THE BROADBAND INFRASTRUCTURE INVENTORY AND PUBLIC AWARENESS IN THE CARIBBEAN (BIIPAC)
(BARBADOS, BELIZE, DONINICAN REPUBLIC, GUYANA, HAITI, JAMAICA, SURINAME, AND REPUBLIC OF TRINIDAD & TOBAGO)

A CONSOLIDATION OF SUMMARY OF FINDINGS AND RECOMMENDATIONS OF THE FOUR COMPONENTS OF BIIPAC

B. Claire Downes-Haynes

July 2016

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Prepared by

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Preface

The Broadband Infrastructure Inventory and Public Awareness in the Caribbean (BIIPAC) Project was conceived by IDB and CANTO in 2011. It was funded by Inter-American Development Bank (IDB), with CANTO acting as the executing agency, covering eight (8) beneficiary countries: Barbados, Belize, Dominican Republic, Guyana, Haiti, Jamaica, Republic of Trinidad & Tobago, and Suriname. The project was divided into four (4) Components and awarded to a number of Consultants, resulting in a number of complete and detailed reports that are commended for reading for a good understanding of the state of Broadband in the beneficiary countries. The project culminated in February 2016 with the presentation of the final reports of Component 4.

CANTO requested this report to summarise the work across the several BIIPAC reports. This report in no way replaces the full reports of each Component, but seeks to present an overview of the full body of work, its key findings and recommendations. This Report does not seek to repeat the detail contained in the individual Component reports and commends them for your attention to further develop the points presented herein. This report also gives a short perspective on the next steps after BIIPAC.

The identification of key findings and recommendations are solely in the view of the author, after reviewing the various reports, and in no way diminishes the importance of other recommendations, which are to be found in the individual detailed reports.

1. INTRODUCTION

1.1 THE PROJECT

Broadband can be a catalyst for economic growth and social inclusion and Caribbean leaders have embraced this concept.

The governments of the Caribbean have a vision that broadband can propel their countries economically and societally, and at a very rudimentary level it is felt that they need more and faster broadband to achieve this. It has been identified that on the path to ubiquitous broadband there are a number of barriers constraining both the supply and demand aspects of broadband. Prime of these as highlighted in the Terms of Reference of the BIIPAC project are:

"(i) lack of awareness and understanding among some public officials, business people and the public at large about how ICTs can contribute to generate economic growth and stimulate innovation in sectors such as health, education and trade;

(ii) Insufficient institutional capacity to design, implement and monitor specific policies that may foster the use and adoption of ICT at all levels of society;

(iii) inadequate regulatory frameworks that have not kept pace with major trends in the industry, particularly the convergence of services, network platforms and applications that have come to characterize the consumption pattern of consumers regionally and worldwide;

(iv) lack of understanding of the implications that variances in socio-demographic and economic conditions between urban and rural areas have in broadband availability and usage, as well as an under-appreciation of how current gaps suppress economic and social development in under-served areas;

(v) scarcity of data to allow governments to track and measure the economic and social impact of ICTs in each country; and

(vi) absence of geographic information on broadband penetration and services in the region."[1]

In 2011, the IDB and CANTO held the Caribbean Broadband Forum in Miami, Florida which brought together Ministers, other officials of Government, service providers and other stakeholders in the ICT sector. As a result of the expressed desire of the Ministers to tackle these barriers in a coordinated manner, and in particular to gain a better understanding of the broadband inventory in the respective countries, the Broadband Infrastructure Inventory and Public Awareness in the Caribbean (BIIPAC) Project was conceived by IDB and CANTO. The overall aim of the BIIPAC Project, is to respond to the desire of the Ministers of Government to have work carried out: *"to identify an inventory of the existing broadband infrastructure in the participating countries, and practical guidelines for the ubiquitous implementation of broadband access technologies in an efficient manner that is consistent with globally adopted standards and international best practices."*[2]

The project was divided into four components that sought to address the aforementioned deficiencies.

Component 1: Involved a diagnosis of the status of Broadband in the beneficiary countries and the development of an inventory and broadband maps. The work to identify the status of broadband penetration was carried out using the digiLAC platform[3], which has among its outputs comparative geographic maps and identified gaps in geographic coverage. The reports of this component also identified relationships between broadband and social indicators and other utility infrastructures. It also provides data to enable the measurement of the impact of ICTs on society and the economy.

Component 2: Reviewed the regulatory and institutional frameworks of the beneficiary countries.

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1 CANTO/ITU. *Broadband Infrastructure Inventory and Public Awareness in the Caribbean (BIIPAC) Project : RG-T2212, Contract for Individual Consulting Services, Annex A, Tranche A, Consultant Terms of Reference,* July 2015

2 Ibid.

3 DigiLAC is a digital platform launched by IDB as part of its Broadband Program that aims to promote an institutional and regulatory environment to facilitate competition and investment to speed up access to as well as adoption and use of broadband services in the region. For further information see http://www.iadb.org/en/topics/government/gobernarte/digilac,9958.html

Component 3: Assessed and determined approaches to ICT awareness and capacity building, classifying recommendations according to various sectors, namely, citizens, public sector and business sector.

Component 4: Having assessed the environment, the project culminates with making recommendations for the construction of a framework to be considered and incorporated into National Broadband Plans (NBP). The work of Components 1 to 3 provided status quo information, providing a jump off point, enabling the recommendations to cover the future. In addition, output of this Component should include:

- Governance models: In an effort to facilitate the future implementation of the national broadband strategies and foster regional cooperation and coordination, recommendations of a governance model will be provided for each country.
- Considerations to work towards a regional broadband strategy: Highlighting the potential synergies in terms of developing harmonized regulations, common infrastructures, and joint content and capacity building programs that, while considering the needs and priorities of each particular country, share common elements to the region.

The Caribbean is a small physical and economic space and co-operation exists through the Caribbean Community (CARICOM) in a number of areas. It is therefore reasonable that such co-operation extend to include ICTs. As such, and in keeping with the Terms of Reference, BIIPAC recommendations identified synergies in national strategies that consider and reflect an approach to promote regional co-operation towards the advancement of a regional broadband strategy. This will be done with particular reference to, inter alia, areas such as harmonized regulations, and common infrastructures.

The Internet has become indispensable to the lives of persons and to commerce globally, it is no surprise that it is pivotal in the measurement of levels of development both social and economic, consequently how it is delivered must be accorded a high priority. Affordable and effective access are key to contributing to development and it has been demonstrated that where governments establish and execute a plan for broadband deployment and use, some meaningful improvements in metrics towards ubiquity have been achieved. The plan, though necessary, is

not sufficient, implementation must be effective and this requires an appropriate governance model.

1.2 BROADBAND IN THE REGION

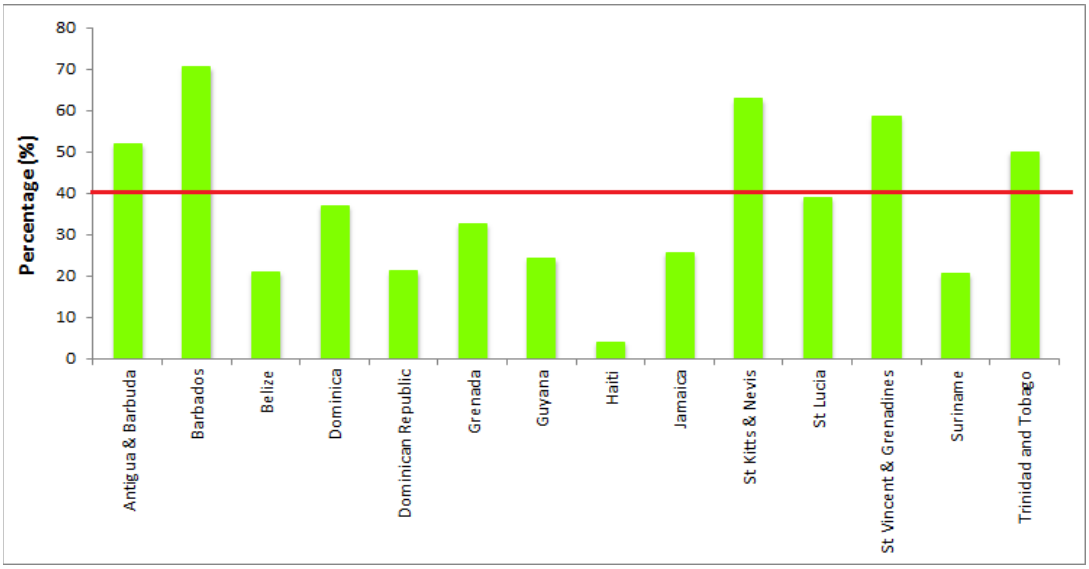
Broadband development is about much more than the furtherance of telecommunications technologies. There is a considerable body of thought that broadband connectivity contributes to advancement of societies and economies, both developed and developing, through a multiplier effect. It is posited that this multiplier effect influences not only GDP, but also other economic components such as productivity and employment. Expansion in the development and availability of broadband generates employment at a variety of skill levels in the economy from the lower skills required in some of the infrastructure build out for broadband, to the highly skilled jobs in the sectors such as financial and health services, which are facilitated by broadband. While there is no definitive multiplier for employment from broadband, a number of specific country studies support the thinking (Katz, 2009) (Kim, Kelly, & Raja, 2010).

Most of the studies focus on the developed countries and the data on the developing and less developed countries has not been very fulsome over the years. Some attention is in recent years being paid to this void by the international and regional agencies and by the countries themselves, having recognized that they had no means of measuring how they stood on these metrics of development vis à vis each other and other developed countries. Over 2003 to 2009, IDB did an econometric study of 26 countries in the Latin America and the Caribbean region (LAC). It was found that within this region, a 10% rise in market penetration of broadband services is estimated to be positively correlated to average increases in GDP of 3.2% and productivity gains of 2.6%. Specifically within the Caribbean, broadband Internet penetration, measured as the sum of fixed and mobile broadband subscriptions in a country, ranges from less than 2% in Guyana and 11% in Trinidad and Tobago, to 21% in Barbados for fixed services (ITU, 2011). In terms of mobile broadband however, the rate of cellular mobile penetration rate is above 60% in all participating countries, giving rise to great optimism regarding the potential to accelerate the penetration rate and usage of mobile broadband services in the Caribbean region

The countries of the Caribbean have lagged behind the rest of the world in access to and use of broadband. In assessing progress towards the Broadband Commission's targets by 2015, the Caribbean countries in their review showed mixed results. The Commission's target for 40 per cent of households in developing countries to have Internet access by 2015 was found to have fallen short in the review at 34.1 per cent. In the Caribbean, of the countries reviewed only five countries were found to have met or exceeded the target (Marius, 2015) as seen in the following chart.

Percentage of households in the select Caribbean countries with Internet access as at 2014[4]

(Source: Broadband Commission)



There is currently no regional broadband plan. Subsequent to a meeting in 2011 where preliminary discussions were held on the issue, the CARICOM Secretariat has been looking at this and anticipates engaging the Ministers of Government in January 2016 on matters relating to broadband such as arriving at a definition of what is an acceptable level of broadband. At this time, while the CARICOM Secretariat has not been given a specific mandate by its member states with respect to broadband, there is a clear understanding that some strategic planning and action

[4] Chart Source: Broadband Commission - See more at: http://www.ict-pulse.com/2015/09/snapshot-2015-update-state-broadband-internet-caribbean/#sthash.HHs3GYpQ.dpuf

is required. It would be hoped that with this clear understanding, further definitive positions could be taken in the form of specific mandates to develop a regional broadband strategy plan.

