Measuring household ICT access and individual use: Jamaica's experience

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Abstract

Information and Communication Technologies (ICTs) play a vital role in the individual and cooperative lives of citizens. In some environments, though a scarce commodity in many developing countries, it is expected to fuel the economic growth and service delivery to the populace. The collection of statistical data to measure such growth and impact on the economy and development of the country is very essential. Jamaica has recognized this fact and as such developed an ICT Sector Plan as part of Vision 2030, which outlines a comprehensive development plan for Jamaica. This paper focuses on the measurement of household access to and individual use of ICTs in Jamaica, the policy framework being implemented, and how ICTs are incorporated into the development plans for the country. A discussion of the main challenges surrounding the collection and production of ICT statistics is included together with recommendations as to how these issues could be mitigated in the context of developing countries.

1. Introduction

There are approximately 16.2 million[1] people distributed across the member countries and associate states of the Caribbean Community (CARICOM). Jamaica has the second highest population with approximately 2.7 million[2] people in the Caribbean. The country is a low-middle income island with a Gross Domestic Product (GDP) per capita income of US$4,268.[3] Information and communication technologies (ICTs) contribute approximately 4.6%[4] (excluding retail and wholesale) to total value added of the economy.

The last twenty years demonstrated an exponential growth in the access to and use of ICTs. Based on current trends, it will be interesting to see the development of ICTs over the next decade. Many countries and businesses have been transformed during this period and are still innovating and re-engineering as ICTs continue to advance. Over the last decade, Jamaica has gone through a transformation of its telecommunications industry with the telecommunications sector liberalized in 2000. A monopoly which existed for several years was removed and the industry became more liberal through the revision of existing legislations.

The introduction of competition into the telecommunications industry sparked new entrants and made the environment more aggressive. This resulted in a renewed telecoms market space. The Jamaican telecommunications industry saw rapid growth in the density of telephone access and use together with rapid and continued decrease in tariffs. There was also an increase in the number of telecoms service providers to three in the mobile telephony market and two in landline services in Jamaica. This concurred with Dunn (2007) who stated that the liberalization of the telecommunications sector in Latin America and the Caribbean has three distinct advantages namely trans-nationalization of major telecoms providers, competition and price reduction for consumers, and technological change..

The information society continues to transform the lives of individuals and collective groups through the momentous advancement of ICTs. Developing countries, like Jamaica, seek to leverage the benefits in order to stimulate growth and improve the well being of its citizens. Several strategies have been adopted by the Government of Jamaica to harness the potential benefits of ICT for development including ICT policies, master national development plan for e-powering Jamaica[5], and establishing organizations and committees with ICT portfolio responsibilities. In its 2030 Vision, a comprehensive plan for the development of Jamaica is outlined. This plan also includes a component outlining how ICT will be used in the entire development strategy.

As ICTs evolve at a rapid pace, there is a growing need for reliable data and indicators that measure ICT readiness, access, use and impact on the society.[6] According to ITU (2008), ICT statistics may be used to track broad trends, interpreted for business decision making, and use for

[1] CARICOM's mid-year population estimates, 2000 to 2007
[2] STATIN's 2009 estimates
[3] STATIN's 2008 estimates
[4] STATIN's 2008 National Accounts estimates
[5] E-Powering Jamaica, NICT strategy 2012
[6] WSIS Thematic Meeting on Measuring the Information Society, held in Geneva 7 to 9 February 2005

regulatory purposes. Statistical data relating to the ICT environment are a vital ingredient to help governments develop policies to encourage ICT-based growth, and related social and economic development. As ICT is highly socio-technical, it will impact both households and individuals in their formal business or work environs, and their casual and social activities.

There have been significant challenges involved in the production of ICT statistics. Until the start of the decade, only the ITU database carried ICT data that could be analyzed.[7] Since then efforts have been put into collaborating with both developed and developing countries to produce a harmonized set of indicators to measure ICTs access, use and impact. This collaboration has several objectives and specific deliverables, which include attaining a common set of ICT indicators, to enhance the capacity in developing countries, and to establish an international database on ICT indicators. According to ITU (2009), countries are encouraged to adopt the core indicators in their ICT data collection efforts.

This paper examines the efforts made by Jamaica to measure access and use of ICTs by households and individuals. Challenges in measuring ICT will also be discussed in the context of concerns peculiar to developing countries. The paper will also include discussions about the development of ICTs in Jamaica and how ICTs are used to drive or enhance development.

2. ICT and Development in Jamaica

Jamaica has developed its first long-term National Development Plan, **Vision 2030 Jamaica**, with the primary objective of achieving developed country status by 2030. There are four strategic goals on which Vision 2030 was built, which will work synchronously with each other in order to achieve the desired objectives. These goals are:

1. Jamaicans empowered to achieve their fullest potential;
2. a safe cohesive and just Jamaican society;
3. a prosperous Jamaican economy; and
4. a healthy natural environment.

