
1.5	Seek funding support for key innovations.
1.6	Develop the process for implementing the factors for innovation.
1.7	Implement regional training in design and product development at community level in

	region.
1.8	Support research on future & emerging technologies by networked research communities for enhanced, academic and industrial collaboration and innovation.
1.9	Implement projects at regional community levels using the models already in train in Region (in Barbados and Jamaica). Partner with private sector and academia to broaden the scale across the region.
1.10	Make provisions for regional training & research programmes that support innovation; creation of new products and services.

Strategic Objective 5

To guide businesses and governments to use ICT for sustainable growth and support social development objectives through partnerships that use networked technologies

1.1	Ensure that the regional model allows for interactive and participatory involvement of the region's citizens, and is driven by consumer needs as well as need for public sector efficiency and effectiveness.
1.2	Adopt a regional e-transactions model with a regional network platform, and based on successes at national levels, for implementation in region.
1.3	Ensure quick wins in interactions/transactions with citizens to gain support for full e-government.
1.4	Encourage infusion of ICT in business development.
1.5	Use international standards and involve statistical, development and planning agencies to provide reliable access measurement figures, and to track ICT achievements, status and ICT goods and services in the Region.
1.6	Ensure quick wins in interactions/transactions with citizens to gain support for full e-government.

Regional Goals to be Achieved by 2015

1. All Member States classified as being in Stage Two (or greater) in development at not less than Stage 2 in the defined Knowledge economy
2. An overall growth rate of not less than twenty percent (20%) towards ubiquitous access and understanding of digital technologies in the Region.
3. A thirty percent (30%) increase in the use of ICT and cultural content and images to create information in an acceptable format and manner, to lead to tangible benefits for education, work and everyday life.
4. A thirty percent (30%) increase in ICT training at all levels, as evidenced in curriculum development and ICT certifications being offered.
5. Fifty percent (50%) of Member States raised to top twenty (20) percent of countries according to appropriate global networked readiness and digital development indices; with the others increasing in present rank.

6. Increase the share of ICT industries to 10 percent of the average regional GDP.

The Regional ICT development plan should remain broad based and non prescriptive, with focus on measurable performance of tangible indicators to demonstrate progress in respect of the changes in adoption of technology, economics and society. The plan is both a tool and an opportunity for increasing the competitiveness of the CARIFORUM Region.

The region should build on the demonstrated strengths of citizens, businesses and organizations in the region. In this regard some effort should be made to identify scalable projects and programmes, which satisfy socio-economic development objectives, the principal focus of the Strategy. Such projects, if supported would be effective in providing solutions for and creating benefits at national, regional and extra-regional/international (e.g., diaspora) levels, and be implementation in the short term. The matters related to infrastructure, are indicated for action in the medium to longer terms.

All actions are to be guided by the leadership of the Knowledge Factor RDdS networks as identified, with oversight by the governing process of CARIFORUM/CARICOM.

Growth sectors have not been specifically indicated, but may include the health sector, tourism, cultural industries, with strong emphasis on research, innovation and social impact objectives, and with technology and a trained human resource as enablers. Table 1 identifies key areas for Regional collaboration as the basis of the Regional DDS and Plan for development.

The Plan of Action addresses, among other things:

- Access, connectivity and Internet governance
- Capacity-building and sustainability
- Business, trade, culture and disaster management
- Policy formulation and the legal and regulatory framework for implementation
- ICT4D statistics

Implementation of the plan would depend on establishing an appropriate and supportive regional infrastructure to build the foundations for more rapid diffusion of modern ICTs as the enabler for collaboration and access for the knowledge based community. This would include:

- The appropriate technology infrastructure to deepen connectivity, through the increased diffusion (affordability and reach), and adoption of ICTs for use both as a tool in social and economic development and as an industry sector.
- Policies and regulations that support competition and technology adoption (including convergence around IP),
- Encouraging innovation through sustainable research, support for entrepreneurial activity, based on applications, content and skill development, and
- Targeted extensive public and private sector investment in infrastructure, and the use of government ICT budgets for effective support of ICT use and adoption
- The unified regional Vision and Mission.

Regional Cooperation Model for Digital Development

Table 1. Regional Cooperation Model

	ICT4D Regional Functional Cooperation Model to Support Development Outcomes			
	KNOWLEDGE ECONOMY – **INPUT**	AGENCIES – **IN PARTNERSHIP**	MANDATE – **OPERATING FACTOR TO ENSURE OUTCOMES**	**EXPECTED OUTCOMES**
1	ICT4D MEASURES/ STATISTICS – Relevant indicators; baseline research	CARICOM (ICT4D statisticians); CRITI; CTO, ACS, National and Regional Universities; UN/ECLAC	Demonstrated support for international rules, Declarations and Agreement; classification standards for benchmarking, tracking progress.	Research/ data collection to measure progress; reflected in international benchmarking processes. Credibility enhanced for FDI.
2	MARKETING - Marketing plan in the Region; Leverage in international community	CARICOM Secretariat (Information /Media) CARICOM (Trade/ Negotiations); CTU, CIVIC, CARISNET; Regional IPP Off.	Rules for fair trade in services Intellectual Property issues for address through advocacy and training	Market access issues: Recognition of Regional Brand - regional processes/standards/ brand certification, etc, recognized; Market information on benefits and value of ICTs.
3	KNOWLEDGE ASSETS - Education; Vocational Skills; Training	CKLNA; CXC; CRITI; CAIC and Regional Coalitions; CARICAD; Regional Media Associations; National and Regional Universities, CRIPS (CARIFORUM)	Curriculum development; Teacher Training/student learning module; Capacity building; Competitive human resource; Online training for interconnected academic institutions	Institutional Strengthening; Teacher Training; Ubiquitous 'student' training; New knowledge assets (human resource) developed
4	ICT INFRASTRUCTURE Technology Laws and Regulations	CARICAD, CTU, C@ribNET, ECTEL, OCURR, CARIB-IS, OECS, CARIFORUM member States; CARICOM ICT Steering Committee (CISC); CANTO, CTO; INDOTEL	Promotes transformation and modernization of governments and public sector. Monitor development of Telecommunication markets and new enabling technologies such as wireless spectrum	Policies/strategies for freedom of entry to knowledge markets; Access to information through relevant affordable technologies; Laws/regulations support competition and liberalization, sustainable living, working practices, human rights and build trust.
5	KNOWLEDGE BASED ECONOMIC ACTIVITIES - Design, Research and Innovation	C@ribNET, CARIMAC/UWI; UTT; UTECH; Technology Institute of the Americas (ITLA) Diaspora community; CARIFORUM; CDB, ACS; Red GEALC Cultural and media; CARDICIS; COMNET-IT, National and Regional Universities	Provide technology support at affordable cost, for increased participation in education, knowledge and research networks; training on design methodology and product development	Factors for innovation in place; Funding supported for key innovations; Regional Invention/innovation Centre established and sustained; Regional Training in design and product development at community level in region; Jobs generated; Wealth generated; Research on Future & Emerging Technologies by networked research communities for enhanced, academic and industrial collaboration and innovation.

Proposed Action Plan for the RDDS

The discussions in the report suggest the following programmes be followed to harness innovation in establishing a Regional knowledge economy. A recommended Regional Digital Strategy is indicated in the Table 2 below.

Table 2. Action Plan for the Regional Digital Development Strategy

STRATEGIC AREAS/GOALS		ACTIONS
USE OF ICTS IN BUSINESS, GOVERNMENT AND COMMUNITY 7. Fifty percent of Member States raised to top twenty (20) percent of countries according to appropriate global networked readiness and digital development indices; with the others increasing in present rank. 8. Increase the share of ICT industries to 10 percent of the average regional GDP	Encourage infusion of ICT in business development	1. Build/Develop 10 new ICT businesses by 2015.
		2. Contribute to growth of ICT industries by providing technology infrastructure support and tax break incentives for retooling with and use of modern ICT technologies.
	Harmonize regional data measurement, collection and classification systems	1. Build an ICT culture of consciousness in business and community and measure level of resulting improvement.
		2. Use international standards and involve statistical, development and planning agencies to provide reliable access measurement figures, and to track ICT achievements, status and ICT goods and services in the Region.
	E-Government	1. Adopt a regional model with a regional network platform, and based on successes at national levels, for implementation in Region.
		2. Ensure that the regional model allows for interactive and participatory involvement of the region's citizens, and is driven by consumer needs as well as need for public sector efficiency and effectiveness.
		3. Ensure quick wins in interactions/transactions with citizens to gain support for full e-government.
	Electronic transactions	1. Financial structures and systems to support e-transactions.
	Social Development	Adopt a community based Regional strategy approach, with the development of a network of community ICT linked learning centres, and an ICT focus on cultural/indigenous issues.
PROBLEM SOLVER ICT (SOFT SOCIAL DEVELOPMENT ISSUES) A thirty percent (30) increase in	Health Sector	1. Implement projects at regional community levels suing the models already in train in Region (in Barbados and Jamaica). Partner with private sector and academia to broaden the scale across the Region.
	Education Sector – based on the	1. Production of larger labour market of qualified professionals across the Region.

STRATEGIC AREAS/GOALS		ACTIONS
		ICT for development to be a critical element of the formal education or retraining process at all levels (primary, secondary and post secondary). Establish retraining programmes in partnership with the private sector to retrofit workers with the ICT skills and understanding. Make provisions for training and research programmes that support innovation and the creation of new products and services. Establish internship programmes with private sector to build skills in the sector. Include training on intellectual property rights issues in the curriculum.
	Haiti	1. Identify one project that provides support for training, health care and job creation for implementation in Haiti, with support of partners in the Region.
	Diaspora	1. Identify one project to partner with willing persons in the diaspora that embraces training, culture and new industries (innovation).
	Social Partnership Issues	1. Identify one project that supports education and humanitarian needs at home or abroad, in partnership with an international partner, to build credibility in the regional process.
ADVANCING ICT An overall growth rate of not less than twenty percent (20) percent towards ubiquitous access and understanding of digital technologies in the Region.	Classification of ICTs	1. Diversify exports in accordance with international classifications of ICT by 2 percent by 2015. 2. Member States classified as being in Stage Two (or greater) in development towards becoming a Knowledge economy.
A thirty (30) percent increase in the use of ICT to use cultural content and images to create information in an acceptable format and manner, to lead to tangible benefits for education, work and everyday life.	Make provisions for training & research programmes that support innovation; creation of new products and services	2. Establish a regional ICT invention/innovation centre. 3. Develop a regional partnership approach to providing internship programmes with private sector to build skills in the ICT sector. 4. Educate on intellectual property rights regimes to build trust and secure value added. 5. Establish an academic/experimental Chair in ICT to provide leadership and ensure partnership activities with the private sector, and organized research programmes, innovation and entrepreneurship linked to cultural activities and business support clusters.
BUILDING THE SINGLE INFORMATION SPACE: Strength in numbers and benefits with a targeted and unified approach	Keep value added within region	1. Information storage and sharing at regional level using outsourcing technologies and model.
		2. Negotiate solutions that fit with vision, using economies of scale advantage.
	Common approach to information to Citizens, consumers and users	3. Organized to define common digital users' rights and obligations (to include privacy rights, address and understand trust issues, consumers' online contractual e-commerce rights, protection against cybercrime and libel.

STRATEGIC AREAS/GOALS		ACTIONS
	Media and content sector	4. Consistent rules; equal pricing, copyright and IPR controls with a single CARICOM copyright valid for all.
TELECOMMUNICATIONS SERVICES SECTOR	Manage Region as a single Caribbean space	1. Deepen markets for new entrants, and enhance competition. 2. Collectively build a single broadband market. 3. Establish a single mobile numbering plan for the region, remove mobile roaming charges (to allow cheaper communications), and remove mobile termination for data and voice. 4. Create a common regional spectrum space with equitable sharing of resources and income.
REGIONAL REGULATORY ENVIRONMENT	Regulatory environment	1. Manage as a single regulatory environment to gain advantage at international negotiating table.
		2. Develop model ICT related laws and regulations for application in the Region.
	Articulate a clear Regional Policy and partnership model for social and economic development	• Develop a partnership model and supporting projects to achieve it; including shared infrastructure.
	Update existing Policies, regulations and strategies to embrace convergent technologies and ubiquitous access	▪ *1. R*efocus convergent technologies as basic ICT requirements in a Knowledge based society, and ubiquitous affordable access to information as central in this regard. ▪ 2. Address issues related to the high cost of bandwidth that results in high resulting cost of delivery of ICT services and user interface technology.
ACCESS TO ICT BANDWIDTH, LOW COST INTERNET, AND NON PROPRIETARY CONVERGENT END USER TECHNOLOGIES	Collectively approach suppliers of value chain services, to have advantage in negotiations for more affordable prices	1. Reduce cost of access to useful technologies. A larger single market of about 20 million people, for sale of goods and services, e.g., leverage regional purchase of ICT consumer equipment for training; define nature of end-user technology (eg smart phones) to be allowed into region; better landing prices for cable and termination fees, etc.
		2. Implement regional strategies of negotiating with service providers, for example, in respect of landing right, cost of services, cost of goods, etc, to reduce the cost of bandwidth and delivery of goods and services and to encourage ICT diffusion, use and production.
GOVERNANCE AND LEADERHIP	Identify and appoint strong leaders as ICT champions	1. Develop an inclusive strategy with the involvement of, and in consultation with those who would use the infrastructure (a bottom up approach); and one that reflected an understanding of the environment. 2. Champion to support rollout of the Regional plan at every level of implementation, and ensure that the regional concept of functional cooperation lead to strengthening partnerships at sectoral, national and regional network levels.
	Effective governance process	1. Establish and advise on an effective implementation structure for implementation,

STRATEGIC AREAS/GOALS		ACTIONS
		supported by monitoring and measuring the results of programmes and aimed at improving accountability.

The recommendations are to be implemented within the five-year time frame, and should continue to deepen areas of responsibility of regional organizations, with care being taken to avoid overlap and properly focus resources.

Where gaps in resourcing initiatives become apparent, these should be developed as projects for support from international and regional funding Agencies. New product development and innovations are to be developed with an eye for sustainability in the medium term, and should form the commercial backbone to support future innovations.

In the short term, the region should identify and build on initiatives that are already in process, with care being given to satisfying intellectual property requirements.

A detailed Action Plan to guide implementation, and to include timelines for achieving the indicated and agreed actions, is to be developed.

Part 2: ISSUES SHAPING THE REGIONAL DIGITAL DEVELOPMENT STRATEGY

Introduction

Successful implementation of the Regional Digital Development Strategy is dependent on understanding:

- The dynamics of the Knowledge Economy
- The process of creating new assets (digital development);
- Implications of treaties, regulations, standards and trade agreements,
- International development/digital divide issues, e.g., World Summit on the Information Society (WSIS), World Trade Organisation/General Agreement on Trade in Services (WTO/GATS);
- How the Region defines the ICT industry sector, including the classifications within the ICT market;
- The reach of the sector, and the opportunities provided by new and emerging technologies to bridge the digital development divide
- How to benchmark the successes and learn from the failures of the global digital environment

The countries in the CARIFORUM[7] Region are characterized by small size and the attendant constraints of economic, social, and environmental vulnerabilities. Such vulnerabilities are manifested as fiscal deficits and high debt to Gross Domestic Product (GDP) ratios, unemployment, increasing crime and social deviance, susceptibility to natural disasters (hurricanes, earthquakes, volcanic activity), a high reliance on international trade, and economies that did not respond with flexibility to changes in domestic and international circumstances.

The countries have recognized that application of ICT solutions, can be to their advantage, and as a result have invested a significant amount of time and financial resources in this regard. In keeping with the WSIS and the Regional Plan of Action, eLAC2007, the region has indicated four (4) pillars of regional integration that should be facilitated by ICTs:

3. Foreign policy coordination
4. Economic integration
5. Functional cooperation
6. Security

There is not however a broad coordinated regional strategy to effect implementation in this regard, nor any coordination agency to ensure timely and effective results. Such a Regional ICT strategy for Development (The Regional Digital Development Strategy (RDdS)), would serve to build the sustainable knowledge society in the shortest possible time. It would rely on:

[7] CARIFORUM Member States (15): Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, the Dominican Republic, Jamaica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.

Collaborative leadership: to reduce the fragmentation that exists at the regional level, and the financial burden on governments that are currently required to support a number of regional organizations with related and overlapping responsibilities in ICT 4D. Such a single process would be able to affect synergies and facilitate collaboration to benefit from economies of scale wit supporting regional integration.

Research and Innovation for Sustainability: Research in the region has uncovered and exploited some innovation initiatives in the region, in key and potential growth sectors – healthcare, education; robotics, that should be supported and widened to become truly regional projects. Such cross-sector solutions, that are scalable across several sectors and countries, and have already proven the technologies in critical sectors locally and in the international community, should form the basis for developing a regional research and new industry centre.

Key social and economic development measures as follows:

- ICTs used to provide a supportive environment (business, regulatory, soft and hard infrastructure), for learning, working and social development;
- Education and lifelong learning environment established to support use of ICTs at levels of community, business and government; and
- Creative use of ICT and a framework that is anchored in cultural industries, to encourage innovation.

Methodology

The consultation process was fashioned to ensure that there was consideration of a broad representation of national, regional and international stakeholder interests. This provided an empirical understanding of the global benchmarks, the regional and national environments, and in particular socio-economic impact issues, regulatory frameworks (including,policies, laws and strategies in place), technology frameworks, training and human resource capacities).

Stakeholders were representative of all Member States in the CARIFORUM Region[8]. The stakeholders organisations and groups included agencies with the legal responsibility for key aspects of the strategic process as well as those with de facto responsibility. In all instances key persons, policy makers as well as practitioners in the industry, who understood the environment, and who operated at appropriate leves in the political and operational chain of decision making, were identified for face to face discussions.

The process resulted in:

1. Robust data collection and the examination of existing studies, project documents and relevant literature and research from the CARICOM, CARIFORUM, international, and relevant benchmark national communities.

[8] Stakeholders from the public sector, private sector, academia, and civil society in Antigua and Barbuda, Barbados, Belize, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, St. Lucia, Suriname and Trinidad and Tobago.

2. An iterative interactive process with the stakeholders from the CARIFORUM Region, to better understand the practical impllications for implementing some of the indicated recommendations and any limitations in the national and collaborative regional process, including cultural issues that would impact on applications and sustainability and the achievement of the objectives of the project.
3. Special efforts were made to visit Member States that were representative of the different levels of development in the Region. These Member States included Guyana, Suriname, St. Lucia, Trinidad and Tobago, Barbados, Dominican Republic and Belize. Visits to the Dominican Republic, Suriname and Belize supported a better understanding of the status of these economies, and identifed areas for an appropriate level of partnership for implementing the Regional ICT4D strategy and Action Plan. The incidence of the earthquake in Haiti prevented a more direct approach to that community.

Functional cooperation, the sharing of scarce resources, and building on the experiences of the partners in the process were at all times promoted to stakeholder interests as a central strategy in achieving the objectives of the consultancy. Other areas considered in the process included:

- assessing the current state of the operations of the National organisations;
- identifying key Regional stakeholders and those who have a significant interest in supporting the process and assessing their capacity and willingness to support a regional initiative from an internal as well as external perspective;
- identifying key problems, constraints and opportunities and
- developing solutions and identify different and appropriate strategies for achieveing these solutions.

The final proposal was developed through iterative consultations with this broad cross-section of stakeholders in the CARIFORUM community[9]. The draft Strategic document was reviewed and revised by relevant key regional stakeholders at a regional ICT workshop for researchers and innovators and at facilitated discussion sessions of the Regional ICT4D Steering Committee. The meeting of Officials representing the CARICOM Mnisters with responsibility for ICT, reviewed the final draft before presentation to Heads of Government. The final proposal therefore benefitted from the guidance of community interests in the CARIFORUM Region, that established vision and mission statements, clear indication of goals, objectives, action plans, risk analysis and contingency plans, critical success factors, key performance indicators, financial projections and sustainability options.

The External ICT Environment

[9] Stakeholder groups included, The CARIFORUM Secretariat, The CARICOM Secretariat, the CARICOM Regional ICT4D Steering Committee, the Officials of the CARICOM Ministers with responsibility for Information and Communications Technology (ICT); stakeholders from the public sector, private sector and civil society in Barbados, Belize, the Dominican Republic, Guyana, Suriname and Trinidad and Tobago; Researchers and innovators from the University of Technology, University of the West Indies, University of the West Indies/Caribbean Mass Communication School (UWI/CARIMAC), Rice/Harvard/Jamaica initiative; regional and international agencies (ECLAC, CTU, CAIC, CDB, CDEMA).

Key issues are as follows:

- Understanding and defining the ICT sector in the new knowledge economy and the international/standard statistical and development definitions and measures of this sector
- Benchmarking the global environment, to understand key trends and impact areas that are relevant to the Community.
- Information Knowledge Societies and Divide issues and how globalization ICT trends could support the region's development objectives.

Understanding the Knowledge Economy

Successful implementation of the Regional Digital Development Strategy (RDdS) is dependent on understanding a number of issues as elaborated in Box 1; on the acceptance of a strategy that

Box 1
Development, Digital Divides, and Opportunities

Development issues relate to allocation of national resources to support essential infrastructure, growth needs, and measures for increasing and sustaining productivity levels. **Development divides** exist in almost every area of social and economic development, within and between countries; are based on differences in economic strength, and are measured, for example, by access to better health care, better education, modern technology infrastructure; and by governance issues such as inclusion and transparency.

Digital Divide issues emerged in the late 1980s, and rapid changes in ICT globally, continue to spur on the race to close a widening digital gap. Closing this gap has always been related to affordable access and adaptation to new technologies. The initial market driven competition policy was related to telecommunications liberalization, universal access to voice communication, and the impact of switching from analogue to digital technologies (land-lines, mobile wireless technologies, and universal access policies, including, an access fund, remote community focus, and access points). This policy, although it strove to be technology neutral, was rapidly impacted by ubiquitous computer and Internet access (IT) as the technologies of voice, video, and data converged and the Internet became more easily accessible (ICT). Today, the notion of access has extended to access to all forms of information. This access can only be provided through access to the converged technologies, that is, all digital devices that are linked on the platform of the World Wide Web (WWW), and end user technologies that could support anytime, anywhere, anyhow access to information. These technologies need greater bandwidth to impact any opportunity afforded by the user interface and allow download of larger files (data, video) and not simply voice and text.

Digital Opportunity refocuses the development agenda, redefines ICTs as a development tool, and pushes countries to identify and build relevant technology capacity in order to take advantage of the empowering potential of ICT when harnessed by the different social and economic groups within each country.

can bridge the divides through achievement of social (at level of the community) and development (through innovation and entrepreneurship) objectives; and on an understanding of the opportunities provided by the digital sector (as defined by international guidelines), as a

productive industry sector as well as an enabler in lifestyle, business, and governance processes

The knowledge economy exists for the purpose of creating new knowledge assets. The policies that guide these economies are supportive of that process. As a country evolves into a Knowledge Economy, it passes through several stages. Box 2 provides the basis for understanding these stages. In the absence of a standard definition for the Regional ICT sector, it has been difficult to monitor its development, to make international comparisons, and to develop policies. The Region has to agree on the essence of the collective economy that is envisioned and proposed for implementation. The definitions are based on recent research and studies that explore the knowledge economy[10].

Box 2

Three-stage model of growth towards achieving knowledge economy status

Stage 1:
ICT readiness, reflecting the level of networked infrastructure and access to ICT (existing knowledge assets),

Stage 2:
ICT intensity, reflecting the level of use of ICTs in the society (knowledge based enterprises and inclusion in basic operating principles), and

Stage 3:
ICT impact, reflecting the result of efficient and effective ICT use (creation of new knowledge assets (innovation, empowered and participating people), jobs and wealth).

Defining the ICT Sector of the New Economy

The Nature of the New Technologies

Some technologies are particularly closed, in that they are difficult to reinterpret and to use in other instances, while others, like ICTs are particularly open. The evolution of personal computers (PCs) has put power in the hands of the people, whether for work, study or entertainment. Miniaturized computer/digital technology has widened the application to multifunctional mobile and 'smart' phones that have become universal communications and multimedia devices that are accessible to people in a way that the Internet and the PC are not. The social impact of all this is that unprecedented numbers of individuals have some form of access to some form of communications technology. The result is that there is an increasingly more powerful set of tools for any time, any-where access available for achieving ubiquitous

[10] Porter, Michael E., and K. Schwab, 2008, The Global Competitiveness Report 2008–2009. World Economic Forum, Geneva

The Global Information Technology Report 2008–2009, Mobility in a Networked World. 2009, World Economic Forum and INSEAD

access and development objectives.

The ICT Indicators, Data Collection and Statistics

The United Nations Conference on Trade and Development (UNCTAD) and the United Nations Statistics Division (UNSD) collaborated in producing the Manual for the Production of Statistics on the Information Economy (2009), to be used as a practical tool for national statistical organizations responsible for measuring the information economy, and as key inputs to countries' national ICT policies and strategies. These ICT statistics are internationally comparable in respect of the ICT sector, ICT trade, and use of ICT by businesses. Rapid technological change requires the more frequent amendment of indicators, with new ones being introduced. The Manual is regularly updated by the UNCTAD Secretariat to ensure that the information reflect the most recent developments on the subject matter.

The countries that have made efforts to collect data on ICT in their society are now in a better position to:

- Assess the impact of ICT on their economies;
- Benchmark their economies and social situation against other countries;
- Identify the type of qualified people needed to advance their country's information economy; and
- Calculate the investment needed to provide businesses and the people with access to different ICTs.

This new total (ICT) sector is broken out into the sub-sectors:

- Communication services
- Computer and information services
- Internet provision services, and other information provision services

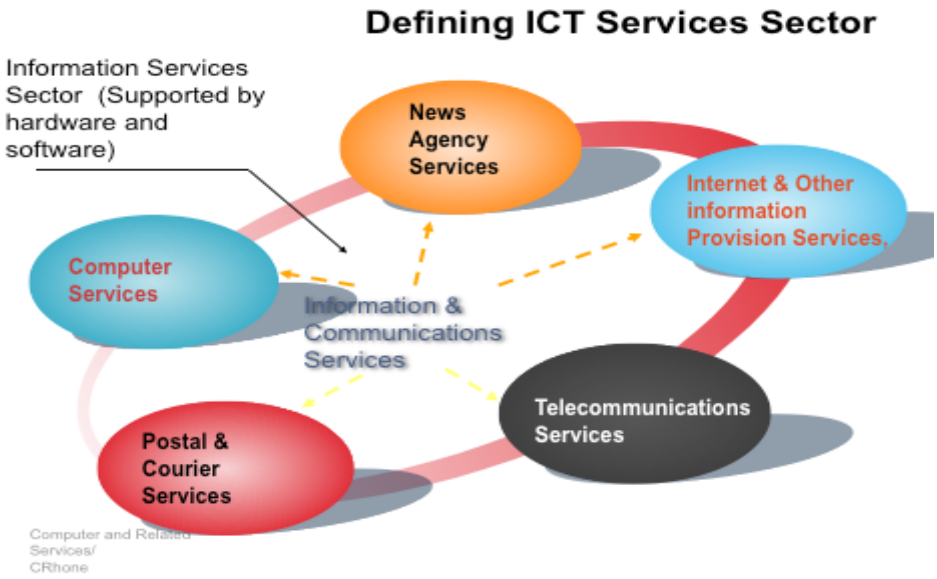


Figure 1. The ICT Sector

The sub-sectors are further disaggregated as follows:

a. Communications services
   i. Postal and courier services (miscellaneous local delivery, postal services related to delivery of letters, parcels, post office counter, other postal, courier), and
   ii. Telecommunications services, which include wired, wireless, satellite and online access services, including voice, telex, telegraph, e-mail, electronic mail (e-mail), electronic data interchange (EDI), audiovisual services, online information and data retrieval, fax services and radio and television transmission services.

b. Computer and information services
   iii. Computer services, comprising hardware, software, consultancy services, data processing services, and maintenance and repair of equipment, disaster recovery, web page hosting, computer facilities management.
   iv. Information services, which are further broken down into:
      - News agency services – provision of news, photographs, and feature articles to the media
      - Other information provision services, such as database provision services to business (including, database conception, storage and dissemination, online magnetic optical and printed media, web search portals)

Measuring Impact on Development

Global studies show that information and communication technologies are a powerful driver of growth and employment. A quarter of EU's GDP growth and 40% of productivity growth are due to ICT. Differences in economic performances between industrialized countries are largely explained by the level of ICT investment, research, use, and by the competitiveness of information society and media industries[11]. ICT services, skills, media and content are acknowledged as a growing part of the economy and society and, thus, are used as indicators of readiness in the New Economy[12]. Figure 2 identifies the key indicators and their relationship; Figure 3 provides a simplified Model, while Appendix 1 elaborates on how these indicators permit measurement through the new ITC Development Index (IDI).