Regions such as the EU have set a precedent that the Caribbean could look to for an example on setting a regional broadband agenda. Of course in looking to a region such as the EU we must always be mindful that the structure of the European Commission gives them greater authority and autonomy than is enjoyed by the CARICOM Secretariat through the Treaty giving it life. The CARICOM Single Market and Economy (CSME) structure could provide a framework for a regional approach to broadband supply and demand strategies, and act as an engine for the single digital or information space envisioned by CARICOM in its strategic plan. An approach that sets out strategies that build on and support the CSME mandates is likely to be more readily incorporated into the regional fabric. Applications that aid in the facilitation of movement of labour and cross border trade for example are likely to promote the value of the single digital and information space. The resources of other regional institutions must also be brought to bear in taking the region forward to a position of broadband universality of access and use.

This report presents a summary of the key findings and recommendations, by beneficiary country, of the four components of BIIPAC.

2. COUNTRY FINDINGS AND RECOMMENDATIONS

2.1 BARBADOS

In the 2016 edition of Measuring the Information Society Report (Telecommunications Development Beureau of the International Telecommunications Union, 2015), Barbados has moved into the top 30 countries on the ICT Development Index (IDI)[5] ranking at number 29, representing an improvement of 9 points from 2010. In the Americas region, Barbados ranked at number 3 behind United States and Canada (Telecommunications Development Beureau of the International Telecommunications Union, 2015). The Report also indicated that in 2014, 77 per cent of individuals used the Internet, this is in line with the findings of Component 1 of this BIIPAC project which found that over 10 years the percentage of individuals using Internet has almost doubled from 39 per cent in 2003 to 75 per cent in 2013.

Barbados performs well in all of the metrics in comparison to the region indicating one of the most developed ICT sectors in the region. Notwithstanding this, there are still gaps in infrastructure and use. According to the DigiLac platform findings of Component 1 (Marin J. , 2015), Barbados' average broadband penetration was 46.57 per cent. The penetration throughout the island does not vary by significant amounts. There is therefore a need to close this gap and get the remaining 25 per cent of the population online, and to get the remaining 53 per cent connected, through the development of the appropriate demand and supply side initiatives respectively. In terms of policies to promote broadband infrastructure, Barbados has no network sharing policies in place. However, there is consideration being given to implementing number portability which it is considered will aid in this promotion by virtue of increasing competition (Downes-Haynes, 2016).

Further, the quantitative finding of Component 1 of 25 per cent of the population being offline is consistent with the United Nation's e-Government Development Index (EGDI) low showing for Barbados e-participation, ranking at 164. Under the EGDI Barbados is the highest ranked

[5] Measuring The Information Society Report 2015, ICT Development Index (IDI)

Caribbean country in 2014 at number 59 out of 193 countries surveyed (Korea is number 1 and Somalia is number 193). Further, it leads the Caribbean countries in all the other UN e-Government 2014 survey metrics, except for a low showing in e-participation (United Nations Department of Economic and Social Affairs, 2014). Notwithstanding good supply side metrics, the Consultant concluded that the ICT sector in Barbados is not fully developed. Due to its high positive metrics they further envision Barbados as a technology hub for the Caribbean.

Under Component 2, the Consultants identified that there is no legislation to address areas of data protection and cyber security. Barbados was one of the subject countries of the HIPCAR[6] project and was therefore a beneficiary of Draft Model Legislative text for cybercrime, privacy and data protection, licensing, interconnection and universal access regulations, which would provide a basis for the legislative revisions to make the ICT legislative framework more complete and effective.

The Consultants also identified fragmentation in the licensing process and in the regulation of the ICT sector. The licensing process endures a level of complexity by virtue of requiring applicants to traverse several different Government agencies, this does not enhance Barbados' standing for ease of doing business. Barbados' standing in the global ratings for ease of doing business according to *Doing Business 2016: Measuring Regulatory Quality and Efficiency* was ranked at 119 out of 189 countries profiled in 2016, a decline from the 2015 ranking of 116 (The World Bank Group, 2016)

They also cited fragmentation in the regulation of the ICT sector in that it is overseen by the Telecommunications Unit (TU) and the Fair Trading Commission (FTC). The Telecommunications Unit falls under the Ministry responsible for telecommunications and performs a regulatory and licensing function under the Telecommunications Act 2001. They are responsible for management of spectrum and number resources and .bb domain name administration. The FTC is a multi-sector regulator that regulates telecommunications, water and electricity and is

[6]HIPCAR Project's full name is *Enhancing Competitiveness in the Caribbean Through the Harmonization of ICT Policies, Legislation and Regulatory Procedures*. Its purpose was to support Caribbean countries in improving their competitiveness by harmonizing approaches to ICT development.

responsible for administering economy wide competition laws and consumer protection. The FTC gets its mandate to regulate telecommunications from the Telecommunications Act 2001.

The Telecommunications Act is a technology neutral legislation, fit for a converged environment, notwithstanding this, while the sector is a converged one, the FTC does not function as a converged regulator and neither it nor the Telecommunications Unit oversee broadcast or TV. Of particular note as well is that the FTC does not regulate broadband as they do fixed line, on which broadband rides, and many of the new and enhanced services entering the market sit on top of broadband. In the BIIPAC Component 2 Report, (Dunn, 2015) the Consultants see a need to make this transition in the regulatory structural framework but recognize that resources and finances are roadblocks to this change. This fragmentation goes further where the Telecommunications Unit, under the Ministry responsible for Telecommunications is responsible for the infrastructure and policy, but the Ministry of Commerce is responsible for ICTs generally, more on the demand side. This has implications for governance of a National Broadband Plan, which will speak to both supply and demand of broadband, where broadband is the foundation of ICTs. With the present structure, there is likely to be uncertainty and confusion as to the leadership and responsibilities and implementation may consequently suffer. All stakeholders, the citizens, providers, Government must understand a consistent message, failing which any Plan is unlikely to progress.

Dovetailing with Component 1 finding that Barbados should become a technology hub in the region based on its ICT metrics, Component 2 found that there was a need for greater training and development of human resources in the ICT area and development of legislation and regulations to promote entrepreneurship in this area. The Consultants also identified that there should be legislation to protect and regulate content, this would be an important component to becoming an ICT hub and creating an industry.

In Component 3, the Consultants identified as priority areas: ICT Infrastructure/Telecommunications; e-Government; and e-Tourism (Attiba Phillips, 2015)**.** Within these priorities, they have identified a number of necessary actions. Notably under the ICT Infrastructure/Telecommunications priority, they have listed as an action the need for the

articulation of Broadband policy that addresses specific demand side initiatives as well as supply side to ensure that broadband needs are met. This would be an important step in addressing the gap in coverage and participation.

Under Component 4 the Consultant concluded that while Barbados' strong ICT metrics position it as a regional leader in ICTs, there are still some areas to be addressed and there needs to be plan to outline a roadmap to becoming an ICT hub in the region.

Barbados has not had a broadband strategy or plan but has developed "National Information and Communications Technologies Strategic Plan of Barbados 2010-2015 – An Efficient Networked Island" which states the country's vision for ICT as being, "*To utilise ICTs to transform Barbados into a globally competitive society*". The Ministry of Economic Affairs, Empowerment, Innovation, Trade, Industry and Commerce developed this, and the Telecommunications Unit, which is responsible for telecommunications and ICT technology and policy, was not involved in the development of the document. This is a strategic document and detailed action plans are not evident, though it does include a number of specific sectoral initiatives. Results to date against these strategic plans and sectoral initiatives could not be ascertained. These sectoral initiatives developed by the Ministry are internally developed and likely needs focused, therefore, when viewed along with the actions recommended by the Component 3 Consultants, give the country a starting ground for generating the demand necessary for creating an e-society. The Telecommunications Unit has indicated that they have already embarked on the development of a Broadband Plan utilizing the assistance of the Commonwealth Telecommunications Organisation, (CTO), and will be moving towards stakeholder engagement in the process.

Funding has been identified in interviews with Barbados officials as a roadblock to their achieving some reforms that they would otherwise pursue, among these is the reform of the structural framework of the regulatory bodies into a converged entity. Funding also affects the acquisition of human resources to carry out technical work in the regulatory agencies, particularly the Telecommunications Unit in the areas of spectrum, numbering and domains. This agency has also indicated a challenge in overseeing the network it is tasked with regulating and gathering accurate coverage data and metrics, in that they lack the software to adequately view the

network maps which may be provided by the carriers. They also lack the capability to view the island wide network. Costs of acquiring the necessary software has been identified as the hold up.

Funding is also an issue for the expansion of the network into rural lower income parishes where penetration and usage metrics are low. Network providers will not see the financial returns in building network to these areas, they therefore need to be incentivized to do so. One method of addressing these funding issues is through the establishment of a Universal Service Policy, (USP), and attendant Universal Service Fund (USF).

Universal Service is provided for in Barbados' Telecommunications Act 2001, it reflects the traditional POTS[7] USO. The policy statement in the Act is technology neutral[8], the obligations are however POTS. The Act also provides for administration of the USP and the establishment of a USF, it has not however been operationalized to date. The Telecommunications Unit has indicated that one of their priorities is the revamping of the universal service framework and to get it functioning. A USF can target getting devices to the population, broadband access, content and applications that deliver social and economic benefit to society. The new Policy and Fund would need to be articulated in revisions to the Telecommunications Act and Regulations. It should provide for infrastructure rollout for specific underserved areas and educational and health institutions and the outfitting and upskilling of the Telecommunications Unit to better monitor and regulate broadband, spectrum and the infrastructure. The HIPCAR project provides output in this area and this can form a basis for the legislative drafting.

Effective January 2016, the Minister of Finance is increasing the value added tax applied to mobile service by four and a half per cent to twenty two per cent. This is not being considered as a universal service contribution but straight tax revenue collected from consumers, which it is reported will be used for tertiary education purposes. This tax increases the price of mobile

[7] POTS - Plain Old Telephone Service

[8] The Telecommunications Act 2001, sec 32, "The universal service policy of the Government of Barbados is aimed at ensuring that every resident and every business enterprise of Barbados has access to reliable, affordable telecommunications services throughout Barbados on an equitable basis."

services, and consequently mobile broadband to consumers, and needs to be considered in revamping the USF.

Low e-participation indicated by the metrics could be indicative of low demand through absence of applications critical to the population. The Administration and citizens need to see a reason for the employment of broadband, so a demand needs to be stimulated and the remaining 25 per cent of the population incentivized to become Internet users and the unconnected 33.3 per cent to get connected at home. Government applications are a good foundation to build this demand as all citizens are touched by its services and Barbados took a definitive step with the introduction of its Electronic Tax Administration where individuals are required to file annual income tax returns online and some corporate tax functions such as related to value added tax can also be done online. One of the challenges facing the furtherance of government applications and services is that many ministries and departments cannot share information because they sit on different networks and do not interface with each other. There are plans to address this by first developing a single Government wide area network to replace the several networks that now exist.

The Telecommunications Unit, with the assistance of the CTO, has commenced work on the development of a NBP and they are likely to have a Broadband Strategy completed by March 2016. For the NBP to be successfully implemented all relevant stakeholders need to be engaged and know the role they play. Governance must start with ownership and championship for the Broadband Plan being driven by a senior policy makers, a Minister of Government, and be backed by political will. The management and execution of the NBP must be vested in an agency or entity that has power, preferably enshrined in legislation, and recognized standing to govern the Plan. This role would be best place in the reconstructed Telecommunications Unit, which would also have broadcast and TV licensing and oversight added to its portfolio. The Telecommunications Unit indicated that the next step in the development of the broadband strategy is stakeholder engagement. It is recommended that they establish a committee of stakeholders, as part of the governance of the NBP that can go through the process of establishing, monitoring, and reviewing the NBP.

Government is best placed to address low e-participation by virtue of very citizen needing to interact with its services. This is an area where two approaches would be appropriate. Firstly, the Government needs to adopt an aggressive policy of taking more of its services online. A dynamic well skilled and financed entity, with an innovative mindset, empowered to establish and implement the necessary applications, should be established to accomplish this. The model used in Jamaica of the development of an incorporated entity to provide the services to government entities is commended to Barbados for adoption. This agency would execute and implement the strategic policy directives. Secondly, regional projects can assist in this regard where Barbados, along with other regional countries, works with regional co-ordination on applications that have common significance such as disaster risk reduction and management. With limited skilled and financial resources, utilizing a regional collaborative approach to developing these demand side applications would be productive.

