



**CAN ANTIGUA AND BARBUDA TRANSFORM THE  
PUBLIC SECTOR THROUGH THE IMPLEMENTATION  
OF E-GOVERNMENT SOLUTIONS?**



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## DECLARATION

I hereby declare that this dissertation is my own original work.

A handwritten signature in black ink, appearing to be 'DZ', written on a light blue background.

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## **ABSTRACT**

This dissertation looks at the public service in Antigua and Barbuda in an attempt to answer the question “Can Antigua and Barbuda transform the public sector through the implementation of e-government solutions.” It reviews the ICT journey of three countries which have been successful at implementing e-government solutions in an effort to determine what they have done. It identifies the e-government solutions required by the citizens and residents of the twin island state against the list of solutions recommended for Antigua and Barbuda by e-government experts. It looks at ICT initiatives which currently exist and proposals for new ones, and performs an analysis of how existing or proposed ICT systems and initiatives may assist Antigua and Barbuda in meeting its e-government goals. The document makes recommendations for implementation of e-government initiatives and concludes that Antigua and Barbuda can transform the public sector through the implementation of e-government solutions.

## ACRONYMS with GLOSSARY

**Table of Acronyms with Glossary**

<b>Acronym</b>	<b>Meaning / Explanation</b>
24/7	Twenty-four hours per day, seven days per week
4Cs	Caribbean Credit Card Corporation. 4Cs is the main organisation which manages credit card profiles and merchant transaction in the Eastern Caribbean.
ABST	Antigua and Barbuda Sales Tax which is a value added tax.
ACT	Antigua Computer Technology. One of the four ISPs on island.
ALP / ABLP	<p>Antigua Labour Party (ALP). In 2013 the ALP changed its name to include the sister island of Barbuda thereby becoming the Antigua and Barbuda Labour Party (ABLP)</p> <p>The Antigua Labour Party is the political party which resulted from the Antigua Trades and Labour Union (AT&amp;LU). The ALP has governed Antigua and Barbuda for much of its journey since the end of colonialism to the current state of political independence. The first leader of the ALP was Dr. the Honourable Vere Cornwall Bird Sr. He was followed by the Honourable Lester Bryant Bird. Vere Cornwall Bird served as the first Premier, then became the first Prime Minister in 1981 during political independence. The current administration (June 2014) is headed by Prime Minister, the Honourable Gaston Browne.</p>
APUA	Antigua Public Utilities Authority. The organisation which provides the main utilities to the people of Antigua and Barbuda. Services include electricity, water, local telephone, cellular telephone and Internet.
ASYCUDA	Automated System for Customs Data

## Table of Acronyms with Glossary

Acronym	Meaning / Explanation
CARICOM	Caribbean Community. Fifteen countries of the Caribbean which are joined in an economic union. The countries are Antigua and Barbuda, The Bahamas, Belize, Barbados, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago.
CARCIP	Caribbean Regional Communications Infrastructure Program. A regional ICT development program, in which Antigua and Barbuda participates. This program is funded by the World Bank.
CEO	Chief Executive Officer
CPC	Customs Procedure Code. A code used by the automated customs system to determine the level of taxes applicable to an importation, exportation or re-exportation.
CSME	CARICOM Single Market and Economy. An economic union of the CARICOM countries.
CSEC	Caribbean Secondary Education Certificate. CXC offers students the opportunity of obtaining certificates in various subjects including English Language (English A), Literature (English B), Mathematics, Principles of Accounts, Agricultural Science, Theatre Arts and so on. More than 23 different subjects are offered.
CTU	Caribbean Telecommunications Union
CXC	Caribbean Examination Council. This body prepares examinations which measure proficiency in various subject areas for primary, secondary and post-secondary school students.
DIA	Dedicated Internet Access