---

[11] EU 1998 Green Paper on convergence of the telecommunications, media and information technology sectors and the implications for regulation towards an information society approach - COM(97) 623, and, EU 2003 Communication on the Future of European Regulatory Audiovisual Policy - COM(2003) 784; EU 2005; Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: "i2010 – A European Information Society for Growth and Employment".

[12] The ICT Development Index (IDI) is intended to measure, development progress of ICT in countries, relative to other countries; level of advancement of ICT; the *digital divide*, i.e. differences in ICT development among countries; and the *development potential* of ICT or the extent to which countries can make use of ICT to enhance growth and development.

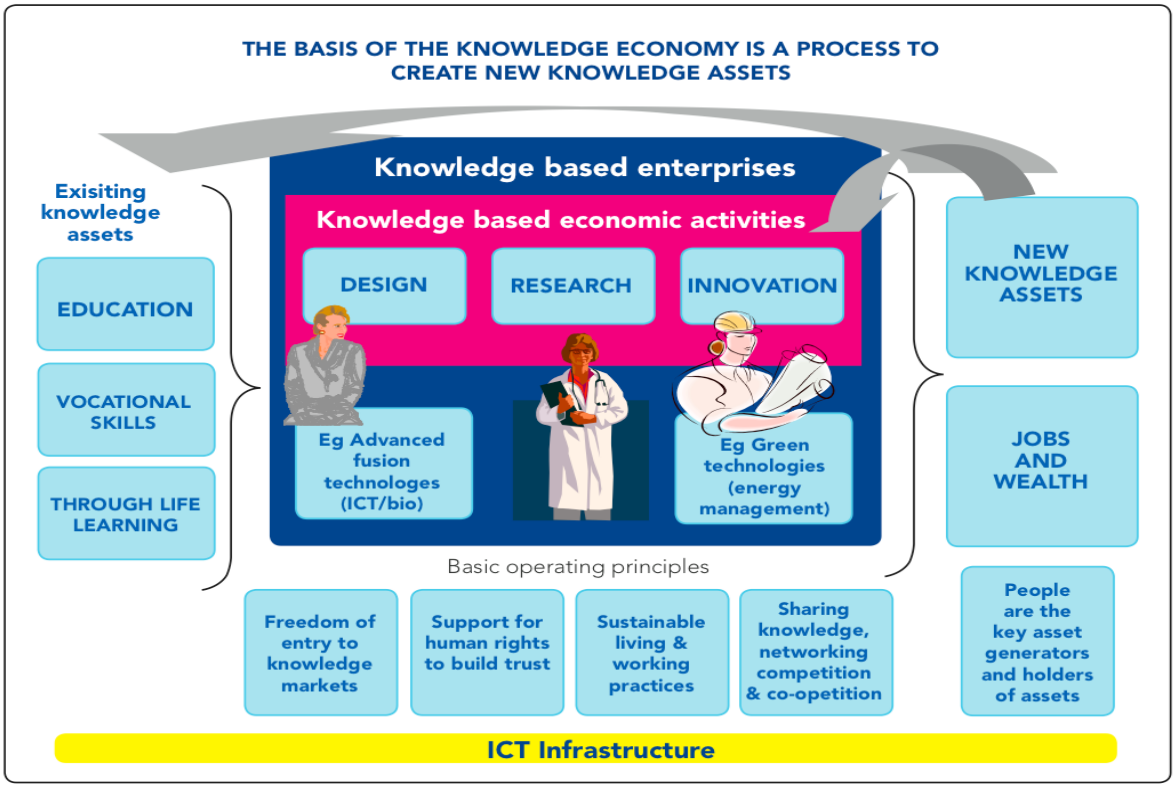


Figure 2. Key indicators of the knowledge economy and the value creation process

In this knowledge economy model, the indicators characterizing (and used to measure) each stage change over time, since, as the technology changes, what is considered basic infrastructure today (e.g., fixed lines), may not be sufficient tomorrow.

A continuous process of measurement to track level of achievement is therefore necessary for any strategic process that is to be implemented. For example, broadband, although at present is considered an advanced technology characterizing intense Internet use and therefore now indicated in Stage 2, may move to Stage 1 in the future, and some new technology may appear in Stage 2. The core list of ICT indicators have to be regularly updated to reflect the dynamic nature of the ICT sector.

Development Measures (DOI and IDI) and Models

In 2005, in response to the WSIS Geneva Plan of Action for an ICT Development (Digital Opportunity) Index to benchmark information society developments at the international level, and to develop a composite ICT Development Index combining statistical indicators with analytical work, the ITU presented the WSIS with the "Digital Opportunity Index (DOI). The main objective of the DOI was to measure the overall ability of individuals in a country to access and use ICTs, and the potential of countries to benefit from access to ICTs. The DOI was based on three (3) main categories: opportunity, infrastructure and utilization. In 2007, two (2) indices which were being developed in parallel by different organisations, the Development Access Index (DAI) and the DOI, were merged to create a single ITU ICT index, the ICT Development

Index (IDI), to track progress in the development of ICTs in countries, and to monitor the global digital divide.

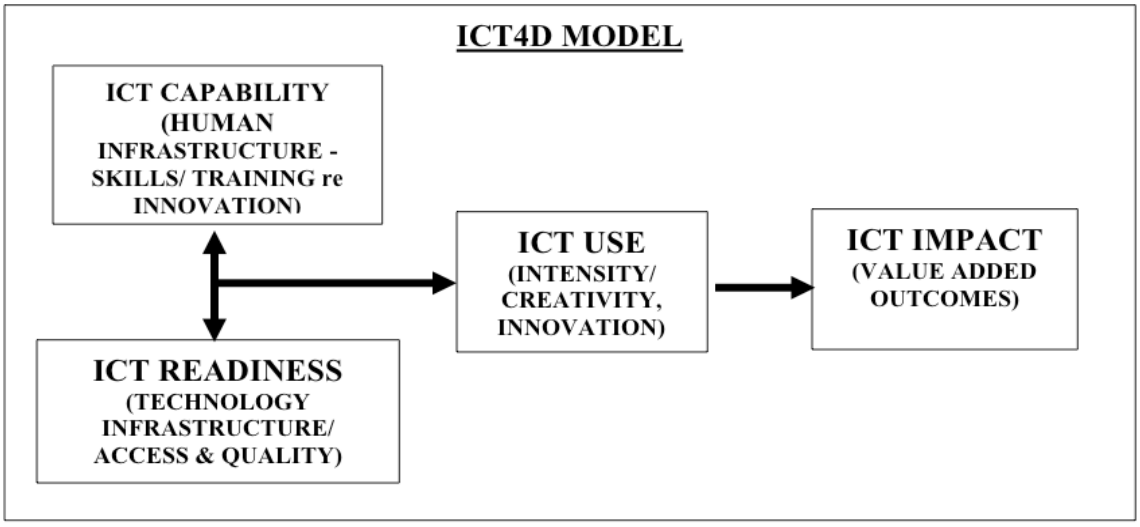


Figure 4. Factors of ICT4D Model to Support Development Outcomes

Benchmarking the Global Environment

The Global Information Society Watch recommends[13] that indicators should:

- Ensure international comparability through universally accepted measures of ICT adoption;
- Provide a measure of actual uptake and use;
- Focus on personal rather than business uses, where the digital divide is being measured;
- Evolve to take into account new technologies and infrastructure and services; and
- Be used by credible organizations to provide ICT indicator data.

A study of examples from established leaders of the knowledge-based society suggests that proactive policies are needed to respond to the fundamental changes in technology. In order to realize advantages, such countries have emphasize ICT as a driver of inclusion and quality of life. They have supported policy convergence and a willingness to adapt regulatory frameworks where needed to promotes an open and competitive digital economy.

The European Commission (EC)

The EC priorities for Europe's information society and media policies included:

[13] Mike Jensen and Amy Mahan, "Measuring progress", in Global Information Society Watch 2008 (http://www.giswatch.org/gisw2008/pdf/MeasuringProgress.pdf).

9. The completion of a Single European Information Space which promotes an open and competitive internal market for information society and media;
10. Strengthening Innovation and Investment in ICT research to promote growth and more and better jobs; and
11. Achieving an Inclusive European Information Society that promotes growth and jobs in a manner that is consistent with sustainable development and that prioritises better public services and quality of life.

The EC defined the knowledge society as supporting lifelong learning, creativity and innovation, and identified the main challenges posed by digital convergence as:

- *Speed*: faster broadband to deliver rich content such as high definition video;
- *Rich content:* increased legal and economic certainty to encourage new services and online content;
- *Interoperability*: enhancing devices and platforms that "talk to one another" and services that are portable from platform to platform;
- *Security*: protecting the Internet from fraudsters, harmful content and technology failures, to increase trust amongst investors and consumers.

Quality of life issues were also built into the ICT Strategy as 'Green ICT', based on the principle of stewardship responsibility of the present generation to maintain and improve the quality of the environment for future generations. A harmonised approach was expected to help Member States to support implementation of the new regulatory frameworks, increase ICT research in national spending, and build on the considerable purchasing power of government as a force for innovation in ICT.

The ASEAN 8 Cs Measurement Model

Table 1 Applicability of the 8Cs in measuring ICT achievements

The 8Cs	Challenges/Parameters	ICT as an Instrument	ICT as an Industry
Connectivity	Increasing ICT diffusion and adoption	Affordability and depth of reach (PCs, internet access, software) to average citizen	Manufacturing Industries for hardware, software, datacom solutions and services?
Content	Websites, local language content, use of online content by key sectors (government, education, healthcare). Practical application of social networking broadband content (eg. YouTube, Facebook, MySpace, Twitter)	Is there useful content (foreign and local) for citizens to use in their daily lives?	Is content being generated in local languages and localized interfaces? Is this being accessed/used abroad
Community	Ensuring sustainability and viability of ICT initiatives. How much is the global diaspora population harnessed to boost and/or globalize domestic ICT industries.	Are there online/offline forums where citizens can discuss ICT and other issues of concern?	Is the country a hub of discussion and forums for the worldwide ICT industry?
Commerce	Creating ICT industries and a favourable climate of competition	Is there infrastructure (tech, legal) for ecommerce for	Does the country have indigenous e-commerce

The 8Cs	Challenges/Parameters	ICT as an Instrument	ICT as an Industry
	between internet service providers (ISPs) and mobile operators; systematically analyzing research on the global information society.	citizens, businesses and government? How much commerce is transacted electronically?	technology and services? Are these being exported?
Capacity	Scaling up, to make costs of dial-up and lease lines more affordable.	Do citizens and organisations have the human resources capacity (tech, managerial, policy, legal) to effectively harness ICTs for daily use?	Does the country have the human resources capacity (tech, managerial, policy, legal) to create and export ICTs and set standards?
Culture	ICT pilot projects being implemented as demonstrable support for this sector.	Is there a forward-looking, open, progressive culture at the level of policy-makers, businesses, educators, media, citizens? Is there fear and nervousness re cultural and political impacts of ICTs?	Are there techies, entrepreneurs and managers proactive and savvy enough to create local companies and take them global?
Cooperation	Encourage investments in software, open source freeware, shareware packages, tools as a viable alternative to proprietary software solutions; e.g., Linux operating system/ Apache Web.	Is there adequate cooperation between citizens, businesses, academics, NGOs and policy-makers to create a favourable climate for using ICTs?	Is there a favourable regulatory environment for creating ICT companies, allowing mergers and acquisitions, and links with the diaspora population?
Capital	Accessible start up resources and business plans that support sustainability. Appreciating social capital and quantifying the value of the human resource.	Are there enough financial resources to invest in ICT infrastructure and education? What is the level of foreign direct investment (FDI)?	Are there a domestic venture capital industry; Stock markets for public listing; Active international players in local private equity market?

The ASEAN Community (Asia and the Pacific) has expanded the knowledge model into a scalable framework referred to as the 8 Cs, for comparing the maturity of and analyzing the digital info-structure. The 8 Cs divide the countries of the ASEAN Region into eight (8) categories: restrictive, embryonic, emerging, negotiating, intermediate, mature, advanced, and agenda-setting, based on ICT diffusion, strength of online content and cultural sectors, progression of domestic ICT industries, and openness of political expression (see Table 1).
'Ubiquitous access' rather than 'Universal access', supported by faster fixed broadband speeds, and deployment of mobile broadband technologies at lower prices, is the new reach for the ASEAN vision. It is to be noted that Singapore had been classified under Stage 3, and has put in place strategies to fully empower its people through ubiquitous appropriate technologies and enabling demand driven policies that are effective in supporting its community both at work (wellness – to relax and stay healthy) and at play (creativity – to produce value).
It should be noted that the ICT indicators are related to ICT intent and application.

Information and Knowledge Societies and Divide Issues

The ideal so-called "Information Society" is seen as an inclusive collective and collaborative environment where individuals, organizations, and communities are empowered by the availability of information, access to it and the means to share, analyze and generate knowledge from this information to improve their interaction. The knowledge economy is a step up from this, as the users of the information turn the knowledge into value added, and directly participate in and contribute to the process at social, economic and governance levels. Thus, it is generally acknowledged that ICTs are powerful tools, but ultimately it is the people who use them and the environments in which they are used that decide whether they are a force for helping or hindering the development of communities.

In the knowledge economy, government, the private sector, and civil society are partners in the process of development. Thus, within the broad context of the government/private sector/community partnership, the partners are expected to first embrace the technologies to create efficiencies and promote effectiveness in lives, businesses, and operations. They are expected to have access to and to be open to the sharing of information and to collaborating to create new knowledge. In addition to these responsibilities, the partners have clear roles:

> The *digital government* or state would use the technology to ensure a participatory and transparent process, led by the needs of their constituents and facilitating the productive process of the business community. Government would implement policies and establish a legal and regulatory environment and enabling ICT infrastructure that would enhance the ICT options and opportunities available to individuals, promote ICT innovation and a creative environment that would support the private sector to generate wealth based on knowledge, skills, open competition and increased capacity and efficiency. ICT permeates everything, and a key feature of the knowledge economy is the capacity of knowledge-based enterprises to create new knowledge value added. Thus in order to properly building the knowledge economy governments have to enable a creative, innovative and competitive environment, which supports enterprises to understand the importance of investing in the intangible assets – knowledge, management, communication, intellectual property rights (IPR) and patents.
>
> The *private sector* would be encouraged to invest in the new and emerging ICT sectors to establish and deepen ICT businesses, to support economic development objectives; would support lifelong training and the certification and continuous upgrading of its ICT professionals. The private sector would use the technology to improve business produces, reduce the cost of production and improve quality, and ultimately would pass on the savings resulting from efficiencies in production, to its customers in order to make the technologies affordable and support ubiquitous access, in the context of social development objectives.
>
> The *society* would be led by discerning consumers, exercising the right to access information anytime, everywhere, to work, live and play, and to effectively lead the market driven process. The consumer would demand access to information, increased participation

> as enabled by the technology, improved quality of access to the useful technologies, and to the benefits to be derived for improving the quality of living, social and economic empowerment, including transparency, accountability and ubiquitous access to efficient government services.

The digital divide thus expresses not only material but also cultural divisions that facilitate or prevent the full use of the resources of the new media, by governments, the private sector and civil society. Digital inequality also includes the limitations associated with infrastructure and access to cognitive, social and cultural capital. Without full digital access the potential of people to be discerning and active 'prosumers', and to use technology to change and shape their lives by actively producing, consuming and communicating, will remain marginal[14].

Globalisation and ICT Issues

ICT occupies a complex position in relation to globalization. It facilitates the movement of people, capital and business, directly or through the World Wide Web. ICT may itself be a traded product, or be a suite of tools for strengthening the abilities of the people to participate in the international economy as entrepreneurs, workers, consumers, and exporters of culturally (and personally) linked goods, services and information.

The rapid gains in communication technologies in the twentieth century have led to space-time contraction, the globalization of the local and the localization of the global, in a phenomenon referred to as "glocalization". This brings with it, a reduction in the importance of the national, and is associated with new understandings of the notions of risk/trust, undermines cultures and traditions. Countries need to come together in regional blocks like the Caribbean Community, to build strength to manage this phenomenon.[15]

Global 'ICT for development' movements have also been growing. The UN Millennium Development Goals (MDG)[16] as articulated through the UN WSIS, has spurred many initiatives from global, hemispheric, regional and national organizations, including the World Information Technology and Services Alliance (WITSA), WTO[17], the Organization for Economic Cooperation and Development (OECD), Caribbean Association of National Telecommunication Organisations (CANTO). In particular, Goal 8: Develop a global partnership for development, and Target 8f, Making ICT available to all: 'In cooperation with the private sector, make

---

[14] United Nations Conference on Trade and Development; Information Economy Report, 2007-2008; Science and technology for development: the new paradigm of ICT. Prepared by the UNCTAD Secretariat, United Nations; New York and Geneva, 2007.

[15] United Nations Conference on Trade and Development; Information Economy Report, 2007-2008, Science and technology for development: the new paradigm of ICT. Prepared by the UNCTAD secretariat, United Nations; New York and Geneva, 2007.

[16] Signed by 189 countries, including 147 heads of State and Government, in September 2000.

[17] United Nations MDG: www.un.org/millenniumgoals/ ; WITSA: http://www.witsa.org/about/; WSIS: http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=1161|1160.

available the benefits of new technologies, especially information and communications technologies…', establishes indicators in respect of telephone lines, cellular subscribers and Internet users per 100 population.

Trade Liberalization/ Market Access Issues

The WTO 1997 negotiations on basic telecommunications set a benchmark for rules on trade in telecommunications and related regulatory principles. The negotiations involved certain categories of four (4) groups of service:

7. Geographic distinctions – local, domestic long distance, and international;
8. Means of technology – wire-based (or fixed infrastructure) and wireless (or radio-based);
9. Means of delivery – on a resale basis or facilities-based; and
10. Clientele – for public use, for non-public use (e.g. services sold to closed user groups).

The global industry has undergone dynamic change as a result of convergence, and new opportunities are presented by the modern digital economy with ICT being regarded as the driver of service economies and digital trade. The sector creates challenges of trading in the open market of an electronic environment. There is the need to be mindful the implications of access to technology, of e-commerce, cyber security, and intellectual property protection.

Market access has the specific objective of ensuring maximum liberalization in those services that are supported by the infrastructure of the Internet, basic telecommunications, and value-added services, on a technology neutral basis. These include wireline, wireless, cable and satellite, computer and related services, and electronic naming and authentication services. The sector is growing and services which are facilitated by the technology, including key and complementary services like distribution services, computer and related services, advertising services, express delivery services, and certain financial services are likely to be integrated into electronic networks in the future.

The classification of some products as goods (General Agreement on Tariffs and Trade (GATT) rules), rather than services (GATS rules), when delivered electronically, would need careful attention, as classification will impact tax and customs duty regimes. Many services, for example, legal, architectural, entertainment, and health services, can be delivered across borders electronically. Such electronic service delivery (e-commerce) implies that where national treatment and market access commitments (Modes 1, 3, and 4) exist on any service, any restrictions would be subject to challenge as impairing the value of the commitment, and countries would have to make Mode 1 commitments for all these sectors to do so. However, commitments under mode 3 (commercial presence) and mode 4 (movement of natural persons) also cover the right to deliver the service electronically, and would affect for example, the financial services delivery. A bank established under Mode 3 or a consultant working abroad on the basis of a Mode 4 commitment has to be guaranteed the right to use computers to deliver their services.

The Greening of ICT

Greening of ICT is related to assuring the sustainability of the environment for future generations. It involves:

- Energy-efficient usage of ICT equipment (central processing units (CPUs), servers, and peripherals),
- The proper handling of electronic-waste (e-waste),
- Server virtualization,
- Data center energy efficiency, and
- Regulatory compliance.

Energy efficiency

ICTs bring benefits from increases in productivity, but its application also could result in significant environmental benefits. Although IT only contributes to approximately 2 percent of greenhouse gas emissions; the balance comes from non-IT related sources, much of which can realize energy efficiency benefit through the intelligent deployment of IT. South Korea, Japan and Denmark are aggressively pursuing green technology, through a wide array of government policies that support green technology, and commit public funding to enhance energy efficiency through the intelligent deployment of IT.

It has been estimated that for every dollar spent on hardware, fifty cents must be spent over the lifetime of the product on power and cooling[18]. Government may lead the way by using government procurement policies to make mandatory the use of more energy efficient technology in the public sector, although environment protection is also of concern for consumers and producers.

Electronic Waste

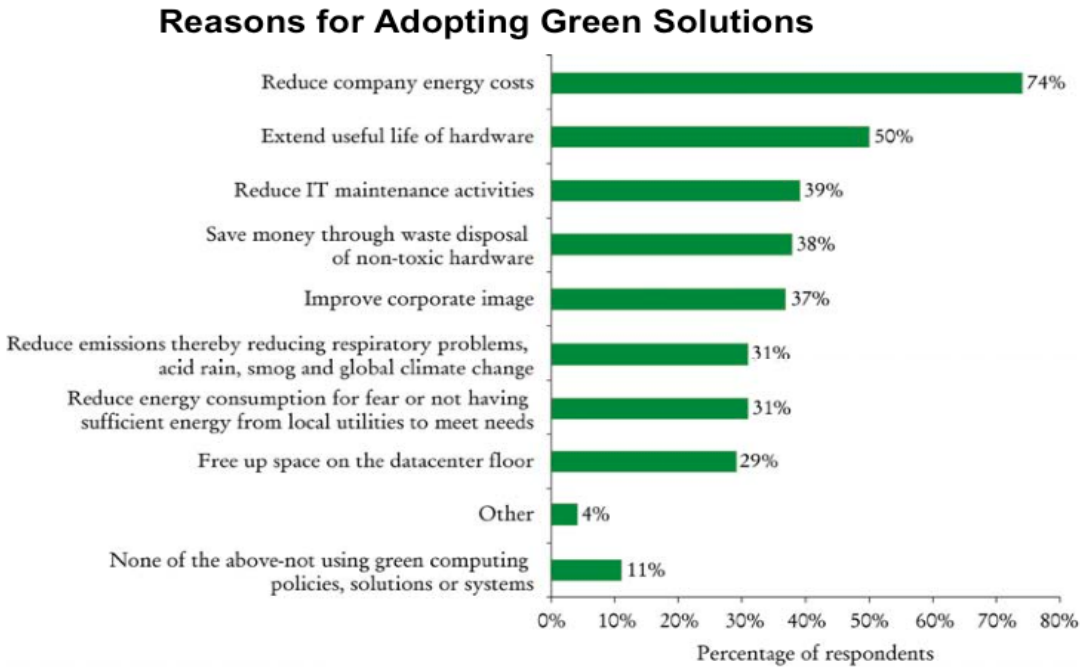
Electronic waste (e-waste) refers to any broken or unwanted electrical or electronic appliance, that could be environmental hazards. Many of the components of such equipment are toxic and non-biodegradable. Health hazards associated with the disposal of e-waste include blood infection, damage to the peripheral nervous system and kidneys, as well as brain damage (especially in the case of children).

E-waste is disposed off by incineration, is dumped in landfill sites or is recycled in secondary markets in developing countries, and ultimately disposed of by the methods indicated. Those disposal methods are hazardous, as incineration releases harmful emissions into the atmosphere while land-filling results in ground water contamination.

Some countries have introduced systems for the collection, recovery, and recycling of e-waste, and IT products have been designed by manufacturers to facilitate effective recycling so as to address environmental fallouts; while newer technologies have been designed to be energy

[18] The Greening of IT, August 2008, Books24x7®; www.AnalystPerspectives.comSM/TM

efficient. Thus better cooling strategies, more efficient chips, will save power and cooling costs to some extent.



(Source: "Survey the green-tech landscape", Green-Tech Insights, an InfoWorld Research Report conducted by IDG Research Services Group, November 21, 2007, InfoWorld)

Figure 5. Issues related to Green Technologies

Data Center Cooling and consumer devices

Data centers contain many servers and heat generating machinery. High temperatures can have negative effects on the performance of data centers and can cause overall damage to equipment. The radiation of heat and CO2 emissions from the devices as well as the cooling equipment raises environmental concerns. Consumer ICT devices present the largest ICT energy load, especially mobile handsets, personal computers and TV sets. There are an estimated four billion mobile handsets globally, that require recharging, with similar effect..

Server Virtualization

Server virtualization[19] is considered under greening of IT because of its low cost and energy efficiency. By dividing a physical server into multiple virtual servers, it reduces cost, saves space, uses less hardware, power and cooling, and improves computing capability. It additionally can improve disaster recovery/backup capabilities, create a more effective software development and testing environment and lower IT administration costs.

[19] Source: "Virtualization: Hot technology for 2008", January 14, 2008, Chadwick Martin Bailey, Network World.

Green ICT Policies that express support for an eco-efficient economy should be adopted by developing countries[20]. Such policies should include the following:

- Strategies for discouraging the dumping and use of recycled e- waste, which usually finds its way to such regions. Governments and private sector encourage recycled e-waste as a second-hand business, with little concern or understanding of its adverse effects.
- Clean renewable energy strategies in order to save environmental degradation, including the reduction of greenhouse gas emissions in order to minimize pollution and global warming, and using natural resources more efficiently by undertaking proper recycling. Because of the upfront costs required for clean energy developing nations are forced to make use of conventional energy, resulting in additional costs in the long term.
- Carbon neutral strategies to cut down on carbon emissions, using renewable energy and by continuing to support environmental projects.

Policy actions would begin with government leading by example in use and procurement of green technologies, and the application of financial incentives for households. Research and development into green ICTs would be encouraged, since the application of ICTs across the value chain could result in massive savings[21].

[20] A Green Knowledge Society; An ICT policy agenda to 2015 for Europe's future knowledge society.

[21] Intelligent motor drives could reduce electric motor consumption by 20-40 percent. Estimates for total savings from the application of ICT imply 15 percent fewer emissions in 2020, which translates to some €600 billion of energy cost savings. The Stern Review suggested that developed countries reducing emissions by 20-40% below the 1990 levels would be a necessary interim target based on IPCC and Hadley Centre analysis (Stern, 2008). Figures expected for savings are (Climate Group, 2008): 553 billion in energy and fuel saved and an additional 91 billion in carbon saved, assuming a cost of carbon of 20/tonne, for a total of 644 billion savings.

Prospects for a Regional ICT Sector

The Regional Situation

The countries of the Region are characterized by small size and the attendant constraints of economic, social, and environmental vulnerabilities that have manifested in fiscal deficits and high debt to Gross Domestic Product (GDP) ratios, unemployment, increasing crime and social deviance, susceptibility to natural disasters such as hurricanes, a high reliance on international trade, vulnerability to international economic events, and economies that did not respond with flexibility to changes in domestic and international circumstances.

In order to meet development challenges, the Region has invested a significant amount of time and financial resources in ICT. The expectation that there would be positive impact on the region has not materialized as the return on this investment continues to fall below expectations[22]. Issues of isolating and quantifying development gains; the absence of verifiable indicators of success, and a general disconnect between a country's development policy and its ICT strategy, have been cited.

There was economic growth in the Caribbean during the 1980s and 1990s that averaged 4% to 6%, per year, in real terms. Poverty and economic development however, remain critical issues for the countries of the Caribbean. Over 30% of the populations of countries such as Dominica, St. Kitts and Nevis, and St. Vincent and the Grenadines are challenged to finance basic consumption, with slightly smaller percentages of populations in Anguilla, British Virgin Islands, Jamaica, St. Lucia, Trinidad and Tobago, and the Turks and Caicos Islands also living in poverty[23].

Factors impeding growth have included the September 11, 2001, attacks on the United States, loss of protected markets for agricultural and financial sectors, shrinking export agriculture and key sectors, the end of trade protections, and increased international competition. Further, outward migration of both high- and low-skilled labor has depleted the region's human resource.

After more than a decade of limited deregulation and market liberalization, establishment of an ICT sector has been slow. Institutional capacity in the public sector remains under-developed; technical capacity in the private sector, and IT-entrepreneurship is low. The slow development of a cadre of ICT professionals; high costs of electrical power, Internet connectivity and computer maintenance, slow ICT adoption and make the establishment of a targeted ICT for Development strategy necessary.

---

[22] Caribbean Policy Makers Seminar, 2006, Barbados.