2.1.1 Recommendations

The Component 1 Consultants put forward the need for digital capacitation through efforts such as offering fiscal incentives to the operators to encourage investment in broadband in the underserved areas to close the gaps identified. They also posited that the high penetration metrics can be capitalized on to make Barbados a technology hub in the Caribbean, facilitating a number of technology driven industries.

The recommendations of Component 2 include the development of a single regulatory agency responsible for ICT with appropriate expertise to regulate industry and providers. This would serve to eliminate the fragmentation identified in the administration of the sector. Hand in hand with this recommendation is one to enhance the human resource skills to fill void found in ICT expertise in areas such as the management of spectrum, data security and communication in emergencies for public safety. Also key among the recommendations is that legislation and regulations to address data protection, cyber security, and to regulate and protect locally created content transmitted over broadband.

Component 3 Consultants have outlined a number of what they termed *Priority Area Projects* most of which are aimed at capacity building in areas such as financial, trade and telecommunications sectors. Key among these is in the area of Government where they speak to e-Government particularly and utilization this to enhance Barbados' e-participation levels. Quite detailed prescriptions are provided in their report.

Key of the Component 4 recommendations are:

- Barbados should continue its work with CTO to develop the NBP and continue to stakeholder engagement. The NBP should set out:
    - A Vision for broadband strategy reflective of the development of Barbados into an e-society and an ICT regional hub;
    - Clear measurable objectives of the NBP that should state the measurable reduction of the 25 percent gap in those offline and the improvement of level of broadband infrastructure.
- The revision of the USP to remove the POTS obligations, introducing a technology neutral approach. USP should address filling the gap in broadband coverage by incentivizing providers or subsidizing the cost of broadband to low income consumers. The USF should then be operationalized, potentially providing access to funds to institute reforms necessary to take the sector forward, additionally it can target assisting in areas such as getting devices to the population, broadband access, content and applications that deliver social and economic benefit to society.
- In the area of legislation it is recommended that Barbados: Enact legislation for Data Protection and Cyber Security, utilizing the HIPCAR model legislation; and Review and Amend Telecommunications Act to facilitate the revised USP and draft attendant Regulations to five effect to Policy and USF, using HIPCAR draft model legislation as a guide.
- Governance must start with ownership and championship for the NBP being driven by a senior policy makers, a Minister of Government, and be backed by political will. The management and execution of the NBP must be vested in an agency or entity that has power, preferably enshrined in legislation, and recognized standing to govern the Plan. This role

would be best place in the reconstructed Telecommunications Unit, which would have responsibility for telecommunications and ICT strategy, policy, and planning, and broadcast.

- The establishment of a converged regulatory body, incorporating broadcast and TV, is an important policy position which should be pursued. Broadband is not regulated by the FTC in the same manner as is fixed line, its foundation, and the medium through which some existing and most new ICT services are being delivered, this is an anomaly which not only fails to acknowledge the technological convergence but also potentially allows behaviours by providers that keep broadband inaccessible to lower income citizens. In the absence of a converged regulator the sector cannot be effectively overseen.
- Barbados should establish an incorporated entity with well skilled resources and an innovative mindset, tasked with providing services to all Government ministries, departments, and offices, and implementing the necessary applications, technologies and hardware to achieve e-government objectives.

2.2 BELIZE

The Component 1 Consultant has cited the average broadband penetration of Belize at 3.1 per cent (Marin J. , Belize: Broadband ICT Diagnosis and Infrastructure Map, 2015), further, only 21 per cent of the households have Internet and 38.7 per cent are using the Internet[9]. Belize has an IDB Broadband Development Index (IDBA)[10] index of 3.15, which is below the average for the region of 3.66, within the index Belize however rates quite well in relation to strategic regulation. This would be reflective of the policies in the sector aimed at, inter alia, liberalization. Belize's broadband suffers from insufficient infrastructure. Much of Belize's geography is so dense that it makes fixed network deployment a challenge, other technologies will need to play a key role in making broadband accessible to the wider population, particularly in the rural areas, consequently strategies and policies need to be adopted that promote the expansion of mobile broadband. The price of broadband in Belize is among the highest in the region (Marin J. , Belize Internet and Broadband Connectivity Report, 2015) and notwithstanding that prices have been reduced by some 50 per cent over 2012 to 2013[11], pricing is still seen as a major hindrance to increased penetration. Further this reduction in prices will not however be sufficient to get Belize nearly fully online in the absence of infrastructure, so the drive must be to get infrastructure built out in the underserved areas.

The BIIPAC Component 2 report provides a detailed outline of the Belizean Telecommunications landscape including a chronology of the events in the reform process. At the time of the Component 2 report although the provision of broadband was not a legal monopoly, Belize Telemedia Ltd. was the only carrier providing fixed broadband. The Consultants posited that it entry would be easier for new players with the employment of network sharing strategies and policies such as Local Loop Unbundling (LLU), so they encouraged the opening up of the market to new entrants. Additionally they found that while Belize Telecommunications Act provided for competition, the enabling Regulations to give effect to those aspects of the Act were absent.

[9] ITU World Telecommunications/ICT Indicator Database - 2014

[10] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

[11] BIIPAC Report: Belize – Broadband ICT Diagnosis and Infrastructure Map, J. Marin, 27/01/2014

They further cited the need for legislation to enable to information society, specifically, data protection, cybercrime and interruption of communications.

Under Component 2 the licensing framework was also found to be in need of streamlining, particularly to provide for terms that set out specific objectives and, given the broadband penetration of Belize, one of these objectives must be increased access to broadband, and also roll out obligations for broadband network to underserved and unprofitable areas. Even once roll out and provision of broadband in unprofitable and underserved areas is addressed through license obligations, the challenge of financing of network roll out and cost to consumers remain potential barriers. Providers will require some incentives for these roll outs and/or funds sourced to be applied, and consumer costs will need to be alleviated in some way. The Consultants discussed the possibility of subsidies from a universal broadband tariff for low income families and to facilitate increased connections in light of high penetration of computers in the household relative to low broadband connections in households (63 percent[12]). Belize's Telecommunication Act provides for Universal Service, but there are no regulations to give it effect and define its management among other things, and it has not been implemented. Belize participated in the HIPCAR project which produced draft model legislation and policy guidelines for interconnection, licensing, and universal service that could be utilized by Belize.

In relation to cost of broadband to consumers, the cost base of the service needs to be addressed. The Public Utilities Commission (PUC) has a duty to ensure that prices are fair, reasonable, and cost based, yet the prices are considered high, even with the 50 percent[13] reduction cited, consequently input cost need to be examined. An obvious cost would be that of bandwidth. This issue can be tackled through a combination of approaches one of which is through the facilitation of the development of competition. Further, they could seek to reduce international bandwidth prices through establishing new carrier international connections. Another or an additional strategy would be to use the USF as indicated above to provide a subsidized tariff to low income families. In April 2015 the Internet service providers in Belize signed a Memorandum of Understanding for the establishment of an Internet Exchange Point (IXP), Belize Internet

[12] Inter-American Development Bank, Belize Internet and Connectivity Report, February 2015, BIIPAC
[13] BIIPAC Report: Belize – Broadband ICT Diagnosis and Infrastructure Map, J. Marin, 27/01/2014

Exchange (BIX). This will allow more efficient use to be made of international bandwidth and contribute to reduced costs as local-to-local traffic will no longer have to travel out and back using international bandwidth once the BIX is established.

The work of Component 4 encountered a challenges in engaging Belize Steering and Technical Committee and this was compounded when subsequent to national elections in November 2015, neither of the assigned members continued in their posts, and no alternative assignments have been given to the time of reporting. The work of Component 4 in relation to Belize therefore took the form of desk research including the review of the Components 1 to 3 recommendations, with particular attention to those with policy implications and this informed the Component 4 recommendations for Belize.

Key among the observations of Component 4 is that the PUC is a multisector regulator, television and broadcast however do not fall under its purview. In an era of converged technology, a converged regulator should be established covering broadcast, television, and telecommunications. This will result in efficiencies in regulation and greater alignment with the sector. Further, a regulator covering the whole ICT sector will be better capable to manage the relevant oversight aspects of the NBP as part of the governance structure.

Governance needs the leader to be an authority who owns and holds responsibility for execution of the defined national broadband strategy and delivery of the NBP. This leader must bring political will to the process and this should reasonably be a senior Minister of Government, responsible for ICTs, broadcast and TV. As an immediate step to commence the process, an entity, other than the presently structured PUC, reporting to this Minister would be responsible for the development, and execution of the NBP. Once the infrastructure expansion or supply plan is implemented there needs to be demand stimulated to use the ICTS riding on the broadband. Government has a role here and the development of e-government is a key component in getting Belizeans online. Belize has started an e-Government programme to make applications and services necessary to citizens available online. This requires governance at a high level and a committee of high level Administrators, preferably Ministers of Government, to lead the charge of developing and implementing essential services and applications online, contributing to

greater inclusiveness by the citizenry and increased e-participation. The governance of the NBP should follow short to medium term time bound targets, this would assist in maintaining focus on the goal and minimize any challenges to continuity.

Belize is challenged with low broadband penetration and use by citizens and the main reasons for this can be cited as limited roll out of fixed broadband by the main telecommunications provider due in part to geographic and terrain challenges, and the high price of broadband to consumers.

2.2.1 Recommendations

Component 1 key recommendations include the promotion of competition by the regulator for the establishment of broadband services at affordable prices and to encourage addressing the lack of infrastructure by implementing a combination of technologies including WIMAX and satellite to cover areas where population density and geography preclude the use of fixed technology. To address the accessibility through pricing, they recommend the implementation of a universal broadband tariff to low incomes family, which could be partially subsidized by the government or could be based on broadband operators cost accountancy. Further, the establishing new carrier international connections to provide decreased international bandwidth prices will also contribute to lower pricing.

Under Component 2, the Consultants the Regulatory Framework for telecoms, liberalization and consumer protection needs to be finalized through the completion of regulations needed to implement Belize Telecommunications Act. Areas recommended for attention are tariffs & pricing, competitive safeguards, and spectrum management. HIPCAR draft model legislation is set out as a guide to be used. In addition, the weaknesses identified on the information society legislation should be addressed, particularly consumer protection areas such as privacy, data protection, cybercrime, and interception of communications.

Component 4 recommends that it with the low metrics experienced by Belize it is imperative that a NBP be developed that establishes the Policy and measurable objectives, for example with respect to improving the 3.1 per cent average penetration to a specific target. Component 4

Consultant commends the recommendations of the Consultant of Component 2 with respect to the enhancement of the regulatory and legislative framework, specifically: complete the legislation for effecting US through development of Regulations and operationalize a USF; develop legislation on data protection, cyber security and interception of communication; revise the Interconnection framework to facilitate transparent interconnection between broadband networks and unrestricted access to facilities and customers; include coverage requirements in the licensing framework.

An effective Governance structure is needed to ensure that the Policies and NBP are implemented. It is recommended that a converged ICT regulator incorporating broadcast, TV and telecommunications be created. Further, a Policy Unit reporting to the Minister should be established to develop and implement the NBP.

2.3 DOMINICAN REPUBLIC

Dominican Republic ranks in third position in the IDBA index[14] within the Caribbean, with an above average rank of 4.22 according to the 2012 IDBA report. The 2012 IDBA report related to broadband development in LAC region, shows an average IDBA score for the Caribbean of 3.66, on an IDBA scale that ranges between 1 and 8, with 8 representing the best score.