Each of these goals has specific national outcomes which will help to monitor the progress of national development. The ICT related outcomes are emphasized in the third goal of Vision 2030 Jamaica; Jamaica's economy is prosperous. The ICT related outcomes of this goal are:

- Technology-Enabled Society; and
- Internationally Competitive Industry Structures.

With reference to the goal for Technology-Enabled Society, Vision 2030 plans to exploit the benefits of science and technology to enable national development through special emphasis on the development of a National Innovation System and promotion of lifelong learning and literacy in ICTs. The Vision also refers to ICT in Jamaica as comprising the information technology industries (computer hardware and software, systems and training), telecommunications

[7] WSIS Thematic Meeting on Measuring the Information Society, held in Geneva 7 to 9 February 2005

industries (telephone, cable and internet) and the broadcast media (television and radio). The ICT objective emphasized in Vision 2030 Jamaica is to develop an advanced private sector driven ICT industry that achieves sustained global competitiveness and enhances the productivity of the goods and services producing sector. This will be achieved by:

- creating a favourable business environment and supporting framework for ICT investments and operations;
- developing ICT-focused business parks and funding mechanisms;
- encouraging greater use and application of ICT by Government and private enterprise; and
- increasing the capacity to gather and apply information on the ICT industry.

ICTs therefore play an essential role in the development of the country. Measurement of indicators to monitor the progress as Vision 2030 Jamaica is implemented will be a key component of the strategy.

3. Emergence and Growth of the ICT Sector in Jamaica

Telecommunications in Jamaica have emerged as an important Sector in the economy over the past decade. The change in the legislative environment resulted in the removal of the monopoly in the telecoms service and contributed to the expansion of the Sector. Prior to this change, earlier modes of communication including telex, telegraph, and landline telephony predominated and were mainly concentrated in urban areas. While some service was available in the rural areas it was largely unaffordable and accessibility was limited.

3.1 Legislation

Legislations that existed prior to the liberalization of the telecommunications sector included the Post Office Act, 1941; Radio and Telegraph Control Act, 1973; Broadcasting and Radio Re-Diffusion Act, 1944; Fair Competition Act, 1993; Office of Regulations Utilities (OUR) Act; 1995. These legislations are still active and work together with newer ones that have been developed to promote the expansion of the ICT Sector in Jamaica.

Since the liberalization of the ICT Sector in 2000, several pieces of enabling Legislation have been promulgated to foster the growth of the ICT Sector. The primary legislation governing telecommunications in Jamaica is the Telecommunications Act, 2000. The previous legislation on which the telecommunications industry was founded had to be reformed in order to remove the control that existed. The 2000 Act repeals the Telephone Act and makes new provisions for the regulation of telephony, telegraphy and other means of communication and the provision of telecommunications services throughout Jamaica.

The improvements and gains in the telecommunications sector have served as a catalyst for the revision of other legislations that relate to other aspects of ICT. These include the Consumer Protection Act, 2005 and the Electronic Transactions Act, 2007. The advent of electronic commerce and the rapid advancement of ICTs driven by the changes in the Telecommunications Sector over the past 10 years have revolutionized business practices. The legal framework that

was developed in the paper-based era does not suit the way businesses operate in this information and computer era. Commercial entities, banks, trade and financial institutions have already changed their business processes to operate in an electronic market space. The development and enactment of the E-Transactions Act, 2007 has helped to promote online business and an electronic commerce. The E-Transactions Act, 2007 provides the legal framework for secured electronic commerce in order to encourage consumer confidence in conducting commerce and business activities online.[8] To date, a significant amount of transactions performed in banking, customs, and tax payments[9] are done using electronic portals.

The Cyber Crime Legislation was passed by the Legislature in February 2010 and will serve to complement the Electronic Transactions Act of April 2007 aimed at promoting confidence and security in electronic transactions. The Cyber Crime Legislation takes into consideration new modalities for committing cyber crimes and prescribes the sanctions for relevant offences. The government will also be developing companion legislation to further enhance the development of the ICT Sector, including a Data Protection Bill.

3.2 Government ICT Projects and Programmes

In supporting the commitment to the use of ICT in the development of the Jamaican society, the Government has initiated several programmes aimed at the creation of a digital society including the projects described in this section.

3.2.1 Government of Jamaica /Inter-American Development Bank ICT Project

In support of the strategy for the acceleration of the use of ICT in public and private sector entities as well as civil society, the Government of Jamaica partnered with the Inter-American Development Bank to provide Community Access Points in marginalized communities; improve Jamaica's e-readiness for the 'networked world'; increase competitiveness; diversify exports and expand employment opportunities. It is expected that an important outcome of this collaborative work will be enhanced efficiency in personal and corporate transactions (through access to and use of modern electronic means) and reduced transaction costs. The project is expected to be completed in 2010.

3.2.2 e-Learning Project

The Government of Jamaica implemented an e-Learning Project with the initial assistance of the International Telecommunications Union (ITU). The primary goal of the Project is to improve the quality of education between Grades 7-11 (Forms 1-5) island-wide and selected Community and Teachers Colleges through incorporation of ICT in the teaching and learning process. This will also help the country to meet its vision of providing world class education and training through the use of technology.