[23] United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), 2003. Road maps towards an information society in Latin America and the Caribbean;

Table 2 *Digital Opportunity Index: Caribbean's Position in the World (2008)*

Economy	Rank	Digital			
		Opportunity	Infrastructure	Use	**DOI Score**
Korea	*1*	*0.33*	*0.25*	*0.22*	*0.80*
Singapore	*5*	*0.33*	*0.25*	*0.14*	*0.72*
Barbados	27	0.32	0.17	0.15	**0.64**
Bahamas	29	0.32	0.18	0.13	**0.63**
Antigua & Barbuda	40	0.31	0.15	0.11	**0.57**
St Kitts & Nevis	45	0.31	0.12	0.10	**0.54**
Jamaica	55	0.31	0.12	0.08	**0.51**
Dominica	56	0.30	0.13	0.08	**0.51**
Malaysia	*57*	*0.33*	*0.11*	*0.06*	*0.50*
Trinidad and Tobago	59	0.33	0.13	0.04	**0.50**
St Vincent & Grenadines	69	0.30	0.10	0.70	**0.47**
Grenada	71	0.31	0.11	0.05	**0.47**
St Lucia	73	0.31	0.10	0.05	**0.46**
Belize	84	0.25	0.06	0.11	**0.42**
Dominican Republic	85	0.31	0.05	0.06	**0.42**
Suriname	110	0.24	0.10	0.02	**0.36**
Guyana	118	0.24	0.06	0.03	**0.33**
Haiti	160	0.11	0.03	0.01	**0.15**
Niger	*181*	*0.02*	*0.002*	*0.008*	*0.0*

Policy Focus and Coordination

The Regional ICT agenda is being coordinated with international ones. Conscious of the declaration of the WSIS, which has set 2015 as the time frame for which countries should have created the information society, and the Regional Plan of Action, eLAC2007, the Caribbean has been working through the CARICOM Regional ICT Steering Committee, to harmonise ICT policies, and to develop an Action Plan in support of a regional strategy for ICT4D. The policy emphasises the Regional Connectivity Agenda, and functional cooperation to achieve the objectives of connecting the Caribbean (government, business, and people of the region) by 2015.

Regional Agencies that have also taken ownership include – The Caribbean Telecommunications Union (CTU); the Caribbean Knowledge and Learning Network Agency (CKLNA), CANTO; CARICOM Centre for Development Administration (CARICAD); and the Eastern Caribbean Telecommunications Authority (ECTEL).

The Region has indicated four (4) pillars of regional integration that should be facilitated by ICTs:

- Foreign policy coordination
- Economic integration
- Functional cooperation
- Security

Support has been received by Member States for establishing National and Sector Strategies, and for many other projects and initiatives in the Region[24]. Given the number of organizations and institutions and the diversity of core responsibilities and interests, it is not surprising that there is some fragmentation in achieving a targeted Regional ICT development process. Figure 4[25] and Table 3 list some organizations that have a declared ICT focus in the Region.

In the absence of a clearly articulated vision and strategic regional focus, the directions have been driven by national and international interests, rather than by the collective regional interest. Thus, the pillars related to economic integration and functional cooperation are being threatened by the fragmented National to Hemispheric and International approach to capacity building, poverty reduction, security, human resource development, joined up government, transparency, electronic business, or whatever the particular international interest is at a particular time.

The various international statistical measures and indicators confirm that Member States are still not IT ready, or are not advancing rapidly in use ICTs for social and economic development, yet the Region has been slow in maintaining collective focus to make improvements. Nonetheless, the entire Region can still reap benefit if there is strategic regional focus on implementing a targeted sector driven process, with continuous benchmarking in order to maintain a sustainable advantage in the opportunities offered in the chosen sectors.

Foreign policy issues related to WTO GATS

The major markets for ICT are outside the Region, primarily in developed countries. The international (external) trade policy agenda has changed significantly. The services agenda is becoming more critical as it provided the greatest potential for the Region's economic growth. There are new negotiations on many fronts, including the multilateral trade agenda of the WTO, as well as regional and bilateral trade arrangements. CARICOM is preparing to engage, and several studies have been commissioned in this regard. The changing nature of the ICT environment may dictate that CARICOM revisits its position in bilateral (e.g., trade negotiations with Canada) and multilateral discussions.

The studies to date have focused on trade liberalization issues in the sector and suggest ways for

[24] It has been estimated (by whom?/when?) that there are over thirty (30) Regional, Hemispheric and International Agencies, supporting the individual and collective governments of the Region, through the implementation of about four hundred ICT projects.

[25] Source: Information Society and public ICT policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences, Carlos Miranda Levy, UN ECLAC, 2007.

maximize opportunities and supporting preparation for undertaking external trade negotiations. There is general agreement that the countries are at different stages of policy development, with inconsistent policy approaches and generally weak regulatory capacities; that the remnants of monopoly in telecommunications have resulted in low levels of network penetration, higher commercial costs for information transfer, and limited resources for supporting technical infrastructure and human resource. The studies also agree that the issues are the affordability of the tools for access, computers, communication instruments and software; telecommunications reform, competition policies, technical standards, customs harmonization, human capacity development, security, consumer protection legislation, intellectual property rights, electronic business (including e-commerce, m-commerce).

Despite the convergence of the technologies and the benefits that the industry brings through networked access, Caribbean Regional Negotiating Machinery (CRNM) studies have recommended that the Region take a sectoral approach to matters relating to trade in services. The ICT sector is, however, the sum of its many diverse and unique parts, each of which impacts differently, either as a technology or when used in collaboration with other technologies and when creatively applied in the context of providing solutions or benefits in each circumstance or country.

CARICOM states thus remained conservative about deepening market access in the WTO negotiations and scheduled commitments that reflected the status quo in their markets in the 1990s. In the past eleven years, although some CARICOM states have honored their commitment to liberalizing elements of their telecommunications sector and to establishing an independent regulator, few new commitments have been made, and others some States still have market access conditions identical to their 1997 situation.

Governance and Cooperation Framework

The fragmented nature of the Region with its many sovereign and colonial territories, each with its own administrative and political structure and cultural peculiarities, has created the need for regional coordination institutions and frameworks to facilitate interaction among the States. Diverse cooperation initiatives address the unequal geographic, social and economic conditions throughout the region. This fragmentation is reflected in the range of institutions that have been formed, usually with the support of international, hemispheric, regional organizations, with respect to implementing ICT initiatives.

Table 2. List of Agencies in the Region with ICT focus

	AGENCY	**MANDATE**	**ICT PROJECT/AREA**
1	UN ECLAC	Support WSIS declarations and Agreement	Research/ data collection to measure achievement.
2	WTO/GATS WTO/ IPP	Rules for fair trade in services Intellectual Property issues	Liberalization in core ICT areas; ICT standards; customs duty on e-services; commerce, classification of ICT goods

	AGENCY	MANDATE	ICT PROJECT/AREA
			and services; levying of tariffs on e-supplied services and market access issues re cross border modes of supply.
3	CARICOM[26] and the ICT4Dev Agenda	Clearly defined in the revised Treaty of Chaguaramus, and by other decisions of the Community.	ICT Ministers; Agencies established by CARICOM, ICT4D Committee among other initiatives.
4	Caribbean Centre for Development Administration (CARICAD)	Promotes transformation and modernization of governments and public sector.	Improve the public sector efficiency; to modernize government through technical assistance, capacity building.
5	CARIFORUM - 9th Caribbean Regional Indicative Programme (CRIP) valued at 57 Million Euros	CARIFORUM Regional Integration and Development Strategy emphasizes ICT as an important tool for economic development and diversification, based on the strengthening of institutions; providing technical advice, and; the development of the Information Society in the Caribbean.	The ICT Strategy includes liberalisation of telecommunications facilities, promotion of investments in the sector, development of harmonised incentives; development of technical and regulatory standards to promote transparency, and the establishment of regional centres of excellence for training.
6	CTU	Monitors the development of Telecommunication markets and technologies such as wireless spectrum.	ICT Road Show
7	CKLNA	Capacity building; to improve competitiveness of human resource; interconnection of academic institutions for online training.	Institutional Strengthening; teacher Training; pilot projects for specific training modules; C@ribNET.
8	Caribbean Regional Information and Translation Institute (CRITI)	Created in 2006, established in 2008, and hosted by Suriname, with grant support from the European Commission for equipment and materials, operations training and services for professional translators, and a study for a business plan.	To encourage regional cooperation, integration, and the effective participation of CARIFORUM Member States, by removing existing communications barriers, through provision of multilingual translation and information services.
9	CARIB-IS	Implemented by the CARICOM Secretariat and funded by the EU.	Project to promote the development of ICT and the Caribbean Information society in CARIFORUM.
10	Eastern Caribbean Telecommunications Authority (ECTEL)	Regulation of Telecommunications in ECTEL countries.	Increasing ECTEL mandate to include regulation of Broadcasting and ICTs - To review the existing regulatory regime; extra-territorial provision of Service; licensing of Mobile Virtual Network operators; ENUM and Number Portability; Top Level Country Domain Name (ccTlds) Management; Access to Emergency Services; Security and Consumer Protection Issues; Universal Service and; Quality of Service Obligations.

[26] CARICOM Member States (15): Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago. Associate Members (5): Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Turks and Caicos Islands.

	AGENCY	MANDATE	ICT PROJECT/AREA
11	Organization of Eastern Caribbean States (OECS)[27]	Established in 1981 to contribute to the sustainable development of its Member States.	Policy and program formulation and execution through bilateral and multilateral cooperation.
12	Regional Research and Education Network for the Caribbean (CARIBNET).	Established in 2006 to reduce social exclusion, digital divide, uneven connectivity, and support increased participation in education, knowledge and research networks.	It is to be managed by CKLN, as a regional technology network for social development initiatives.
13	CIVIC	Permanent virtual forum of Caribbean ICT stakeholders to share ICT information, and network on regional ICT projects or initiatives.	To contribute to the building of a common vision on ICTs and to promote a Caribbean strategy and regional Caribbean-wide actions.
14	CARISNET	To contribute to the development and impact of ICTs for Development (ICT4D) in the Caribbean, through the CIVIC forum in order to build a common perspective on ICTs; promote a Caribbean strategy and address regional critical development issues.	To improve communication across the language barriers while promoting membership in CIVIC among French and Spanish speaking countries; to create an online data base/ multilingual regional ICT clearinghouse for members and projects.
15	CARICOM ICT Steering Committee (CISC)	Established 2005 to work towards WSIS deadline actions.	Institutional Strengthening; HR Capacity development; Media
16	The Caribbean Association of National Telecommunication Organizations (CANTO)	Founded in 1985 as a nonprofit association of telephone operating companies in the Caribbean. Works with stakeholders, including the CTU, ITU, for harmonization and growth in the industry	Connect the Caribbean Initiative, in response to the "Connect the World Initiative for intent on achieving the goals of WSIS through an enabling environment, infrastructure and readiness, and applications and services.
17	Latin America and Caribbean e-Government Network (Red GEALC)	A network of e-government professionals supported by the Organization of American States (OAS) - promotes cooperation and exchange of experiences and best practices among government officials, institutions and technicians.	Meetings, capacity building initiatives and workshops; enables virtual working groups, a horizontal cooperation fund and maintains a database of e-government experts in the region.
18	Commonwealth Secretariat support for Public ICT Policies	A voluntary non-political association, to promotes cooperation among its members and channel technical assistance to key development areas.	Actively supports policy development and capacity building in the Caribbean.
19	The Commonwealth Network of Information Technology for Development (COMNET-IT)	Established in 1995 and endorsed by the Commonwealth Heads of Government.	Actively promotes and supports "policy resources and best practice in e-government and informatics strategies.
20	The Commonwealth Telecommunications Organization (CTO)	An international partnership of governments, businesses and civil society institutions (evolved from its former role as the Pacific Cable	Provides funding, co-operation, technical assistance, knowledge sharing and capacity building initiatives to bridge the digital divide, achieve social

[27] OECS Member States (7) are: Antigua and Barbuda, Commonwealth of Dominica, Montserrat, St Kitts and Nevis, Grenada, Saint Lucia, Saint Vincent and the Grenadines and Associate Members (2): Anguilla and the British Virgin Islands.

	AGENCY	MANDATE	ICT PROJECT/AREA
		Board, established in 1901).	and economic development and fulfill the global development agenda for ICT.
21	Commonwealth Connects	The Commonwealth Heads of State, through WSIS, launched the Commonwealth Action Programme for the Digital Divide at the end of 2005, which was re-branded as "Commonwealth Connects"	ICT policy in five areas: - Build policy, regulatory capacity. - Modernize education/ skills development. - Entrepreneurship to reduce poverty - Promote local access/ connectivity. - Regional networks, local content and knowledge.
22	CARDICIS:	A Caribbean civil society virtual community established to inform about the cultural and linguistic diversity in the Caribbean and importance in planning of regional solutions for an integrated Caribbean vision.	Links active ICT for development (ICT4D) and civil society stakeholders in the region to establish strategies and document common positions on the matter.
23	CIVIC: The Caribbean ICT Virtual Community (CIVIC)	A virtual forum and mailing list of Caribbean ICT stakeholders, to share information and ideas, have discussions, network; link actors, projects and initiatives on ICTs and development.	Contribute to the building of a common vision o-n ICTs and to promote a Caribbean strategy and regional Caribbean-wide actions.
24	The Association of Caribbean States (ACS)	Created in 1994 to promote consultation, cooperation and concerted action among all the countries of the Caribbean (With twenty five (25) Member States, four (4) Associate Members, including Spanish speaking countries.	- The Virtual Community of International Cooperation focal points; - The Integrated Information System of the Greater Caribbean (statistics in Trade, Tourism, Transport, Natural Disasters) - The Virtual Market of the Greater Caribbean (online marketplace) - The Internet-based Port and Maritime database (port and shipping information)
25	Caribbean Forum for Development	Includes CARIFORUM Member States, Anguilla, The Bahamas, The British Virgin Islands, Cayman Islands, Netherlands Antilles, Turks & Caicos Islands; CIDA, DFID, EC, FAO, IDB, IMF/CARTAC, OAS, UNDP, USAID, World Bank.	A consultative group for 15 Caribbean states (13 of them English speaking), provides a single forum for policy makers and direct dialogue with the international donor community.
26	Caribbean Disaster and Emergency Management Association (CDEMA)	CARICOM Agency responsible for disaster management and to make an immediate and coordinated response to Member States.	Securing, collating and channeling to interested governmental and non-governmental organizations, comprehensive and reliable information on disasters affecting the region; Enhancing the Effectiveness of Information in the Caribbean Region: Using ICT to provide a seamless link across the Region for managing fast onset hazards in the Caribbean, with a focus on e-messaging, amateur (Ham) radio and Geographic Information

	AGENCY	MANDATE	ICT PROJECT/AREA
			Systems (GIS) applications
26	WINDS-Caribe Seventh Framework Programme (FP7), an instruments used by the European Union (EU) for research collaboration in ICT.	FP& addresses seven activities incl.; Reliable networks and services; cognitive systems, robotics and interaction; components, systems and engineering; digital libraries and content; healthcare; ICT for mobility, environment and energy efficiency. Inclusion and governance.	Research into Future and Emerging Technologies (FET; networked research communities to facilitate enhanced, academic and industrial collaboration and innovation

Statistics and the Regional sector

In the Caribbean, like in most developing countries, the availability of ICT indicators is still a challenge and results in these economies developing ICT-related policies and strategies, without the guidance of reliable and timely statistical evidence. Such statistical evidence is needed to guide decision making in respect of the range of economic and social developments, including poverty reduction, increases in health and education standards, generation of new industries and employment opportunities, and improvements in competitiveness. However, to bridge this gap, the Statistics Sub-programme of the CARICOM Secretariat, since convening its first meeting of the ICT Sub-Committee on Statistics (a sub-committee of the Regional ICT Steering Committee), in October 2007, and has produced a draft document to guide the collection of ICT data[28], in keeping with the international trends and guidelines.

The Caribbean Community Secretariat, CARICOM Trade in Services Statistics (CTISS) Project refers to The Manual on Statistics of International Trade in Services (MSITS), a reference manual of concepts and methodologies for the compilation and reporting of statistics on trade in services, as a primary authority on the issues addressing a newly defined framework for measuring trade in services. The goal of the MSTIS is: '…to produce statistics that reveal the growing importance of services produced in each economy and specifically the growth in trade in those domestic services that are now traded internationally, or have the potential to be traded because of international interest in such trade...'[29].

Regulatory Frameworks, National Policies, and Strategies

The liberalization process of the national telecommunication markets in the Caribbean started mostly in the late nineties and early 2000 and is currently at different stages throughout the

[28] Defining the Scope of the Information and Communication Technologies (ICT) Sector and Developing a Framework for Analysing the Impact of ICTs, CARICOM Secretariat, Follow-up to the Second Meeting of the ICT Sub-Committee on Statistics, February 2009, Barbados.

[29] United Nations (UN),, 2004. International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev.3), UN (United Nations) (unstats.un.org/unsd)

region. Given the autonomy of the Caribbean sovereign States, international providers deal with individual Member States rather than with the collective region. If the region is to be successful in working through the regional partnership, a regional approach in engaging all the factors of production needs to be taken. The model to be adopted is one where the partnership for growth using knowledge and innovation drives the engines of sustainable growth, and is based on a fully inclusive information society with the widespread use of ICT in all sectors - public services, SMEs, and households.

Table 3. Structure of Caribbean Telecommunications Markets (March 2009)

Country	**Structure of Sector**	**Market Status**	**Year Competition Achieved**	**Type of Regulator**
Antigua & Barbuda	Public and Private	Competition in mobile and internet		Telecommunications Division; Ministry of Broadcasting, Informa and Telecommunications
Bahamas	Public and Private	Duopoly in fixed; monopoly in mobile; internet liberalized		Independent/Public Utilities Commission
Barbados	Private	Fully liberalized	2005	Independent
Belize	Public and Private	Competition in mobile and internet	2003	Public Utilities Commission
Dominica	Private	Fully liberalized	2003	Independent
Grenada	Private	Fully liberalized	2003	Independent
Guyana	Public and Private	Mobile and internet markets liberalized		Public Utilities Commission
Haiti	Public and Private	Competition in mobile and internet		
Jamaica	Private	Fully liberalized	2003	Independent
St. Lucia	Private	Fully liberalized	2003	Independent
St Kitts & Nevis	Private	Fully liberalized	2003	Independent
St. Vincent & Grenadines	Private	Fully liberalized	2003	Independent
Suriname	Public and Private	Fully liberalized	2007	Independent
Trinidad & Tobago	Private	Fully liberalized	2004	Independent

Source: Monitoring of eLAC 2010 Progress of ICT Development Caribbean Information Societies (October, 2009)

The Region has been funded by external Agencies to manage national regulatory processes, and to establish National and Sector strategies. This has resulted in a variety of national legislation and regulations. Nevertheless, there are successful collaboration models in the region. The successful experience of the ECTEL in formulating a coordinated telecommunications policy among five (5) Caribbean states demonstrates the potential for harmonizing policies in the Region and the advantages of so doing.

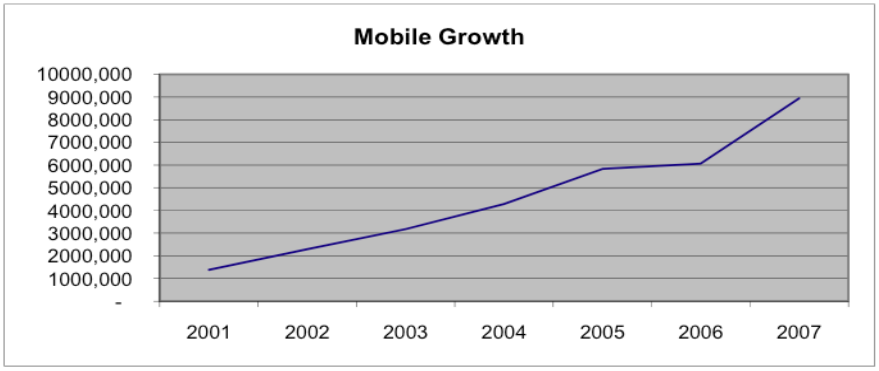
There has been some unevenness in the regional telecommunication reform process and the

enactment of modern legislation throughout the region, and there is still some concern in some countries about the susceptibility of the telecommunications regulators to political influence on the one hand, and to private sector influence ('regulatory capture'), on the other. In some countries, the government still maintains a stake on the former incumbent and the telecommunications regulator is not an autonomous agency. This increases the difficulty of achieving affordable access to modern technologies, as required to benefit from the promise of ICTs in a market driven economy.

Member States have been focused on dealing with telecommunications liberalization matters, and have not fully embraced the potential of the range of the technologies as defined in the classifications of the ICT Sector (see Table 3). The discussion of the status of the technologies in the Region, and the need for the Region to have access to more affordable bandwidth, and to use the more ubiquitous mobile technologies to catch up to access and penetration rates of the rest of the world, is clearly demonstrated in the literature, and has been mentioned at several fora of ICT practitioners.

The difference in the levels of growth between the Member States correlates well with the different rates of the process of liberalization, which has spurred investment in the sector. In many countries, because of the penetration rate of mobile resulting in over 100% access to mobile telephony, it has been indicated that universal access to voice telephony, a central theme in all regulations, has been achieved.

Figures 7 and 8 show the trend of the overall mobile growth in the Region.

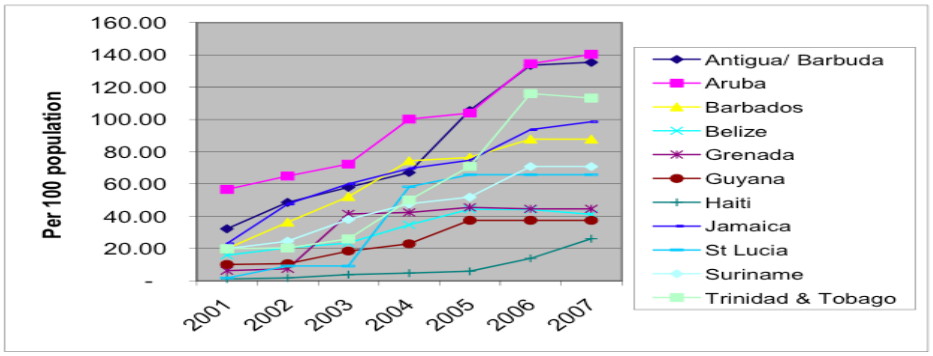


Source: ITU

Figure 7. *Overall mobile growth in 16 Caribbean markets, 2001-2007*

Dial-Up Internet

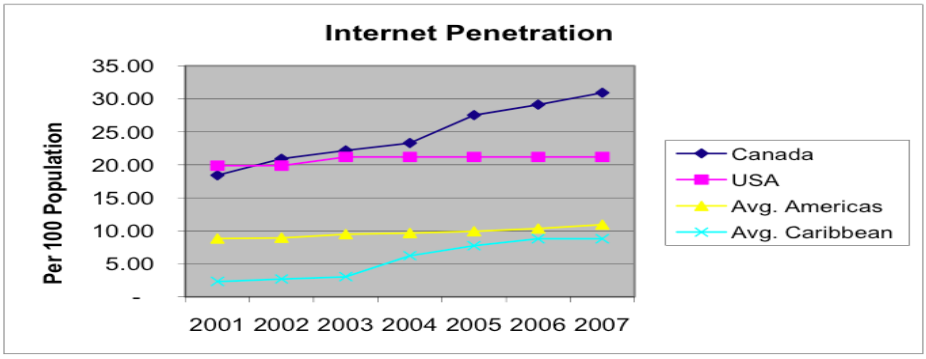
Access to Internet services and specifically internet broadband is lagging behind telephony, and in this regard, universal access has to be addressed since the internet is necessary infrastructure to achieve ubiquitous access to information needed for countries to begin to effectively become Information Societies.



Source ITU http://www.itu.int/ITU

Figure 8. Mobile per 100 population, 2001 – 2007

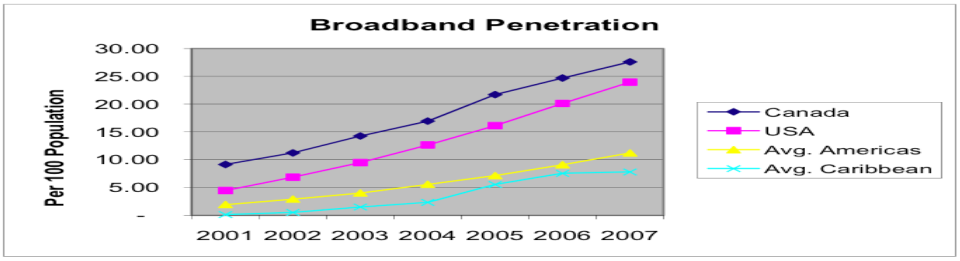
Figure 7 shows that although Internet penetration per 100 population has been increasing steadily since 2001 in the Caribbean, the levels of penetration are nevertheless lagging behind those in OECD countries and the Americas. Figure 8 shows a correlation with broadband penetration.



Source: ITU

Figure 9. *Dial-up Internet penetration in the Caribbean compared with the rest of the Americas, 2001 – 2007.*

Figures 9 and 10 suggest that improving broadband penetration will lead to greater access via the Internet, which is the technology that provided linkage to information for social and economic development. Data also identifies the cost of broadband as a serious deterrent. All these parameters will need to be addressed, and solutions may be achievable through the adoption of a Regional strategy and a collective approach to the resolution.



Source: ITU

Figure 10. *Broadband penetration in Caribbean compared with rest of Americas, 2001 – 2007.*

Affordability

Research suggests that mobile prepaid pricing plans have proved very effective in addressing the affordability issues for Caribbean users. Figure 11 below shows the cost a basket of 100 mobile prepaid minutes across a selection of countries across the region.

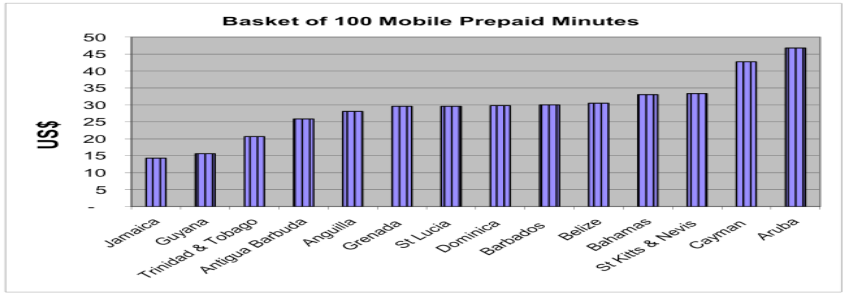


Figure 11. *Price of a basket of 100 mobile prepaid minutes.*

Figure 12 shows the high relative cost of bandwidth that has been seen as the primary reason for the low rates of Internet access.

Regional Trends in Using ICTs in Sectors

All the Caribbean countries that have developed national ICT plans have included E-Health, Education, E-government as areas for focus. The use of the traditional ICT tools (phones, fax, emails and, to a lesser extent, websites) is universal, but there is limited integration of ICT into the delivery services in these sectors.

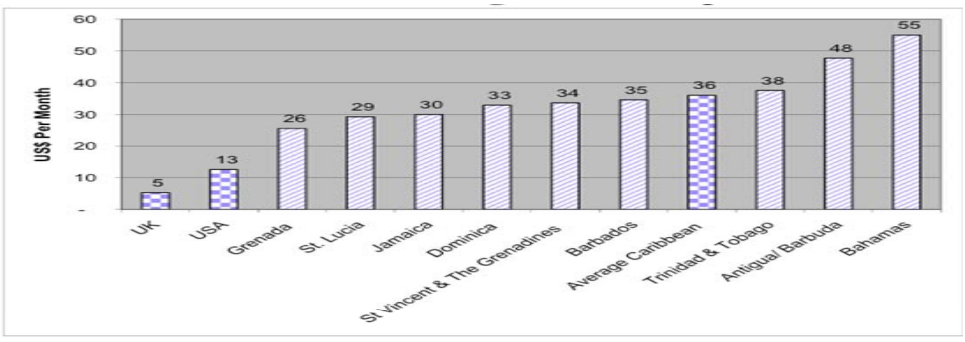


Figure 12. *Prices of broadband 1 megabit down-speed service.*

E-health

Belize has been successful in using ICT to make citizens' health records readily available across

the health system. Using open technologies, and adapting and scaling these to the unique environments of the health care sector, Jamaica has taken the application further and has developed software to solve integrated problems at community/public health levels. The Barbados' Computerisation of Health Ministry Programme is implementing information systems to support decision-making, information sharing and research in the health system, through a disease management module in primary health care system, a fully staffed health information unit, and a Hospital Information System. The Guyana Enterprise Architecture and Patient Management Information System (PMIS), is a Health Information System that links hospitals and health centres, to facilitate the storing of patient records and epidemiological data across the health administration system.

All the above systems are working separately to achieve similar and somewhat related objectives. As the region in general is yet to incorporate ICT in the delivery of health services to make any marked impact on service delivery, these examples should be used as the basis for a broad region-wide network solution in this regard.

e-Government

E-government is recognized as a key component of this process of transformation. CARICAD is a CARICOM intergovernmental agency that has the mandate to modernize the public sector in member States, and to promoting standards for e-Government services and interoperability across the Caribbean. CARICAD has recently developing an e-Government Strategy for the region. All the countries in this study have some level of online presence based on the UN matrix for the classification of the stages of e-Government development. While 45% of these websites showing a well-established presence with a wide range of up-to-date information available, only 23% of the sites are partially interactive, with users are able to download forms from various government agencies. None allow for the meaningful participation of the public in guiding public policy development.