## Table of Acronyms with Glossary

Acronym	Meaning / Explanation
DoS	Denial of Service attack. An attack by malware which prevents service providers normal access to their hardware or software systems and users normal access to services, thereby rendering the systems unusable. The attack can cause temporary or permanent damage. However, damage is normally temporary, lasting until the malware can be removed.
DSB	Dispute Settlement Board of the World Trade Organisation (WTO). This Board handles trade dispute between countries or regions.
ECACH	Eastern Caribbean Automated Clearing House is an ICT system which provides fast and efficient settlement of retail transactions.
ECCB	Eastern Caribbean Central Bank. The monetary authority of the Eastern Caribbean Currency Union which regulates the Eastern Caribbean Currency.
ECCU	Eastern Caribbean Currency Union. A collection of eight member states of the OECS which subscribe to and use the Eastern Caribbean currency. The ECCU consists of Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Lucia, St. Kitts and Nevis and St. Vincent and the Grenadines.
EMIS	Education Management Information System
G2B	Government to Business
G2C	Government to Citizens
G2E	Government to Employees
G2G	Government to Government
GATE	Government Assisted Technology Endeavour. A program designed to increase the use of and proficiency in ICTs in Antigua and Barbuda through several programs including training, tablet distribution, technical support, website design, student internship and more.
GATS	General Agreement on Trade in Services.

## Table of Acronyms with Glossary

Acronym	Meaning / Explanation
GDP	Gross Domestic Product. A measure of the quantum of economic activity in a country. This activity is generally reported in current prices or constant prices.
HEART	Human Entrepreneurship and Assistive Resources Technologies.
HR	Human Resource(s)
ICT	Information and Communication Technology. Sometimes used interchangeably with IT. However, it includes the communication requirements for local networking, wide area networking and global networking via any medium, including the Internet.
IG	Internet Governance
IT	Information Technology. In the early days of implementation, computerized solutions were referred as information technology solutions.
IXP	Internet Exchange Point
JEMS	Judicial Enforcement Management System used by the courts of the Eastern Caribbean for managing cases.
LAN	Local Area Network
LIME	Landline, Internet, Mobile, Entertainment. One of the four ISPs on island
MAG	Mutli-Stakeholder Advisory Group. The group tasked with encouraging debate on Internet Governance and advising the United Nations Secretary General on Internet Governance Issues which should be brought to the attention of heads of governments internationally.
MSJMC	Mount St. John's Medical Centre. The single public hospital in Antigua.
NRENs	National Research and Education Networks

## Table of Acronyms with Glossary

Acronym	Meaning / Explanation
OECS	Organisation of Eastern Caribbean States. An economic union of nine countries located in the Eastern Caribbean. These countries are Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines. The activities of the union are managed by the OECS Secretariat, which is located on the island of Saint Lucia.
PPS	Pharmaceutical Procurement Service. The OECS PPS is a division of the OECS Secretariat charged with procuring pharmaceutical products on behalf of all nine OECS countries.
SBA	School Based Assessment. A practical requirement for completing many CSEC subjects. For example, the Information Technology SBA requires that students complete projects using Microsoft Word, Excel and Access.
TLD & cc TLD	Top Level Domain and country top level domain.
TRIPS	Trade Related Aspects of Intellectual Property Rights
UPP	United Progressive Party. The UPP is a consolidation of several political parties and labour unions, including the Progressive Labour Movement (PLM) which formed the government between 1971 and 1975. The UPP is led by Dr. the Honourable Winston Baldwin Spencer. The UPP led the government between March 2004 and June 2014.
UWI	University of the West Indies
WAN	Wide Area Network
WTO	World Trade Organisation
XCD / EC\$	Eastern Caribbean dollars. The EC dollar is pegged to the US dollar at a constant rate of US\$1=EC\$2.7, and is managed by the Eastern Caribbean Central Bank.

## FORWARD

The author is an Information and Communication Technology consultant who has spent over twenty years assisting governments of the Organisation of Eastern Caribbean States (OECS) and the Caribbean Community (CARICOM) in implementing, managing or maintaining computer based solutions. Some countries were able to embrace ICT solutions rapidly while others lagged behind. Antigua and Barbuda became known for lagging behind in ICT implementations.