Key components of the project are to outfit schools with the necessary computer equipment to aid learning; train teachers in the basic use of computers and applications such as power-point

[8] Move to conduct business online, 2007
[9] Using the Government Tax Portal which became operational in 2004

and spread sheet and the establishment of an online Content Repository for Educational Material (CREM) The CREM will make educational material available to students 24 hours per day through a single broadband network linked to all targeted schools.

3.2.3 GovNet

The Government of Jamaica intends to establish a one-stop access point for delivery of government services online. In this regard the Government has embarked on the creation of a common Government Wide Area Network 'GovNet' which aims to harmonize and integrate all Ministries, Agencies and Departments in one overall public sector communications network with a view to realizing significant savings through use of the communications and data backbone. The intent is to build on infrastructure some of which already exists in parts of the country.

3.2.4 Broadband

In pursuit of creating a digital society the Government has awarded a license which will facilitate the roll out of wireless broadband and 3G Services island-wide during 2010 thereby expanding the broadband infrastructure in Jamaica. In addition, a national project is contemplated to establish an island-wide broadband fibre network. Further, in December 2009, the Government awarded a license to land an additional submarine fibre cable on Jamaican shores. It is expected that this will have the effect of increasing competition and reducing the cost of international bandwidth. OUR data indicate that 471 licenses have been issued between 2000 and 2009 (The Draft GOJ ICT Policy, 2010).[10] This is already a contributory factor for improved access to landline and mobile telephony.

3.3 ICT Policy

In February 2010 Jamaica completed work on a draft ICT Policy for the country. The Policy is predicated on four fundamental principles:

1. ICT as a developmental instrument;
2. Provision of universal service and access;
3. Neutrality in technology selection and regulation; and
4. Fostering competition within the ICT Sector

The main goals outlined in the Policy are:

- *Improved National Productivity* - ICT will be utilized to increase overall efficiency and productivity

- *Increased local and International Investments* - The establishment of world-class high capacity ICT infrastructure and services across the island will facilitate increased investments in the country.

The draft policy will be subjected to an extensive consultative process before it is fully adopted. A series of supporting plans are aligned to the ICT Policy. These include:

[10] The Draft GOJ ICT Policy, 2010

- National Information and Communications Technology Strategy 2007-2012;
- The Information and Communication Technology Sector Plan of the 2030 National Development Plan;
- National Energy Policy; and
- National Telecommunication Numbering Plan.

The impact of the ICT Policy on other relevant policies being developed was also recognized. These included the Rights of Way Policy; Disposal of ICT and Hazardous Waste; Draft Electronic Media and Content Policy; and Spectrum Policy.

According to the Draft ICT Policy the strategic vision for the Sector is focused on - an ICT Sector that:

1. achieves sustained global competitiveness in industry and market segments where Jamaica has competitive advantages;
2. is driven by private sector investment within a policy and regulatory framework that fosters competition and transparency;
3. is accessible to all Jamaicans and contributes to greater ICT literacy;
4. enhances the productivity and competitiveness of Jamaica's productive sectors;
5. is environmentally sustainable with minimal harmful environmental impacts;
6. supports improved governance at all levels; and
7. contributes to the science, research and innovation capabilities of the country.

3.4 ICT Infrastructure Access in Jamaica

Jamaica currently enjoys a teledensity rate in excess of 100% which indicates that almost every citizen has access to telephony service. Data from the OUR at the end of 2009 indicate that there were 2,820,442 subscribers to mobile telephone services.[11] According to the Ministerial Report presented at the 7th CTU Conference March 2010, the phone penetration rate for fixed and mobile subscribers was 121.29% at the end of 2009. This achievement is believed to be a consequence of the liberalization of the telecommunications sector and the introduction of competition brought on by new entrants to the market in 2000.

Dunn (2007) reported that the use of mobile telephones in Jamaica is very high with approximately 94% of Jamaicans accessing and using cellular phones. Dunn also reported that the distribution of mobile phones in the country is spread equally between males and females across most age groups. Approximately 95% of males and 93% of females access and use mobile phones. Dunn further stated that most persons believe that a cellular telephone constitutes a major segment of their lives. Approximately 96% of persons who are using mobile phones, according to Dunn, own the devices. STATIN's revised consumer price index (CPI) reflect an increase in the percentage weight for the Communication Division, up from 0.5% to 4%. The

[11] Draft GOJ ICT Policy

increase in consumer expenditure on mobile equipment and telephone services necessitated the revision of weights in the revised CPI basket.

4. ICT and the Caribbean

With the emergence of the ICT Sector and the demand for statistics on ICTs the Caribbean Community took a lead role to develop a system of harmonized statistics for the Region. The CARICOM Secretariat established an ICT Sub-Committee on Statistics in October 2007. This Committee has met twice since that time and initiated work on the definition of the scope of the ICT Sector, identification of themes, and discussion of issues related to the measurement of the Sector. According to the Draft CARICOM ICT Sector Definition (2010), the ICT sector is viewed from a socio-economic perspective. Countries in the Region are primarily importers of ICT goods and producers of ICT services. CARICOM defines the ICT Sector as "all technologies and products that process, transmit, and display information electronically, including that section of the Content Industry that is engaged in the transformation of products for electronic distribution (online or otherwise). The definition also includes the retail sale of ICT goods that are accompanied by services incidental to the sale of these goods." (p. 2). This definition is expected to place the compilation of ICT statistics in the context of the Caribbean and help develop a common understanding for measuring and collecting the relevant data.