Harmonising of Laws and Regulatory Processes (HIPCAR)

The Region is presently benefitting from the ITU/EC project, HIPCAR, that is aimed at harmonizing ICT policies, legislations and regulatory procedures throughout the region. The project is expected to take place in two phases:

> Phase 1 – The Regional Development Phase involves the preparation of proposals for guidelines on regional policies, legislations, and regulatory best practices.
>
> Phase 2 – The Implementation Phase, where individual countries are expected to include/adapt the policies, legislations, and regulatory practices to their respective jurisdictions.

The project is currently at the Regional Development Phase. A review of the project suggests that attention should be given to not only harmonization, but also to the enabling power of the regulatory framework in supporting social and economic development.

National ICT Strategies

Developing countries are expected to embrace the WSIS initiative, and to build their strategic visions on exploiting the dynamic relationship between the use of ICT and innovation. It is accepted that compared to the rest of the world, the Caribbean region in general continues to lag behind as a result of the quantum leap in new technology applications in the ICT sector. The entire Region can still reap benefit however if there is strategic focus on implementing a targeted sector driven process, with continuous benchmarking in order to maintain a sustainable advantage of the opportunities offered by the chosen sectors.

The CARICOM Connectivity Agenda and Platform for Action provides a conceptual framework and general guidelines for Member States to develop and countries are implementing ICT development projects to support sectors of the economy. As such all countries that develop ICT strategies, use similar models. The model speaks to transformation of economies into a knowledge based society, and thus has a core component of support o education by incorporating ICT as one of the basic pillars of education – reading, writing, arithmetic and ICT. Policies also seek to use ICT to improve administrative processes, in government – e-government; and to address the legal and regulatory frameworks for ICTs, affordable access to ICT services for every citizen and resident, electronic commerce, and the growth of SMEs through the application of ICTs.

Table 4 outlines the status and focus of the National Policies and Strategies in the Region. Member States have been working hard to deal with liberalization, competition, regulatory, legal and spectrum issues as dictated by international guidelines and Universal access obligations, with reference to telecommunications. This has essentially kept the majority of Member States at Stage 1 of the Knowledge Economy development process. All countries are still concerned about high costs and inadequate infrastructure to provide the capacity to use the new data rich technologies. The Dominican Republic has begun to focus on using digital technologies for social solutions, as well as to target the building of an innovation framework; Antigua and Barbuda alone has demonstrably set out to distinguish itself through Internet gaming and software development; Barbados 2005 draft strategy speaks specifically to healthcare and quality of life issues.

The Region, through CARICAD, is bringing focus to establishing e-Government frameworks, with focus on the development of internal systems to make the government processes more efficient. The Dominican Republic, Jamaica, and Trinidad and Tobago are moving with dispatch in this regard. It is to be noted that although all countries are working towards providing e-Government services, only the Dominican Republic speaks to social inclusion, which refers properly, to the public being involved in and influencing development of government policies, and transparent and customer driven government.

All Member States have identified education and human resources development initiatives that may be facilitated through ICTs. In this regard, there are major and intersecting initiatives which are being centred at various levels (tertiary and post secondary levels primarily), but which would ultimately depend on the affordable bandwidth as promised through CKLN and C@ribNET. The gap here is to extend inclusion throughout the formal and informal human

development process – to provide access from tne level of kindergarten through primary, secondary and community, for training, with emphasis on creative use and innovation.

Table 4. Overview of Regional/National ICT4D Policies, Strategies & other ICT Strategies

State/ Agency	ICT Policy/ Strategy	Key Strategy Areas/ Objectives/ Thematic Areas	Sector Focus
Antigua and Barbuda	Antigua and Barbuda Information and Communication Technologies (Draft) Policy "People First" philosophy	Upgrade intellectual capital of its people; Ensure that every resident has affordable access to ICT services for communication and for social, educational and economic development. Modern Telecommunications Strategy	Regional Centre of Information Technology Excellence in development of: • E-commerce • Internet Marketing • Internet Gaming • Software Development • E-education
Bahamas	Policy Statement on E-Commerce and Bahamian Digital Agenda, 2003	ICTs as fundamental to the sustainable growth and development of the Bahamian economy across all sectors.	E-business development; Telecommunications Legal Infrastructure; Human Resources Development; Financial Issues; E-government; Content/Tourism
Barbados	Barbados' National ICT Strategic Plan: Mobile Barbados: Building the Networked Nation, 2005[30]	Health of the Nation Wealth of the Nation Security of the Nation	Human resource development (Youth, Sports, Culture, Education) Quality of life (Healthcare Environment, Insurance) Socio-economic (Community, Labour/Trade Unions, and Infrastructure/Public Utilities)
Belize	Belize Benchmarking and e-Readiness Assessment Workshop		Facilitate electronic transactions CT Infrastructure - Legal and Regulatory Framework - Human Resource Development - Industry - Government
Dominica	Dominica's e-Government Strategy and Action Plan 2010 - 2015 (2009)	To provide cost effective and customer driven services by the public sector To reduce poverty levels through growth and employment To improve national productivity and competitiveness Sustainable government financing	Projects: National ICT Policy and Sectoral Strategies (Government, Tourism, Education, Agriculture & ICT Sector)
Dominican Republic	National Strategy for the Information and Knowledge Society, 200:5: The Dominican Republic Surfing into a Better Future	1. Strengthen Institutions 2. Sustained Economic Growth Promotion of equality and social inclusion	- Access to information and Knowledge (Education and Training for elementary, high school and universities; public sector, SMEs, civil Society) - Digital Government and Public Services (Digital Services; E-

[30] The Barbados strategic ICT plan has been revised.

State/ Agency	ICT Policy/ Strategy	Key Strategy Areas/ Objectives/ Thematic Areas	Sector Focus
			government; e-commerce; social inclusion services, incl. content) - Instruments of Policy
Grenada	ICT - A strategy and Action Plan for Grenada, 2001 to 2005	Gov. Internal systems/ processes Education and Training Improvement of business processes Support strategic implementation of civil, public and private sector initiatives	Government Services Physical Infrastructure; Strengthening Human resource capacity, Regulatory and legal infrastructure Ensuring a financial capacity Develop and ICT Industry Modernising Government E-Commerce
Guyana	Concept document	Human Resource Capacity Building; ICT Content and Applications Development; Infrastructure; Legislation; Public Sector Reform; Establish a local ICT Industry Economy	*Education* - ICT integration, training, education, skills retention, capacity-building *ICT Content and Applications Development* - service delivery enhancement, e-government, local content, partnerships *Infrastructure* - connectivity, universal access, reliability *Legislation* - legislative and regulatory framework *Economy* - niche IT enterprises, software development, IT Parks
Haiti		Education and training Social development; Pilot of One Laptop Per Child Model; IDB (Ha-T1093), 2008	Mobile handsets as the ubiquitous "ICT" device Virtual Reality (e.g., tagging in Mango industry) Health care Training E-Governance
Jamaica	E-Powering Jamaica: National Information and Communications Development Strategy (2007-2012).	Government systems and revamped services and the Delivery of services that facilitate private sector transactions e-Inclusion: Open Access to ICTs and Participation in a Knowledge-Based Society.	Education and Training Network readiness and infrastructure development E-government E-business and ICT Industry development Research and innovation Cultural Content and Creativity Legislative and Policy framework
St Lucia	St. Lucia ICT e-Development Strategy. 2005-2006	SMART Government, wired into today's technology	Tourism SME Development Legislation (e-commerce, data protection, computer misuse, IP) Training (for Cruise line linkages in Desktop publishing, typesetting b) Print processing c) Text editing d) Content development; GIS

State/ Agency	ICT Policy/ Strategy	Key Strategy Areas/ Objectives/ Thematic Areas	Sector Focus
			f) Small call center operations g) Web designing and hosting h) Internet gaming i) Insurance claims processing j) Bill payments and k) Software development.
St Kitts and Nevis	The National Information and Communications (ICT) Strategic Plan, 2006 (Fostering, accelerating and sustaining the long-term social, cultural and economic development of the country).	1. Building the information infrastructure 2. Enabling policy and legal environment 3. Developing ICT human resources and building capacity 4. Modernizing government and delivering citizen services electronically 5. Leveraging ICT for economic and social development through public-private partnerships.	Tourism (handicraft and agriculture) Financial Services Electronics and Informatics Specialised agriculture
St Vincent and the Grenadines	ICT Strategy Plan Roadmap OECS ICT Strategy document	• Human resources • Infrastructures • Enabling environment for E-Business, incl. the legal and regulatory framework • Leading role of Government	• Electronic Transactions Act • E Government, • Business competitiveness and development • Financial services • Culture and national identity • Citizenship and participation • Quality of life issues
Suriname	In Process	E-government Establishing National ICT Institute to formulate, monitor and coordinate national ICT policies. ICT Awareness building and Human Resources Development: ICT skills training for community; Legislation Bridging cultural barriers; Building on cultural diversity	Government Connectivity: network backbone to interconnect Ministries and Agencies in Paramaribo. Economic Commission for Latin America and the Caribbean E-Readiness Study: government procedures and procurement Establishing a modern Telecommunications Authority
Trinidad and Tobago	Fast Forward: Trinidad and Tobago's National Information and Communication Technology Strategy, 2003	Human Resources, Economy, Government, Legal, Infrastructure	Human Resources: education, training, accessibility. Economy: small business, e-marketplace, skills development. Government: service delivery, public awareness, health care, justice. Legal: legislation, policies, training Infrastructure: competition, regulation, service, accessibility, investment.
ELAC 2010		In order of priority a) Education b) Infrastructure and access	83 specific goals, grouped under the priority areas

State/ Agency	ICT Policy/ Strategy	Key Strategy Areas/ Objectives/ Thematic Areas	Sector Focus
		c) Health d) Public management e) Production sector f) Policy instruments and strategies	
WSIS/MDG		Eradicate extreme poverty and hunger; Achieve universal primary education; Gender equality; Reduce infant mortality; Improve maternal health; combat HIV Aids and other diseases; guarantee sustainability of the environment; encourage world association for development.	
ECTEL Member States	Dominica, Grenada, St Kitts & Nevis, St Lucia, St Vincent & The Grenadines Draft Model National Policy for Advancing Growth in the ICT Sector in ECTEL Member States, 2007	ICT Infrastructure: networks, facilities, equipment, software, and supporting structures and services for access to electronic information ICT in Government: ICT to support operations, and effective interaction with citizens and businesses. ICT in Business: providing products and services, use of ICT to improve efficiency, productivity and profitability; employment and training ICT in Civil Society: community, education, health, safety, culture	Improve infrastructure capacity, competition, cost and access Manage top country domain names and internet assess points as an asset Standards, fiscal incentives, new businesses Support software development and IP rights using local content Training to provide support services Collaborate in providing R&D Internet Security ICT Standards E-Government, procurement and related activities Mass media

The research suggests that generally countries are focused on capacity building and lower level enterprise building initiatives (e.g., tele-centres), and are still in search of ways to reap the benefits of using the technology to empower citizens and communities. While matters related to exploiting the uniqueness of culture have been indicated, projects for civil society participatory processes, self-administrated sustainable initiatives, entrepreneurship development and innovation, and self-reliance, which are the essence of a sustainable knowledge society, appear not to be considered in most ICT Strategic plans.

Labour Issues in a Knowledge Based Caribbean

The International Management Institute of New Delhi recently explored why the Caribbean economies '…have not been able to take advantage of their physical proximity to the highly

developed economies…'[31]. The institute suggested that the shortage of skilled labour may have a big role to play in this. Their analysis of the situation indicated that the growing need for FDI and lack of enough highly skilled workers was giving rise to '… an emerging competitive disadvantage…' of the Caribbean countries.

According to the Institute, the Caribbean has demonstrated high literacy levels, but the higher education and skill development strategy of the region lacks vision, and as a result, although the region can make effective use of information technology, in the area of services the associated need for highly skilled and knowledge-intensive workers would require serious upgrading of educational and training systems.

Governments in the Caribbean region have implemented technical and vocational training at secondary school level, to increase the labour marketability of school leavers. At post-secondary level, in the Community colleges and Technical schools in Barbados, Trinidad and Tobago and Jamaica, and at the State Colleges in the OECS - Antigua, St Lucia, technical and vocational training are offered, and certification are provided through national and international examinations, in a number of specialized craft, technician and service skills. Skills training programs have been established to meet needs at different levels of the production process: engineer, technologist, master craftsman/technician, multi-skilled craftsman, skilled craftsman, craftsman and apprentice. A range of short managerial and supervisory courses targeted at mid-level managers and courses for the tourism sector and in cosmetology are also offered.

In 1999, Jamaica led the region by placing emphasis on the training of persons in computing and related areas as part of its IT policy and strategy. Training of programmers and computer professionals is now offered in Jamaica by the College of Arts, Science and Technology (CAST) which was upgraded to the University of Technology (UTECH), to provide training in science and technology areas needed by the Jamaican economy. The University of the West Indies (UWI) and the University of Guyana (UG) also provide degree-level education and training for persons entering high levels of the occupational ladder. Given the shortage of skilled and well-trained personnel in the region, graduates from special technical and vocational institutes are readily employed in the labour market.

In the OECS, the lack of critical skills has been a constraint on economic expansion and international competitiveness [World Bank, 2005]. For example, in St Vincent and the Grenadines and Grenada, skill shortages have been identified in the technical/engineering. Data on work permits granted by Caribbean governments during the 1990s reinforce the nature of skilled labour shortages. The main categories for which work permits were granted were in the managerial, technical and professional occupations[32]. The development of the human resources is a vital element in enhancing overall productivity and international competitiveness. Improving

---

[31] FDI, Skilled Labour and the Caribbean's Emerging Competitive Disadvantage. Pradip K. Bhaumik and Arindam Banik is Professor, International Management Institute B-10, Qutab Institutional Area, Tara Crescent, New Delhi.

[32] Information Society Country Profiles, UNECLAC Subregional Headquarters for the Caribbean, November 2006; Levy, Carlos Miranda, 2007. Information Society and Public ICT Policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences. UN ECLAC, Santiago, Chile, 2007

the quality of the human resources of the region would require investment in education and training.

E-Training and E-Education

Caribbean countries have worked over the last 10 years to increase both ICT skills instruction and more general use of ICT in education, despite limited ICT capacity and the more traditional teaching approach (rather than student driven learning approach) and exam-focused orientation of instruction (rather than creative innovation and experimentation approach). These efforts have increased student access to ICT at the secondary level, and enhanced the knowledge, capacity, and experience of the region's education personnel, especially among those now responsible for furthering ICT[33].

Table 5. Education systems and educational institutions in the Region

	ORGANISATION	INITIATIVE
1.	OERU	The OERU policy initiative
2.	CUPIDE	Caribbean Universities Project for Integrated Distance Education (aka Caribbean Universities Portal for Integrated Distance Education)
3.	OERU	The OERU policy initiative
4.	CKLNA	Training and research in regional tertiary institutions
5.	C@RIBNET	Technology infrastructure for delivery nd collaboration at regional and international levels
6.	UWI Open University	UWI Open University blended learning project
7.	CARADOL	Caribbean Association for Distance and Open Learning
8.	VUSSC	Virtual University of the Small States of the Commonwealth
9.	Barbados	EduTech 2000 from the Barbados Ministry of Education, Youth, Sports and Culture (MOE) Barbados
10.	Jamaica	Learning Management System (LMS) and National Qualifications Register (NQR), HEART Trust/NTA
11	US Virgin Islands	Voice Over Internet Protocol (VOIP) network, Department of Education (VIDE)
12	Aruba	The School of Tomorrow, Ministry of Education

Source: Author

A 2008 InfoDev/World Bank survey of ICT and education in the Caribbean[34] provided some insight into the use of ICT in primary and secondary education, as well as in tertiary, vocational and non-formal education. While the report did not address services for special-needs students, assistive technologies, and provision of ICT access to isolated and vulnerable populations, it noted that Caribbean's investment in ICT in education has resulted in significant incremental

[33] The Survey of ICT and Education in the Caribbean: Volume 1 - Regional Trends and Analysis; Volume 2 - Country Reports comprises 16 country reports, primarily Small Islands Developing States (SIDS, 2009).

[34] Gaible, Edmond. 2008. Survey of ICT and Education in the Caribbean: A summary report, Based on 16 Country Surveys. Washington, DC: infoDev/World Bank. Available at http://www.infodev.org/en/Publication.441.html.

achievements. It also noted that the reform in the sector was not necessarily driven by declared policy changes or the establishment of defined ICT in education policy, but was dependent on funding support for various projects related to ICT infusion into the education process, that had the support of several regional organizations that were specifically concerned with ICT in education.

Other studies have highlighted initiatives intended to increase ICT access and/or capacity in education systems and educational institutions in the Region (see Table 5). It was noted that ICT as it is currently provided (in computer labs and as training for examinations) was unlikely to prompt needed changes in the curriculum or to lead to profound transformation of learning behavior. The observation was that these projects could promote deeper change in teaching and learning if there was some focus on integrating ICT into a reformed curriculum.

At the regional level, expanding ICT access and improving educational quality in relation to both traditional standards of assessment, within the concept of an "ideal Caribbean person", are become regional goals[35]. Surveys of the regional education sector agree that all drivers of economic growth can benefit from the development of human capacity in general and from ICT skills in particular, with the offering a more highly-skilled labour force.
Trends in ICT in Caribbean education show a lack of equipment and ubiquitous access. Educational challenges continue to be an over-focus on IT curriculum and exams; ineffective technology-focused teacher professional development, and few initiatives to focusing on technology integration across all subject areas. Some work is being done at tertiary level to deliver training and to collaborate in delivery of curricula through the CKLN. This is liked to providing affordable access to modern technologies. The Caribbean Examinations Council (CXC) is reviewing its strategic approach to ICT integration to guide changes in teaching and learning, and alternative assessment methods.

Member states which had deepened the infusion of ICT in education were Dominica and Jamaica. Even in the absence of a formal ICT-in-education policy, Dominica had provided Internet-enabled computer labs in over 50 percent of both primary and secondary schools, and the Jamaican HEART Trust/NTA had opened up access and established ICT support, including e-learning, for its 80,000 students.

ICT in Education Policy

Regional cooperation, including cooperation through the Organisation of Eastern Caribbean States Education Reform Unit (OERU) and education ministries, has influenced policy development. There remains however much more room for supporting teachers or students to use technology to collaborate, access learning resources, or otherwise use ICT for creating and innovation, and to support mastery of the curriculum.

Most governments have drafted or approved ICT policies for primary and secondary education. However, ICT policies in education have had limited impact on practice. While many individual governments have a strong understanding of issues surrounding ICT in education, organizational

[35] Caribbean Knowledge and Learning Network; Caribbean Examination Council strategies; CARICOM (Caribbean Community) Charter for Civil Society.

understanding of issues surrounding ICT in education is low. Institutional capacity is not usually adequate to plan and implement comprehensive projects using ICT to support transformation of management, curriculum, and classroom practices, and high capital and operational costs of ICT projects are cited as barriers to impact.

ICT in Tertiary Education

All tertiary level institutions (TLIs) offer degrees and/or certificates in technical skills (e.g., autoCAD (Computer-aided design) and subjects (e.g., computer science). Generally, student access to computers and the Internet at many tertiary level institutions (TLIs) is adequate. Access to ICT and ICT-focused education at teachers colleges and other teacher-education institutions is significantly lower than in other TLIs, and the establishment of region-wide ICT infrastructure supporting increased regional collaboration. While the wider use of ICT-supported distance education is a challenge, there are several ongoing and new initiatives to bridge access gaps using the technology. UWI through its Open Campus is expanding use of ICT to overcome geographical obstacles in the region.

The Caribbean Knowledge and Learning Network Agency (CKLNA) has been providing teacher and administrative training in readiness and doing pilot projects to guide the rollout of the wider project that is intended to support collaboration and training across the region, as well as research collaboration with other international tertiary networks. The Caribbean Universities Project for Integrated Distance Education (CUPIDE) is another regional TLI level process.

ICT Infrastructure in Education

Internet connectivity to schools is in many cases adequate to meet current needs, and most secondary and many primary schools enable teachers and students to access computers and the Internet, although the quality and maintenance of hardware and software may pose a challenge. To date, most ICT initiatives target basic technology skills and support for students on the Caribbean Examination Council Information Technology (CXC IT) exams. The success of this is reflected in the student scores on CXC IT exams that are high relative to scores in other subjects. However it has been noted that because of the nature of the curriculum, which target basic skills in IT, student scores on CXC IT exams do not correlate with workplace-ready skills.
Studies suggest that the IT curriculum, the high reliance on CXC exams for assessment and the present IT-teacher position may pose barriers to the use of technology to support learning in other subjects, and ultimately limits the potential for changes in classroom practice.

Of specific concern was the gap in teacher professional development (TPD), which relied on workshops that could produce only limited change in classroom practice, tended to teach ICT skills separately from pedagogical skills, and did not address use of ICT to support teaching and learning.

Ubiquitous Access to Computing

Although the price of computing hardware continues to fall, access for developing countries

remains a challenge. The One Laptop Per Child (OLPC) project has been the benchmark for Suriname whose national telecommunications provider of Suriname, Telesur, is supporting a 200-laptop pilot initiative using the OLPC-developed laptop. Trinidad and Tobago as well as Guyana are implementing similar OLPC initiatives. It is expected that smart technologies facilitate willreal-time classroom interactions between teachers and students and continual access will support the infusion of ICT into learning activities across the curriculum and beyond the boundaries of school. However, even as region-wide focus on IT skills has driven rollout of infrastructure, elements of the system, including IT teachers, curricula, and exams, block change.

ICT Supporting Security: Issues and Institutions

Security, in an age of globalization, has to be extended to encompass several non-traditional aspects. While territorial disputes have been core traditional concerns, non-traditional security issues are becoming more important for the region. Drugs, political instability, HIV/AIDS, migration, and environmental degradation are the chief non-traditional security concerns; with money laundering now also important.

The problem of drug operations and their consequences have increased in scope and gravity over the last decade and a half in the Caribbean, and is related to drug production, consumption and abuse, trafficking, and money laundering. The consequences of and implications for marked increases in crime, systemic and institutionalized corruption, and trafficking in arms make these importance because of high negative impact on agents and agencies of national security and good governance, and the implications for crimes of violence, sex crimes, domestic violence, and for drug addiction, drug-related violence, and drug-related corruption of law enforcement and public officials.[36] The effect has been deleterious to the economic security of the region, with impact on major foreign exchange earners and contributors to the Region's GDP (tourism, aviation, financial services, and agricultural sectors), and to employment in the Region.

The use of ICT technology networks would facilitate cross-sectoral and cross-country communication and cooperation mechanisms between ministries within countries and across sectors in the Region, to ensure that safety and security issues be addressed from both a community level as well as an executive level, and that industry best practices be introduced and enforced in all jurisdictions throughout the Region. It would also support a comprehensive annotated bibliography on public security, with entries for example, by country, crime category, issue area, language, and author. Such a database would facilitate both research and teaching while providing information to be used as intelligence in managing the security process.

The Dominican Republic has implemented an integrated information system ("*Sistema de Administracion de Informaciones Criminologicas" (*SAIC)), to assist the administration of criminal justice in that country. SAIC is a law enforcement tool, that supports the provision of direct services to citizens via the Internet, and which includes the option of making complaints

[36] One study sees two basic categories of drug crimes: "enforcement" crimes, and "business" crimes. Another typology posits three types of crime: "consensual" ones, such as drug possession, use, or trafficking; "expressive" ones, such as violence or assault; and "instrumental" or property crimes, examples being theft, forgery, burglary, and robbery.

and initiating requests for police certificates and replacement of lost documents. The software was also able to provide updated information on detainees, traffic accidents and corresponding police acts and stolen vehicles reports. Reports are entered directly into the database by law enforcement officers from local police stations and even on-duty patrols equipped with wireless notebooks. This allowed police authorities to have updated, information on security events throughout the country. The project had been funded by the Telecommunications Development Fund, and managed by the Dominican Telecommunications Institute (INDOTEL), the national telecommunications authority of the Dominican Republic.

Belize has recently designed and implemented a similar and cost effective software capability to provide a communication network for its security forces.

Use of e-Payment, e-Document and e-Signature

The adoption and development of electronic transactions between citizens and the State (e-payment, e-document, e-signature and e-contracting) is not widespread in the Region, since there is not a regional enabling legislative framework, nor is there general trust in the electronic system. Some Caribbean countries that have enacted e- transactions related legislation (Bahamas, Barbados, Belize, Jamaica). Gaps relate to regional security and interoperability.

Barriers to Implementing a Common Regional Policy Framework

There are gaps in the Regional Policy Framework. While the CARICOM Connectivity Agenda speaks to full integration with the global knowledge society, liberalization and facilitating universal access, because of the dynamic changes in technology, the policy fails to consider *ubiquitous access* through smart and emerging consumer technologies. It also does not adequately embrace the broadened definitions of ICT in making recommendations for development, and as a result falls short in respect of the application aspect of the technology and its productive use by the region to create the knowledge society.

Access to information and knowledge is essentially determined by *connectivity, capabilities*, and *content*. Despite gains, it is in these three areas that urgent action is required to ensure full access to ICT by countries in the Region. Connectivity involves the material and physical access to the global information infrastructure and services, including computer hardware and software. There are constraints to connectivity, associated with the lack of basic physical infrastructure, such as telephones and electricity, which can only be resolved at high financial costs.

Regional Connectivity Framework

All CARICOM member states have opened their telecommunications sectors completely and there is vibrant competition in the cellular mobile market. Cable & Wireless (C&W) owns between 49% and 100% of the telephone companies in the CARICOM member states where it operates, and continues to provide nearly all domestic and international fixed and mobile services, value added and Internet services in all of CARICOM.

The governments of Commonwealth of the Bahamas, Haiti, and Suriname, wholly own and operate the telecommunications services. Guyana's telephone company is owned by a private investor; in Belize a local private investor controls more than 60% of the dominant operator[37].

In absence of a vision that fits with the new economy, Member States remain in 2003 mode as represented in the model in Figure 13, rather than projecting forward through to Stages 2 and 3.

As part of the liberalization process, Barbados, Belize, five members of the OECS, Jamaica, and Trinidad and Tobago have implemented new legal and regulatory frameworks, and established independent national regulators. The OECS also has established a regional regulator (ECTEL). The British Overseas Territories of Anguilla, Cayman Islands, Montserrat, Turks and Caicos Islands, and British Virgin Islands are in the process of passing of new laws in support of open competition, and the establishing of independent regulators.

The Bahamas is still in process of privatizing its state-owned monopoly company, although it has passed a new telecommunications law, amended its Public Utilities Commission Act (2000) and issued a telecommunications Sector Policy in 2001 (amended in 2002). Guyana operates under a Telecommunications Act of 1990 and is developing a new policy for the sector. Cable & Wireless retains exclusivity in Antigua & Barbuda for international communications until 2012. The Antigua Public Utilities Authority (APUA), a fully government-owned, is in process of liberalizing the sector for local fixed line services.

Suriname has established an independent regulator, Telecommunication Authority of Surname (TAS), and a new Telecommunications Act (2004). Haiti has not amended its 1997 laws although it has begun to invite competition in its mobile services.

Regional ICT Sector Network Infrastructure

The ninth (9^{th}) pillar of the measurement indices of the Global Competitiveness Report 2008-2009 [38] is Technological Readiness. A country's Technological readiness is measured by eight (8) indicators, four (4) of which are directly related to the country's networked readiness. 'These indicators are – Laws related to ICT, Mobile telephone subscribers, internet users, personal computers and broadband internet subscribers. The others, which are more closely related to research and development and the diffusion of technology (including information technology)

---

[37] Levy, Carlos Miranda, 2007. Information Society and Public ICT Policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences. UN ECLAC, Santiago, Chile, 2007

Mc Kinsey and Co., 2008. Development of IT and ITES Industries – Impacts, Trends, Opportunities and lessons Learned for Developing Countries. Government of St Kitts and Nevis

Final Report ICT Policy and Strategic Plan: Telecommunication Reform & Modernisation Project. Member States of the Organisation of Eastern Caribbean States (OECS);

[38] Global Competitiveness Report, 2008-2009, World Economic Forum, Geneva, Switzerland, Klaus Schwab, and Michael Porter.

into productive value added, are – the availability of latest technology, firm level technological absorption, FDI and technology transfer. The Caribbean countries surveyed – Trinidad and Tobago, Jamaica, Guyana and Barbados – in terms of the indicators for ICT readiness, generally ranked in the first and second quartile of the countries surveyed; yet in the final overall rankings, with the exception of Barbados, they were in the lowest quartile of 134 countries.