In an effort to improve ICT implementation, the author sought to research why ICT implementations were so slow to completion, since as the timeline for ICT implementations increased so did the cost. On some occasions, the implementation had to be abandoned or significantly curtailed due to lack of funding.

The research also sought to identify how e-government implementations could transform the public sector into a more efficient organisation. Much of this research came from the work done in two capacities:

- As ICT Consultant in Antigua and Barbuda and the Organisation of Eastern Caribbean States (OECS);
- As the Country Based Specialist for Antigua and Barbuda during the Electronic Government for Regional Integration Project (EGRIP), which was conducted between 2009 and 2014.

## **DISCLAIMER**

The ideas expressed in this document, including those concerning the difficulties in implementing ICTs, the strategy which should be adopted going forward and ICT requirements of citizens and residents, are based on feedback the author received and experiences gotten while carrying out her duties as an ICT Consultant in implementing several ICT initiatives in Antigua and Barbuda, the Organisation of Eastern Caribbean States and the wider Caribbean. These ideas do not have the endorsement of the government of Antigua and Barbuda, nor will the plans proposed necessarily be the ones implemented.

Instead, this document is intended to provide valuable information which can be used by ICT policy makers and implementers to more effectively implement ICT solutions, shorten the timeframe required for implementation and improve public services through e-government initiatives.

## THESIS STATEMENT

### *Can Antigua and Barbuda Transform The Public Sector Through Implementation of e-Government Solutions?*

Electronic government has advanced the way in which governments are able to provide services to its stakeholders: citizens, residents, other government agencies, businesses, partner countries, visitors and others. It allows its stakeholders to apply for or use the service at their convenience. It changes the way in which governments and its stakeholders (businesses, citizens, employees and other government agencies) interact. It gives government employees the flexibility of servicing the stakeholder requests as required, and has the potential of nullifying the effect of work disruption when the office closes its doors at the end of the work day. It has also been proven to enhance the productivity, integrity and transparency of the services provided by government as a result of the procedural systems which must be put in place. It has propelled countries such as Singapore and Korea into first world status in a mere fifty years where hitherto they were considered developing countries. In essence, implementing e-government solutions has transformed the public sector of many countries.

Most e-government services now use the Internet, since it offers a cost effective solution for both the provision of and access to services. The Internet has grown significantly since over the last 25 years. It is used by billions of people for many reasons, but its success has been that it has had the benefit of enhancements by multiple persons and organisations across the globe. Because the Internet is universally owned, managed and maintained, its stakeholders have a vested interest

in ensuring that it benefits from good governance, since this is pivotal to its survival and growth. Countries which have implemented e-government solutions or plan on doing so must also ensure that Internet governance issues are addressed, since cost effective access to those solutions depend on a reliable and accessible Internet.

In 2005, the World Summit on the Information Society (WSIS) agreed to a working definition of Internet Governance as “the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet” (Tunis Agreement, 2005).

The Tunis meeting requested the creation of the Multi-Stakeholder Advisory Group (MAG), which was constituted as a result of paragraph 72 of the Tunis Agreement. Together with other groups and organisations such as ICANN and ISOC, several governance issues have had the benefit of much debate, resulting overall in a “better” Internet.

Antigua and Barbuda proposes to use e-government solutions to transform its public sector. These services will be provided via the Internet and accessed by stakeholders via the Internet. It is therefore imperative that Antigua and Barbuda address several IG issues including:

1. Availability and reliability of the Internet infrastructure;
2. Universal access to the Internet including access by disabled persons;
3. Capacity building through the Internet;
4. Economic advantages/disadvantages of the Internet; and
5. Content creation to ensure that Antigua and Barbuda is able to contribute to the knowledge repository housed on the Internet.

In achieving its objectives, Antigua and Barbuda must ask and answer the following questions:

1. What are the recommended e-government solutions?
2. Can Antigua and Barbuda really implement the required e-government initiatives, given a history of stalled or delayed ICT implementations, and a public service which is not readily yielded to following instructions?
3. Will these e-government initiatives transform the public sector of Antigua and Barbuda?