The Secretariat has also embarked on the development of an indicators framework for the Region based on its definition of the ICT Sector.[12] The Framework brings together in a simple matrix the themes and variables for measuring and reporting indicators for the ICT Sector. This template is being reviewed for adoption. The Draft CARICOM ICT for Development (4D) indicators framework include eleven (11) themes as shown below:

1. ICT infrastructure and access;
2. Access to, and use of, ICTs by households and individuals;
3. Access and use of ICTs by business;
4. ICT (Producing) Sector, labour force, trade in goods, investment and revenue;
5. Education e-learning indicators; and
6. Local website content indicators;
7. ICT security;
8. e-Government indicators;
9. Capacity building;
10. Legal and regulatory framework; and
11. Culture and disaster management.

There is another initiative within the Region that aims at developing a standardized data collection instrument for the collection of ICT data on infrastructure, access and use. The first phase of the project will focus on the collection of data on ICT access and use by households and individuals and usage of mobile and broadband technology. The survey will initially be

[12] Draft CARICOM ICT4D Framework

implemented in Jamaica and Trinidad and Tobago with the University of the West Indies (UWI), Economic Commission for Latin America and the Caribbean (ECLAC) as the main sponsors.

This type of partnership within the Caribbean will offer substantial benefits to the Region in the development and design of a survey instrument that can be implemented region-wide and help to harmonize the production of ICT statistics within the Region. This initiative will complement the available data on ICT access and use that are available from the decennial census, household surveys of individuals, business establishments and special surveys for the Region.

Caribbean countries such as Barbados, Guyana, and the Dominican Republic showed growth in landline telephony (see Table 1). For the period between 2003 and 2008, Jamaica showed the largest decline in landline telephone access per 100 inhabitants' significant growth in mobile telephony during the period. This growth in mobile telephony is a true reflection of the Jamaican experience. Table 1 also illustrates that Barbados and Jamaica have the highest internet access per 100 inhabitants of 73.67 and 56.88 respectively. Though telephone penetration may be high for many countries, other ICTs, such as internet access are less prevalent, particularly in rural areas.

Table 1. Key Demographic, Economic, Telecommunications and Internet Indicators for Selected Caribbean Countries in 2008

Country	Population (000,000)	GDP per capita	Fixed Lines / 100	% Change fixe Lines / 100 *	Mobile subs. per /100	% Change Mobile subs. *	Internet users / 100 2008	Broadband Subs. / 100 2008
Bahamas	0.34	21,684	39.32	-1.1	106.04	24.0	31.54	10.08
Barbados	0.26	13,393	58.78	2.0	159.09	23.7	73.67	21.77
Belize	0.30	4,336	10.35	-3.4	53.23	21.5	11.31	2.56
Dominican Republic	9.95	4,179	9.90	0.2	72.45	28.1	21.58	2.27
Guyana	0.76	1,407	16.37	6.2	36.84	42.8	26.85	0.26
Haiti	9.88	356	1.09	-6.6	32.40	58.5	10.13	-
Jamaica	2.71	4,268	11.69	-7.7	100.58	11.6	56.88	3.59
Suriname	0.52	4.733	15.82	-0.7	80.76	19.8	9.71	0.53
Trinidad & Tobago	1.33	16,269	23.02	-1.1	112.87	34.9	17.02	2.67
World	6,772.51	8,257	18.88	1.2	59.62	23.3	23.77	6.09

Source: GOJ, 2010 (ITU Data); * Percentage changes are between 2003 & 2008

5. Measuring household and individual access to and use of ICT in Jamaica

Whereas data on ICT infrastructure and access are available from administrative data sources, data to compute ICT access and use indicators could not easily be derived from existing administrative data sets in Jamaica. As such, special measurement initiatives were necessary

excepting in cases where ICT data collection could reasonably be annexed to existing censuses and surveys.

Jamaica was guided by the recommendations and guidelines developed by the Partnership for Measuring ICT for Development and has extensively utilized the ITU Manual for measuring ICT access and use by households and individuals. The development of the ICT statistics measurement program at STATIN started from as far back as 2001 when all 12 Core Indicators on household and individual access and use (along with the associated reference indicator on access to electricity) were initially considered for inclusion in the 2001 Population and Housing Census. Although one of the most appropriate vehicles for collecting data on individual use of ICTs, the many topics competing for a space on the 2001 census questionnaire relegated ICTs to a mere 3 indicators on household access and 1 on individual use (i.e. proportion of households with telephone, computer, and internet access; and individual use of mobile telephone).