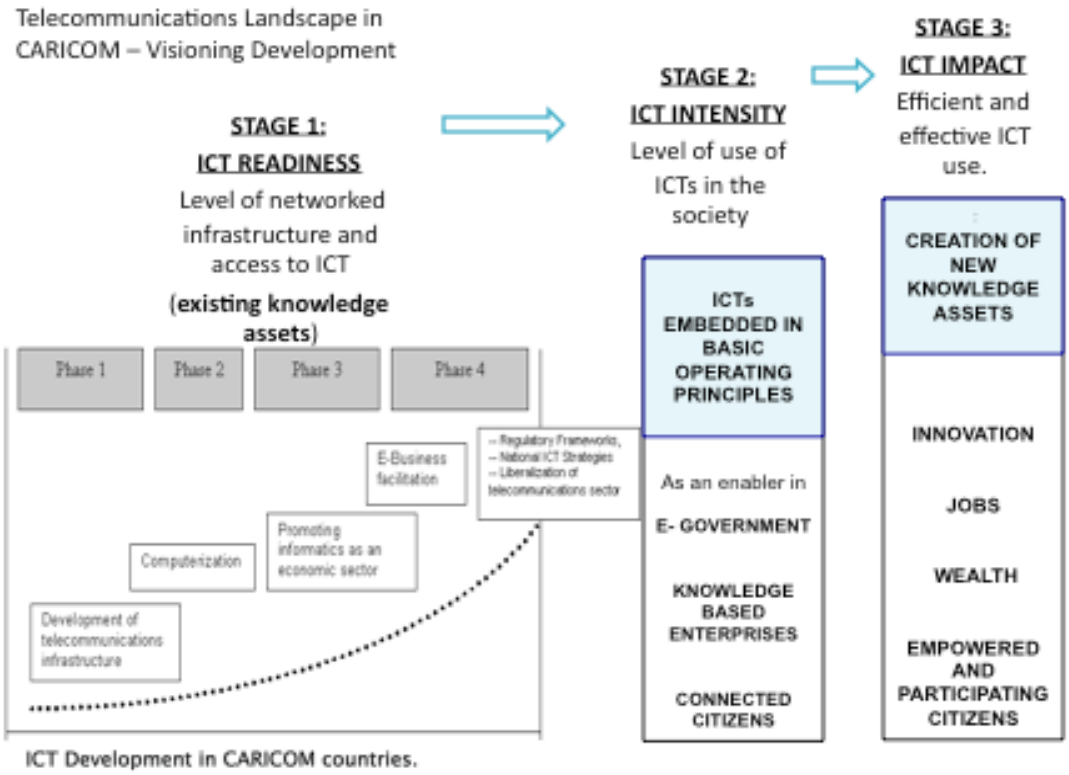


Figure 13. Stages in becoming a Knowledge Economy

Other recent international studies on the sector include data on specific core indicators (telecommunications, internet access included, e-commerce activities), also conclude that developing countries, like those of the Caribbean need to "harness Science, Technology and Innovation (STI) and human capital to value-add the traditional agricultural and industrial sectors and to develop the new economy, particularly through information and communications technology (ICT), and biotechnology …'. The recommendation is that ICT policy should be conceived as an integral part of STI policies, which should encourage R&D and commercialization in ICT[39].

The CRNM Report (2006) which was done in respect of WTO market access issues related to telecommunications services, underscores the role of computers in facilitating digital

[39] United Nations Conference on Trade and Development (UNCTAD), Information Economy Report, 2007-2008, Science and technology for development: the new paradigm of ICT, Prepared by the UNCTAD secretariat, United Nations, New York and Geneva, 2007.

convergence of information and communications, using devices like the telephone, television, computers, radio, and multimedia tools, as well as their distribution systems, services and applications, such as satellite or cable TV, the global network of networks called the Internet, and the countless innovative applications able to run through these delivery channels.
The region has benefited from global innovations that continue to make the Regional ICT industry a viable growth industry. These advances have supported the dynamics of the global network of the Internet, and the countless innovative applications able to run through these delivery channels, such as:

- The reductions in the price and capacity of the processors used in digital devices including analogue-to-digital converters and computers;
- The continuing increases in computer processing power;
- The ability to link computers into networks to communicate and/or share software, digital information, and often even processing power,
- Advances in transmission technologies, in particular wireless cellular, fixed wireless, DSL, cable, WiFi, WiMax, and systems, services and applications, such as satellite or cable TV.

Latin America and the Caribbean Region now have access to nineteen (19) submarine fibre optic cable systems and the support of 80 cellular mobile operators in the 30 countries and territories[40]. This makes possible the use of modern wire-line, wireless and broadband access technologies to allow broadband transmission over transport and local loop access networks in the Caribbean at data transfer speeds comparable to the developed world to support ICT-related activities and services such as e-commerce, education, commerce, health and cultural development.

Several Caribbean countries have developed and are implementing ICT Strategies and are rolling out ICT initiatives at the community level with the establishment of programmes to provide the widest possible access to ICTs. Development of information-based industries and effective implementation of ICT strategies, and their incorporation into every-day economic activity are dependent on the availability of physical infrastructure. For economic impact, however, it is not enough that technology be available or efficient, its application should be effective in supporting productivity. It should be networked, open and constantly accessible, to allow people, businesses and governments to communicate effectively at any time, and to be creative in solving everyday problems. The level of affordable access to this infrastructure should be such that all who wish to communicate and to use accessible information can use it as needed to add some value to their activities. While the Caribbean infrastructure is relatively sound, it is expensive and not universally networked or distributed across the communities in the region.

In CARICOM Member States, main line telephone penetration, an index for measuring the degree of development of telecommunications infrastructures, ranges from a high of 60% in St. Kitts & Nevis to a low of 1.7% in Haiti. The average main line telephone penetration in CARICOM at the end of 2005 was just over 10% compared with over 60% in North America (Canada and USA).

[40] Levy, Carlos Miranda, 2007. Information Society and Public ICT Policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences. UN ECLAC, Santiago, Chile, 2007

Table 8. Access indicators for Selected Regional States

	Fixed Telephone lines per 100		**Mobile Subscriptions per 100**		**International Internet Bandwidth per Internet user (bits/s)**		**Proportion of households with Computer**		**Proportion of households with Internet**	
	2002	**2007**	**2002**	**2007**	**2002**	**2007**	**2002**	**2007**	**2002**	**2007**
Dominican Republic	10.7	9.3	20.0	56.5	83	894	5.5	12.5	2.8	5.7
Haiti	1.6	1.1	1.7	26.1	746	155	0.3	4.0	-	1.8
Jamaica	16.6	13.5	47.6	98.6	3’333	34’000	13.0	17.3	7.7	12.7
Trinidad & Tobago	24.6	23.1	20.3	113.2	696	4’229	17.0	43.6	15.5	18.1
Singapore	46.3	42.0	79.6	133.5	2’857	34’655	68.4	79.0	59.4	74.0

In CARICOM Member States, main line telephone penetration, an index for measuring the degree of development of telecommunications infrastructures, ranges from a high of 60% in St. Kitts & Nevis to a low of 1.7% in Haiti. The average main line telephone penetration in CARICOM at the end of 2005 was just over 10% compared with over 60% in North America (Canada and USA).

As mobile becomes a substitute for the fixed service, this trend is changing, with main line penetration showing a slight decrease. Mobile penetration has grown much more rapidly than the developing world, rising from a negligible 0.1% in 1992 to 35% at the end of 2005[41]. There is no available study of the Region to suggest that taken together, main line and mobile will satisfy the 100 percent penetration. Tables 8, 9 and 10 provide access, use and skill indicators respectively, for selected Member States in the Region.

Table 9. Use Indicators for Selected Regional States

	Country	Internet Users Per 100 Inhabitants		Fixed Broadband Subscribers Per 100 Inhabitants		Mobile Broadband Subscribers Per 100 Inhabitants	
		Secondary		Tertiary			
		2002	2007	2002	2007	2002	2007

[41] Selected Country Profiles: The Global Information Technology Report 2008-2009, World Economic Forum, INSEAD, 2009

1	Dominican Republic	7.3	17.2	-	1.6	-	-
2	Haiti	1.0	10.4	-	-	-	-
3	Jamaica	23.0	55.3	0.3	3.4	-	0.2
4	Trinidad & Tobago	10.7	16.0	2.7	8.0	-	-
5	Singapore	49.6	68.0	6.5	20.2	-	43.3

Table 10. Skills Indicators for Selected Regional States

	Country	Gross Enrollment Ratio				Adult Literacy Rate	
		Secondary		Tertiary			
		2002	2007	2002	2007	2002	2007
1	Dominican Republic	69.0	79.1	34.	36.1	84.4	86.1
2	Haiti	29.4	29.4	1.2	1.2	51.9	56.5
3	Jamaica	84.3	87.1	19.1	18.4	87.6	89.3
4	Trinidad & Tobago	74.6	76.3	8.4	11.6	98.5	98.9
5	Singapore	74.1	74.1	43.8	43.8	92.9	94.4

Key Challenges to Implementing a Regional Strategy

Studies that have been done with specific focus on the CARICOM countries, lament the difficulty in finding adequate detailed sector, production and trade data that is necessary for analyzing and choosing among different options in the various subject areas. Adequate data is available for telecommunications - landline and mobile services, regulatory frameworks and institutional arrangements, infrastructure and competitiveness, as well as new transmission and switching technologies such as VOIP; and some information is available for computer services, including internet services. Such information is critical to predicting the potential of the region in respect of transmitting of information and media convergence. It does not measure how the technology is used to add value, or the continuing innovations in ICTs. There is however general consensus that the Region continues to suffer from a limited human resource to provide innovative support in the industry.

Key challenges as identified by stakeholders are as follows:

Co-operation and Governance Models

a. There is no clearly defined Regional vision to position ICT as catalyst for social and economic development and to catalyse a regional co-operation focus. The present Regional Vision is articulated as a series of indicators, as follows:

- A full-employment economy;
- A decent standard of living & quality of life for all citizens;
- Elimination of poverty;

- Adequate opportunities for young people; and
- Spatially equitable economic growth within the Community.

The Girvan Report[42] also emphasizes the following:

- Social equity, justice, cohesion, personal security;
- Environmental protection ecological sustainability;
- Democratic, transparent, participatory governance

b. There is no clearly defined Regional Policy Coordination and Cooperation Framework to support rollout at regional level

c. Governance and leadership:
   - The governance process is not well defined and may be limited by the existing regional level framework.
   - The implementation process needs to be structured and streamlined to ensure that there is not duplication.
   - There is no structured process for converting ideas into tangible development benefits.
   - More 'visible' ICT champions needed at all levels in the sector/region.

d. The absence of Regional and National implementation plans that are complementary.

<u>Regional Regulatory and Technical Connectivity Models</u>

e. The Regulatory Framework is fragmented, limited and not focused on ubiquitous access using digital technologies; a modern policy and legislative framework needs to be articulated
   - Affordable access to quality ‘smart’ end user technology for regional space.

f. Regional Co-operation Model for Maximizing Capabilities and Minimizing Costs

   - Limited Resources – for technology hardware, software and training
   - A critical mass of trained human resource to be planned for the Region
   - Collective negotiations with hardware and software providers
   - Quality Assurance Issues to support procurement, interoperability and the like
   - Trained and certified human resources
   - Relevant ICT statistics indicators and standards not being uniformly implemented

g. Regional Co-operation Model for Exploiting Regional Content
   - Regional media plan and process for refocus to create value from regional content
   - Opportunities for ICT research, innovation and venture capital support are limited; attention to be given to intellectual property rights

[42] Girvan Report – Towards a Single Economy (CARICOM, 2007).

A study of the Regional process suggests that while there are many agencies willing to implement aspects of the ICT Regional plan, the existing model needs a more targeted approach, leadership and a clarity of governance that drives the Region in its agreed direction. In this regard, the roles of the Agencies have to be clearly indicated, the present tendency for overlap eliminated, and the network harnessed to drive aspects of the vision for effect and sustainability. The governing body as well as the leaders in the process (regional, national and sectoral), need to agree on targets, areas of responsibility, and the approach to be taken to harness the goodwill, and resources of the many agencies indicated, and of the many entrepreneurs and community groups that have not been specifically identified, but are already working towards development of the Regional knowledge based society.

A review of existing National Strategies (in draft as well as in action), gives further evidence that a unified approach with clear governance guidelines and strong leadership is needed. While there are clear signs that the region is supportive of a regional approach to closing digital gaps and benefitting from a regional approach, the present process is dominated and driven by international interests through a National interest and focus. In the absence of a clearly indicated and agreed regional approach this results in a 'scatter shot' method of achieving any unified vision; and the disparate rates of progress. The gaps in the existing regional process have to be filled to drive the region as a whole along the road to making social and economic advances.

The Regional ICT Steering Committee agreed with the need to define an appropriate and governance structure for the effective implementation of the Regional ICT4D strategy. The Committee agreed that while realistic and measurable outcomes and success indicators were necessary, it was imperative that workable institutional and management mechanisms need to be put in place to facilitate the implementation of the Action Plan that will realize the strategic plan. While such a mechanism will focus on a Regional Governance Structure, an in-country governance process would also have to be elaborated.

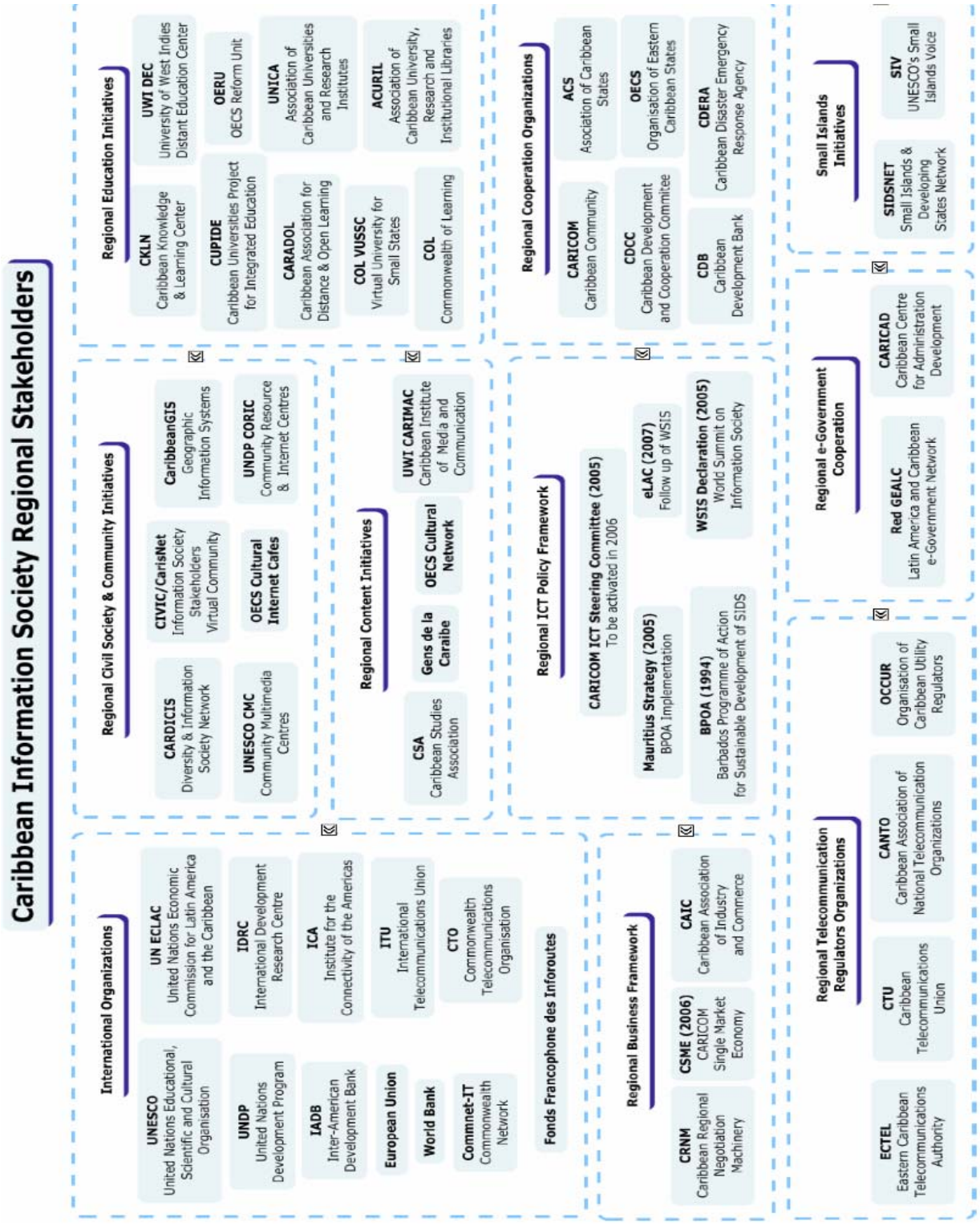
Critical Regional Issues

Stakeholders agreed that the Region needed a well-defined ICT policy and strategy, and identified several issues for address at both regional and national levels as follows.

- Apply harmonised regional ICT data measurement, collection and classification systems, with internationally acceptable indicators tailored to regional fit.
- Develop and Implement a targeted Regional Marketing programme to build understanding and adoption of goals
- Maintain a sustainable process of Regional strategic planning in the sector, to emphasize development aspects
- Develop a Regional Regulatory framework to refocus convergent technologies as basis of development
- Involve the region's private sector as partners in using ICT for business enterprise, innovation and development
- Apply ICT for development guidelines as core elements of key sectors (formal

education, retraining, health, security) Establish a Regional Centre for ICT invention/innovation and to encourage research

- Establish an ICT Chair to provide leadership and guidance and build partnerships with industry
- Identify and appoint strong and charismatic leadership to champion rollout of the Strategic Plan, and sustain partnerships



Source: ECLAC 2007

Figure 13. *Network of Caribbean Regional Stakeholders*

- Ensure an effective governance structure for implementation

- Implement regional strategies for negotiating with service providers to reduce cost of use at level of consumer

Collaborative Leadership (Governance and Operational)

Proposed Regional Governance Structure[43]

A number of specialized agencies and committees have been established over the years, in order to operationalise the aims and objectives of the Treaty of Chaguaramus and relevant mandates. Many of these agencies were established when the subsets of the ICT sector were being treated and managed as separate sectors. The convergence of the technologies, the crosscutting nature of the ICT sector and the focus of the Strategy on harnessing the power of the converged technologies to support development, suggests that it is no longer feasible or efficient and effective to address ICT4D in such a fragmented manner, and requires the centralizing and converging of all the activities that would drive the successful implementation of a Regional ICT4D Strategy.

Reducing the fragmentation that exists at the regional level would reduce the financial burden on governments that are currently required to support a number of regional organizations with related responsibilities in ICT 4D, whose activities often overlap, otherwise compete and cloud the focus and clarity of unified vision necessary to support the region in ultimately achieving global competitiveness. Such a single regional governance structure would be able to affect synergies and facilitate collaboration to benefit from economies of scale wit supporting regional integration.

The roles and responsibilities of such a Regional Governance structure need to be detailed, but two key elements, which have not previously been included in any currently existing ICT agencies and committees should be considered:

1. Such a structure should as a as possible seek to be self financing, e.g. by a levy imposed for financing the work of the regional structure/organisation
2. The structure/organisation should be mandated to mobilize financial resources to support the implementation of the strategy across the region.

In-country Governance Process/Structure

Member States are at different stages of development in respect of development and the implementation of an ICT Strategy and infrastructure, and as such it is not feasible to propose a single solution and mechanism to satisfy the needs of all member states. At the national levels however, there are some key elements that should be in place to ensure effective and efficient implementation of the ICT strategy. At present, all are in process of implementing some aspect of an IT4D strategy, and thus already have some mechanism in place for implementation. The elements of this mechanism would become the core of the national framework mechanism,

[43] Reproduced from the recommendations of the Regional ICT4D subcommittee, May 2010.

which would operate with clearly defined responsibilities, effect cost savings where significant fragmentation exists, and provide a point of contact through which the regional governance structure can function.

The key in-country elements are as follows:

1. One champion, and Information and Communications Technology, Chief Information Officer (ICT/CIO) with an appropriate profile (respected, knowledgeable, with access to key decision makers) should be identified,
2. An independent multi-stakeholder steering committee (with representation from public sector, private sector, civil society, Non-Governmental Organisations (NGOs), regulators), to be in place to ensure that the national development objectives and the regional elements, that speak to integration and functional cooperation, are addressed. This national stakeholder team will also implement formal and informal marketing strategies to support buy in and success.
3. A centralized Planning Unit to coordinate all government infrastructure and application deployment to ensure compatibility, harmonization with standards, and interoperability. Such a unit would cross all sectors, ensure quality, and be responsible for identifying and taking advantage from synergies.
4. Government budgeting for ICT4D should be done on a sectoral basis to facilitate ownership and accountability.

Innovation and Entrepreneurship

ICT Research and Innovation – Hardware, Software, Content

Many tertiary institutions in the region have been refocusing training and research at Post graduate diplomas, certificate and masters and doctoral levels, in disciplines such as Computer Sciences, Information Technology, computer engineering and Technology Management, in Electrical and Computer Engineering, Communication Systems, Computer Systems Engineering, Control Systems, Electronic Systems and Energy Systems. Those institutions include the University of the West Indies (in particular, St Augustine and Mona), University of Technology, The University of Trinidad and Tobago. Some of this research has resulted in recognition outside of the region. Few to date have resulted in new growth industries for the region.

Some of this research is indicated as follows:

- Tertiary Engineering and Computer Studies students from the University of Technology in Jamaica regularly compete, with some degree of recognition, at international level in the area of robotics and software technology applications, but this cannot be generalized to other parts of the region.

- The Mona Institute of Applied Sciences (MIAS), has been focusing on building R&D bridgeheads and local and global business networks and training. It is also central to

plans to establish a Mona Research and Innovation Park (R&I Park) at the UWI Mona Campus to facilitate research and innovation from local and global knowledge institutions and firms, and to contribute effectively to the development and diffusion of new and adapted technologies. Some of its projects relate to e-government, risk mapping strategies for national development, innovation and trade; mapping disaster risk from natural hazards, Scenario planning, fore-sighting and technology road-mapping, as well as climate change adaptation strategies. The UWI has also established a Disaster Risk Reduction Centre to support disaster management and mitigation, by establishing a database of disaster management technical expertise

- The UWI/Caribbean Centre of Excellence for Teacher Training (CCETT) aim's to improve the competence of teachers in literacy education in order to improve the literacy proficiency of students in the first three years of primary education. Their project includes the development of an information technology interactive platform, with a pilot started in five countries (Jamaica, Belize, Guyana, St. Vincent and the Grenadines, St. Lucia) and planned for full roll out.

- The Caribbean Fisheries Training and Development Institute (CFTDI), based in Trinidad, utilizes remote audio training and advisories to enable fisher folk to access these services remotely, building on the high penetration levels of cellular phones among Caribbean fisher folk and by demonstration, to strengthen the possibilities for offering innovative mobile applications and services through the ubiquitous mobile phone. This research uses fisheries as a focal point for the development and demonstration of innovative capacity in pro-poor, mobile application needs assessment, design, development, deployment and evaluation that can be applied to any sector.

- The Computer Systems Engineering Group of UWI, St Augustine, conducts research, and collaborative work, in the areas of Computer Architecture and Organization, Embedded systems design and application, Video/Audio processing for Multimedia applications, Artificial Intelligence and Robotics and robust control system design. The Electronic Systems Group conducts research, and collaborative work, in the design of reconfigurable logic systems using the ever-increasing family of static RAM base programmable logic devices such as the Field Programmable Gate Array (FPGA) and the Complex Programmable Logic Device (CPLD); CAD tools for process control; Multi-media signal processing; Robotics.

- The UWI students and their MIT counterparts won MIT's NextLab[44] Award for Excellence in Technology Innovation for the development of a mobile phone application that tracks package and courier activities and displays package locations on maps in real time. The winning mobile application was conceptualized, designed and developed by the UWI team members while their MIT counterparts developed the business case and managed the project.

- Center of Excellence (CoE) For IT-Enabled Business Innovations, UWI, Mona, was

[44] http:\\nextlab.mit.edu

formally launched December 1, 2008 with mandates to build a distinctive Free and Open Source Software (FOSS) Competency and Practice, for establishing IT-enabled business innovations that can be deployed to SMEs in the wider business community.

- The Telecommunications Policy and Management (TPM) Programme, UWI, Mona, continues to operate as a dynamic, pioneering unit within the School. It delivers academic programmes, specialized industry training, academic research output and consulting services.

Research in the region has uncovered and exploited some innovation initiatives in the region that should be supported and widened to become truly regional projects. These technology-based enterprises provide hardware, software, and content and/or technology-based services and solutions in key and potential growth sectors – healthcare, education; robotics. The characteristics of these initiatives make them especially attractive as regional projects. They provide cross-sector solutions, are scalable across several sectors and countries, and have already proven the technologies in critical sectors locally and in the international community. A sample of these includes the following:

- The Mona GeoInformatics Institute (MGI), UWI, Mona launched a the first Global Positioning System (GPS) Navigation product in Jamaica, designed to meet a wide range of navigational needs by providing a detailed dataset of over 10, 000 km of navigable roads including major highways, principal highways, arterial roads, residential roads and alleys in Jamaica. It also highlights over 10,000 points of interests in 69 categories including gas stations, airports, banking/ finance services, entertainment locations, schools, shopping centres, hotels, police station, transportation centres and utilities. The GPS Navigation is ideal for the average road user as it allows calculation of faster/shorter routes and alternative routes in the event of a road block while allowing the user never to get lost, thereby saving time and money and reducing security risks related to getting lost.

Currently there are no robust research-based Regional networks in the Caribbean. Some work is being done through the Caribbean Institute of Mass Communications (CARIMAC, UWI), that is specially targeted at identifying ICT innovations for support with the eventual spin off into viable industries. The CKLN, through its C@ribNET project, plans to implement a regional research network. It has already begun to work with the international community on a research project (WINDS Caribe/EU), which will link the regional researchers to the European University research networks.

Research has been stronger in respect of ICT policy and includes agencies like ECLAC, the Regional Dialogue on the Information Society (DIRSI), the Caribbean Communications Policy Forum (CCPF), the Caribbean Institute of Mass Communications (CARIMAC), the Caribbean Development Bank (CDB), the UWI Masters in Regulations Programme (MRP) and Telecommunications.

Other innovative research that has been yielding tangible commercial results is ongoing at the University of Technology School of Public Health (health care)[45], and the University of Trinidad

[45] Modernizing the Heath Care System of the Caribbean in preparation for the Health Tourism

and Tobago (robotics)[46]. Discussions with stakeholders in the diaspora in respect of Cultural Arts and training industries and the media (CAVE)[47], have also revealed some interesting research projects for development. The final project involves the CXC in collaboration with the UN and the Centre for Internet and Society of the Harvard Law School, and a private sector Company in Jamaica. The initiative involves the use of ICT learning games with virtual winnings going toward real donations to solve the global hunger problem (solving also learning and social development problems) (http://www.freerice.com). These four initiatives form potential regional projects for short-term action, and may become the core of a Regional Action Plan.

Some other trends that may warrant attention in planning for research and human resources development include:

1. Green ICT, as already indicated.
2. Any e-commerce or related activities which support sectors in which there is comparative country advantage, such as tourism and culture, sports (all countries), bauxite (Jamaica), petroleum services, steel, shipping (Trinidad), gaming (Antigua and Barbuda), and general services such as finance, heath and training
3. Financial Services – inked with services to provide consumer support to access financial resources
4. Health Services- linked with other sectors like tourism, wellness and agriculture
5. Consumer demand driven technology and software applications – consumer usage has begun to surpass business usage and this trend is expected to continue.
6. Next generation technology that is more interactive and user friendly, e.g., data applications with virtualization, is being now developed internationally
7. Software and services that put the customer in control and support Social networking, e.g. – Face book, You tube, Wikipedia
8. Connected devices, e.g.., mobile phones,
9. Solutions to industry concerns – security, privacy, customizability, visibility and control, data accessibility, global reach, ease of provisioning, business agility, deployability and manageability

Innovative Financing

Financing ICT strategies should be managed at the regional level. And innovative approach should be taken in this regard. The Regional strategic plans should be used to identify financing for implementation. CDB has indicated that a fair amount. of financing available, but that countries needed to be strategic in how they accessed these funds The CDB is well poised to identify and access funding. Financing that is appropriate to the current state of the countries should be identified, and may include, off-budget financing, regular budget, special funds, loans,

---

Market, a commercial viable project involving UTECH, the Centre for the Development of Enterprise (CDE).

[46] Using robotics, and applying cultural innovations to solve physical development/training problems (eg, cultural innovations, including, tassa drumming, steel pan playing, bowling machines for cricket and karate); at UTT.

[47] The CAVE is one of several proposals of a Trinidadian national who lives in Washington. It involves, Trinidad Cultural Scholastic Tourism, Carnival Arts Village Education and Arts and Humanities Courses.

donor contributions, blended funds, private sector financing, multi-donor financing and various combinations of these.

Approach to financing/funding:

1. Regional ICT projects should be identified and prioritized with those that would generate revenue to help finance other projects having priority;
2. Identify special funds with clear objectives;
3. Apply loan financing to projects that could generate revenue to finance debt;
4. Train member states to become informed about available financing and use the available facilities effectively;
5. Support innovative partnerships, that would facilitate raising funds through bond issues, deferred debt burden arrangements, regional projects and blending of funds;
6. Manage projects effectively in order to achieve objectives and demonstrate ability of region to properly manage resources;
7. Maintain good governance practices;
8. Aligned strategic goals to regional development goals;
9. Align strategic goals with focus areas of the funding agencies;
10. Define a Regional Universal Service Fund to support ubiquitous access to digital technologies, which could be managed by the CDB.