In researching the answers to the aforementioned questions, the author will use the following methodology:

1. Look at examples of countries which have successfully implemented e-government so as to determine the elements necessary to implement successful e-government systems;
2. Provide some background information on Antigua and Barbuda, so that readers understand the context of its operations;
3. Present a synopsis of the information technology related initiatives which have been implemented to date (2014);
4. Identify the service delivery platforms currently available and proposed for the near future;
5. Compare the e-government requirements of the citizens and residents of Antigua and Barbuda to the recommendations of e-government experts;
6. Create an inventory of Internet governance initiatives which have been addressed or will be addressed, which will impact the ability to successfully implement e-government systems;

7. Identify the challenges which Antigua and Barbuda faced in implementing its e-governance solutions.

## **EXECUTIVE SUMMARY**

Antigua and Barbuda desires to transform the public sector through the implementation of e-government solutions. The experiences of countries like Korea, Singapore, and to a lesser extent, Barbados, show that implementing e-government solutions can transform the public sector. The question is whether Antigua and Barbuda can do this given the challenges which include:

- absence of a comprehensive ICT and e-government policy;
- lack of legislation which underpins e-government initiatives;
- history of failed implementations;
- limited funding with little wiggle room for mistakes and implementations which cannot rebound from delays and other factors;
- a public service which is not known for following instructions;
- Unwillingness to modify processes and procedures.

### **Internet Governance Issues**

Since e-government solutions will be provided via the Internet and access through the Internet, Antigua and Barbuda must address several Internet governance issues.

These include:

- Availability and reliability of the Internet Infrastructure to Antigua and Barbuda;
- Universal access to the Internet by residents of Antigua and Barbuda;

- Capacity building opportunities through the Internet in an effort to prepare the civil service and its stakeholders to meet international challenges for knowledge and education;
- Economic advantages/disadvantages of the Internet; and
- Content creation which will allow Antigua and Barbuda to contribute to the repository of information about the twin island state, its OECS and CARICOM neighbours, which is housed on the Internet.

### **Thesis Objectives**

This thesis will complete several activities. Specifically it will:

- Determine the e-government solutions required by residents and citizens in Antigua and Barbuda, based on an e-government survey conducted in 2012;
- Identify a catalog of e-government solutions recommended by e-Government experts;
- Research the IG issues which the country has addressed or should address to facilitate its e-government initiatives;
- Determine how the Internet governance issues can facilitate e-government implementations;
- Determine whether Antigua and Barbuda will be able to implement the required e-government initiatives given its history of stalled implementations;
- Make recommendations for action to be taken by the private sector, people and government of Antigua and Barbuda in implementing e-government solutions;
- State whether it is likely that Antigua and Barbuda can use e-government solutions to transform its public service.

## **Methodology for Thesis**

In achieving its objectives, the thesis will:

- Look at examples of countries which have successfully implemented e-government so as to determine the elements necessary to implement successful e-government systems;
- Provide some background information on Antigua and Barbuda, so that readers understand the context for its operations;
- Present a synopsis of the information technology related initiatives which have been implemented to date (2014);
- Identify the service delivery platforms currently available and proposed for the near future;
- Compare the e-government requirements of the citizens and residents of Antigua and Barbuda to the recommendations of e-government experts;
- Create an inventory of Internet governance initiatives which have been addressed or will be addressed, which will impact the ability to successfully implement e-government systems;
- Identify the challenges to e-government implementation which Antigua and Barbuda face.

## **Recommendations**

Based on the research and experience, the author makes the following recommendations for the implementation of e-government solutions which are intended to transform the public sector in Antigua and Barbuda:

### ***Recommendations Related to Policy and Strategy***

Antigua and Barbuda should:

1. Create a national ICT and e-government policy based on the Digital policy available from the CARICOM Secretariat and the requirements for e-government articulated by the heads of government of the OECS and implemented by the EGRIP;
2. Create a national ICT and e-government strategy based on the respective policies.