The Dominican Republic has implemented a number of policies and plans aimed at closing the digital gap, both in terms of use and access. Among the separate projects as cited by the Component 1 Consultants are (Marin J. , IADB: Dominican Republic Internet and Broadband Connectivity Report, 2015):

- The Policy and Intervention on Educative Strategy based on ICTs, implemented by the Ministry of Education.
- The Strategic Plan 2013 – 2016, carried out by the Office of the President Information Technology and Communication.
- The digital literacy plan "PAD", promulgated by the Office of the President Information Technology and Communication.
- Other digital inclusion projects led by the national telecom regulator lNDOTEL.[15]

They also had implemented digital rooms or community centres to provide access to the population. This effective use of policies and plans had led to the country ranking well in the IADB pillar for strategic vision and public policy. Further, these policies saw the percentage of the population using the internet increase from 8.81 percent in 2000 to 45 percent in 2010[16].

Dominican Republic enjoys significant competition in infrastructure with three private sector companies making significant investments. Government also invests in infrastructure. In January 2014, Government through Indotel announced that the Dominican Republic would invest US$62

[14] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

[15] Dominican Republic Internet and Broadband Connectivity Report, J. Marin, 2015

[16] Ibid.

million to roll out a new national optical fiber network[17]. This demonstrates the importance that this country attributes to development of ICT. Notwithstanding these efforts the Component 1 Consultants found there still remained a gap in penetration and access metrics, with fixed broadband subscription per 100 inhabitants at only 4.4% while households with computers remains at 19.8% and with Internet access at home 13.6%[18]. The broadband fixed network is relativity well implemented, there are low subscription rates in the country, and it has been identified that pricing in the Dominican Republic represents one of the highest percentages of monthly income spent across the region (Marin J. , IADB: Dominican Republic Internet and Broadband Connectivity Report, 2015).

Under Component 2, the Consultants found in their review of the legal and regulatory framework that there is was no plan or legislation to transition Dominican Republic to a legislative and regulatory framework for next generation broadband technology (Dunn, 2015). The current legislation is the General Telecommunication Law No. 153-98 in 1998, which while in its development facilitated competition and entry of new operators, is dated, and has not kept pace with the technology advances in the sector. Indeed, the Consultants cite that there are no policies or legislation specific to broadband. The country has no NBP and forces need to be brought together to develop same[19]. Dominican Republic has a one regulator in INDOTEL that is responsible for all aspects of ICTs including telecommunications licencing, universal service, broadcasting, spectrum, and sector competition. There are also a number of other agencies that impact the ICT sector and will need to be looked at in an effort to streamline the processes such as licencing.

Component 3 identified a number of specific projects recommended to enhance the demand for broadband. Included is a recognition that Government is the best facilitator of demand and they have spoken to the development of e-Government policy and strategy, following the general direction set out in the 2013-2016 Strategic Plan[20].

[17] ibid
[18] ibid
[19] A Report for Broadband Infrastructure Inventory & Public Awareness in the Caribbean (BIIPAC) Component 2 - Tranche A, Hopeton S. Dunn, 2015
[20] http://www.optic.gob.do/index.php/multimedia/documentos-digitales/item/163-plan-estrategico-2013-2016

The 2016-2020 Dominican Digital Agenda (or E-Dominicana) was being finalised (Jan 2016), with several consultations being undertaken with key stakeholders within the private and public sector, as well as non-state actors,, this should be taken account of in the development of a NBP (Khelladi, 2016).

There is a specific project which was designed in 2012-2014 called "Fiber Broadband deployment across the national territory". This project is INDOTEL led under the World Bank's CARCIP regional program, and a 30 Million USD loan from the World Bank was pre-approved in September 2014. The main objective of this project was to make broadband more accessible in remote rural areas, achieving 80 per cent penetration by 2030 (Khelladi, 2016). Additionally, INDOTEL started the implementation of a "connected households" project in late 2015 using USF funds, targeting the provision of computers, access to subsidised broadband services and training for some 10,000 households.

It is the view of the Component 4 Consultant that The Digital Agenda 2016-2020 and the "CARCIP broadband" project, both include most of the elements of a NBP, and will therefore provide a basis for its development. In relation to governance, a challenge was identified in establishing a framework for implementation of the Digital Agenda across all of government and the private sector in that there is no Telecommunications Ministry, and the regulator INDOTEL, a central government institution, has no mandate over any other agency. In addition, INDOTEL also plays the role of USF manager, and establishes ICT/Telecommunication policies, tasks that would be carried out by a Telecommunications Ministry in other countries. Further, it has been noted that co-ordination and implementation of the Digital Agenda is complicated across the multiple agencies.

2.3.1 Recommendations

Among the Consultant recommendations made under Component 1 are some that reflect addressing the low penetration rates and access in the homes, namely:

- Broadband universal service should be based on the combination of different access technologies (WIMAX, FTTH, HFC, 4G) to be decided upon on a case by case basis.

- The combination of new mobile technologies such as LTE-advanced with low spectrum allocation (700 MHz band) will reduce costs and could represent a low cost, tangible alternative.
- Explore the implementation of new technologies such as satellite, radio links, or microwave technology to implement broadband connections in schools or rural community access points.

To address the pricing issue, they should consider subsidies to low income families; making devices available through programmes such as “one laptop per child”; and pay attention to those factors that contribute to increased price of broadband service such as direct taxes to consumers on the services, taxes on telecommunications and device providers.

In recognition that the low penetration metrics, particularly access at home, can be attributed to cost of service to consumers, Component 2 Consultant made recommendations to address this. Among these is that they create regulations that foster telecommunications infrastructure sharing. Currently every concessionaire deploys infrastructure in different geographic locations, and do not share sites or tower facilities that could help reduce the cost of maintenance, security, power and other expenses.

The review of legislation under this Component resulted in the recommendation that the Telecommunications Law 153-98, the principle law governing ICTs is dated and needs to be reviewed, and one objective of the review would be to update for NGN. This recommendation is consistent over Components 1 to 3.

It is also recommended that they develop policies that unify the procedures for existing concessionaires that are required in many cases to address different governmental entities in order to get the permissions, licenses, payment of fees, and other elements needed to start operation or deployment of additional infrastructure.

The Consultants’ of Component 3 made some specific project recommendations aimed at building capacity and stimulating demand Some of these projects set out in the Consultants’ report (Attiba Phillips, 2015) include:

- Training and Capacity Building Program for SMEs
- Project for E-Payment Solutions Development/Promotion / Integration program
- Project for Bolstering the Enabling Environment: Review and update of legislation with regard to the e-Economy is recommended. Plus Capacity building for government agencies (Finance, Trade, Telecoms / ICT) in the provision of value added service (VAS), "over the top" (OTT) and other e-Business / e-Commerce / e-Payments related services
- Project for the Promotion of R&D, Software Development and University – Industry Collaboration: to develop the national software development Industry,
- Project for the Design of Financing and Incentives for Intangible Assets and Internet Enabled Businesses "
- Project to Develop Local Internet Registries and Reduce Hosting Costs to Local SMEs
- Education and Public Awareness Programs
- Project for Capacity Building for Financial, Trade and Telecoms Government Agencies and Authorities
- Project for Digital Broadband Content and Open Data - Intervention to facilitate the Commercial Re-use Public Sector Information
- An Action Plan for, and list of Projects for e-Agriculture
- An Action Plan for e-Tourism Interventions
- Action Plan for– e-Education and Youth Empowerment
- An Action Plan and Tasks for– e-Government/e-Governance Interventions DR

Component 4 main recommendation is to develop the NBP based on the Digital Agenda 2016-2020 and "Fiber Broadband deployment across the national territory", the CARCIP project.

In relation to governance, along with the stated plan to revise the telecommunications law the Component 4 Consultant also recommends the following:

- Mandate a high level ministry, ideally the Ministry of Economy, Planning and Development or the Ministry of Presidency (which coordinates the actions of all Ministries across government) to assume the coordination of the implementation of the Digital Agenda 2016-2020, head the National Information Society Commission (CNSIC), and ensure that it is coherently implemented with the national development strategy (END 2030), and sufficiently

funded, monitored and evaluated (as its implementation involves specific projects and activities in all government ministries).

- Create a specific commission, headed by INDOTEL, to manage and implement the Broadband Plan, directly connected to the agenda outputs, using a mix of USF funds, private sector investments and donor funds.
- Give a formal mandate to the other ministries and agencies that manage the implementation in a coordinated fashion, specific projects of the Agenda and Broadband plan, such as the Community Centres (currently mostly managed by Indotel and some by the Vice Presidency), the Education Labs, and the e-government program.

2.4 GUYANA

Guyana's broadband connectivity is low relative to the rest of the Caribbean, with fixed broadband penetration at 4.6 per cent (Marin J. , IADB: Guyana Internet and Broadband Connectivity Report, 2015), and remained one of the only countries in the regions that does not have mobile broadband data service. Also, over the last five years fixed telephone subscriptions per 100 have remained flat at around 20 per cent. Guyana's IDBA index is 3.16, below the average for the Caribbean of 3.66. This certainly does not seem so low, when taken against the low penetration metrics. Guyana has undertaken a number of policies and plans aimed at expanding and improving telecommunications and broadband development across the country. Some of these are:

- Government commissioned Dax Engineering to fix national fiber backbone network;
- Government distributed more than 11,000 laptops under One Laptop per Family (OLPF) scheme, with some 70,000 laptops in the program;
- Guyana Telephone & Telegraph (GT&T) is currently engaged in the build-out of an undersea international fiber optic cable at a cost of US$30 million;
- E-Governance project is meant to give access to the public, to government services, as well as interconnect the agencies.

The articulation of ICT policies and plans such as these and others, has accounted for Guyana having IADB rankings better than other countries in the Caribbean for the pillar of Public Policy and Strategy Vision.

The Component 4 Consultant (Khelladi, 2016) summarized some of the Component 1 findings as:

- Percentage of households with computers, is only 22.9%;
- State sold its 20% stake in GT&T to Datang Telecom Technology and Industry Group, a Chinese state-owned company;
- GT&T blocks internet access for cybercafés that use third party applications for VoIP services;
- iNet launches satellite broadband service offering data at up to 6Mb/s;
- DIGICEL Guyana asks for permits to land its own cable in Guyana;

- E-Networks signs agreement to use O3b's Fiber in the Sky satellite network;
- DIGICEL data held up by the license to be issued under the revised legislation;
- Government then announced that in addition to E-governance, it would lease bandwidth to the private operators.

Guyana has been slow to join its Caribbean neighbours in liberalizing its telecommunications sector, having embarked on the process in the late 1980s. In 2012 the Telecommunications Reform Bills were presented, more than 20 years after the process was started, and a series of readings of the Bills commenced. Coming in on the bottom rung of Guyana's liberalization process, BIIPAC Component 2 report had a front row seat to examine the Bills to facilitate liberalization being debated, and this was able to inform the recommendations related to broadband.

Under Component 4, it was stated that to improve digital inclusion, there is need for full market liberalization and fixed broadband infrastructure, and further, the new set of laws is necessary to encourage competition and provide the telecom regulator (Public Utilities Commission, PUC) with enough capabilities to manage competitive markets such as fixed and wireless broadband (Khelladi, 2016). It was noted that he OLPF programme was replaced by the One Laptop per Teacher (OLPT).

2.4.1 Recommendations

Component 1 Consultants made the following key recommendations:

- Promote fixed broadband competition, and possibly impose the obligation of providing fixed broadband universal services at reduced prices.
- Provide the Public Utilities Commission, (PUC), the telecom regulator with enough capabilities to manage a competitive market such as fixed and wireless broadband
- Create a fund to supply telecommunication services to areas, where it might not be economically viable for private operators. Government. Could possibly offer subsidies to GT&T to provide internet access to poor communities with internet access.
- Utilise technologies to provide connectivity where there is low coverage

- The implementation of 4G technologies at 700 MHz is the best affordable substitute to fixed broadband in the areas of the country where there is a lack of connectivity.
- WIMAX and satellite might be the only options in the areas where population density is not enough for implementation of broadband technology.