A total of 8 questions were added to the 2011 Population and Housing Census questionnaires on household and individual access and use of ICTs. The additional questions are expected to provide more statistics on household and individual access and use of ICTs. These questions conform to the specifications of the ITU Manual (ITU, 2009). See Table 2 for the ICT indicators included in the 2011 Population and Housing Census.

The SLC 2010 has a special module to capture the indicators on individual use and represents the only data source for all 12 ICT indicators. This is an improvement over the previous SLCs which were capturing data on only 8 of the core indicators.

Table 2 outlines the indicators and the source that will be used to capture ICT data. These indicators are related to questions asked in the 2010 SLC and 2011 Population and Housing Census.

Table 2. Core Indicators on ICT Access and Use by Households and Individuals - Measured in Jamaica Survey of Living Conditions and Population and Housing Census

ICT Household Indicators		SLC 2010 and Census 2011	Census 2001
HH1	Proportion of households with a radio	Census 2011 (Q. **A**3.17) SLC 2010 (Section J Code 607)	
HH2	Proportion of households with a TV	Census 2011 (Q.**A**3.17) SLC 2010 (J Code 610)	
HH3	Proportion of households with telephone	Census 2011 (Q. **A**3.16) SLC 2010 (Q. I 30)	available
	▪ Fixed telephone only ▪ Cellular telephone only ▪ Both fixed and cellular telephone	▪ SLC & Census ▪ SLC & Census ▪ SLC & Census	
HH4	Proportion of households with a computer	Census 2011 (Q **A**3.17) SLC 2010 (Q.I 33)	available
HH5	Proportion of individuals who used a computer (from any location) in the last 12 months	Census 2011 (last 6months) (Q**B**10.2 SLC 2010 (Q. B32)	
HH6	Proportion of households with Internet access at home	Census 2011 (Q **A**3.18) SLC 2010(Q I 34)	available
HH7	Proportion of individuals who use the Internet (from any location) in the last 12 months*	Census 2011(last 6months) (Q. **B**10.3) SLC 2010 (Q.**B**33)	
HH8	Location of individual use of the Internet in the last 12 months	SLC 2010 ONLY (Q.**B**36)	
HH9	Internet activities undertaken by individuals in the last 12 months (from any location)	SLC 2010 ONLY (Q **B**.35)	
HH10	Proportion of individuals with use of a mobile cellular telephone	Census 2011 (last 3months) (Q**B**10.1 SLC 2010 (Q.**B**31)	available
HH11	Proportion of households with access to the Internet by type of access	SLC 2010 ONLY (Q.I 35)	
HH12	Frequency of individual use of the Internet in the last 12 months (from any location)	SLC2010 ONLY (Q **B**34)	
HHR1	Proportion of households with electricity	SLC (Q. I 27) & Census 2011	available

The ICT related questions for the SLC 2010 and the 2011 round of Population and Housing Census are highlighted in **Appendix A**.

No dedicated or standalone instrument to capture ICT data in Jamaica currently exists because of resource constraints. Two main surveys are being used in the capture of data on ICTs, the Population and Housing Census of Jamaica and the Annual Survey of Living Conditions (SLC).

6. Current ICT Statistics for Jamaica

The only ICT indicators currently available at STATIN are those from the Census 2001, and the SLC 2006 through 2009. Other data sources exist but mainly concentrate on indicators related to infrastructure and access. Data for the following indicators were computed using SLC 2007 and 2008.

- Proportion of households with a Radio
- Proportion of households with a Television
- Proportion of households with Telephone (Fixed and Mobile)
- Proportion of households with a Computer
- Proportion of households with Internet access at home
- Proportion of households with access to the internet by type of access
- Proportion of households with electricity (Reference indicator)

Table 3 and Table 4 show the ICT household access indicators.

Table 3. 2008 SLC Data with ICT Indicators

Indicator	Finding
Proportion of households with Electricity	92%
Proportion of households with a Radio	85%
Proportion of households with a Television	87%
Proportion of households with Telephone **fixed** **Mobile** **Both**	 2% 73% 16%
Proportion of households with a Computer	19%
Proportion of households with Internet access at home	10%
Proportion of households with access to the internet by type of access	

Source: STATIN, SLC 2008

Table 4. 2007 SLC Data with ICT Indicators

Indicator	Finding
Proportion of households with Electricity	89%
Proportion of households with a Radio	79%
Proportion of households with a Television	86%
Proportion of households with Telephone **fixed** **Mobile** **Both**	 2% 69% 20%
Proportion of households with a Computer	16%
Proportion of households with Internet access at home	7%
Proportion of households with access to the internet by type of access	

Source: STATIN, SLC 2007

Data from the 2007 and 2008 SLC are shown in the **Appendix B**.

By the end of 2011 there will be a comprehensive set of ICT statistics for household and individual access and use. These data will be obtained from the 2010 SLC and the 2011 Population and Housing Census.

7. Challenges Measuring ICT

Teltscher and Cervera-ferri argue that developing countries and transition economies encounter significant challenges in their ability to produce quality ICT statistics. These constraints include institutional and technical challenges. Jamaica has several challenges which are generic to developing countries.