### ***Recommendations Related to Legislation***

Antigua and Barbuda should implement the required legislation soonest. The required legal instruments include

- The Electronic Evidence Bill
- The Data Protection Bill
- The Electronic Crimes Bill
- The Electronic Filing Bill
- The E-Filing Rules and Regulations

The Electronic Funds Transfer Act should be amended to include all new elements included in the OECS heads approved Electronic Funds Transfer bill.

### ***Recommendations Related to Leadership***

Antigua and Barbuda should:

1. Identify committed leaders who will drive the e-government and ICT implementation;
2. Create a national ICT/e-government Steering Committee;

3. Assemble a committee of committed persons, spanning all functionality of the public service, to serve on the ICT/e-government steering committee. All persons do not necessarily have to serve at once. Instead, the committee may consist of a core including the Financial Secretary, Accountant General, Director of Planning, ICT Director, Director of Education (since education is a primary focus) and Director of Tourism (since tourism is the chief economic driver). Subject matter participants may be included when plans related to their specialty are up for discussion or implementation. However, it would be best if all persons were a part of meetings and discussions, but only the core and relevant subject matter experts had voting rights;
4. Instill in employees of the civil service a need to follow instructions. This is best done by human resource professionals. A system of rewards and punishments is normally known to change behavior and guide the workforce along the required route.

### ***Recommendations Related to ICT Implementations***

Antigua and Barbuda should:

1. Create a comprehensive e-government implementation plan based on its e-government and ICT policies and strategies;
2. Create annual ICT and e-government implementation plans which will facilitate the completion of the comprehensive plan;
3. Implement several easy, quick wins, so as to gain the confidence of the public, employees and department heads and engender buy-in;
4. Ensure that Department heads understand the national e-government policy, strategy and implementation plan and their respective roles in their success;
5. Sensitize members of the civil services as to the e-government and ICT policy, strategy and implementation plans and the need to ensure that required

activities are completed as required, along the consequences of failing to follow directives;

6. Sensitize citizens, residents and businesses as to the ICT/e-government policies and strategies, and their role in ensuring success;
7. Engage local ICT experts in the planning and implementation of the e-government initiatives.

### ***Recommendations Related to Financing***

The e-government Steering Committee leadership should decide on how each e-government initiative will be funded. The Minister of Finance, Financial Secretary and Accountant General should be a part of the funding discussions. Funding options could include:

1. Appropriation of percentage of the ABST paid on the sale of electronic goods and services;
2. Creation of [government] bonds which will be used to fund the e-government initiative and encouraging citizens and residents to invest in the country's e-government initiatives by purchasing said bonds;
3. Identification of private sector partners willing to invest in the country's development and provision of investment incentives to encourage the required investments.

### **Recommendations Related to Internet Governance Issues**

Antigua and Barbuda should:

1. Continue to focus on ensuring that the Internet Infrastructure remains robust and available;

2. Monitor the cost of access to the Internet so that it does not become prohibitive. As data need increases, the bandwidth required by residents may also increase from the current 1M to possibly 4M;
3. Continue to ensure that the Internet is accessible by all through the use of mobile access points;
4. Sensitize school aged and college students to the importance of creating content about Antigua and Barbuda.
5. Encourage content creation in schools. This can be done as CXC school based assessment projects for 5<sup>th</sup> formers;
6. Create Internet Exchange Points to decrease the volume of traffic generated while completing internal searches.

### **Conclusions**

It has been determined that Antiguan and Barbudan are sufficiently resourceful to successfully implement e-government solutions and thereby transform its public sector. However this feat requires the partnerships between the government, its employees, citizens and local businesses. The initiatives would also benefit from the body of work already done by the OECS and CARICOM and international initiatives by the Commonwealth group of countries and the OAS.

## **CHAPTER 1 - INTRODUCTION**

### **1.1 E-Government Defined**

Electronic government is loosely defined as the electronic interaction between governments and its stakeholders in the provision or receipt of services. Palvia and Sharma (no date) also define it as the delivery of national or local government information and services via the Internet or other digital means to citizens or businesses or other governmental agencies. Stakeholders include the government itself, other governments, its employees, citizens and residents, visitors, businesses and so on. Services provided by the government include, but are not limited to online payment of taxes, application for government identification such as drivers licenses and passports, scheduling for the existing transportation service, application for vital records such as birth, marriage and death certificates, provision of statistics, Customs clearance processes and so on. Services received by the government may include authorization for payments, verification of applicant information, acquisition of statistical information, approvals between government agencies, status reports and the like.