Some key Component 2 recommendations include:

- For Broadband Any-to-Any Interconnection, regulations should require operators to establish interconnection arrangements within a principle of any-to-any connectivity.
- Symmetrical interconnection regime is essential to establish a level playing field for inter-modal (e.g., wireline vs. wireless) competition.
- Recommendation for Technology-Neutral Interconnection Charging
- The HIPCAR licensing policy guidelines, legislative model and assessment results should be adopted where relevant, as a reference by which the current bills and licensing regulations may be strengthened in the areas of:
- Simplified license application procedures
- Transparent licensing criteria
- Licensing framework, and
- Licensing of scarce resources
- Recommended simplified license Application Procedures
- Licensing framework exceptions for certain activities
- Technology-neutral frequency authorizations
- Technology-neutral types of class licenses
- License exclusivity conditions and timing, if exclusivity is provided
- Declaration of quantitative restrictions on the number of licenses, if any exists
- Policies and regulations that lower investment risk and cost structure for industry should be enacted while creating an enabling environment with clear incentives and increased regulatory certainty.

- Ensure and promote fair pricing and the use of cost-oriented pricing methods by telecommunications providers in Guyana
- Regulations are needed for infrastructure sharing by national backbone networks with backhaul providers of capacity to wireless network providers

Some of the key Component 4 recommendations considered include:

- The transfer of telecommunications from the Prime Minister's Office to the Ministry of Infrastructure to be completed and Telecommunications Director to be appointed.
- Design the institutional framework for ICTs and mandate an agency to develop and manage the National ICT agenda, and the National Broadband Plan with the support of a high level inter-ministerial Commission.
- Broadband access should be both fixed and wireless. The implementation of 4G technologies at 700 MHz is the best affordable substitute to fixed broadband in the areas of the country where there is a lack of connectivity.

2.5 HAITI

A major challenge face by Haiti is the destruction by most of its infrastructure by the earthquake in 2011 and it has since then been undergoing much needed restructuring. Under Haiti's strategic plan "Emerging Country in 2030"[21] a number of projects have been undertaken by the Government towards restoration of the infrastructure. As noted by the Component 1 Consultants, these efforts have reaped some improvements in the ICT sector since the earthquake:

- *The percentage of individuals using the Internet has grown from 8.49% in 2010 to 10.9% in 2013.*
- *Mobile penetration has also increased from 52% in 2012 to 69.4% in 2013 with 6,239,590 users. Haiti has had a high ICT dynamism during the last years: In 1998 there were 2 million of mobile cellular subscribers while in 2012 this number was increased until 6.3 million.*
- *Haiti's fixed line density remained amongst the lowest in the world, at around 1%. Though progress in network development is slow, growth potential is considerable.*
- *In 2012, 40 ICT labs in rural school were deployed. Additionally, a new core rural network is being built under the "Haiti Rural Initiative", delivering access to 6 key rural regions.* (Marin J. , IADB: Haiti Internet and Broadband Connectivity Report, 2015)

With the mobile penetration high relative to fixed, the future growth of broadband will rest in mobile coverage and penetration growth. The lack of fixed broadband penetration can be mitigated with new 4G –LTE mobile internet services. The IDBA is a useful measurement tool, developed by the IDB, that provides an indicator of the state of broadband in a country. The 2012 IDBA report related to broadband development in LAC region, shows an average IDBA score for the Caribbean of 3.66, on an IDBA scale that ranges between 1 and 8, with 8 representing the best score. Of the Caribbean countries, Haiti has the lowest IDBA index [22] at 1.70.

[21] Strategic plan for the development of Haiti: An Emerging Country in 2030

[22] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

It is worthwhile noting that the telecommunications and broadband infrastructure challenge is compounded by a low level of literacy which will impact internet use. Further, the progress in telecommunication infrastructure and access to digital information is driven by projects and programs, carried out by nonprofit or multilateral organizations in collaboration with Government Ministries.

Component 2 review of the legal and regulatory framework, particularly arising out of the Telecommunications Act of 1977, together with the HIPCAR Assessment Report along with Haiti's IDBA rankings, found that there is a lack of the necessary explicit provisions for regulating a liberalized market that requires, for example, the basic instrument of a reference interconnection offer for ex-ante regulation of a dominant operator (Jackson, 2015), further, regulations for these issues of liberalization are lacking. The Consultants noted that "*Haiti needs to develop an effective, comprehensive and modern regulatory framework that can attract investments for the ICT sector with a structure that is determined, in part, by the legal and constitutional system of the country and includes the establishment of a comprehensive set of laws, rules, and regulations that clearly identifies the contractual obligations and property rights of governments and stakeholders"* (Jackson, 2015). Recognising the inadequacy of the Telecommunications Act 1977, the Haitian Government drafted new Bill in 2012.

At the time of the Component 4 review the draft Bill had not been yet been enacted, and a new Government was in process of being put in place. This Consultant noted that notwithstanding this new draft Bill, the findings and recommendations of the Component 2 still needed to be addressed, inter alia, specifically, laws on electronic transactions, access to public information, privacy and data protection, as well as the regulations on the different aspects highlighted by the component 2 consultant, relative to Interconnection & Access, Operator & Services Licensing, Consumer Protection & Quality Standards, and the Broadband Spectrum Management (Khelladi, 2016). It was recognized that Haiti was challenged not only in the immediate term by recovery from a catastrophic earthquake, but also faced a difficult governance reality, institutional weakness, incomplete legal framework and a complex political situation. This would present a particular challenge to the development and execution of a NBP, that is to say the governance.

2.5.1 Recommendations

Key among the recommendations of Component 1 are:

- Government should create an ICT agency tasked with coordinating and alignment of the activities of non-profit organizations, foreign government aid and the Haitian public and private sectors.
- Implement broadband implementation and digital inclusion alongside literacy policies, as a good mechanism to reduce the high level of illiteracy in Haiti.
- Utilise alternative technologies to improve the connectivity by upgrading the 3G networks to 4G-LTE networks, improving mobile coverage, which can in turn revolutionize the broadband penetration.

Further key recommendations of Component 1 not directly related to increasing infrastructure and penetration are related to e-government and the promotion of demand:

- E-government and innovation could provide significant opportunities to transform the public administration of Haiti into an instrument of sustainable Development, generate important benefits in the form of new employment, e-health and tele-education across Haiti.
- E-government is another way to promote the demand of ICT by Haitians citizens adopting plans and programs based on ICT solutions which would enhance the agility of public procedures so citizens have 24-hour access to all important government services and incentive the demand of ICT.
- Implement a unique and solid computer program _“One laptop per child” or “One computer per family programs”, across the country.
- Massively promote digital literacy, and install and promote new community access point (CAP) or telecentres.

Under Component 2, the key recommendations include:

- The adoption of the HIPCAR Interconnection & Access Framework, policy guidelines, legislative model and assessment results for interconnection and access as reference in developing a suitable convergent liberalization framework for Haiti.
- Establish Regulatory Capacity for Expedited Interconnection to minimize any obstacles to incremental deployment of broadband infrastructure based on interconnection issues.
- Establish a consistent licensing framework that is clearly targeted to achieving a set of defined policy objectives. In addition, general authorizations can be used in lieu of onerous licensing regulations to ease market entry.

Component 4 Consultant made a number of critical public policy and governance recommendations and key among these are:

- Revise the draft Telecommunications Act which was prepared by the Government in 2012, with a view to updating the entire legal and regulatory framework, incorporating laws on electronic transactions, access to public information, privacy and data protection, as well as regulations regarding the different aspects highlighted by the BIIPAC component 2 consultant, related to Interconnection & Access, Operator & Services Licensing, Consumer Protection & Quality Standards, and Broadband Spectrum Management.
- Create a national ICT committee, headed by the Prime Minister, which would include key ministries (such as Minister of Transport Publics works and telecommunications (MTPTC), economy and finance, public works and education), CONATEL, non-profit organizations, independent Haitian ICT experts, private ICT and ISP sector representatives, multilateral agencies and the E-government inter-ministerial commission, (which was reactivated in 2015). This National ICT Committee would review and update the 2010 ICT agendas and the governance proposal prepared by GTIC [23].

[23] A 21- member ICT Presidential Commission for Information and Communication Technologies (Groupe de Travail sur les Technologies de l'Information et de la Communication (GTIC) set up by by GoH in 2009 with the mandate (i) to develop a strategic plan for ICT in Haiti; and (ii) to clearly indicate to the Government guidelines and recommendations on urgent sector issues, especially in respect of E-Government as a support to GOH's current efforts to both increase the quantity, and improve the quality of services to the population nationwide.

- Develop a solid ICT strategy that recognises the key enabling role that modern telecommunications and data based technologies should have in supporting the reconstruction, governance, sustainable development and social inclusion efforts within Haiti.
- Review the proposed draft national ICT strategy and recommendations for a legal framework, prepared in 2009-2012 by the GTIC. Included within the draft national ICT strategy should be programs for digital inclusion, references to literacy policy, e-government initiatives, ICT training programs, initiatives which reduce the cost of access to ICT equipment such as OLPF or OLPC, suggestions for the improvement of access to electricity, the establishment of community access centres and school computer labs, and the promotion of local high-tech companies.
- Define the overall policy goals, and design of a NBP, which would be reviewed year on year and measured with specific Key Performance Indicators (KPI), with the participation of key private sector stakeholders.
- Upgrade the institutional capacity in country to be able to handle the regulatory demands of the market effectively. (Khelladi, 2016)

2.6 JAMAICA

Jamaica ranks second in the Caribbean in the IDBA[24] index with an above average rank of 4.29. The 2012 IDBA report related to broadband development in LAC region, shows an average IDBA score for the Caribbean of 3.66, on an IDBA scale that ranges between 1 and 8, with 8 representing the best score. The Government of Jamaica has over the years undertaken a lot of projects aimed at taking access into communities and schools, this has contributed considerably to the strong IBDA ranking.

Jamaica was one of the first countries in the Caribbean to liberalise in 2000 and has experienced very rigorous competition. With this competition has come a very well developed broadband infrastructure. There was an even greater boost to the fixed and wireless broadband infrastructures with significant investments in 2013 by the network operators. However, as reported by the BIIPAC Component 1 Consultants, the average broadband penetration for Jamaica was 15.7 per cent, and only 26 per cent of households having internet at 2014[25]. The gap between the geographic areas with high and low penetration was however great, ranging from St. Andrew (which hosts the capital) at 27 per cent to St. Elizabeth at 5.5 per cent (Marin J. , BIIPAC: Jamaica Broadband ICT Diagnosis and Infrastructure Map, 2014). This reflects issues other than infrastructure being present. The Component 2 Consultants identified the high price as one of the reasons for the low penetration.

In their review of the Legal and Regulatory framework the Component 2 Consultants have described Jamaica as having "a fractured institutional arrangement", that they cite as responsible for the slow pace of broadband growth. This arrangement is attributed to the number of separate agencies involved with the regulation and policy of ICTs and which are generally set up along technology lines (Dunn, 2015). By way of example the triple play services growing in popularity straddle the Office of Utility Regulation (OUR), and the Broadcast Commission for licensing and pricing regulation of the different services that male up the triple play. The Government

[24] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

[25] ITU World Telecommunications/ ICT Indicators Database

recognizes that a converged regulator, combining content and infrastructure and services, would be more efficient. Work has commenced on creating such a converged regulator, bringing together the Office of Utility Regulation (OUR), Broadcast Commission, and the Spectrum Management Authority, with the funding assistance of IADB.