7.1 Institutional Capacity

Teltscher and Cervera-ferri identified institutional coordination mechanisms as one of the major institutional constraints in NSOs of developing countries. Some NSOs like STATIN are in the process of establishing a National Statistics System (NSS) to assist with the coordination among relevant Agencies responsible for producing official statistics. As part of the collaborative effort at STATIN, the establishment of the NSS will also be responsible for the implementation of public relations and awareness activities to encourage the relevant agencies and entities to supply statistical data. Bringing the stakeholders together will require major coordination and could be an expensive undertaking.

In Jamaica, some Ministries and Agencies plan and implement their own statistical operations without the involvement of the NSO. Furthermore, Some Agencies are expected to be self-sufficient and as part of their cost recovery strategy they are requesting payment for the data supplied as a service.

There is also the issue regarding funding for statistical operations in Jamaica. Since the last few years financial support for the NSO is on the decline. The budget submitted to fund statistical operations is usually not approved in its entirety resulting in several programes not being implemented. The ICT Statistics programme is one such example. Though ICT is a priority from a national perspective and has been included in the 2030 vision for national development, economic constraints have limited the availability of funding to support this programme. In many cases the approved budget for the NSO is insufficient to support the priority statistical programmes.

7.2 Data collection

Collecting household data in Jamaica can pose significant challenges due to verbal and physical abuse of the interviewers. In addition there is restricted access in several communities in different socio-economic categories. There is also the problem related to reluctance to provide data as persons think the information given will be used for purposes for which they were not intended.

7.3 Technical and Operational Issues

Though the planning and development of ICT indicators have been ongoing for many years, ICT statistics is relatively new to many. Countries that are not familiar with ICT or do not have a core set of staff and experts in the field to interpret and offer subject matter expertise continue to be on the lower end of the learning curve.

As Teltscher and Cervera-ferri argued, the persons involved in the data collection process (including statisticians, interviewers, and respondents) may also lack the technological background required to interpret and understand some of the jargons and definitions regarding ICTs. The problem becomes more complex as ICTs converge. For example, one may use a Smartphone to access and use telephony services. The same individual may also use the equipment to access e-commerce services to transact business or simply use the device to access and use the internet.

The fact that ICTs have a very short life-cycle and the technology changes rapidly, places an added strain on the capacity of the NSOs and their staff to keep pace with the requirements of measurement.

8. Mitigation Strategies

Many developing countries like Jamaica depend on funding from various sources to fill the gap in their budgets. These sources are not a sustainable method to fund critical ongoing programmes but provide tremendous opportunities for initiating work and building capacity in new and emerging areas of statistics. Without the requisite funding from external sources, many programmes and statistics projects however, would not get started. With the recession still existing in many developing countries, much of their funds have been depleted.

If ICTs are mechanisms that can be used to fuel growth within developing countries, then greater importance and priority may need to be placed on the measurement of related statistics, particularly at the level of household and individuals. Without ICT related statistics, measurement of the progress as a result of the implementation of strategies for development will not be based on reliable evidence.

Many developing countries may not be able to administer dedicated instruments to measure household and individual access and use of ICTs. Existing surveys that are properly funded may need to be extended to collect the relevant data. In Jamaica, the SLC is being used and the Population and Housing Census will also be used to capture ICTs data for analysis.

In order to solve some of the challenges that are being experienced, there needs to be collaboration at all levels including, private and public sectors and individuals within the society. The soci-technical nature of ICTs will require all stakeholders to be aware and be part of the way forward.

9. Conclusions and Recommendations

ICTs have become an agent for change not only at the individual, household or business levels but also at the national and regional levels. Many lives continue to be revolutionized as ICTs advance. In addition, businesses have redesigned and re-engineered their operations in order to become more competitive.

ICTs are necessary for the economic growth and development of the country. It is therefore imperative that a system of measuring ICT indicators be established. A single-sided approach should not be adopted when measuring ICT indicators. Both business and household indicators must be analyzed to retrieve an accurate view of the access, use and ultimate impact (Stork, 2007).

Recommendations for the measurement and development of ICT statistics within Jamaica and other developing countries include:

- Collaboration and agreement for setting priorities for the expansion of ICT programmes. For example, since small countries have limited resources, it would be helpful if partners or stakeholders work with the NSOs to identify basic, preferred and desired core indicators on a scale of priorities for measurement purposes. Out of this could result a priority matrix which can be used to guide the expansion and roll out of ICT statistics programmes. This is a strategic approach to the production of ICT statistics that will address user needs and the issue of affordability over time.

- It is recommended that Government place higher importance on statistics within developing countries.

- NSO should form partnerships with stakeholders in the Telecoms Sector to obtain funding for the ICT initiatives. These partnerships and agreements must be carefully handled in order not to compromise the integrity of the NSO and the statistics.

- Establish mechanisms for verifying the integrity of data from administrative sources. There is usually no Metadata available and some sources may not provide reliable statistics.

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Appendix A

ICT related questions in the 2010 Survey of Living Conditions and 2011 Population and Housing Census.