Electronic government allows governments to provide the service at any time and gives the stakeholder the opportunity of accessing the service at convenient times, thereby removing delays created when an office closes for the work day. This availability of services twenty-four hours per day, seven days per week (24/7) often improves the productivity of the organisation providing the service. In providing e-government services, countries have had to define and standardize processes resulting in improved productivity, integrity and transparency.

Countries such as Singapore (Chua, 2012) and Korea, which have successfully implemented e-government solutions (Wikipedia Korea, no date), have been able to propel themselves from developing to developed country status over short periods. Wikipedia notes that a mere fifty years ago, Singapore was just a dependent of Great Britain (Wikipedia Singapore, no date).

## **1.2 The Internet: A Major Driver in the Success of E-Government**

One of the major factors in providing any online service is the setup (or capital) cost and the recurrent cost. Historically, online services were provided through several technologies. Services accessed via dial-up required relatively small capital costs for the service provider but high recurrent costs for the consumer.<sup>1</sup> Services accessed via dedicated leased lines and frame

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<sup>1</sup> For the service provider, dial-up setup costs included installing multiple telephone line and a line management system. Recurrent cost included the cost for maintaining and accessing the telephone lines. Depending on the call volume package purchased this could be inexpensive or moderate. For the consumer, this was normally expensive, since access is charged at the going telephone rates. At the time dial-up access

relay required moderate to high capital cost for the service provider and very high recurrent cost for both service provider and consumer.<sup>2</sup>

With the Internet, the setup cost for the service provider is low to moderate, depending on the infrastructure available. Setup may require installation of an antenna to ensure that the signal between ICT service provider and the Internet Service Provider (ISP) is good. Recurrent cost to the service provider is normally very low, consisting of the cost of the access bandwidth and any maintenance fees. For the consumer, there are no additional fees for access since the cost is normally a part of the monthly fee paid to the ISP for services.

Countries which have been successful in implementing e-government, as determined by the United Nations e-government ranking, have implemented Internet accessible services, thereby decreasing the cost of access and use for both service providers and consumers.

### **1.3 Internet Governance Issues**

In 2005, the World Summit on the Information Society (WSIS) agreed to a working definition of Internet Governance as “the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet” (WSIS, 2005).

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was popular, there was no flat rate telephone service in the OECS. Hence a service requiring 30 minutes of access incurred the same charge as a 30-minute telephone call.

<sup>2</sup> Installation of Frame relay and leased lines required a high to moderate capital investment, since they often required the laying of fiber optic cables, expansion of the existing telephone network or use of ISDN technology.

Historically, access to ICT solutions provided by both the public and private sector, have been via wide area network (WAN), facilitated through leased lines, frame relay or ISDN services. Today access to government ICT solutions is relatively inexpensive because of the Internet. Hence, service providers, consumers and regulatory agencies such as governments have a vested interest in ensuring that the Internet is readily accessible, universally available, usable and inexpensive. Stakeholder organisations such as Internet Corporation for Assigned Names and Numbers (ICANN), Internet Engineering Task Force (IETF), the Internet Society (ISOC), the Internet Governance Forum Multi-Stakeholder Advisory Group (IGF MAG) and others exist to ensure that the Internet continues to be universally available, universally governed, and usable by all.<sup>3</sup>

In Antigua and Barbuda and for the purposes of this thesis, the Internet governance issues which will be addressed will include:

1. Availability and reliability of the Internet Infrastructure to Antigua and Barbuda;
2. Universal access to the Internet by residents of Antigua and Barbuda, including access for disabled or disadvantaged persons;
3. Capacity building opportunities through the Internet in an effort to prepare the civil service and its stakeholders to meet international challenges for knowledge and education;
4. Economic advantages/disadvantages of the Internet; and

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<sup>3</sup> Here, the distinction has to be made between availability and usability. The Internet may be available, but may not be usable for reasons including high cost, unacceptably low speed for resolving web pages, inability to access information due to censorship by ISPs or government, an over-abundance of advertising, excessive SPAM and security issues.