Adopting A Regional Approach

The current short-term plan of action on the Information Society for Latin America and the Caribbean, eLAC 2010 comprises 83 specific goals in six thematic areas[48]. The 83 goals have been grouped into 29 areas, under the six eLAC themes. ECLAC has noted that ICT indicators, particularly on usage and the impact of ICT on human and economic development, are not generally readily available on the Caribbean and indicated that Antigua and Barbuda was the only member State that has done a surveys to provide these measurements, and further suggested that the approach used in the latest Antigua and Barbuda survey of 2009, provided a good benchmark for the rest of the region.

The region, as a whole, has not yet used ICT to positively impact the delivery of health services. Countries have used different approaches to strategy development and implementation and are at various stages of the journey towards the development of the information society. The development and implementation of action plans needed to be streamlined to drive the progress towards reaching the goal of sustainable information societies, and to measure progress. In general, stakeholders agreed that there were several universal challenges to overcome, which could form the basis of a Regional ICT for development Strategy as follows:

[48] Monitoring of ELAC 2010 Progress of ICT development CARIBBEAN information societies, The Economic Commission for Latin America and the Caribbean (ECLAC), Subregional Headquarters for the Caribbean, October 2009

1. *Application of harmonised regional data measurement, collection and classification systems* that more properly reflected the indicators for information and communication technologies for development (within region and with international guidelines); the use of these by the statistical and development agencies that needed to support development planning, to provide reliable access measurement figures, and to track achievements and ICT goods and services in the Region.
2. *Articulation of a clear Regional Policy* for social and economic development and a partnership model and supporting projects to achieve it; including shared infrastructure.
3. *A targeted Regional marketing programme* to support the limited understanding of the role that ICT could play in socio and economic development. It was felt that would support the development of meaningful national ICTs applications in social development Strategies, and the development of specific action plans to target social and economic development; as opposed to focus on Telecommunications laws and regulations. The marketing programme to provide a basic understanding of the impact and potential application of the technology at all levels in the society.
4. *A sustainable process for maintaining currency of the Regional ICT for development strategy to emphasize ICT tangible social and economic development* initiatives to provide a framework for national implementation. Linking all the national initiatives under an overarching rolling Regional Strategic Plan that would continuously review and redefine the vision and policy; as the environment changes. Such a plan would also guide the modernizing of the legal/regulatory framework, e-Government, education, health, community development and the leveraging of cultural value added. A community based strategy approach, with the development of community ICT learning centres, and an ICT focus on cultural/indigenous issues, would be emphasized.

Table 7. Value of adopting a Regional approach linked to Stakeholder Interests

STAKEHOLDER INTEREST	**IMPACT OF A SINGLE CARIFORUM MARKET (Strength in numbers with a targeted and unified approach)**
A single information space with value added staying within the region.	Information storage and sharing at regional level using outsourcing technologies and model.
Citizens, consumers and users	Organized to define common digital users' rights and obligations (to include privacy rights, address and understand trust issues, consumers' online contractual e-commerce rights, protection against cybercrime and libel.
Media and content sector	Consistent rules; equal pricing, copyright and IPR controls with a single CARICOM copyright valid for all.
Telecommunications Services sector	Agree on the Region as a single Caribbean space, in order to deepen markets for new entrants, and enhance competition. Collectively build a single broadband market; establish a single mobile numbering plan for the region, remove mobile roaming charges (to allow cheaper communications),and remove mobile termination for data and voice; create a common regional spectrum space with equitable sharing of resources and income.
ICT value chain services giving power in negotiations for affordable	A larger single market of about 20 million people, for sale of goods and services, e.g., leverage regional purchase of ICT consumer equipment for training; define nature of end-user technology (e.g. smart phones) to be

STAKEHOLDER INTEREST	IMPACT OF A SINGLE CARIFORUM MARKET (Strength in numbers with a targeted and unified approach)
prices	allowed into region; better landing prices for cable and termination fees, etc.
Labour market	Larger labour market of qualified professionals across the Region.
Financial structures and systems	Better and common electronic transaction (payment and funds transfer) systems applied at regional level.
Regulatory environment	A single regulatory environment to gain advantage at international negotiating table.

5. *The Regional regulatory framework for ICT to be revised* to refocus the convergent technologies as the basic ICT requirement in a knowledge-based society, and ubiquitous affordable access to information as central in this regard. This would include issues related to the high cost of bandwidth that results in high resulting cost of delivery of ICT services and user interface technology.
6. *The private sector focus to be involved as partners with the public sector* in embrace innovation and ICT for development. There was no formal IT sector and the social development concept was not an essential part of private sector focus.
7. *ICT for development to be a critical element of the formal education or retraining process at all levels.* There was limited training at the post secondary and tertiary levels; a limited number of trained and certified ICT human resource; and no formal ICT Curriculum spanning the primary through secondary to tertiary level education. Assure the availability of skilled and certified human resources through training and retraining to fit with the intended ICT infrastructure; make provisions for training and research programmes that support innovation and the creation of new products and services; linked this with internship programmes with private sector to build skills in the sector, and intellectual property rights regimes to secure value added.
8. *An ICT regional invention/innovation centre to be established* and otherwise make provisions for training and research programmes that support innovation and the creation of new products and services; linked this with internship programmes with private sector to build skills in the sector, and intellectual property rights regimes to secure value added. A Chair in ICT could also be established to provide leadership and ensure partnership activities with the private sector, the organized research programmes, innovation and entrepreneurship linked to cultural activities and business support clusters.
9. *Identify and appoint strong and charismatic leadership* to champion the rollout of the Regional plan; including dynamic leaders and champions at every level of implementation, and ensure that the regional concept of functional cooperation lead to strengthening partnerships at sectoral, national and regional network levels. Develop an inclusive strategy with the involvement of, and in consultation with those who would use the infrastructure (a bottom up approach); and one that reflected an understanding of the environment.
10. *Ensure an effective governance structure for implementation,* supported by monitoring and measuring the results of programmes and aimed at improving accountability.
11. *Implement regional strategies of negotiating with service providers,* for example, in respect of landing right, cost of services, cost of goods, etc, to reduce the cost of bandwidth and delivery of goods and services and to encourage ICT diffusion, use and production

All stakeholders agree that a regional approach in establishing a Regional Knowledge Based environment will support social and economic development.

Implementation

Governance Structure for Implementation of Regional Strategy

The Caribbean Region has to work together to respond to new developments and concerns in building the information economy and knowledge societies. In order to achieve the aims and objectives of the Treaty of Chaguaramas and subsequent mandates, a number of specialised agencies and committees have been established over the years. Responsibility for ICT, has been fragmented across several agencies and committees, each with responsibility for an area of the ICT process, including telecommunications, e-government and education. However, the cross-cutting nature of ICTs indicates that it is more strategically effective to have a central coordinator for all the activities that would drive the achievement of a strategy for ICTs.

This coordinating structure would be responsible and accountable at the regional level for ensuring that member countries follow the regional approach, adhere to standards, progress towards building information societies and facilitate integration. An in-country structure would complement, champion and drive the Regonal ICT Strategy at the loevel of national implementation, to assure development. The regional structure/regional implementation agency would be primarily responsible for addressing the fragmentation that exists and seek to effect synergies, avoid duplication of effort and repetition of mistakes and facilitate collaboration to benefit from economies of scale while supporting regional integration. It will:

10. Assure a Regional sector focus with a clear understanding of the broader strategic outlook.
11. Eliminate texisting fragmentation, to effectively focus on ICT for development and implementation of the strategy.
12. Be an agency/body that is self-financing in order to reduce the existing financial burden on member countries[49].
13. Be responsible for mobilising concessionary funds to support the implementation of the strategy within member countries.
14. Have the autonomy and political support to implement the strategy.

The experiences of Singapore, Malta, Korea, the Cape Verde Islands and the European Union suggests key policies/practices for the region to follow:

- Appointing a champion at the highest level in the country;

[49] Several MFIs, governments, foundations and partners have allocated large sums to ICT development in this region. The regional strategy will provide the basis on which support will be provided, with the understanding that one agency is accountable for the progress of the region towards building knowledge societies.

- Involving all stakeholders in implementation (public sector, private sector, civil society, all economic sectors, ISPs, youth, education, health, security, legal fraternity, regulatory bodies, financial sector);
- Ensuring that the implementation is market and demand driven,
- Focussing on the regional strategy and common goals; and
- Creating through a targeted marketing programme An education and awareness programme.

There are two potential models for the implementing Agency:

1. An autonomous regional authority, and
2. An authority that centralizes the work of but which works through the existing organs of the community, to progress the development agenda.

Member States are at different stages in development, and the model will need to address:

1. Effective in-country structures
2. Standardization of those structures
3. Broad-based involvement of stakeholders at national level
4. Identification of a national champion
5. Implementation of a marketing/communication/education and awareness process that reaches all areas in the community

This may be achieved through in-country advisory bodies, or consultative bodies.

The Regional process will take into consideration the organizations tat have been established at Regional level, including the CCS, CDB, CRNM, CSMEu, CARICAD, CROSQ, CKLNA, C@ribNET, etc. These community organisations will work together while focusing on core responsibilities, in an integrated IT approach.

An effective governance framework would serve to enhance chances of the current strategy being effectively implemented.

The Framework[50]

The management structure will be implemented within several key IT Principles:

- The value to be created from ICTs as identified – the Application and use – social and economic development.
- Assuring monitoring through the specific, explicit, measurable development outcomes (i.e., the value) from the ICT initiatives.

[50] Based on The Ross and Weill framework

- Prioritizing IT Investment within the regional strategic development plans and the priorities of Member States and the Region.
- The content and application, e.g., The electronic applications such as Electronic Patient Care Record, Customs Administration, Online Education Delivery.
- The IT infrastructure: that will support shared services, affordable access, and the like, to deliver on the stated principles.
- The ICT Architecture, including, the standards, guidelines and practices applied.

The ICT4D Steering Committee was concerned with the central governance question of identifying decision rights in each of the domains identified, and the relationship with the current Governance Structure of the Community The current structure has the Conference of Heads of Government at its apex, being supported by the "organs" COHSOD, COFAP, COTED, COFCOR and the Council for National Security and Law Enforcement. The ICT portfolio has been assigned to the COTED on the basis of its trade and economic impact on the Community.

Table 9. Possible Governance Matrix – CARICOM ICT for Development

Decisions / Groups	IT Principles		IT Investment and Priority		Applications		IT Infrastructure		IT Architecture	
	Input	Decide	Input	Decide	Input	Decide	Input	Decide	Input	Decide
Conference of Heads of Government		X		X						
COHSOD, COTED, COFAP etc		X		X		X				
Legal Affairs Cttee							X		X	
National Cabinets/Cabinet Subcommittees		X		X		X				
National Ministers for ICT/CIOs	X		X		X			X		X
Permanent Secretaries, Senior Public Service Mgrs	X		X		X					
Regional ICT Steering Committee	X		X		X		X		X	
National ICT Advisory Bodies	X		X		X		X		X	
Attorneys General							X		X	

Source: CARICOM ICT4D Steering Committee

Because of the critical and cross-cutting nature of the ICT sector, the decision rights in the areas of IT principles and IT investment and priorities lies ultimately with the Heads of Government, even as decisions on principles with respect to ICT sector development initiatives in education and health would rest with those agencies that have sector responsibilities (eg. COHSOD for

education, security with the Council of Ministers for National Security and Law Enforcement); since these organs, their constitution, their areas of responsibility and their rules of procedure among other things are enshrined the Revised Treaty of Chaguaramas.

Thus any regional strategic ICT for development initiative in the areas of health, education, financial systems (e.g. systems to facilitate capital markets), security and the like are going to have to be addressed by the organs of COHSOD, COTED, COFAP, etc. It is, however, acknowledged that a Council of Ministers for ICTs ought to be more effective at dealing with infrastructure issues. Thus the infrastructure issues could be the direct responsibility of the council of ministers for ICTs. This would assure the primacy of the **4D** "For Development" by having the responsibility for sector initiatives remain with the relevant existing councils.

Table 9 suggests one model for the distribution of decision rights and accountability in strategy making and implementation. It recognises CARICOM as a "community of sovereign states" while expecting that implementation/execution would ultimately occur at the level of the member states.

Some requirements on establishing the governance frameworks could include

- Approval of an explicit governance framework for ICT with the development focus.
- Requirement for establishment of cabinet subcommittees for ICTs comprising ministers represented on the councils in addition to Attorneys General (for laws and harmonization efforts)
- Requirement for establishment of ICT Authorities and/or apTpointment/designation/ identification of CIOs
- Requirement for organs to consider ICT development initiatives for a specific number of consecutive meetings to ensure that continued attention is paid to the initiative in its formative stages
- Establishment of National Advisory Bodies
- National Advisory Bodies meet to produce written recommendations to subcommittee or relevant ministers.

The model also speaks to mechanisms for making the decisions, and enacting them and it specifies,

- Decision-making structures based on what exists
- Alignment processes to assure that the decisions are aligned with the IT principles.
- Communications approaches for building effective communication with stakeholders

The provision of technology alone will not optimally harness the potential of ICTs to improve access, the transformation of teaching and learning and the growth of new technologies. To take full advantage of the different technologies and to direct their maximum use for the benefit of all students, there needs to be a clear framework which sets the scene and provides the enabling environment for technologies to be integrated, deployed and used to their fullest potential. The next steps in the implementation of the RDdS, is to agree on such a framework.

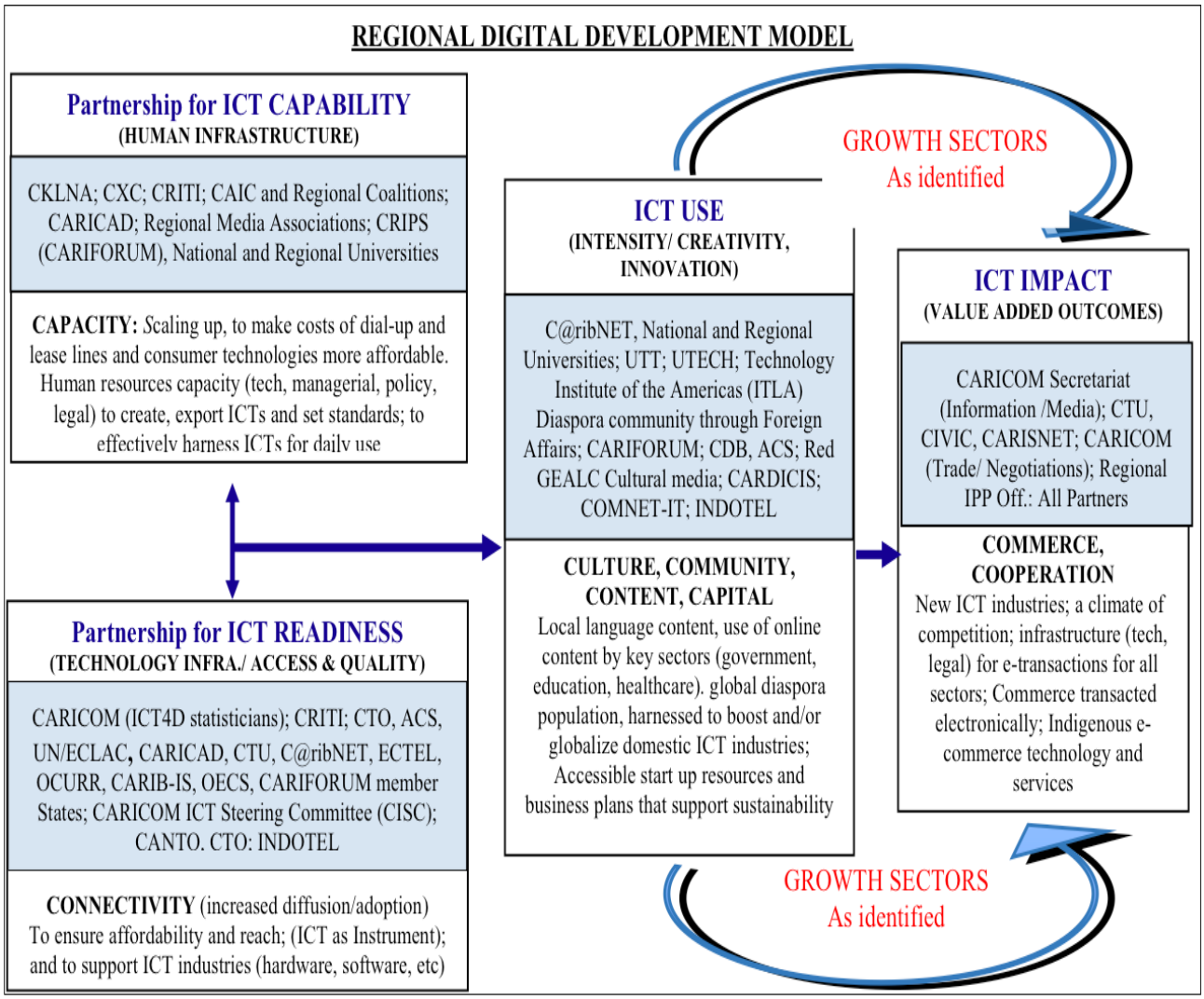


Figure 11. *Players in the Regional ICT4D Model to Support Development Outcomes*

Social and Economic Development Issues

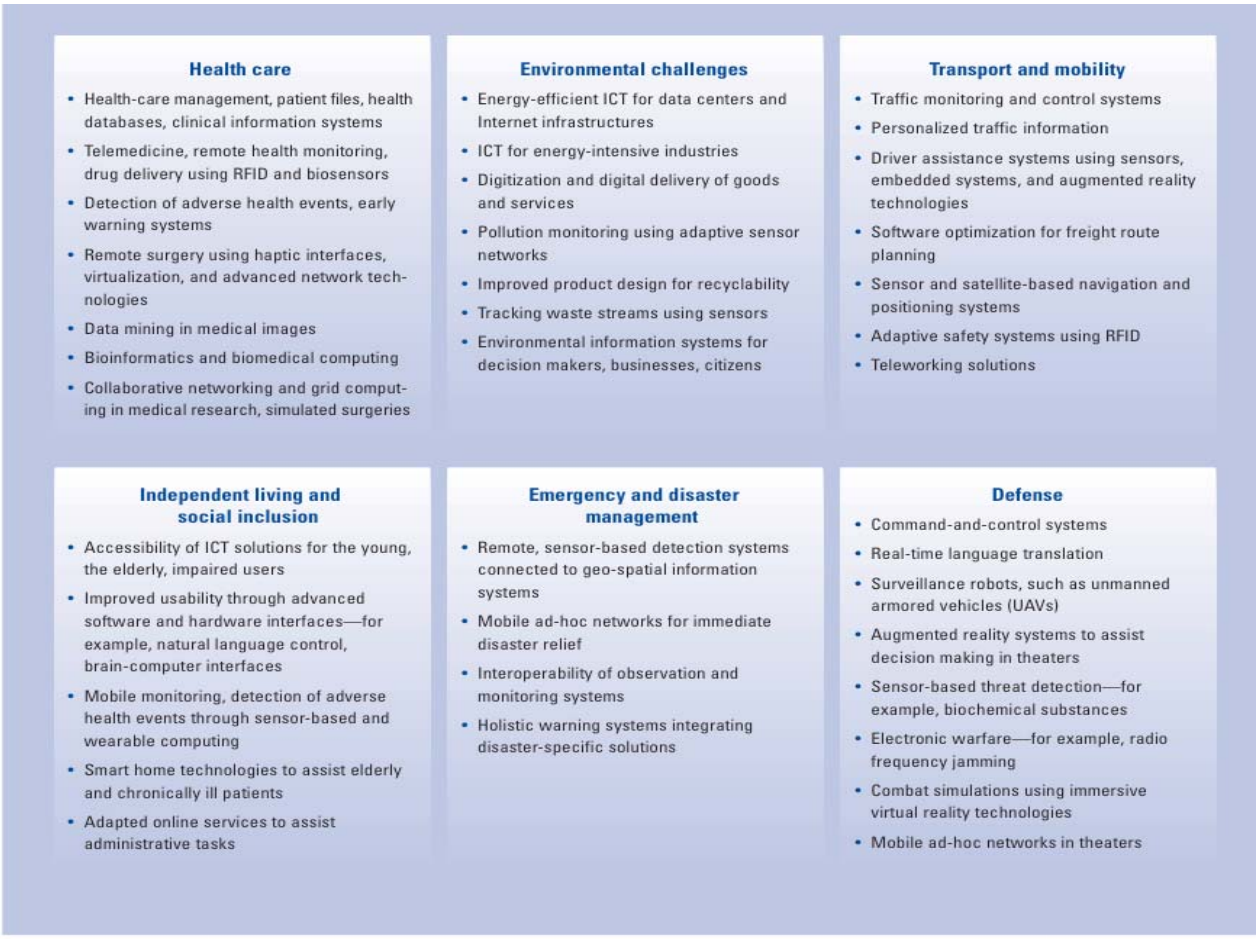
Examples of research and development solutions impacting Socio-Economic Development challenges are provided to give focus to the short-term strategy and action plan. Existing initiatives and research projects, which have Regional focus, and have been implemented partnership with other agencies, both national and international, are outlined.

These projects may be scaled up to become regional projects and to provide quick wins as part of a short-term strategy for implementation.

Social and Economic Development ICT Examples

The area of ICT for social and economic development has recently begun to take prominence in the global ICT sector, and is especially indicated for developing countries. Box 2A shows how research could impact Socio Economic Development.

Box 2: Examples of R&D Solutions in Socio Economic Development Issues.



Source: World Economic Forum, 2009

Regional Social Development Inventions/Innovations

Researchers in the CARIFORUM have been working steadily and quietly for the most part to develop solutions to everyday problems that have been impacting on efficiency and service to the community. Discussions with stakeholders in the region have uncovered innovators in Belize, Jamaica, Trinidad and Tobago, Washington DC, who have been working to prove and improve their products and services within the constraints of an informal environment that makes it difficult for inventors and entrepreneurs to survive or prosper. Innovative research that has been yielding tangible results is to support health care and tourism, robotics, stakeholders in the diaspora in respect of Cultural Arts and training industries and the media; and education linked with humanitarian support to the impoverished. These four initiatives as outlined below and in Appendix C, form potential regional projects for short-term action:

1. Doctor on Call – Jamaica Team for Coral Project

This project has designed and proven software to provide databases and community healthcare access and linkages to medical support on line, by the ubiquitous mobile telephone. Modernizing the Heath Care System of the Caribbean in preparation for the Health Tourism Market, is a commercial viable project that involves the collaboration of the School of Public Health and Health Technology, College of Health Sciences, UTECH, and the Centre for the Development of Enterprise (CDE).

UTECH has already had interest from European Companies as well as funding agencies. Discussions have begun with the Haitian University to use the software for similar purposes, and to link this with distance learning classes, delivered to Haiti from the School of Public Health, using the facility of C@ribNET.

2. University of Trinidad and Tobago (UTT)

One UTT research programme is developing applications in robotics, and applying cultural innovations to solve physical development/training problems (e.g., cultural innovations, including, tassa drumming, steel pan playing, bowling machines for cricket and karate). UTT is working with India to continue to develop and prove the inventions, and is proposing,

'… the establishment of a regional invention/innovation centre, for the purposes of:

- Evaluating concepts for new products and Building prototypes
- Innovating/improving new products and services
- Conducting short courses throughout the Caribbean for inventors on design methodology
- Conducting short courses throughout the Caribbean for inventors on product development…'

UTT is willing to spearhead the efforts to achieve the indicated results[51].

3. The SET/Jamaica Promise Foundation

GSAT Project, is being executed in conjunction with CXC/Harvard Law School Centre for Internet and societyRice (See Box 2C). The initiative involves the use of ICT learning games with virtual winnings going toward real donations to solve the global hunger problem (solving also learning and social development problems) (http://www.freerice.com).

The SET/Jamaica Promise Partnership is committed to open education expressed through cyberspace in open code emanating from the warmth of Jamaica, spreading through the Caribbean and potentially to the rest of the world. It aims to utilize open source education to

[51] Professor Prakash Persad, Engineering Dept, UTT, at Roundtable Discussions, Caribbean ICT Workshop, 26 -28 April 2010.

foster the growth of students and unleash their true potential not only in Jamaica but also in the wider Caribbean.

The GSAT Project will develop and program a software environment accessible through computer and phone to earn points toward scholarship by getting right answers on GSAT prep questions. Results of the GSAT Project will be tangible and quantifiable. The progress will be measured by the performance scores of GSAT Project students in Jamaica and the wider Caribbean who sit for these examinations.

4. Cultural Scholastic Tourism, Carnival Arts Village Education (CAVE)

This is one of several proposals of a Trinidadian national who lives in Washington involving, Trinidad Cultural Scholastic Tourism, Carnival Arts Village Education and Arts and Humanities Courses. It is linked to the cultural and heritage tourism and training through distance learning modules. It is a model worth exploring[52].

There are many other creative projects being implemented in the region. A concerted effort has to be made to identify them, and to determine fit, scalability and potential effect.

[52] Videos received from Trinidadian national, David Boothman, Maryland, dboothman2@aol.com.

BIBLIOGRAPHY

Asia-Pacific Telecommunity, 2010. Strategic Plan of the APT 2009 – 2011, Asia-Pacific Telecommunity, aptmail@apt.int,

Bassi, Roxana, 2009. Survey of ICT and Education in the Caribbean – Volume I: Regional Trends and analysis ICTs in Education (ICT4E); Policies and Plans worldwide; Version 30/October/09 (full country list, 193 countries and territories). Global e-schools and Communities Initiative, http://www.gesci.org

Bhaumik, Pradip K., and Arindam Banik, 2006. FDI, Skilled Labour and the Caribbean's Emerging Competitive Disadvantage. International Management Institute B-10, Qutab Institutional Area, Tara Crescent, New Delhi.

Caribbean Centre for Development Administration (CARICAD), 2009, CARICAD Regional and Sub Regional Initiatives and Country Specific Activities, 2009. CARICOM Secretariat, Guyana

----------, 2009. CARICAD e-Government strategy 2010 -2014, CARICOM Secretariat, Guyana

----------, 2010. Report of the Fourth Meeting of the Regional Information and Communication Technologies (ICT) Steering Committee, St. Georges, Grenada. CARICOM Secretariat, Guyana

Caribbean Community (CARICOM), 2009. Brief on the Caribbean Telecommunications Union (CTU) for the Meeting of CARICOM and CTU Officials, Trinidad and Tobago. CARICOM Secretariat, Guyana

----------, 2001. Revised Treaty of Chaguaramas establishing the Caribbean Community, including the CARICOM Single Market Economy. CARICOM, 2001. http://www.caricom.org/jsp/community/revised_treaty-text.pdf

----------, 2009. Brief on the Caribbean Telecommunications Union (CTU) CTU Mission and Achievements, 2003-2009

----------, (undated). Information and Communication Technologies for Development (ICT4D) - E-CARICOM. CARICOM Secretariat, Guyana

----------, 2002. CARICOM Advisory Group to Establish a Core Data Set for the Region with specific attention to Statistics on Information and Communication technologies (ICT) - meeting rationale, CARICOM Secretariat, Guyana.

----------, 2002. Discussion Paper: Draft Framework For CARICOM 2010 – Information Society Strategy

----------, 2007. Work Plan of the Information and Communication Technologies (ICT) Sub-Committee on Statistics, Sub-Committee to the Regional Information and Communication Technologies (ICT) Steering Committee at the Inaugural Meeting of the ICT Sub-Committee on Statistics held 4 October 2007 in Georgetown, Guyana. CARICOM Secretariat, Guyana

----------, 2009. Defining the scope of the Information and communication technologies (ICT) sector and developing a framework for analysing the impact of ICTs: Follow-up to the second meeting of the ICT Sub-Committee On Statistics, February 2009, Barbados. CARICOM Secretariat, Guyana

Cleland, Celene M. and David M. Gomez, 2003. IDB Technical Cooperation Project; Prospects for Caricom Services Exports In Information and Communications Technology: Trade and Investment Issues. Caribbean Regional Negotiating Machinery, Bridgetown, Barbados

Eastern Caribbean Telecommunications Regulators (ECTEL), 2007. Draft Model National Policy for Advancing Growth in the ICT Sector in ECTEL Member States. St Lucia

Ertl, H., and G. Sciadas, 2006. The Canadian experience and applications for Latin America and the Caribbean: A Training Workshop; Panama City, Panama. International Development Research Centre (IDRC)

Forge, S., Blackman, C., Bohlin, C., Cave, M., 2009. A Green knowledge society: An ICT policy agenda to 2015 for Europe's future knowledge society 2005; A study for the Ministry of Enterprise, Energy and Communications, Final Report. 2009, Government Offices of Sweden, SCF Associates Ltd, UK

Gaible, Edmond. 2008. Survey of ICT and Education in the Caribbean, A summary report, Based on 16 Country Surveys. Volume 1: Regional Trends and Analysis. The International Bank for Reconstruction and Development/ The World Bank, Information for Development Program (infoDev)

Girvan, Norman, 2007. Towards a Single Development Vision and the Role of the Single Economy, Caribbean Community (CARICOM), Guyana.