Component 2 also concluded that Jamaica has a developed suite of ICT legislation, it is however defined on technological lines. To complete ICT enabling legislation there is still a need for the enactment of additional legislation, specifically, data protection and privacy laws and the Government has indicated that data protection legislation will be provided by 2016/17, as highlighted by the Component 4 consultant (Downes-Haynes, 2016).

Component 3 Consultants identified that the use of ICT in Jamaica is very transaction based, with a high level of use of ICT among SMEs. Further, 81 per cent use mobile phones and 59 per cent use email, the use of web sites and computers are 16 and 27 per cent respectively. Over time a large number of projects were undertaken utilizing the USF. These have not increased Jamaica's penetration numbers as high as one might expect. These projects so far have primarily focused on community and educational access, not infrastructure build or tariff support, consequently this could account for what may appear as a low impact on penetration metrics. E-Government is a critical peg to lift a country's digital inclusion and while Jamaica has undertaken initiatives to enhance this, there is more required, apart from more infrastructure build, to drive a greater percentage of its population online. On the United Nation's e-Government Development Index (EGDI) Jamaica ranks 109th, out of 193 surveyed, at 2014[26], and it is this that merits some focus to get more participation and use of the Internet by its citizens.

At a policy level, *Vision 2030 Jamaica, National Development Plan*, cites ICTs as being key to achieving the fifteen national outcomes outlined in the Plan, as it sees ICTs as an enabler of the key economic sectors, and cites "A Technology Enabled-Society" as a national outcome. This document is a good foundation for the development of a NBP for Jamaica that will support the vision as set out in the National Development Plan.

[26] United Nations Department of Economic and Social Affairs, https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2014-Survey/E-Gov_Complete_Survey-2014.pdf

2.6.1 Recommendations

Jamaica has a well-developed infrastructure and the issue as identified by the Component 1 Consultants was access, based on low penetration rates. They further recognized that the issues holding Jamaica back in broadband access were price and demand. Arising from Component 1 some of the key recommendations are:

- Boost the mobile broadband penetration through the use of 4G technologies at 700 Mhz, which will represent a unique opportunity to boast the broadband penetration to 100% in the country.
- Providing a universal broadband tariff to low incomes family, which could be partially subsidized by the government or could be based on broadband operators cost accountancy.
- Look for support from multilateral organism and manufacturers in order to provide equipment and computer devices to all households in the country.

Component 2 Consultants key recommendations include:

- Regulations and guidelines for implementation of a first rate next generation broadband legal and regulatory framework is needed in Jamaica.
- Efficient public service delivery through broadband must become part of the overarching policy of the Government, as a direct strategy of stimulating uptake and usage of services.

In pursuit of uptake and use of public service through broadband, these are additional specific technological issues that require attention:

- Net neutral regulations – to facilitate the unimpeded flow of content over the internet in order for broadband to grow;
- Move towards more market-based determination of the value of spectrum;
- Strengthening of the legislative content layer: data protection legislation and privacy legislation;
- Optimal design of IPR legislation to strike balance between protection of intellectual property rights and not restricting innovation within a dynamic economic system;

- Policy on treatment of e-waste disposal of electrical and electronic equipment will become increasingly important given the rise in mobile broadband devices;
- Legislate a minimum standard for broadband speed and quality.

Component 4 key recommendations include:

- Establish the committee responsible for the development of the NBP, directly accountable to the Minister that engages relevant stakeholder groups.
- Develop the vison and objectives regarding the level of coverage within the timeframe that the NBP will drive. Increase the households with broadband to 50 percent in 2 years and percentage of individuals using internet to 75 in 18 months.
- Define a USP that does not depend on solely funds from incoming international calls, but receives funds from local operators as well. The fund to be used not only for demand and community and education hardware access projects, but to subsidise access cost to low income population.
- Enact the Data Protection legislation.
- Conclude the establishment of a converged Regulator for the ICT sector.
- Rationalise the agencies that currently utilise the USF, creating one body through which the USF is not only administered but utilized.

2.7 REPUBLIC OF TRINIDAD AND TOBAGO

Broadband in The Republic of Trinidad & Tobago (Trinidad & Tobago) has experienced very commendable movement over twelve years, moving from 22 percent of individuals using the Internet in 2002, to 65.1 percent in 2014[27]. Trinidad & Tobago has been defining its ICT road in a number of plans falling under the umbrella of it 2003-2028 National ICT Plan. The individual plans are: *fastforward,* 2003-2008; *ttconnect*, 2007 to 2009; and *smarTT – National ICT Plan* 2014-2018. Each plan has had a different focus, and having achieved much of the connectivity that was the focus of earlier plans, this last plan is focused on innovation and skills development. The plans and policies set out in these plans and implemented by Government would well have accounted for the 3 fold increase in individuals using the internet. A number of these connectivity plans are detailed in the Component 1 Consultant Report (Marin J. , Trinidad and Tobago Internet and Broadband Connectivity Report, 2015).

The 2012 Broadband Development Index (IDBA)[28] report related to broadband development in LAC region, shows an average IDBA score for the Caribbean of 3.66, on an IDBA scale that ranges between 1 and 8, with 8 representing the best score. Trinidad & Tobago has an IDBA index of 4.14, which is above the average for the Caribbean, and ranks fourth in the region. The country ranks particularly high in the pillar of Strategic Vision and Public Policy, based on the plans and projects undertaken. According to the BIIPAC Component 1 Consultant notwithstanding that broadband penetration was generally high throughout the country, with an average of 44.6 per cent, penetration is not even throughout the island, ranging from 61 per cent in Diego Martin to 12 per cent in Princess Town, indicating that there is still a digital gap within the country (Marin J. , Trinidad and Tobago Internet and Broadband Connectivity Report, 2015).

[27] ITU World Telecommunications/ICT Indicators Database

[28] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

Further, it is noted that in the Latin America and Caribbean (LAC) region, mobile broadband penetration exceeds fixed broadband penetration. The average penetration of mobile broadband was 20%, while it was 8% in fixed broadband. Trinidad & Tobago is above the average with 18.9% mobile broadband penetration and 14.6% fixed broadband penetration.[29]

The Consultant of Component 1 has expressed the view that, "Trinidad and Tobago is one of the Caribbean countries with higher penetration rates for Internet and broadband and full mobile coverage for the population. Additionally, fixed and mobile broadband are also one of the most affordable for users." (Marin J. , Trinidad and Tobago Internet and Broadband Connectivity Report, 2015). The metrics reflect a mixed position and indicate that there are still some challenges to be overcome, identified by the Consultant as fixed broadband, digital inclusion and fixed broadband competition.

Under Component 2 a complete review was undertaken of the legislation and regulations that establish the legal and regulatory framework of the sector, as well as the results of the HIPCAR review. Trinidad & Tobago has a full suite of ICT enabling legislation, with some areas still to be enhanced. The legislation is technology neutral in its scope and largely addresses Next Generation Networks (NGNs). The Consultants identified that that there were 2013 amendments made to The Telecommunications Act to include provisions for Merger and Acquisitions Controls and Competition Oversight, to be added to the remit of Telecommunications Authority of Trinidad and Tobago (TATT). At the time of the Component 2 review the amendments had not been laid in the Legislative Assembly. Further, both Components 2 and 4 recognized that among the specific areas to be addressed are: the Data Protection Act has not been promulgated, this is a critical piece of legislation for a society participating in e-commerce and online transactions; and, the Cybercrime Bill 2015 that is slated to be amended before it is brought back before Parliament.

A digital gap exists at the level of participation in that citizens have not had a sufficient drive or need to go online. The best channel to mediate this is often through the medium of e-government and this can also be a catalyst for e-business growth. As in most Caribbean countries, there are

[29] ITU, 2013

challenges with e-payment platforms being required along with appropriate education of the consumers and businesses. BIIPAC Component 3 report sets out a number of projects and action plans for the furtherance of closing the digital gap.

The Component 3 Consultants also identified one of the major obstacles to some businesses in Trinidad and Tobago participating in e-business and e-commerce, as the high cost of the platforms and solutions to facilitate payments. They also noted inter alia that:

- "…Banks also do not facilitate Government online receipts from citizens to-date or online / mobile payments to citizens.
- Banks generally do not facilitate Business to Business or Business to Government online payments" (Attiba Phillips, 2015)

The banking system is a challenge that Caribbean Governments will need to get behind in order to obtain support in taking the region into the e-business, e-commerce world, where full advantage can be made of conducting e-transactions. Without the co-operation of the banking system, the enabling legislative frameworks will not get the region where it needs to be on the global scene in this regard.

Trinidad and Tobago had objectives set out in its various ICT plans and they now need to develop a strategy and plans that will bring them to reality. With the current levels of penetration, the objectives that they have set are not likely to be achieved without getting citizens online. The Government of Trinidad and Tobago has started to work on a project assisted by the World Bank (WB) to develop a National Broadband Strategy. This would round out and complete the overall strategic plan for ICTs development for the country. The Component 4 Consultant notes that a complete NBP would include the quantifiable targets for penetration metrics, and this would define the work needed to take Trinidad to the next step of becoming a full e-society. The work with the WB is well advanced and TATT has been actively collaborating with key stakeholders to develop the national broadband strategy and plan (Downes-Haynes, 2016).

Under the Telecommunications Act, Trinidad & Tobago has a converged regulator, that adopts a technology neutral approach, to regulating broadcasting, telecommunications, including ISPs,

acts as the spectrum management authority, and is responsible for development of policies that further the sector, such as network sharing policies. This makes the country well placed for managing a converged sector marked by NGNs.

There is a developed governance mechanism in Trinidad & Tobago and this is described in the current ICT plan, smarTT National ICT Plan 2014-2018 (Government of Trinidad and Tobago, 2013). The Ministry of Science and Technology is at the core of the structure. TATT, the converged regulator, responsible for telecommunications sector development, is part of this structure. There is also a committee, the smarTT Secretariat, also under the Ministry, responsible for ICT policy and strategy. The fact that these all lead to the same Minster will allow for a streamlined approach to ICT planning and ensure that the political will is engaged. This Secretariat is well positioned to oversee the various aspects of NBP development, however under the engagement with the WB, the responsibilities for the NBP and strategy fall to the Executing Team, established by Government, and the WB (Downes-Haynes, 2016).

2.7.1 Recommendations

As observed under Component 1, Trinidad & Tobago has a well-developed infrastructure, but faces some specific challenges, the key recommendations made by the Consultant seek to address these, specifically:

- Impose a reduction of mobile interconnection rate to solve the problem of asymmetry of prices between on-net and off-net calls.
- New regulatory initiatives like the establishment of a MVNO regulatory framework or the fixed portability implementation could improve broadband competition.

Among the Component 2 key recommendations are:

- TATT needs to enhance its skill set, and as necessary, its procedures, to address the Next Generation Broadband networks.
- Regulations need to be developed for Data Protection and Electronic Transaction Act to provide certainty and clarity. Classification of electronic signatures also needs to be

addressed through regulations, absence of this is a hindrance to initiating online filing of public documents and e-payments.

- Modernise the Computer Misuse Act and Electronic Funds Transfer (Crime) Act to address the modern issues of cybercrime.

Component 3 Consultants outlined a number of Action items to fulfill the enhancement of demand, key among these are:

- Develop a public engagement initiative to explain the benefits of the e-Government Program and ttconnect in particular.
- Develop and publish a measurement index for e-services, as a way to address the issue of whether the high demand services are being addressed.
- Review the relationship between e-payments and end-to-end provisioning of e-services with a view to identifying and removing impediments to making online payments as these can depress e-transaction interactions and discourage e-participation and would encourage end-to-end e-services rollouts.

Component 4 key recommendations include:

- The process of development of the National Broadband Strategy and Plan is well advanced under an engagement with the WB with TATT executing, this process should be seen through to completion.
- Review the sector enabling legislation to ensure that the technology neutral language is consistent throughout in support of the converged governance structure. Use of HIPCAR draft model legislation would be useful in this regard.
- Enact the outstanding regulations to give effect to Universal Service.
- Enact the Data Protection Bill.
- The smarTT Governance framework, headed by the Minister, be maintained and TATT continue with its assigned task of development and execution of the NBP.
- Within the established smarTT governance framework, the smarTT Secretariat be responsible for the oversight of the NBP and stakeholder engagement.