5. Content creation due to the paucity of information about Antigua and Barbuda, countries of the Organisation of Eastern Caribbean States (OECS) and the wider Caribbean Community (CARICOM).

#### 1.4 Mandate of the OECS

The Organisation of Eastern Caribbean States (OECS) was created by countries of the Eastern Caribbean<sup>4</sup>, through the Treaty of Basseterre to, among other things, forge economic harmonization amongst its Member States. In 2010, the OECS revised the Treaty of Basseterre. Two of the main agreements of this revised treaty were the creation of the OECS Economic Union and the OECS Assembly. The economic union will eventually allow the OECS countries to act as a single economic space. The Assembly will ensure that legal instruments passed during sittings of the body are binding on all member states, even if not passed in the individual member countries. This is so because the OECS assembly consists of representatives from both the ruling parties and the oppositions in all member states.

One of the requirements of the economic union is to use Information and Communication Technology to promote the “*efficiency, quality, and transparency of public services through the delivery of regionally integrated e-government applications that take advantage of economies of scale*” (Francis, 2012). These ICT solutions are intended to transform the public sector of the OECS member states into modern, citizen-friendly services.

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<sup>4</sup> Countries of the OECS are Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines as full members and Anguilla and the British Virgin Island as associated members.

Having decided to use ICTs to transform its public service, the OECS heads sought to identify appropriate legislation to underpin the various e-government initiatives. They identified and approve seven legal instruments which are:

- The Electronic Transactions Bill
- The Electronic Evidence Bill
- The Data Protection Bill
- The Electronic Crimes Bill
- The Electronic Funds Transfer Bill
- The Electronic Filing Bill
- The E-Filing Rules and Regulations

Member states are expected to pass these bills, since at the time of writing (2014), not all countries of the OECS had completed the requirements of the Assembly.

Antigua and Barbuda implemented the Electronic Funds Transfer Act around 2003, presumably to facilitate online gaming. This act will need some amendments to be consistent with the OECS approved bill. Antigua and Barbuda also implemented the Electronics Transactions Act. The others bills are with the Ministry of Legal Affairs awaiting legislation.

The CARICOM Secretariat provided a Digital policy which is expected to guide ICT and e-government policies of countries of the Caribbean Community (CARICOM). According to Project Manager of the OECS Electronic Government for Regional Integration Project, Ms. Karlene Francis, the Digital

Policy is comprehensive and could be used by countries of the OECS as the basis for their national e-government and ICT policies.

## **1.5 Implementing e-Government in Antigua and Barbuda**

In achieving its objectives, there are several questions which Antigua and Barbuda must ask and answer:

1. What are the recommended e-government solutions?
2. Can Antigua and Barbuda really implement the required e-government initiatives, given a history of stalled or delayed ICT implementations, and a public service which is not readily yielded to following instructions?
3. Since the e-government initiatives will be accessible via the Internet, what Internet governance issues must be addressed to ensure a successful implementation?
4. Will these e-government initiatives transform the public sector?

## **1.6 Objective of this Thesis**

This thesis will complete several activities. Specifically it will:

1. Determine the e-government solutions required by residents and citizens in Antigua and Barbuda, based on an e-government survey conducted in 2012;
2. Identify a catalog of e-government solutions recommended by e-Government experts;

3. Research the IG issues which the country has addressed or should address to facilitate its e-government initiatives;
4. Determine how the Internet governance issues can facilitate e-government implementations;
5. Determine whether Antigua and Barbuda will be able to implement the required e-government initiatives given its history of stalled implementations;
6. Make recommendations for action to be taken by the private sector, people and government of Antigua and Barbuda in implementing e-government solutions;
7. State whether it is likely that Antigua and Barbuda can use e-government solutions to transform its public service.