Holmes, Henderson B., 2004. Analysis of IT Sub-sector in Dominica. The National Development Corporation of Dominica

International Development Research Centre (IDRC), Institute of Southeast Asian Studies (ISEAS), 2009. Living the Information Society in Asia, ISEAS Publishing, Institute of

Southeast Asian Studies, Singapore

International Development Research Centre (IDRC), 2009. Telehealth in the Developing World. Royal Society of Medicine Press Ltd, International Development Research Centre

International Telecommunication Union (ITU, 2009. Measuring the Information Society – The ICT Development Index, 2009, International Telecommunication Union (ITU), Geneva, Switzerland

Labelle, Richard, 2004. ICT Policies and e-Strategies in the Asia-Pacific: A Critical Assessment of the Way Forward, An Overview of ICT Policies and e-Strategies of Select Asian Economies, Elsevier

----------, 2005. ICT Policy Formulation and Strategy Development. A Comprehensive Guidebook,; United Nations Development Programme-Asia Pacific Development Information Programme (UNDP-APDIP); Academic Press, Butterworth-Heinemann, Digital Press, Elsevier

Levy, Carlos Miranda, 2007. Information Society and Public ICT Policies in the Caribbean: a review of advances and challenges, policy instruments and country experiences. UN ECLAC, Santiago, Chile, 2007

Mallalieu, Kim, 2007. Pro poor mobile capabilities: service offering in Latin America and the Caribbean. Diálogo Regional sobre Sociedad de la Información (DIRSI), Lima.

Marcel, Gillian, 2004. Mobilising ICTs for CARICOM Development: A 21st Century Imperative; An Action-Oriented Regional ICT and Development Strategy: Adopted by Third Meeting of Ministers Responsible for Information and Communication Technology (ICT). Caribbean Community (CARICOM), Guyana.

Mc Kinsey and Co., 2008. Development of IT and ITES Industries – Impacts, Trends, Opportunities and lessons Learned for Developing Countries. Government of St Kitts and Nevis

Okuda, A., K. Jin Lee, and R Delmotte, 2009. Measuring ICT for Development and Building of the Information Society in Asia and the Pacific. Technical Paper. Information and Communications Technology and Disaster Risk Reduction Division, ESCAP

Porter, Michael E., and K. Schwab, 2008, The Global Competitiveness Report 2008–2009. World Economic Forum, Geneva

Stern, Peter A., 2006. Assessment of the Telecommunication Services Sector in CARICOM: Convergence Issues at the Regional and International Level. Caribbean Regional Negotiating Machinery, Barbados

The Dominican Telecommunications Institute (INDOTEL) and the National Commission for

the Information and Knowledge Society, 2005. National Strategy for the Information and Knowledge Society (*Estratégia Nacional para la sociedad de la Informacion y el Conocimiento: Plan Estratégico E-Dominicana*) 2007-2010; The Dominican Republic Surfing into a Better Future. Dominican Telecommunications Institute (INDOTEL) and the National Commission for the Information and Knowledge Society, Santo Domingo, Dominican Republic. www.cnsic.org.do

The European Commission (EC), 2009. i2010: A European Information Society for growth and employment. European Commission (EC),

----------, 2009. A Strategy for ICT R&D and Innovation in Europe: Raising the Game. European Commission (EC),

The European Union, 2009. Communication from the Commission to the Council, The European Parliament, The European Economic and Social Committee and The Committee Of the Regions, "i2010 – A European Information Society for growth. The European Union

The Government of Antigua and Barbuda, 2008. Antigua and Barbuda National ICT Housing Survey, Commonwealth Secretariat, 2008

----------, 2009. The Government Gateway of Antigua and Barbuda: An E- Government Strategy For Antigua and Barbuda and The Government Gateway E-Government Initiative of Antigua and Barbuda.

The Government of Barbados, 2005. Draft National ICT Strategic Plan: Mobile Barbados, Building a Networked Nation, Government of Barbados

The Government of Belize & the Commonwealth Secretariat, 2007. Belize Benchmarking and e-Readiness Assessment Workshop, Belize

The Government of Grenada, 2002. Information and Communication Technology Strategy and Action Plan 2001-2005, Office of the Prime Minister, Grenada

----------, 2007. Grenada Information & Communication Technology Sector Profile, The Agency for Reconstruction and Development, Government of Grenada, 2007 http://www.bandwidthmarket.com/index.html

----------, 2009. E-government and ICT Status Report. Government of Grenada, Office of the Prime Minister, St. Georges, Grenada.

The Government of the Republic of Guyana, 2006. ICT4D Guyana National Strategy, Final Draft, Government of Guyana

The Government of Jamaica, 2007. Powering Jamaica - National Information and

Communication Technology Strategy 2007-2012, Government of Jamaica

----------, 2009. Draft Green paper: The Jamaica Information and Communications Technology Policy. Government of Jamaica.

The Government of St. Lucia, 2006. National Information and Communication Technology Strategic Plan, St Lucia

----------, 2009. Readiness of St Lucia in the area of e-government, "Development of eGovernment in St Lucia"; Small State Network for Economic Development. The Government of St. Lucia.

The Government of Suriname, 2006. Roadmap to Information and Communication and Technology (ICT) policy of Suriname, Minister for Transport, Communications and Tourism, Government of Republic of Suriname.

----------, 2007. Suriname National Technology Policy, 2007: Understanding its Wealth; Building up New Horizons: Policy Document and Action Plan. Ministry of Labour, Technological Development and Environment, the Government of Suriname and the Inter-American Development Bank (IDB)

The Government of the Republic of Trinidad and Tobago, 2003. Fast Forward: Trinidad and Tobago's National Information and Communication Technology Strategy, 2003, Ministry of Public Administration and Information, Trinidad & Tobago

The Organisation of Eastern Caribbean States (OECS), 2002. Final Report ICT Policy and Strategic Plan, Member States of the Organisation of Eastern Caribbean States (OECS), Grenada, St Vincent & The Grenadines, St Lucia, Dominica, St Kitts & Nevis, Antigua & Barbuda, Montserrat, Anguilla and the British Virgin Islands; Telecommunication Reform & Modernisation Project. IBRD

----------, 2006. Final Report ICT Policy and Strategic Plan: Telecommunication Reform & Modernisation Project. Member States of the Organisation of Eastern Caribbean States (OECS);

United Nations (UN), 2003. Bávaro declaration - report of the Latin America and Caribbean regional conference for WSIS (Bávaro, 29-31 January 2003); World Summit on the Information Society, Measuring the Information Society: United Nations, New York

----------, 2004. International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev.3), UN (United Nations) (unstats.un.org/unsd)

----------, 2008. Delivering on the Global Partnership for Achieving the Millennium Development Goals.MDG Gap Task Force, Report 2008, United Nations, New York and Geneva,

United Nations Conference on Trade and Development, 2004. Globalisation for Development: The International Trade Prespective: e-Health for Health-care Delivery: Strategy 2004-2007. UNCTAD, Geneva: WHO www.who.int/eht/en/EHT_strategy_2004-2007.pdf

----------, 2007. Information Economy Report, 2007-2008: Science and technology for development: The new paradigm of ICT. UNCTAD Secretariat, United Nations, New York and Geneva, 2007

----------, 2007. World Information Society Report: Beyond WSIS. International Telecommunication Union, United Nations Conference on Trade and Development, Geneva

----------, 2007. The Least Developed Countries Report: Knowledge, Technology, Learning and Innovation or Development. United Nations Conference on Trade and Development, Geneva

----------, 2007. Information Economy Report, 2006-2007: Science and technology for development; the new paradigm of ICT. Prepared by the UNCTAD Secretariat, UNITED NATIONS, New York and Geneva

----------, 2007. Digital Opportunity Index 2005/06-World, World Information Society Report 2007, UNCTAD/ ITU

United Nations Development Programme-Asia Pacific Development Information Programme, (UNDP-APDIP), 2005. ICT Policy Formulation and e - Strategy Development. A Comprehensive Guidebook, Asia-Pacific Development Information Programme (APDIP), United Nations Development Programme-Asia Pacific Development Information Programme, (UNDP-APDIP)

----------, 2004. ICT Policies and e-Strategies in the Asia-Pacific; A critical assessment of the way forward . Asia-Pacific Development Information Programme, Published by: ELSEVIER, India.

United Nations Education, Scientific and Cultural Organization (UNESCO), 2005. Building capacity for ICT-based distance education; Caribbean Universities Project for Integrated Distance Education (CUPIDE), 2005. UNESCO Office for the Caribbean, Kingston, Jamaica

----------, 2009. National Information Society Policy; A Template, UNESCO

United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations Conference on Trade and Development and World Trade Organization, 2002.The Manual on Statistics of International Trade in Services, United Nations Publications, DC2-853, New York, NY 10017

United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), 2003. Road maps towards an information society in Latin America and the Caribbean; Regional Preparatory Ministerial Conference of Latin America and the Caribbean for the World Summit on the Information Society, Bávaro, Punta Cana, Dominican Republic, United Nations, General Economic Commission for Latin America and The Caribbean – ECLAC

----------, 2006 Barbados's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2006. Grenada's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2006. Guyana's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2006. Jamaica's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2006. Suriname's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2006. Trinidad and Tobago's Information Society Country Profile, UNECLAC Subregional Headquarters for the Caribbean, November 2006

----------, 2009. Report of the Expert Group Meeting on Knowledge Management for Development: Towards a practical approach for the Caribbean, 2009 Port of Spain, Trinidad and Tobago. UNECLAC Subregional Headquarters for the Caribbean.

United Nations University, 2008. Embedding Research in Society: Development Assistance Options for Supporting Agricultural Innovation in a Global Knowledge Economy; Andy Hall; UNU-MERIT Working Papers ISSN 1871-9872. Maastricht Economic and social Research and training centre on Innovation and Technology, UNU-MERIT, United Nations University, MERIT, Maastricht, The Netherlands

World Bank, 2008. Survey of ICT and Education in the Caribbean: A summary report, Based on 16 Country Surveys. Washington, DC: infoDev / World Bank. Available at hppt://www.infodev.org/en/Publication.441.html

World Economic Forum and INSEAD, 2009. The Global Information Technology Report 2008–2009, Mobility in a Networked World. 2009, World Economic Forum

World Health Organization 2006a, Building Foundations for Health, WHO Region of the Americas, Bahamas, WHO, Geneva

----------, 2006b, Building Foundations for Health, WHO Region of the Americas, Belize,

WHO, Geneva

----------, 2006c, Building Foundations for Health, WHO Region of the Americas, The Bahamas, World Health Organization, Geneva

World Society for Information Services (WSIS) Declaration of principles, 2004, United Nations, www.euklems.net

World Trade Organization (WTO), 2004. World Trade Organization Treaties: General Agreement on Trade in Services, WTO, Geneva, Switzerland, World Trade Organization (WTO) Services Decision on negotiations on basic telecommunications; WTO, Geneva, Switzerland

World Trade Organization and the World Bank, 2006. Measuring trade in services: A training module produced by WTO/OMC in collaboration with the Inter-agency Task Force on Statistics of International Trade in Services. Economic Research and Statistics Division of the World Trade Organization and the World Bank, WTO's International Trade Statistics (www.wto.org/English/res_e/statis_e/statis_e.htm).

APPENDICES

Appendix 1. About the IDI Indicators

TECHNOLOGY INFRASTRUCTURE

1. Fixed telephone lines per 100 inhabitants

Fixed lines remain an essential critical infrastructure indicator in all countries for both voice traffic as well as a basis for upgrading to broadband infrastructure, although slightly decreasing worldwide.

2. Mobile cellular telephone subscriptions per 100 inhabitants

Mobile subscription is a key indicator for measuring telephone access and uptake. Mobile

is rapidly replacing fixed telephony in developing countries, and is especially important for developing countries where fixed line infrastructure is limited. By the end of 2008, mobile subscriptions would have represented over 77 per cent of total (fixed and mobile) telephone subscriptions.

3. International Internet Bandwidth (bit/s) per Internet user

This is an important indicator, although there has been some discussion among experts re including this variable in the index at this time. This debate has suggested that domestic bandwidth may also be an important indicator as the technology permits in the future.

ACCESS

4. Proportion of households with a computer

This is a core indicator to record degree of people's access to computers, since having access to a computer at home can be a key enabler for developing ICT skills, in particular among children and young people.

5. Proportion of households with Internet access at home

This provides information about sustainable access to the Internet by individuals. Public Internet places, additionally provides information, but can often target specific groups, for example, young people and foreigners.

IT USE AND INTENSITY OF USE

1. Internet users per 100 inhabitants

To measure the uptake of Internet access and use that would not be captured by the number of Internet subscribers.

2. Fixed broadband Internet subscribers per 100 inhabitants

Broadband indicators are important for measuring the uptake and intensity of Internet use and the quality of the Internet experience.

3. Mobile broadband subscriptions per 100 inhabitants

IMT-2000/3G networks and devices (including mobile handsets and data cards that allow users to access the Internet over the mobile cellular network using their computer) will support the increased use of mobile broadband, and will become important in particular in countries with limited fixed line infrastructure. It is an important variable to measure the use (and intensity of use) of Internet in both developed and developing countries.

Box A1
IDI Assessments for selected Countries

High *(IDI values above 5.29):* Economies included in this group have high level of ICT access and use and high ICT skills. The 33 economies accounted for 15 per cent of the world's population in 2007 and included twenty-one European countries, ten Asia & Pacific economies, as well as Canada, and the United States.

Upper *(IDI values between 3.41 and 5.25)*: The economies included in both this group and in the "high" group accounted for more than 27 per cent of the total population in 2007. Economies included in this category are those that have achieved an elevated level of access to and use of ICTs, and ICT skills, for a majority of their inhabitants. This group includes countries from different regions such as Mauritius from Africa, nine countries from Eastern Europe, three countries from South-Eastern Asia, two countries from the Caribbean (Jamaica and Trinidad and Tobago)

Medium *(IDI values between 2.05 and 3.34):* Dominican Republic;

Low *(IDI values between 0.82 and 2.03):* The remaining one-third of the world's inhabitants can be found in this group, including Haiti.

Appendix 2a: List of Stakeholders Consulted

Organisation/ Member State	Representative	Contact Information
Barbados		
The National Council for Science and Technology, Barbados	Charles Cyrus Senior Technical Officer,	246-228-5765, Ext 5272., Charles.cyrus@commerce.gov.bb
	Chesterfield Coppin E-Commerce Development Officer	246-427-5270; 246-228-4548. Chesterfield.coppin@commerce.gov.bb
Ministry of Commerce, Consumer Affairs and Business Development,		
Belize		
Public Utilities Commission	Renell Alamilla Sr.	
Ministry of the Public Service, Governance Improvement and Elections & Boundaries	Charles A. Gibson CEO (Permanent Sec.)	ceo@mps.gov.bz
Attorney General's Ministry	Pricilla Banner Deputy Solicitor General	
Public Service Union (PSU)	Jacqueline Willoughby Sanchez, JP, President PSU	
Public Service Union (PSU)	Kathy Linares Chair, PSU Belmopan Branch	
Central Information Technology Office (Wide area network)	Michelle Longsworth Director	
Public Utilities Commission (PUC)	Kingsley Smith Director Telecommunications	
University Management Ltd. (Private Sector – ICT Industry)	Carlos Namis Managing Director	
Customs Department	Pete Castillo Senior Project Officer	
Private Consultant IT	K. Mustafa Toure	
De Gannes Technologies	Dereck A. De. Gannes CEO	dereckddg@yahoo.com 011-501-600-0784
University Management Ltd.	Juan Carlos Namis CEO	jcmnamis@www.bi 011-501-223-1607
Ministry of the Public Service, Governance Improvement and Elections & Boundaries	Charles A. Gibson CEO	ceo@mps.gov.biz +501-822-2204
ICT and E-Gov Task Force	**Member**	**Group Consultation**
Ministry of the Public Service	Dwightt Gillet	it@mps.gov.bz
Police Department	Harry Noble	harry.noble@policenet.bz
Min. of the Public Service	Ninfa Matus	csc@mps.gov.bz
Taiwan Technical Mission in Belize	Max Chung	h.c.chung@rcdf.org.tw
Ministry of Education	Kevin Harris	kevin.harris@mse.gov.bz
Ministry of Health	Ian Smith	ismith@health.gov.bz

Organisation/ Member State	Representative	Contact Information
ICT and E-Gov Task Force	**Member**	**Group Consultation**
Ministry of Foreign Affairs	Patricia Menzies	patriciamenzies@gmail.com
NEMO	Andrew Wade	andrew.wade22@msn.com
Office of the Auditor General	Elvis Saravia	ellfae@gmail.com
Ministry of Natural Resources	Favidi Martinez	it_manager@mnrei.gov.bz
Ministry of Economic Development	Jeanette Garcia	jeanette.garcia@med.gov.bz
Caricom Climate Change Centre	Derek de Gannes	ddegannes@caribbeanclimate.bz
CITO	Michelle Longsworth	
Office of the Auditor General	Selwyn Fuller	selwynfuller@yahoo.com
GIU-MPS	Byron Teseuim	itsa@mps.gov.bz
UB	Ruel Cima	rcima@ub.edu.bz
GIU	Caleb Pena	itech@mps.gov.bz
Dominican Republic		
INDOTEL	Amparo Arango International Relations	809-688-0671; 769-1981 aarango@indotel.org.do
Oficina Nacional de Estadistica	Margarita Jiminez, International Relations	809-688-0671; 769-1981 margarita.jiminez@one.gov.do
MESCYT	W. Murcelo Mouver CEO	809-731-1220; 370-0276 willie@seescyt.gov.do
Centro de Invest. Para la accion feminina (CIPAF)	Jennifer Yepez Researcher	809-535-2656; 460-3354 Yepezj@gmail.com
Conseja nacional de competitinidad	Laura del Castillo Coordinator of Negotiations	809-873-5995 laura@cnc.gov.do
Parque cibernetico Santo Domingo	Rafael Vargas Director of Marketing	809-738-5000 rafael.cberparkofstodgo@gmail.com
OPTIC	Julissa A. Quintero G Head, Department of Planning and Control	809-472-4276 julissa.quintero@optic.gob.do
OPTIC	Ana Lendor International Relations Officer	809-286-1009 ana.lendor@optic.gob.do
Oficina Nacional de Estadistica (ONE)	Cristiana Rodriquez Coordinator of Negotiations	809-682-7777 cristiana,rodriquez@one.gob.do
Comision nacional de neg. commerciale	Alejandro Correa Technical Analyst	809-345-4117 alejandro.correa@cnnc.gov.do
Ministeria de Educacion	Elas Romano Technica Docenta Nacional	809-696-2848 elsa.romano@see.gob.do
Ministeria de Administracion Publica	Conrado E Morillo Gebhard Systems Coordinator	809-451-2650 conrado.morillo@map.gob.do

Organisation/ Member State	Representative	Contact Information
ITLA	Mariel Matos Social Issues	809-738-0852 matos.mariel@itla.gov.do
Universidad Iberroamericana Cunibe	Darwin Munoz ICT Specialist	809-689-4111 d.munoz@unibe.edu.do
Consultant	Marcos Juan Troncoso Mejia	809-334-6000 marcos.troncoso@gmail.com
Inovaware Teleservices INC (UNIBE)	Eric, Federico Perez Vega President, Business Director	809-221-2293 eric.perez@inovaware.com
Sang DATARED	Rosario Sang de Santo President	809-567-0290 rsang@sangdatared.com
NEX	Taiana Mora Gerente General	809-540-6186 tmramis@nexconsulting.net
CIPAF	Magaly Pineda Executive Director	809-535-2696 magalypt@gmail.com
MUDE	Randy Torres Brea Enc. Computos	809-563-8111 rtorres@mude.org.do
Alianza One	Roderigo Segura Franco Executive director (Interno)	809-221-9192 rsegura@alianzaorg.org.do
Participacion Cuidadana	Patricia Pena Local Consultant	809-685-6200 p.pena@pciodadana
Fundacion Sur Futuro, Inc.	Susana Arie Corporan Gerente de Educacion	809-472-0611 sdone@surfuturo.org
INTEC	Cesar Pichardo Researcher/Coordinator of IT	809-567.9271 cpichard@intec.edu.do
FUNGLODE	Mildred Reyes Esterez Assistent Education and Technology	829-715-1704 m.reyes@funglode.org
FUNGLODE	Paul Goris/famile Eusibio Assistent Education and Technology	p.goris@funglode.org
Fundacion Sur Futuro, Inc.	Jamile Eusibio Assistent Education and Technology	j.eusibio@funglode.org
CIVIC Representative	Yasmine Kelladi Consultant	
Guyana		
Office of the President	Gita Raghubir	gitaraghubir@yahoo.com
Private Sector and CIVIC rep.	Lance Hinds Member ICT4D Committee	
St. Lucia		

Organisation/ Member State	Representative	Contact Information
Ministry of the Public Service and Human Resource Development	Philip Dalsou Permanent Secretary	758-468-2202 pdalsou@gosl.gov.lc
Ministry of the Public Service and Human Resource Development	Judith Fontanelle Accountant	jfontanelle@publicservice.gov.lc
Ministry of Tourism	Angella Smith Tourism Officer	ansmith@gosl.gov.lc
Ministry of Commerce	Gisele JnBaptiste Info. Systems Manager	gijnbaptiste@gosl.gov.lc
Ministry of the Economic Affairs	Fiona Ghirawoo Economist	fghirawoo@gosl.gov.lc
Ministry of Education	Francis Jn Baptiste Software Engineer	fjnbaptiste@gosl.gov.lc
Ministry of Health	Randal Neptune Network and data base manager	randal@stlucianhc.org
Ministry of Economic Planning	Esther Peter Economist	scorpionov78@hotmail.com
Ministry of Social Transformation	Richard Maxwell IT Manager	rmaxwell@gosl.gov.lc
Ministry of Education	Ron Isaac IT Manager	risaac@education.gov.lc
LIME	Ronald Norville Network Engineer	ronald.norville@time4lime.com
Spectra TV	David Fernandez Manager	ferdi@candw.lc
IRD	Terry Ferguson Systems Administrator	terrence.ferguson@ird.gov.lc
CCL	Desmond Astwood General Manager	dastwood@gosl.gov.lc
G.I.S.	Richard Alfred Webmaster	webmaster@dis.gov.lc
NICTO	Richmond Felix Information Systems Analyst	admin@ict.gov.lc
NICTO	Leota Charlemange Information Specialist	lcharlemange@ict.gov.lc
NICTO	Alisha Errance ICT Research Assistant	research@ict.gov.lc
NICTO	Heidi Noel Secretary	info@ict.gov.lc
OECS	Kervyn Tobias EGRIP Specialist	ktobias@oecs.org
Civil Status	Franklin Chandler DBA	crushiv@hotmail.com
SLICTA and Coverage Solutions	Terrance Elliot Vice President	terrance.elliot@converge solve.org

Organisation/ Member State	Representative	Contact Information
Suriname		
Ministry of Trade	Dr. Thea Smith	
	Cynthia Scarke	Telecommunications, Media and ICT matters, ,
	Daniella Hoffdom-Baldame	ICT$D, Labour matters
	Jean Smith, Senior Librarian	, Anton de Kom Universiteit van Suriname
Executive Body of the Suriname Business Development Centre	Ratan Kalka Managing Director, Business and Trade Promotion Advisor	rkalka@sbc.sr, Tel. 597-471521
	Mr. Zalmain	Consultant and Trade Advisor
	Mr. Gomsma	ICT Consultant
Digicel, Suriname	Romeo Kasanwidjojo, IT Manager	romeo.kasanwidjojo@digicelgroup.com597-810-1031; 597- 462-626 ext 2023
Ministry of Commerce, Consumer Affairs and Business Development (MCCABD)	Farley Tamsiran Industry and SME Unit	
MCCABD	Imro San A. Jong, Policy Advisor	
Suriname's E-government project	Michael duQuesnay, Consultant, Rick Clayton, Consultant, Merv Perry, Consultant,	mduquesnay@hotmail.com, rclayton@doyletechcorp.com mperry@doyletechcorp.com
Suriname Business Development Centre	Ernie Isselt General manager; National Programme Manager	597-471521 info@sbc.sr
Trinidad & Tobago		
Ministry of Public Administration and Information (MPA)	John Gillette	868-627-5600, 868-681-0636, Ext 3105
MPA	Shelly-Ann Clarke-Hinds Executive Manager, External Relations	clarke-hindss@mpa.gov.tt
MPA	Gary Kalloo Telecommunications	
MPA	Sheba Mohammed Policy Analyst	
MPA	Peter Mitchell ICT Policy and Planning	
MPA	Nadine Remmy Business Analyst/ International Relations	
MBA	Kevon Swift Business Analyst/ International	

Organisation/ Member State	Representative	Contact Information
	Relations	
Evolving TecKnologies and Enterprise Development Company Limited (E-Teck)	Beverly John President	beverly.john@eteck.co.tt
E-Teck	Gerard Richards Vice President, Capital Projects	gerard.richards@eteck.co.tt
E-Teck	Wendy Fitzwillians Vice President, Investment Promotions	wendy.fitzwilliams@eteck.co.tt
E-Teck	Nesha Kochhar Vice President, Property Management	nesha.kochhar@eteck.co.tt
E-Teck	Henry Kumar General Manager, ICT Project Implementation	henry.kumar@eteck.co.tt
Odessy Consult Inc	L. Anthony Watkins CEO/Principal Consultant	law@odessyconsultinc.com
Regional/ International Organisations		
UN/ECLAC, Subregional Headquarters for the Caribbean	Dale Alexander, Programmer	868-623-5595, Ext. 2320
UN/ECLAC, Santiago, Chile	Marianna Balboni	
CAIC – Caribbean Association of Industry and Commerce	Ms. Carol Ayoung, Chief Executive Officer	http://www.trinidad.net/caic/
CTU – Caribbean Telecommunications Union	Selby Wilson, Advisor	868-627-0281; 868-627-0347
Caribbean Knowledge and Learning Network (CKLN)	Ken Sylvester CEO	ken.sylvester@ckln.org
CDB - Caribbean Development Bank	Dr. Kathleen Gordon, Deputy Director, Information & Technology Solutions; Deputy Chair, Regional ICT Steering Committee	Gordon@caribank.org (246) 431-1818
CARICOM Regional Organisation for Standards and Quality (CROSQ)	Nadia Corbin ICT Specialist	nadia.corbin@crosq.com

Appendix 2b: Summary of Comments from Stakeholders

The development of this proposal was facilitated by the Information and Communication Technology for Development (ICT4D) Programme of the Caribbean Community (CARICOM) Secretariat. The report benefitted greatly from the guidance and discussions of stakeholders from a broad representation of Member States of the CARIFORUM Region. Special effort were made to visit Member States that were representative of the different levels of development in the Region. These member States included Guyana, Suriname, St. Lucia, Trinidad and Tobago, Barbados, Dominican Republic and Belize.

GENERAL COMMENTS

Several one-on-one and group discussions were held to involve as broad a cross section of stakeholder interests as possible. Consultations with the CARICOM Secretariat The open and frank discussions of shared experiences and information, resulted in consensus on the recommendations to strengthen the document and the indicated proposals for implementation. These discussions resulted in broad appreciation of the issues to be considered, and ownership of the strategic development process.

Stakeholders were representative of all Member States in the CARIFORUM Region[53]. The core concerns, were as follows:

- *The CARIFORUM Secretariat* –
    - To assure inclusion of the Dominican Republic in a meaningful

[53] Stakeholders from the public sector, private sector, academia, and civil society in Antigua and Barbuda, Barbados, Belize, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, St. Lucia, Suriname and Trinidad and Tobago.

partnership with CARICOM Member States.

- To identify a specific area of experience in the Dominican Republic, that could become the centre of a partnership.

- *The CARICOM Secretariat* -
  - To build regional understanding at highest levels of the issues indicated;
  - To thus assure tangible support by heads of Government;
  - To use ICT technology to not only realise CSME objectives, but to improve the administration of the Single Market processes)
- *The CARICOM Regional ICT4D Steering Committee* –
  - To ensure application for social and economic development;
  - To implement an effective governance process;
  - To structure the regional collaboration for effective implementation)
- *The Officials of the CARICOM Ministers with responsibility for Information and Communication Technology (ICT)* -
  - To use ICT technology to realise CSME as well as national objectives;
  - To be assured of support by Heads of Government in fulfillment of the implementation of the strategic objectives.
- Stakeholders from the public sector, private sector, academia, and civil society in:
  - Barbados
  - Belize
  - Dominican Republic
  - Guyana
  - Suriname
  - Trinidad and Tobago

- Researchers and Innovators in region and abroad, including:
  - University of Technology (UTech)
  - University of the West Indies (UWI)
  - University of the West Indies/Caribbean Mass Communication School

(UWI/CARIMAC)

- Rice/Harvard/Jamaica initiative
- Cultural Media Washington/Caribbean initiative

Face to face discussions were held with stakeholder representatives from Barbados, Belize, Dominican Republic, Guyana, Suriname and Trinidad and Tobago.[54] The interviewees were advised on the objectives of the consultancy to develop a five-year regional for development (ICT4D) strategy. There was general support for the objectives, and discussions around the present infrastructure for support and some of the limitations that could affect the achievement of the regional ICT for development environment. The gaps in the national processes were identified.