2010 Survey of Living Conditions

Section B: Education – Questions 31 to 36

31. Did you use a cellular telephone during some or all of the past 12 months?

32. Did you use a computer from any location in the past 12 months?

33. Have you used the Internet from any location or any device in the past 12 months?

34. How often did you use the Internet during the past 12 months (from any location)?

35. For which of the following personal activities did you use the **Internet** in the past 12 months (from any location)?

- Communication.....1
- Information search/Browsing.....2
- Purchasing/ordering
- goods or services.....3
- Education,research
- and related activities.....4
- Internet banking or
- other financial services.....5
- Playing/downloading
- games,music,movies, software.....6
- Reading/downloading online newspapers, magazines,books.....7
- None.....8
- Other(Specify).....9

36. From which of the following locations did you use the Internet in the past 12 months?

- Home..... 1
- Work.....2
- Place of education..... 3
- Another person's home..... 4
- Community Internet access facility... 5
- Commercial Internet access facility.....6

- Any place via a mobile telephone.....7
- Any place via another mobile access device.....8
- Other (Specify).....9

Section I: Housing and Related Expenses – Questions 27, 30, 33 to 35

27. What is the main source of lighting for this dwelling?

30. Does this household have a telephone?

33. Is there a working computer in this household?

34. Is there Internet access in this household?

35. What type of internet connection is used in this household?

Section J: Inventory of Durable Goods

Do the members of your household have....

- Radio/Cassette Players?
- TV Sets?
- Computer, printer, etc.?

2011 Population and Housing Census

PC011A- 2011 Census Household Questionnaire: Section 3 – Characteristics of the Household

3.11 (Reference indicator)

3.16 Is there a telephone in this household? (One answer only)

3.17 Are there any of the following communication devices in this household?

	Yes	No	Not Stated
Radio			
Television			
Personal/Laptop computer			

3.18 Is there an Internet connection to this computer?

PC011B- 2011 Census Individual Questionnaire: Section 10 – Information and Communication Technology

10.1 Have you/has ……used a cellular telephone during some or all of the last three months?

10.2 Have you/has …… used a computer from any location in the last six months?

10.3 Have you/has…… used the Internet from any location in the last six months?

Appendix B

2007 and 2008 SLC Data Showing ICT Indicators on Household Access

Urban/Rural Composition – SLC 2008

No	Indicators	All households	Urban/Rural	
			Urban	Rural
	Total number of households	731,618	395,618	335,999
HH1	Number of households with a radio	619,896	343,037	276,859
HH2	Number of households with a TV	636,745	364,596	272,149
HH3	Number of households with telephone (fixed or mobile)			
a	Number of households with fixed telephone only.	11,211	9,223	1,989
b	Number of households with mobile cellular telephone only	536,181	266,021	270,160
c	Number of households with both fixed and mobile telephone	114,191	90,430	23,761
HH4	Number of households with a computer	140,974	103,606	37,368
HH6	Number of households with Internet access at home	71,087	59,049	12,037
HH11				
a	Number of households with access to Internet, by type of access.	17,406	12,696	4,710
b	Number of households accessing the Internet by **narrowband.**	53,680	46,353	7,327
c	Number of households accessing the Internet by **fixed broadband.** Number of households accessing the Internet by **mobile broadband.**			
HHR1	Number of households with electricity	675,521	378,251	297,271

Household composition – SLC 2008

No	Indicators	Household composition					
		has children			does not have children		
		Total	Urban	Rural	Total	Urban	Rural
	Total number of households	567,391	315,967	251,424	164,226	79,651	84,576
HH1	Number of households with a radio	484,859	275,723	209,136	135,037	67,314	67,723
HH2	Number of households with a TV	515,211	297,283	217,929	121,534	67,314	54,220
HH3	Number of households with						
a	telephone (fixed or mobile)	8,907	7,546	1,361	2,305	1,677	628
b	Number of households with fixed telephone only.	413,385	206,133	207,252	122,796	59,888	62,908
c	Number of households with mobile cellular telephone only Number of households with both fixed and mobile telephone	103,055	81,807	21,249	11,136	8,624	2,512
HH4	Number of households with a computer	124,061	90,670	33,391	16,913	12,936	3,978
HH6	Number of households with Internet access at home	63,796	52,701	11,095	7,290	6,348	942
HH11	Number of households with						
a	access to Internet, by type of	15,581	11,498	4,082	1,826	1,198	628
b	access.	48,216	41,203	7,013	5,464	5,150	314
c	Number of households accessing the Internet by **narrowband.** Number of households accessing the Internet by **fixed broadband.** Number of households accessing the Internet by **mobile broadband.**						
HHR1	Number of households with electricity	536,185	305,068	231,117	139,336	73,183	66,153