2.8 SURINAME

Suriname has one of the lowest broadband penetration rates in the Caribbean, with fixed broadband connections per 100 inhabitants is only 6.9 per cent. Additionally, fixed telephone subscriptions per 100 inhabitants has remained flat over the last 5 years at about 15.5% (Marin J. , 2015). The percentage of individuals who use Internet in Suriname is one of the lowest in the region, the ITU, 2013, indicated that the percentage of individuals using the Internet was only 37.4%.

The 2012 Broadband Development Index (IDBA)[30] report related to broadband development in LAC region, shows an average IDBA score for the Caribbean of 3.66, on an IDBA scale that ranges between 1 and 8, with 8 representing the best score. Suriname has an IADB index value of 2.9, which is below the 3.66 Caribbean average. ICT policy in education and e-government represent a major component of the Government's overall strategy. Further, Suriname's regulator is promoting policies such as a new e-educational ICT strategy, promoted by the IDB and a new e-government policy and strategy on ICT with the objective of improving telecommunication development across the country. There are many non-governmental programs focused on the improvement of learning and teaching with ICTs. Additionally, the government is forcing the state-owned operator Telesur to invest in new mobile broadband networks and bandwidth across the country (Marin J. , 2015). These policies, and others, have contributed to a reasonable high rank in the IDBA pillar of Public Policy and Strategic Vision of 4.06.

Three challenges facing Suriname are broadband penetration, its fixed broadband network and competition in the fixed markets. The reason for lack of fixed broadband is the lack of competition in the fixed market. Of note is that state owned Telesur is the only operator licensed to offer both fixed broadband and telephone services in Suriname, at the time of the Component 1 review. Competition was introduced into Suriname's mobile sector in 2007. The importance of competition to the sector is reflected in the results of a survey that revealed that approximately

[30] The goal of the IDBA is to define the size of the digital divide in Latin America and the Caribbean. It is built from four pillars: infrastructure, applications and capacity, strategic regulations, and public policy and strategic vision and provides policy makers with a tool to identify strengths and areas to improve on

37 per cent of users responded that they did not have access to internet until Digicel and Uniqa entered the mobile market, and 17.4 per cent did not have mobile access before their entry into the market (Marin J. , 2015).

As noted in the Component 2 report (Jackson C. C., 2015), Suriname has a converged regulator by virtue of the Telecommunications Act in 2007. The regulator, Telecommunications Authority of Suriname, (TAS), has oversight of telecommunications sector, broadcasting, media and cable Television. Competition issues do not fall under the remit of TAS, and according to the Component 2 Consultant report there are no competition laws or agency, TAS has performed this function for the telecommunications sector de facto.

The HIPCAR review found that there was not a full suite of ICT laws, absent were laws coverings: Electronic Transactions; Electronic Evidence; Privacy; Data Protection; and Cybercrimes. There is legislation related to USF, but it is not operationalized.

Component 3 Consultants, in their research and discussions, identified Educations and Youth, and e-Government as priority areas for Suriname. They concluded that legislative intervention is needed to for effective government e-services, and to promote e-participation, both of which would aid in driving penetration up.

In the Component 4 assessment the Consultant determined that since the Component 1 to 3 reviews, the ICT in Education strategy was approved, and a unit was established within the Ministry of Education. However implementation of the strategy is slow as sufficient resources are not yet available, including the necessary computers, Internet connectivity and human resources. There was however no ICT agenda or responsible agency or broadband plan in place. The Regulator and Ministry are in place with clear roles established, as well as an e-Government committee under the Prime Minister. USF laws in place, but it is not operationalised.

2.8.1 Recommendations

Component 1 key recommendations include:

- Use wireless solutions such as satellite, to reach underserved remote areas. This is necessary for Suriname to achieve its goals on training, education and digital inclusion.
- Promote network sharing to address the speed of roll out. This would help mobile operators expand in a country with one of the lowest population densities in the world.
- Encourage foreign investment by promoting the competition of fixed lines and fixed broadband. Implement a new telecom reform that would include the fixed market

Out of the Component 2 Review of the Legal and Regulatory Framework, some of the key recommendations are:

- The TAS needs to improve its regulatory capacity to effectively handle the highly dynamic nature of the demand on its human resources.

- To minimize the risk of distorting investment incentives and reduced possibility of the desired market expansion, we recommend regulatory forbearance in the introductory stage of the development of the broadband market in Suriname when broadband services are new, and markets are not mature.
- It was identified that there are no explicit and adequate provisions for consumer protection & quality standards. The Consultant commended the proposed consumer protection and quality of service regulations for Guyana drafted in 2011 to Suriname for adoption.
- Adopt HIPAR policy guidelines and draft regulation for universal access, licensing, and interconnection to effect practical implementation.

Out of the Component 3 work, the Consultants recommended that with respect to the e-government priority area Suriname should assess the deliveries of the e-Government agenda to date, and put a new strategy in train to drive implementation.

Key among the Component 4 Consultant recommendations are:

- Start a participative process to develop a NBP that should include targets for infrastructure and usage in the different areas of the country, and detail the means and strategies to achieve them. Specifically, the NBP should include a comprehensive review of the use of a combination of various access technologies in different areas of the country.

- The NBP should coherently encapsulate a National School Connectivity program and articulate its strategies with other sectors' key projects such as the E-government program and rural community centres.
- Healthy competition in fixed line and fixed broadband is key to Suriname's broadband growth, to facilitate this competition it is recommended that Suriname implement regulations that facilitate access to new entrants, issue new licences on fixed lines and fixed broadband, and deliver the international cable landing permits that will increase international bandwidth capacity and lower wholesale prices.
- The President or Prime Minister issues appropriate legal text, mandating the Ministry of Transport, Communication and Tourism (MTCT) to coordinate and take the lead on the design and development of the Suriname National Broadband plan. Further, a National Broadband Commission comprising the other relevant ministries, the regulator, and public and private stakeholders (including e-gov. committee) should be established with the mandate to coordinate the design of their individual ICT strategies and plans with the MTCT.

3. GROUNDS FOR REGIONAL COOPERATION

The Component 2 Consultant in his Executive Summary Report (Dunn, 2015) identified recommendations for regional collaboration, coordination and harmonization. These recommendations are in the following areas:

Spectrum

The Caribbean region stands to benefit significantly from the economies of scale that could be derived from harmonizing its spectrum policies. While the CARICOM 2015-2019 Strategic Plan does identify spectrum management as key to the creation of this single Caribbean ICT Space, it may be prudent for CARICOM to pick 'low hanging fruits', of which spectrum is one, for immediate work. In this regard the initiatives of the Caribbean Telecommunications Union (CTU) should be supported.

Strengthen and/or Broker Inter-sectoral Linkages

With the exception of resource-rich countries of Trinidad and Tobago and Guyana, the mainstays of the economies of the Caribbean region have been the traditional sectors such as agriculture and services sectors such as tourism and financial services. With broadband technologies upending much of the value chain in tourism and other sectors, CARICOM could play a distinct role by seeking to foster a greater relationship between these and broadband technologies in the region, to at once increase the competitiveness and to stimulate demand among both large and MSME businesses.

Regional Content Production Fund

Content is equally as important to the technologies that facilitate its flow. The opportunity exists for the Caribbean region to imprint upon the world its distinctive culture and creative expressions through a dedicated Content Production Fund that would give financial assistance to creative artistes whose work could generate significant global interest in the region. Such a fund is already proposed by the Broadcasting Commission of Jamaica (BCJ) and could be further supported by USF once its spending mandate is suitably altered. Governments are encouraged to support the CANTO i-create initiative to drive innovation and creation of local content. Wide promulgation within countries and country specific activities are necessary.

Competition, Dispute Resolution and Enforcement Functions

Given the growth of pan-Caribbean operators who are horizontally integrated across service and market segments and the emergence of new service models such as OTT, the risk of the market structure reverting to region-wide monopolistic operators and significant economic extraction with minimal operational or strategic returns and inward investments cannot be ignored. Accordingly, there needs to be a paradigm shift to the approach to regulation across the region, recognising the inherent risks of increasing information asymmetry that trans-regional monopolies bring to bear. This requires coordination, collaboration and unambiguous policy and operational positions will be required across the regulatory frameworks in the region.

Regulatory authorities across the region should focus on strengthened competition management functions. There needs to be considerable growth in the capacity of regional regulators to quickly identify anti-competitive practices and the emboldened practice of enforcing appropriate sanctions to remove such practices from the market and discourage the operators in that regard. In a trans-regional operator environment, these capacities and practices must be effected not only at national levels, but across the region. Accordingly, coordination in managing competition issues, especially with respect to cross-border activities, becomes paramount. While the Caribbean Competition Commission established by CARICOM is a critical facilitator in this regard, there may need to be greater awareness of its functions and a re-evaluation of how its oversight is engaged, as currently, it only acts on the advice of the local Competition Authority. This limited scope of engagement may not facilitate the ready identification of trans-regional market distortions or anti-competitive practices.

A specific area of operational focus may need collaboration with respect to information collection, particularly on financial concerns of trans-regional operators, to ensure that supernormal profits in one jurisdiction are not used to mask anti-competitive losses (via the "sinking of minutes" or "sinking of bytes") in others.

National and Trans-Regional Market Definition

The region seems to have disjointed definitions with respect to what should be considered regulated and unregulated telecommunications services. The emergence of OTT services, such as VoIP-based and VoD-based "apps" exacerbates this challenge.

Going forward, in seeking to coordinate regulatory functions such as competition management, another aspect of the regulatory framework that would require harmonisation is the frameworks associated with market identification. Key questions in this regard include:

(i) The scope of the applicability of the term "telecommunications" and whether it is limited to telephony via the PSTN, or whether it should be technologyneutral in definition, and whether it should include data carriage;

(ii) The definition private telecommunications services, and whether they should be regulated;

(iii) The determination of what OTT-based service models are to be regulated, and if so, how should the regulation differ from non-OTT service models; and

(iv) The definition of the appropriate procedures, and implementation of appropriate checks and balances to ensure that public policy objectives to sector regulation are effected in a Next Generation Network environment.

Common Technical Standards in Quality of Service and Security

In conjunction with the harmonised definition of markets and associated services, there would also need to be a harmonisation, or at least co-ordination, of the service standards required of operators across the region. In this way, both investors and consumers would be comforted by, and benefit from, a seamless Caribbean-wide ICT experience, not only with respect to the carriers with which they do business, but also by the regulatory protections afforded by the regulators throughout the region.

The standards should encompass both technical issues associated with the customer perception of the telecommunications (and broader ICT) services, and should also include some minimum obligations for carriers to maintain the security and confidentiality of customer information in their control.

Research, Capacity Building, Open Data and Innovation

Research plays a very crucial role at every level of the ICT/broadband value chain; from the hard-core inquiries into the technologies from an engineering standpoint to the policy and business issues associated with uptake, usage and consumer behaviour. A joint CARICOM /University Research Fund would be very useful towards funding specialised ICT research in the region.

CARICOM ought to lead by example and begin to make its data openly available and accessible in the least restrictive form (CSV) in order to spur the development of innovative solutions for some of the longstanding challenges besetting the region.

Every Caribbean country must implement at least a biennial survey of ICT broadband access that addresses rural and urban access as well as affordability in a very detailed manner. This research generated from the survey is then used by a national broadband commission to track, set targets and engineer progress towards measurable improvements which would be noted in subsequent surveys. This is in line with the development of a national broadband policy which is a living document that is tweaked continuously as technology circumstances and developments change.