The ensuing discussions –

- Provided an update on the existing country status and an understanding of the national vision, the strategies being applied to achieve that vision; and the existing limitations in this regard.
- Identified issues at regional, national and local levels that would support or prevent the achievement of a modern regional ICT environment,
- Recommended some of the strategies that could be adopted to ensure success.
- Suggested sectors of potential impact in an improved ICT environment
- Indicated areas of application in improving the social and economic environment in the region, and for improving productivity in the specific areas of work.

Universal issues identified included the following -

- *Application of harmonised data measurement, collection and classification systems* that more properly reflected the indicators for information and

[54] See Appendix 2a for list of persons consulted.

communication technologies for development (within region and with international guidelines); and the use of these by the statistical and development agencies that needed to support development planning, to provide reliable access measurement figures, and to track achievements and ICT goods and services in the region.

- *Articulate a clear Regional Policy* for social and economic development and a partnership model and supporting projects to achieve it; including shared infrastructure

- *Limited understanding of the role that ICT could play in socio and economic development,* which resulted application of ICTs in social development and social infrastructure not being formalized in National Productivity Polices and Strategies, or in comprehensive and overarching ICT for development policies supported by related ICT laws, broader ICT regulations, strategies and specific action plans to target social development sectors; as opposed to focus on Telecommunications laws and regulations.

- Elements of ICT for development initiatives in the planning and/or in early stages of implementation. Primarily in e-Government, education and community development.

- *The regulatory framework* for ICT consisting of a number of legal documents intended to support a specific sectoral (telecommunications) demand; it did not speak to a collective ICT 4D focus or ICT as a centre of innovation.

- *High cost of access and delivery of ICT services*, driven by the high cost of bandwidth with the high resulting cost of delivery of ICT services; and cost of delivering the technology to market.

- *The private sector* focus was in the application of ICTs in business management to create efficiencies. The private sector had not extended reach to ICD for development and needed to be more fully engaged in the process. There was no

formal IT sector and the development concept was not an essential part of the process, eg as in sports (link of Telecom providers with cricket)

- *Public sector and private sector* partnerships were limited and relationship was adversarial and not working towards ICT for development.

- ICT4D not a critical element of the formal education or retraining process. There was limited training at the post secondary and tertiary levels; a limited number of trained and certified ICT human resource; and no formal ICT Curriculum spanning the primary through secondary to tertiary level education.

- No organised research programme to support innovation.

Common strategic approaches to ICT development as recommended by the interviewees included -

1. Linking all the regional initiatives under an overarching Regional Strategic Plan, that would clearly define the regional vision and policy; and lend support to modernizing the legal/regulatory framework

2. A community based strategy approach at national level, with the development of community ICT learning centres, and an ICT focus on cultural/indigenous issues.

3. Identify and appoint strong and charismatic leadership to champion the rollout of the plan; including dynamic leaders and champions at every level of implementation.

4. Ensure that the regional concept of functional cooperation leads to strengthening partnerships at sectoral, national and regional network levels. Develop an inclusive strategy with the involvement of, and in consultation with those who would use the infrastructure (a bottom up approach); and one that reflected an understanding of the environment.

5. Ensure an effective governance structure to support implementation.

6. Attention to be given to assuring the availability of skilled and certified human resources through training and retraining to fit with the intended ICT infrastructure;

7. Make provisions for training and research programmes that support innovation and the creation of new products and services; link this with internship programmes with private sector to build sustainable skills in the sector.

8. Implement a marketing programme to provide a basic understanding of the impact and potential application of the technology at all levels in the society.

9. Implement strategies to reduce the cost of bandwidth and delivery of services for ICT production

Concerns identified which were specifically highlighted during the discussions with the CARIFORUM Secretariat, the CARICOM Secretariat, Barbados, Belize, the Dominican Republic, Guyana, Suriname, and Trinidad and Tobago are indicated below.

CARIFORUM

Discussions with CARIFORUM, confirmed the support for the project, as there was resonance with the thinking outlined in the European Partnership Agreement (EPA).

The main areas for attention should include -

Partnership process – should

- Be defined to ensure that the objectives of the Strategic plans were implemented across the CARIFORUM Region as initially identified, and the process was sustainable and efforts were made to sustain the networks and links established.

- Assure that the investigation and recommendations truly reflected the

CARIFORUM stakeholders, and engaged the Dominican Republic in an essential manner.

- Establish links with INDOTEL, CARIBNET, WINDS Caribe and CIVIC, and other such agencies, which reflected the representation of the Dominican Republic

Benchmarking - should be an element of the process –

- Successful projects in Latin America (Santiago, Chile in particular) should be considered in the development of the ICT4D Strategy
- There was a specific niche for the Dominican Republic in the example of implementing ICT Innovation Parks for research and entrepreneurial development, which should be considered in the regional Plan
- Communication with the relevant agencies in the Dominican Republic should be established and maintained using modern communications technology (including teleconferencing, Skype telephony, Facebook, etc.). A visit may not be necessary in the first instance, but sustained participation in the process of implementation was desirable.

Financing –

Sustainable financing could be made available through the 10th EDF once there was agreement on projects to be supported in the development/action plan.

Specific recommendations –

- Governance issues would have to be adressed to assure the continuing involvement of the Dominican Republic.
- Support for identifying an areas of strength should be built into the planning.

- The Dominican Republic could become the Centre of Excellence for research and could partner the establishment of an ICT Research and Innovation Centre through Memoranda of Understanding with the other Universities in the region.

- A Regional ICT Innovation Centre could be established with 10th EDF funds

CARICOM Secretariat

Discussion centred around

1. The role that CARICOM could play in establishing a Regional ICT framework that would support social and economic development.
2. The application of ICT as an enabler in the administration and management of the Secretariat,

The following was noted -

- Need to ensure that Haiti, Dominican Republic and Suriname remained essential partners in the process. Haiti and Belize should be treated as special partners because of particular constraints re access. Haiti will need to be addressed with recommendations to reconstruct and rebuild and infrastructure, while Belize had specific problems with the cost of bandwidth and the price of access to its telecommunications infrastructure in general, and interconnectivity with the rest of the Member States in particular.
- Identifying champions in the strategic process, e.g., Guyana which had peculiar problems with cost of access, but was interested in supporting the initiative
- Addressing the special problems associated with bandwidth, cost and access.
- Social and economic development should be key aspects of the strategy, and

thus access to social bandwidth and the role that CARICOM could play in leading group negotiations should be clearly articulated.

- Creative applications resulting in innovation and new product development should also be part of the strategy.

Support for the regional implementation process of the Regional ICT4D Strategy should also include -

- Attention to Human Resources, Labour and Services matters and applications (efforts should be made to have discussions with relevant persons with responsibility for these subject areas)
- Recommendations in respect of relevant ICT applications to support regional networking and business management processes for improving efficiency should be given; and should include some of the following areas -
- Supporting an efficient tax regime;
- Security and traceability with attention to levels of security;
- The metrics for measuring services;
- Foreign direct investment;
- The funding of projects for development;
- Properly defining the term ‘development’ in the context of the ICT industry;
- Modernisation of the existing ICT technology system at the Secretariat;
- Training at all levels of the Secretariat;
- Implementation of an electronic filing system and a process for conversion

to electronic filing;

- The seamless networking of the several systems in use across the region;
- Upgrading the website and modernizing the ICT brand of the organisation in keeping with its stature and image, to ensure it served the publics of the region and beyond.
- Implementing an offsite back up system for the electronic files generated by the Secretariat was a critical need. It was noted that offers to digitize the information produced by the region and housed at the Secretariat should be followed up also as a short-term goal.

The partnership process –

- It was critical to forge partnerships to support the implementation of ICT programmes
- The PIU could be approached to assist with the development of the web-based network for the ICT4D strategy and discussion forum.
- The database of media contacts could be available to identify stakeholders to contact in respect of the development of the strategic plan.

Follow up discussions will be had as recommended.

Barbados:

Areas recommended for attention

1. ICT Policy development in the public sector at national and subject sector levels

2. ICT strategy development and implementation at national and subject sector levels.
3. ICT implementation at regional sector levels
4. ICT projects in process or being planned
5. Evidence of Facilitation in a collaborative environment (regional and /or cross-sectoral)
6. Research and the application of technologies in innovation and enterprise development
7. Regulatory framework (including policies, laws and strategies in place),
8. Technology framework, training and human resource capacities.

The National Development Policy was the foundation for the global knowledge society, with the aim of improving competiveness by increasing the factors of production; and education with retraining to ensure availability of trained personnel to support ICT services

Important Services Sectors identified

- Tourism
- Education
- Trade/Commerce-movement of goods relative to E-commerce
- Moving of Electronic goods-digital goods and services

Regional issues for attention

- E-commerce with Government being a model user
- E-Government
- ICT4D surveys - collaborative process
- Statistics and Census – agreeing on ICT indicators to add to the Census
- Financial institutions/sector – Perception was that the banks were not facilitating E-commerce Internet merchant account. Regional Credit Bureau (Credit Cards) and assurance of Secure Payment Sources needed.

Regional Policy should focus on:

- Global Excellence
- Visionary Leadership
- Governance and empowered leaders
- ICT supporting transparency, sharing of information
- Collaboration to support the Regional strength in negotiations
- Security Issues
- Regional Organizational should be established for:.
- Public Key infrastructure – Certified Organizations, ICANN-“Internet grievance”
- The regional air space, e.g. Satellite transmissions
- Local content

Belize

Areas recommended for attention

- ICT Policy development and legislative drafting capacity in ICT matters
- ICT strategy development
- ICT implementation at regional sector levels
- Deepening and sustaining collaboration between public sector, private sector and civil society ICT process to support development.
- Establishing an appropriate regulatory framework (including policies, laws and strategies in place),
- Establishing a technology framework, training and human resource capacities.
- Using technologies (open technologies) and approaches to reduce cost of implementation and access.

Important sectors identified

- Tourism
- Education and Training
- Agriculture
- E-government
- E-Legislation

Regional issues for attention

- Establish a collaboration between the Legislative drafters in the region to fill the gaps
- Training of legal professionals (judges, lawyers) to deal with the ICT legal matters and jurisprudence issues. Role of the Bar Associations to be clarified.
- HIPCAR project to be supported and model laws proposed for adoption.
- Regional training to produce a core of skilled ICT persons and regional classification of skilled ICT persons to facilitate movement of people.
- Financing of e-government implementation

Regional Policy should focus on: identifying the tipping point in respect of key areas

- Education, eg. one smart technology tool per child (i-pad, laptop).
- Governance and visionary leadership – with tangible and visible support for e-development
- Transparency – to build trust in process of leadership
- Open communication and collaboration with civil society – to deepen involvement
- Security Issues (customs, police, disaster management) – as key area for demonstrating usefulness of ICTs
- Connectivity - Access to affordable technology by civil society
- Collaboration using the technology to standardise legislation, eg. Public Services Acts

- Establishing Regional technical advisory groups to support implementation.
- Support for higher level training of the region's human resources.
- Public education to build understanding of the potential of ICTs

Dominican Republic

Issues Identified

- ICT Policy is suppored at the highest level of the President, who was actively involved in promoting ICT for social and economic development (E-development)
- Arres identified for attention in the National strategy included the following:
    - Cultural including language and translation matters
    - Open source technologies
    - Regulatory framework
    - Achieving ubiquitous access to the 32 provinces – to put technology in the hands of the people so they could create.
    - Affordability of providing access
    - Technology framework, training and human resource capacities.
    - Research and development – how to transfer knowledge and use in a positive way.
    - ICT statistics and indicators – need to standardize and measure
    - Using ICT to eliminate poverty in civil society; for eneral geducation, transparency, development, e-learning.

A National Strategy was in place with a vision to develop an inclusive knowledge society, to improving competiveness and maximise the potential of citizens.

Important Services Sectors identified

- Tourism
- Remittances and finance sector
- Free Trade zones being turned into ICT incubators and technology parks.
- Integrating of the private, public and civil society efforts, to provide value added goods and services.

Gaps identified

- Relevant media and digital content
- Education – trained teachers
- Education – curriculum development
- Security issues with open access

Regional Policy should focus on:

- Building and maintaining partnerships between the existing agencies
- Promoting capacities in region, exchanging and sharing same
- Identifying resources for implementation and sustainability
- Establishing a Regional Model for development – which would have all countries working together to advance technology through created synergies.
- Collaboration of the Regions CIOs through a formal Task Force to implement the integrated Regional vision
- effective governance with the President as central to this support
- Adopting international indicators and statistical models in Region
- Adopting polices to use less expensive open technologies
- Supporting innovation – the Technology Park was held up as an example of this process which brought industry, academia and researchers together to establish and support ICT new businesses (CLAVE - Internet 2/INDOTEL and Ministry of Science and Technology collaboration supported software developers in innovation clusters; and focused training on high end IT engineers and in electronics).
- Training of certified professionals

- Branding Regional ICT goods and services.
- Supporting SMEs to access the technologies
- Accessing funds at regional levels, e.g., 10th European development Funds were available for ICT development projects; and ACP funds (BRIDGE) were also available to support SMEs.

Guyana

It was indicated that Guyana would also welcome guidance and support to link all it's ICT initiatives under a broad Strategic Plan, that would assure relevance in the achievement of its ICT social and economic development objectives. It was indicated that the President of Guyana had taken the lead in supporting ICT development initiatives, and it was expected that with strong and charismatic leadership, Guyana would make good strides in implementing its vision.

Guyana was represented on the CARICOM ICT4D Steering Committee.

- *Laws and enabling Regulations*

A legal framework for liberalisation of the telecommunications sector was in process. It is expected that negotiations would result in deepening of competition in the sector with all the attendant benefits.

The Telecommunications Act was under review. The comprehensive set of laws would support a modern IT framework and provide for universal, nondiscriminatory and affordable access (including, licensing, spectrum management, pricing, interconnection, number portability, universal access, consumer protection, rebalancing, broadband and wireless issues). Reform was envisaged specifically in respect of telecommunications regulation and spectrum management, and a consultancy was in place to support this process.

A National Development Strategy (2000) and a national Competitiveness Strategy (2005) were in place.

National ICT for development policy and laws were in development – including a

modern E-Transactions bill. There is no formalized national strategy to guide ICT for development.

- *Governance Framework* – the framework is not well defined, and there is no central Office to manage all the initiatives. Some ICT initiatives being implemented include the electronic access in respect of the Registrar of Births and Deaths; as well as Customs and Immigration (Ministry of Home Affairs); and some initiatives in agriculture, health, the revenue Authority and the Public Service (www.gina.gov.gy)

- *Partnerships* – Guyana is represented on the CARICOM ICT4D Steering Committee. There is no formal IT sector and few IT industries, and thus no formal process indicated for engaging the private sector. Formal engagement of the private sector and civil society is needed, although there is evidence that a community based approach strategy, with the development of community ICT learning centres, and an ICT focus on cultural/indigenous issues is being supported.

- *Other Enabling Framework*

e. Technology – The affordability of the technology backbone, including cost of access, cost of bandwidth and the cost of delivery of technology services as a result of inefficient infrastructure (including intermittent electricity which demanded surge proctors as an essential in doing electronic type business) remained an issue to be addressed. Specific others include -
   - Broadband connectivity – available but costly, with limited universal access. Action being already taken in the short-term, include the laying of terrestrial cable through Linden to provide for a data centre in Providence (August 2010 deadline); and in the longer term the laying of a 10 Gigabyte fibre-optic ring to support access for e-governance initiatives and for social services. This social bandwidth would be enabled through two projects that would be completed in 2010 and 2011 – the laying of fibre through Globenet, Brazil, to

link with Georgetown, and another fibre cable, linking Georgetown to Suriname (with the support of the Chinese government). Establishing a Digital Library is part of this process.

- Wireless networks – available; some competition.
- Standards and interoperability – largely dictated by the technology and services providers
- Service operators – none indicated
- Network security issues – addressed by operators
- Internet governance - no formal process indicated
- Services available – a GIS system for geology and transport applications was being implemented; ICT strategies for deepening value added in Agriculture were also being developed. A SchoolNet programme between Guyana and Canada;
- Other issues indicated include International domain recognition issues and telecommunications interconnectivity.

Capacity Building and Human Resources –

- The existing formal education system is not responsive to skill demand and offers limited relevant ICT training to extend the limited human resource available to develop a strong ICT infrastructure. Software developers were few and not organised for ICT enterprise development, research or innovation. Skilled/certified ICT personnel were in limited quantity. Trained ICT persons often lacked the capability to serve on project development because they lacked hands on training.
- No formal ICT Curriculum to support sustainable human resource development for future development.
- No organised research programme to support innovation.

- *Sustainability* – not indicated as being built into any ICT for development programme. There is no demonstrated understanding of how ICT could

support social and economic development.

Other specific issues indicated for attention included the following –

- Disadvantage re negotiations with providers because of small market size, and support for any initiative taken by a CARICOM collective which could result in reduced cost of access and delivery of ICT services
- Efforts to implement an ICT4D Strategy, where the free access to and sharing of information is a characteristic of a modern ICT network, would be frustrated by the following –
  - Limitations in basic understanding of the use of the technology at all levels in the society,
  - A culture of guarding information
- Implement strategies to reduce the cost of bandwidth and delivery of services for ICT production, which would leverage recognition of CARICOM as a regional institution, with a mandate to negotiate on behalf of the region in the global economy
- Expand training of certified ICT trainees to deepen critical mass
- Training institutions to implement an internship programme in partnership with private sector to build skills in relevant sectors.

St. Lucia

Background:

- Electronic government was present area of focus with ICT portfolio responsibility being driven by the Ministry of Communications an E-government Project, with EU support. National ICT Office established in 2009.

- Areas to be acted upon included:
    - Institutional reform
    - ICT implementation management strucure
    - Deepening and sustaining collaboration between public sector entities, and in particular the Ministry of the Public Service, to facilitate the ICT implementation process.

Important areas identified for attention:

- ICT indicators, statistics and research.
- Policy and regulatory framework to support implementation
- Regional process for support
- Community access and social education issues
- Formal ICT education and training
- Developing ICT as a business sector
- Supporting sectors such as Tourism, education, culture, tourism, government, business innovation

Regional issues for attention

- Collaboration at policy and technical levels to avoid turf issues nationally while benefitting from regional synergies.
- Using affordable open technologies in ICT strategy and education.
- Training of Teachers and professionals
- Community access programmes, eg, Vision Soufriere and link with innovation.
- Marketing to build understanding of the potential impact of the sector.

Regional Policy should focus on: identifying the tipping point in respect of key areas

- Sector reform with ICTat the centre (e.g. Education, Technology)
- Modernisation using ICTs in government and businesses

- Transparency – to build trust in process of leadership
- Open communication and collaboration with civil society – to deepen involvement
- Security Issues (customs, police, disaster management) – as key area for demonstrating usefulness of ICTs
- Connectivity - Access to affordable technology by civil society
- Telecommunications regulatory framework
- Support for developing ICT curricula to support ICT training that would ead to higher level training of the region's human resources.
- Marketing and public education to build understanding of the potential of ICTs

Suriname

It was indicated that Suriname would welcome support to link all it's ICT initiatives under a broad Strategic Plan. Although Suriname was represented on the CARICOM ICT4D Steering Committee, it was suggested that the President should be briefed to get his fullest support, since with strong and charismatic leadership, Suriname would make good strides in implementing its vision.

Suriname intended to review what had been already achieved and identify what is required to steer the country into developing a strong ICT industry.

Laws and enabling Regulations

A Telecommunications Act was in place, but no other ICT laws had been promulgated. There were no National ICT Policy or formalized Strategy to guide ICT for development

Work had begun on drafting elements of a National Strategy and Action Plan; e-readiness

Governance Framework – the framework was not well defined. A National ICT

Commission had been appointed by government (under the Ministry with responsibility for Transport and Tourism); some ICT initiatives were implemented by Ministries with responsibility for Home Affairs, Labour and the Environment, as well as the Ministry of Finance. Some other initiatives were anchored in a Public Sector Programme, with draft documents to support e-readiness and a government technology backbone to connect 47 locations in government buildings in support of transparency, efficiency and responsible governance. A Road Show had occurred in collaboration with the Caribbean Telecommunications Union and support from the Inter American Development Bank

Partnerships – Suriname was represented on the CARICOM ICT4D Steering Committee. There was no formal IT sector and few IT industries, and thus no formal process indicated for engaging the private sector. It may be possible to engage the private sector through the Suriname Business Forum. Continue to deepen engagement of civil society through the initiatives already started in education, training and the cultural industries for strengthening and as basis of innovation.

Other Enabling Framework

Technology – The affordability of the technology backbone remained an issue to be addressed

- Broadband connectivity – available but costly, which limited universal access
- Wireless networks – available; competitive (there were three mobile companies operating in Suriname).
- Standards and interoperability – largely dictated by the technology and services providers
- Service operators
- Network security issues
- Internet governance

- Services available

Human resources –

- The existing Polytechnic offered IT related courses,
- No formal ICT Curriculum at primary or secondary level,
- No organised research programme to support innovation.

Sustainability – not indicated as being built into any ICT for development programme, although is an understanding of how ICT could support social and economic development.

Other specific issues included the following –

- Challenges to implementation with changes in government
- Problems with websites disseminating negative/slanderous information were posing a concern and there were no laws or policing processes in this regard.

A follow up visit to Suriname is indicated. This would be done at a time to be advised by Suriname. In the interim, collaboration would continue by electronic media, as it was indicated that copies of the draft ICT strategy documents were available on line.

Sector areas that have been identified as basis for economic development, are indicated as follows:

1. ICTS
2. Agriculture
3. Tours
4. Cultural Industries
5. Aquaculture
6. Food Processing
7. Horticulture

Trinidad and Tobago

Clearly defined in the National ICT Policy and Strategy as aligned with National development plans.

Regional issues: willingness to

- Estabish a collaboration to fill gaps in training of legal professionals (judges, lawyers) to deal with the ICT legal matters and jurisprudence issues.
- Support the HIPCAR project t
- Support regional training to produce a core of skilled ICT persons and regional classification of skilled ICT persons to facilitate movement of people.
- Provide services through its IT Park to rest of the Region

Regional Policy: support in national strategy for key areas, including:

- Education,
- E-Government to support improved efficiencies in delivery of services, transparency – to build trust in process of leadership; open communication and collaboration with civil society – to deepen involvement
- Security Issues (customs, police, disaster management) – as key area for demonstrating usefulness of ICTs
- Connectivity - Access to affordable technology by civil society
- Collaboration using the technology to standardise legislation, eg. Public Services Acts
- Support for higher level training of the region's human resources.
- Public education to build understanding of the potential of ICTs

UN-ECLAC

Aim to ensure understanding of the ICT development status and progress of the Region, and to facilitate benchmarking against the global process, by conducting

measurement evaluations based on international indicators.

Actions already undertaken in this regard:

- Capacity building workshop re. measurement in Caribbean
- Consultancies in several Member States which will be extended to other Member States in 2009/2010

Core principles to guide the Region

- ICT to be implemented within the context of knowledge management, in collaborative knowledge colonies
- ICT should be employed for pro poor initiatives

ECLAC draft work programme 2010 to support four areas :

- Communication
- Culture
- ICT indicators to measure progress and status over a two year period, so that impact could be seen and felt to indication of achievement (evidential policy making).

Issues recommended for attention:

- Regulations and Policy that focus ICT that is nonprescriptive, and is used as an enabler
- Implementing a true knowledge economy for social and economic development Implementing strategies that support sustainability

ECLAC would be willing to partner with the to establish a permanent Technical Observatory that develops relevant indicators for monitoring/ and planning in the region. Example of such a partnership - IDRC and UWI on ICT survey in Trinidad and Tobago, and Jamaica, with ECLAC resource. The aim would be to use the same measurement process in as many islands as possible in the region.

Appendix 3: Examples of Innovative Digital Activities in Region

Box 2B
PROPOSED JAMAICAN COLLABORATIVE PROJECT "DR ON CALL" TECHNICAL IMPLEMENTATIONFOR CARIBBEAN COUNTRIES INCLUDING HAITIPROCESS FLOW

1. Patient calls the "Doctor on Call Number" that is configured on an IP PBX soft switch with 32 channels.
2. The IP PBX routes the call to Doctor on Call IVR System. The IVR System collects basic authentication information from the patients and determines the service being requested.
3. The IVR System initiates outbound call to a "Hunt Group" of doctors based on the type of service being requested through the IP-PBX.
4. Simultaneous calls are placed to all the doctors in the hunt group. When the first doctor picks up the call the other calls are dropped. The IVR system authenticates the doctor and ensures that he is available to take the call.
5. The Patient Line and the Doctor's line are bridged.
6. The duration of the call is limited by the Credit available with the patient
7. The Details of the encounter (Patient all Number, Doctor ID, other available demographic information) is logged to the Unimedics EHR through a web service.
8. When the call ends the duration of the call is logged to the Unimedics EHRS along with the audio recording of the encounter.
9. The doctor logs into the Unimedics EHRS and sees a list of his Tele-encounters. He chooses one encounter at a time and enters the following notes
    a. Complete the Demographic profile of the patient.
    b. Enter Diagnostic codes (ICD 10) codes
    c. Enter Procedure Codes (CPT) if any procedures are performed / recommended.
    d. Enter referrals
    e. Enter prescriptions.
    f. Approve the encounter
10. A daily batch process will update all de-personalized encounter info to Sapphire system.
11. A batch process transfers the payments due to doctor's bank account.

WORK PACKETS

1. Acquisition of equipment/licenses – USD 38 000
2. Develop/Customize software– USD 41 770
3. Manpower development (Doctors training and development: To be programmed and cost determined))

Prepared by: Prof. Winston Davidson, Head, School of Public Health and Health Technology, College of Health Sciences, UTECH Jamaica; w.davidson@utech.edu.jm; winstondavidson@yahoo.com; (876)948-9057/948-8784 Fax: 922-7369, 509-0836 & Mr. Sanjeev Kumar (Jamaica Team for Coral Project): April 8, 2010

Box A3a
Free Rice

For Each Answer You Get Right, We Donate Free Rice through the United Nations World Food Programme to Help End World Hunger. The rice you donate makes a huge difference to the person who receives it. According to the United Nations, a child dies every 6 seconds from hunger related causes.

Though 10 grains of rice may seem like a small amount, it is important to remember that while you are playing, so are thousands of other people at the same time. It is everyone together that makes the difference. Thanks to you, FreeRice has generated enough rice to feed millions of people since it started in October 2007.

Subjects available at FreeRice include math, science, geography, art history, other languages and more. FreeRice is working to add more subjects and more material within each subject. Our goal is to provide knowledge that is useful and interesting for you. The rice is paid for by the sponsors whose names you see on the bottom of your screen when you enter a correct answer. These sponsors support both learning (free education for everyone) and reducing hunger (free rice for the hungry). We thank these sponsors for their generous participation at FreeRice. For information about how you or your company can sponsor FreeRice, please email freerice.rep@wfp.org.

How does the FreeRice program work?

FreeRice has a custom database containing knowledge questions at varying levels of difficulty. There are levels appropriate for beginners and levels that will challenge the most scholarly professors. In between are levels suitable for students of all ages, business people, homemakers, doctors, truck drivers, retired people. Everyone! FreeRice does not make any money from this. FreeRice is a website committed to the cause of ending hunger around the world. It is run entirely for free and at no profit. All money (100%) raised by the site goes to the UN World Food Programme to help feed the hungry. Sponsors make all payments to the UN World Food Programme directly.

Can you tell me more about the UN World Food Programme (WFP)?

The UN World Food Programme (WFP) distributes all of the rice that you donate to help fight hunger. It is the United Nations frontline agency in the fight against global hunger and the world's largest humanitarian organization, working closely with many other organizations in over 75 countries. In addition to providing food, WFP helps hungry people to become self-reliant so that they escape hunger for good. www.wfp.org.

FreeRice is pleased to have the Berkman Center for Internet & Society at Harvard University as our partner. Founded over ten years ago, the Berkman Center is a network of faculty, students, fellows and members of an extended community. In their own words, .We envision a growing opportunity to use Internet technologies to improve the ways that we teach, learn, and make information accessible to citizens around the world.. Besides helping FreeRice to provide you with the best possible educational content, the Berkman Center has the talent and resources to help FreeRice develop in other areas as well.