Breakdown by urban/rural and household size – SLC 2008

No	Indicators	Household size (number of members)								
		1-5			6-10			Over 10		
		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
	Total number of households	632,691	350,702	281,988	93,781	43,119	50,662	5,146	1,797	3,350
HH1	Number of households with a radio	535,511	303,870	231,641	80,032	37,849	42,183	4,353	1,318	3,036
HH2	Number of households with a TV	546,927	321,357	225,570	84,986	41,442	43,544	4,832	1,797	3,036
HH3	Number of households with telephone (fixed or mobile)									
a		11,211	9,223	1,989						
b	Number of households with fixed telephone only.	453,761	231,646	222,116	77,618	32,818	44,800	4,802	1,557	3,245
c	Number of households with mobile cellular telephone only Number of households with both fixed and mobile telephone	102,861	81,926	20,935	10,986	8,265	2,721	344	240	105
HH4	Number of households with a computer	122,550	90,311	32,239	18,080	13,056	5,024	344	240	105
HH6	Number of households with Internet access at home	63,243	52,462	10,781	7,619	6,468	1,151	224	120	105
HH11	Number of households with access to Internet, by type of access.									
a		14,997	11,019	3,978	2,410	1,677	733			
b		48,246	41,442	6,804	5,210	4,791	419	224	120	105
c	Number of households accessing the Internet by **narrowband.** Number of households accessing the Internet by **fixed broadband.** Number of households accessing the Internet by **mobile broadband.**									
HHR1	Number of households with electricity	583,176	334,892	248,284	87,513	41,562	45,951	4,832	1,797	3,036

Urban/rural Composition - SLC 2007

No	Indicators	All households	Urban/Rural	
			Urban	Rural
	Total number of households	730,213	384,479	345,734
HH1	Number of households with a radio	579,687	306,058	273,629
HH2	Number of households with a TV	624,209	357,976	266,234
HH3	Number of households with telephone (fixed or mobile)			
a	Number of households with fixed telephone only.	16,761	13,433	3,328
b	Number of households with mobile cellular telephone only	504,824	235,262	269,562
c	Number of households with both fixed and mobile telephone	149,008	120,535	28,472
HH4	Number of households with a computer	114,477	88,223	26,254
HH6	Number of households with Internet access at home	49,100	44,293	4,807
HH11	Number of households with access to Internet, by type of access.			
a	Number of households accessing the Internet by **narrowband.**			
b	Number of households accessing the Internet by **fixed broadband.**			
c	Number of households accessing the Internet by **mobile broadband.**			
HHR1	Number of households with electricity	652,272	360,154	292,117

Household composition - SLC 2007

No	Indicators	Household composition					
		has children			does not have children		
		Total	Urban	Rural	Total	Urban	Rural
	Total number of households	370,327	189,880	180,447	359,886	194,599	165,287
HH1	Number of households with a radio	293,030	150,669	142,361	286,657	155,389	131,268
HH2	Number of households with a TV	334,977	181,892	153,084	289,233	176,083	113,149
HH3	Number of households with telephone (fixed or mobile)						
a		1,822	1,452	370	14,939	11,981	2,958
b	Number of households with fixed telephone only.	284,935	128,523	156,412	219,889	106,739	113,149
c	Number of households with mobile cellular telephone only Number of households with both fixed and mobile telephone	70,332	55,911	14,421	78,676	64,624	14,051
HH4	Number of households with a computer	63,131	45,382	17,749	51,346	42,841	8,505
HH6	Number of households with Internet access at home	22,570	19,242	3,328	26,530	25,051	1,479
HH11	Number of households with access to Internet, by type of access.						
a							
b	Number of households accessing the Internet by **narrowband.**						
c	Number of households accessing the Internet by **fixed broadband.** Number of households accessing the Internet by **mobile broadband.**						
HHR1	Number of households with electricity	337,612	179,351	158,261	314,660	180,803	133,856

Breakdown by urban/rural and household size – SLC 2007

No	Indicators	Household size (number of members)								
		1-5			6-10			More than 10		
		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
	Total number of households	620,141	338,008	282,134	45,382	45,382	60,642	4,047	1,089	2,958
HH1	Number of households with a radio	491,621	269,389	222,231	35,580	35,580	48,810	3,678	1,089	2,588
HH2	Number of households with a TV	525,567	313,320	212,247	43,567	43,567	51,398	3,678	1,089	2,588
HH3	Number of households with telephone (fixed or mobile)									
a		16,761	13,433	3,328						
b	Number of households with fixed telephone only.	417,732	205,854	211,878	28,682	28,682	55,096	3,314	726	2,588
c	Number of households with mobile cellular telephone only Number of households with both fixed and mobile telephone	129,329	104,924	24,405	15,248	15,248	3,698	733	363	370
HH4	Number of households with a computer	96,217	75,879	20,337	11,981	11,981	5,916	363	363	
HH6	Number of households with Internet access at home	41,106	36,669	4,437	7,261	7,261	370	363	363	
HH11	Number of households with access to Internet, by type of access.									
a										
b	Number of households accessing the Internet by narrowband.									
c	Number of households accessing the Internet by **fixed broadband.** Number of households accessing the Internet by **mobile broadband.**									
HHR1	Number of households with electricity	550,308	315,135	235,173	43,930	43,930	54,356	3,678	1,089	2,588

Note: the blank cells in the tables indicate that data were not captured in the survey for those indicators.