Ongoing education in the use of technology and encouragement and implementation of programmes to support innovation and entrepreneurial initiatives such as associated with a Green Economy, development of Apps, linkages with development and utilisation of alternative energy solutions. (Dunn, BIIPAC Project Executive Summary - Component 2, Tranche A , 2015)

In analysis and review of the beneficiary countries and results of Components 1 to 3, the Component 4, Tranche A Consultant concluded that each of the beneficiary countries have digital gaps within country, and there are similarities in the issues that face them. Funding for changes is a challenge across the board and the ways of addressing this include assistance from regional or international agencies or through USFs.

All of the legislative frameworks require some level of revision and updating. HIPCAR has led the way in this as a project benefitting several countries in the region, and providing implementable outputs. However, many countries have not implemented the recommendations out of HIPCAR for various reasons, but one that repeats itself is resources to do the detailed work from the draft models and policy guidelines provided.

Another common position is that while they may have developed ICT plans or strategies, they all need to now develop NBPs, that give detailed time bound actions to achieve the specific visions and targets, but some expertise to do this may be absent along with a scarcity of resources. With scarce resources, human and financial, there are benefits to be derived from taking a

collaborative approach at a regional level to acquiring assistance. The tables below, prepared by each of the Component 4 Consultants for Tranche A and B, set out a list of needs and indicates the needs for which the beneficiary country may require assistance. A collaborative regional approach would mitigate cost, gain efficiencies, and share best practices (Downes-Haynes, 2016).

Needs Assessment Table for Tranche A Countries (Downes-Haynes, 2016)

Identified need	Barbados	Belize	Jamaica	Trinidad & Tobago
Actions targeting High political decision levels and policy makers on the strategic importance of NBP for the countries development	Yes	Yes	Yes	Yes (Exists)
Technical assistance to develop new NGN regulations or implementation methods	Yes	Yes	No	No
Training / Capacity in NGN regulation	No	Yes	No	No
Training / Capacity in spectrum management	Yes	Yes	Yes	Yes
Training / Capacity in USF management	Yes	Yes	No	Yes
Technical assistance (TA) to set up the USF	Yes	Yes	No	Yes (Exists)
Develop better data gathering capacity on key NBP related indicators	Yes	Yes	Yes	Yes (Exists)
Specific support for demand project design (e-education, OLPF or OLPC, e-government)	Yes	Yes	Yes	Yes
Sharing best practices on NBP and USF	Yes	Yes	Yes	Yes
Policy or project design to ensure additional international bandwidth	Yes	Yes	Yes	Yes
Technical assistance to develop joint projects (as using USF for regional project either in supply side, interconnecting neighbouring countries, or demand side such as: disaster planning and recovery; cyber security and incident response co-ordination)	Yes	Yes	Yes	Yes (Exists)

*Feedback was not received from Belize on these needs so the responses are based on an assessment from research. Responses were received from the Telecommunications Unit for Barbados and from the Ministry of Public Administration in Trinidad and Tobago.

Needs Assessment Table for Tranche B Countries (Khelladi, 2016)

Identified needs	Dominican Rep	Haiti	Guyana	Suriname
Technical assistance (TA) to develop a new or refine an existing NBP	Yes	Yes	Yes	Yes
Training / Capacity to develop and/or implement a NBP	Always welcomed	Yes	Yes	Yes
Technical assistance (TA) to develop the institutional framework and coordination mechanism for NBP	Always welcomed	Yes	Yes	Yes
Actions targeting High political decision levels and policy makers on the strategic importance of NBP for the countries development	Yes	Yes	Yes	Yes
Technical assistance to develop new NGN regulations or implementation methods	Yes	Yes	Yes	Yes
Training / Capacity in NGN regulation	Always welcomed	Yes	Yes	Yes
Training / Capacity in spectrum management	Always welcomed	Yes	Yes	Yes
Training / Capacity in USF management	No	Yes	Yes	Yes
Technical assistance (TA) to set up the USF	No	Yes	Yes	Yes
Develop better data gathering capacity on key NBP related indicators	Yes	Yes	Yes	Yes
Specific support for demand project design (e-education, OLPF or OLPC, e-government)	Yes	Yes	Yes	Yes
Sharing best practices on NBP and USF	Yes	Yes	Yes	Yes
Policy or project design to ensure additional international bandwidth	Not an issue	Not a priority	Yes	Yes
Technical assistance to develop joint projects (e.g. using USF for regional projects either in supply side, interconnecting neighbouring countries, or demand side)	Yes	Yes	Yes	Yes
Technical assistance and support in the use of technology in disaster planning and recovery	Yes	Yes	Yes	Yes

Identified needs	Dominican Rep	Haiti	Guyana	Suriname
Technical assistance and support in developing cyber security framework including incident response co-ordination	Yes	Yes	Yes	Yes

3.1 Caribbean Broadband Support Program

The Component 4 Consultants collaborated to define a Regional project for collaborative approach in the region (Downes-Haynes, 2016) (Khelladi, 2016).

Many of the countries have yet to start or are at different stages of readiness to start NBPs. Given that the region continues to lag the developed world and must make speedy efforts to achieve all gains possible towards economic growth, time is of the essence. Collaboration will reduce the time to develop and implement NBPs and will lead to best practices being adopted and efficiency may be observed. Further, where there may be a void in human capacity in this regard, collaboration could offer real benefits to individual countries. In assessing the needs of the beneficiary countries, it is concluded that they all could utilise technical assistance and training to varying degrees in the area of NBP development and implementation. The following programme of support is recommended for adoption by the beneficiary countries. It is further suggested that for the region to fully benefit from the adoption and expansion of broadband, through NBPs, the lead regional body such as CARICOM or CTU should extend this programme to other countries in the region.

Programme Objectives

- Support Caribbean governments to design, implement and monitor their National Broadband Plans (NBPs)
- Design and validate a regional strategy or regional reference framework (set of common targets) and monitor it
- Support regional partnerships and collaboration for broadband development (such as regional projects and joint ventures on both demand and supply sides)

Governance and organisation

- Small implementation unit (2-3 persons) hosted in one of the organisations, with a roaster of regional specialists and consultants available on demand.

- Steering committee that includes : the countries reps, CTU, ITU, CANTO, CARICOM, CTO, eventually also donors

Activities

- Implement high level **awareness raising activities** targeting High political decision levels and policy makers on the strategic importance of NBP for the countries development goals
- Develop **training** (face to face and online) and **provide technical assistance** for telecom agencies, ministries and regulators, to enhance countries' capacity
    - to develop and/or implement an monitor a NBP
    - to design and implement develop new NGN regulations or implementation methods
    - spectrum management
    - USF establishment and management
    - Demand stimulation project design (as on e-education, OLPF or OLPC, e-government)
- On request **facilitate NBP participative design processes**, including consultation, target definitions and set up of a NBP **enabling institutional framework** and coordination mechanism
- Gather **relevant national and regional data**, to **analyse and benchmark** the Caribbean countries Broadband development (using broadband development index and additional tools)
- Develop mechanism for **permanent exchange of best practices, lessons learned and peer to peer support** and collaboration

Expected Results and Monitoring Indicators

High level objective indicators

- After 18 months, at least 60% of participating countries have updated or developed new NBP with detailed targets and KPIs
- After 2 years, at least 40% countries have started implementing NBP
- After 2 years, at least 30% countries are implementing demand projects using their USF and/or international development funding

Activity indicators

- Organise by the end of year 1, a series of online training courses, offered in the areas identified by the countries, similar to one offered by the CEABAD for Central America[31]
- In 3 years at least 8 national and 5 regional onsite training workshops have been delivered
- At least 2 times a year an awareness raising event is organised targeting high level policy makers (as specific panels or activities in some broader regional key ministerial events)
- Each year at least 4 case studies or policy briefs relevant for the region are prepared
- In year 1 a permanent online forum is established to facilitate stakeholders ongoing exchange of best practices, lessons learned and peer to peer support and collaboration
- Each year a monitoring report is prepared benchmarking the Caribbean countries broadband plans implementation and other relevant indicators. Indicators are updated online quarterly
- At least 5 short term technical assistance missions are implemented throughout the BIIPAC countries, as requested

[31] http://ceabad.com/campus-virtual/cursos

4. AFTER BIIPAC

Over the years in the region there had been emphasis placed on the demand side of broadband through ICT plans by Government, but there have been no plans or strategies for the medium that transports the ICTs, that is broadband. Broadband plans would address the development of the supply side, without which the demand plans and strategies cannot materialize. The challenge identified was that the Administrations did not have intelligence with a high degree of confidence on the status of the broadband infrastructure, or supply. The request for the work by the concerned Ministers was to identify the broadband infrastructure inventory in the beneficiary countries and identify guidelines for ubiquitous implementation of broadband access technologies. The project had the sanction of multiple Governments and primarily sought to fill gaps in information for the beneficiary countries as it relates to broadband stock. The work of BIIPAC is we believe the first of its kind for the region.

The project has been undertaken over two years and was very comprehensive in scope. Using the IDB's digiLAC platform, Component 1 provided the beneficiary countries with a quantitative picture of the current state of broadband infrastructure, penetration, access and utilisation. Across the board digital gaps were found to exist. In examining the legal and regulatory frameworks, Component 2 Consultants looked at the existing ICT enabling laws and regulations. They also examined the framework from the perspective of the previously concluded HIPCAR review. They identified a number of areas in the various countries where both review and improvement was needed or some facet of enabling legislation was absent. In many instances the recommendations were to utilize the HIPCAR draft model legislation to fill the gap. Component 3 examined capacity building potential and made expansive recommendations for projects aimed at improving the level of digital inclusion in each country.

The Component 4 Consultants brought together the work of Components 1 to 3 and with their further investigations provided guidelines for the development of broadband strategies and NBPs. It is generally accepted that a NBP is necessary to drive the supply or infrastructure side of broadband if the countries are to achieve the level of ubiquity and digital inclusion that they aspire to, in anticipation of reaping the benefits of broadband's contribution to societal and

economic growth. Throughout the project consideration has been given to regional engagement and in Component 4 in particular a regional project was put forward. In addition, out of discussion with the country representatives, needs were identified were each country would require assistance in the development of its NBP[32].

Next Steps

After BIIPAC, the momentum needs to be continued so that value can be derived from the work to benefit the countries. It is recommended that the following be considered as next steps:

- CANTO should examine the needs identified under Component 4 to develop a project to provide assistance to accepting beneficiary countries. Funding agency to be identified.
- These needs should be further discussed with the beneficiary countries. This would be particularly useful since some of the countries have had elections during the time of the project, resulting in Administration changes.
- An engagement should be undertaken to update on what activities have been undertaken since the conclusion of the project, e.g. amended and new legislation; institutional changes; progress in liberalization.

[32] Pages 55-57 of this report.

Acronyms and Abbreviations

BIIPAC	The Broadband Infrastructure Inventory and Public Awareness in the Caribbean Project
CARICOM	Caribbean Community
CTO	Commonwealth Telecommunications Organisation
CTU	Caribbean Telecommunications Union
EGDI	United Nation's e-Government Development Index
GDP	Gross Domestic Product
GPT	General purpose technology
HIPCAR	Enhancing Competitiveness in the Caribbean through Harmonization of ICT Policies, Legislation and Regulatory Procedures
ICTs	Information and Communication Technologies
IDB/IADB	Inter-American Development Bank
IDBA	Broadband Development Index
IDI	ICT Development Index
ITU	International Telecommunications Union
LAC	Latin America and the Caribbean
LLU	Local Loop Unbundling
NBP	National Broadband Plan
NGN	Next Generation Network
OLPC/OLPF/OLPT	One laptop per child / One laptop per family / One laptop per teacher
TA	Technical Assistance
TV	Television
UN	United Nations
US	Universal Service
USA	United States of America
USF	Universal Service Fund
USO	Universal Service Obligation
USP	Universal Service Policy

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