## **1.7 Methodology**

In author will use the methods below to meet the objective of this thesis:

1. Look at examples of countries which have successfully implemented e-government so as to determine the elements necessary to implement successful e-government systems;
2. Provide some background information on Antigua and Barbuda, so that readers understand the context for its operations;
3. Present a synopsis of the information technology related initiatives which have been implemented to date (2014);
4. Identify the service delivery platforms currently available and proposed for the near future;

5. Compare the e-government requirements of the citizens and residents of Antigua and Barbuda to the recommendations of e-government experts;
6. Create an inventory of Internet governance initiatives which have been addressed or will be addressed, which will impact the ability to successfully implement e-government systems;
7. Identify the challenges to e-government implementation which Antigua and Barbuda face.

## 1.8 Literature Review

Having reviewed the literature, it is clear that implementing e-government solutions will transform the public service by making it more efficient as has been evidenced in the significant advancements made by Korea, Singapore, the United States, Canada, Australia, and to a lesser extent, Barbados. This efficiency can be measured in several ways, including the decreased time to access services, decreased cost of service, better linkages between government departments, better interaction between government and its agencies (G2G), government and its employees (G2E), government and its citizens (G2C), government and business (G2B). What the literature did not forcefully point out was that the level of change required often necessitates mandating actions, which may be viewed as dictatorial, if the public service does not have an effective reward/punishment mechanism or if employees are not disciplined. Wikipedia's assessment of Singapore did note that that country has had the same government for more than 50 years and has been classified as a semi-authoritarian regime (Wikipedia Singapore, no date).

The literature recognized that governments of small states often spearhead economic activity (Chua, 2012). However, it did not acknowledge that with this level of responsibility comes a level of authority which surpasses what is normally seen in larger states that have less of a dependence on the government for economic activity. The literature also did not acknowledge that as the main proponent for universal Internet access, reliable Internet infrastructure and affordable cost, the governments of small island developing states may of necessity be more involved in making IG decisions than persons representing civil society, the private sector, the technical fraternity and other stakeholders. For example, government may mandate that in order to receive a license to operate, ISP must provide access to 90% of the country, rather than allowing market forces to decide the percentage of access to be provided.

The literature did point out that the success of ICT implementations often rested, to a large extent, in the human capital (Laudon, 2002). What it did not address was the herculean task of implementing an ICT solution in an ill disciplined environment.

Much of the specifics of implementing e-government and the requirements for IG in Antigua and Barbuda came from dialogue between the author and various senior members of the government of Antigua and Barbuda, regional personnel involved in ICT projects and participants of ICT Fest 2012. Specific persons with which discussions were held include:

- Mr. Sean Cenac, PS in the Ministry of Finance
- Mr. Luxmore Edwards, Director of the IT Centre of Antigua and Barbuda

- Mr. Frank Holder, former ASYCUDA Consultant and current Deputy Comptroller of Barbados with responsibility for ICT matters
- Mr. Daryl Jackson, Acting Director of Telecoms and Lead for Open Data Initiative
- Ms. Beverly Laviscount, Director of Connect Antigua and Barbuda
- Ms. Karlene Francis, Project Manager, EGRIP
- Mr. Clarence Matthias, Senior ICT Officer and Officer responsible for e-government issues.

## CHAPTER 2 - BACKGROUND ON ANTIGUA AND BARBUDA

### 2.1 Brief on Antigua and Barbuda

Antigua and Barbuda is a multi-island state of approximately 160 square miles located in the Caribbean archipelago between the Caribbean Sea and the Atlantic Ocean. It consists of the two main inhabited islands of Antigua and Barbuda and several smaller islands of which the most popular are Redonda, Long Island, Bird Island, Maiden Island and Guiana Island. Long Island is a tourist resort. The other smaller islands are generally uninhabited. Because of the dominance of the two main islands, Antigua and Barbuda is often referred as a twin-island state rather than a multi-island state.

Antigua is located at latitude 17° 10' North, and longitude 61° 54' West, while Barbuda is located at latitude 17° 44' North and longitude 61° 53'. The combined population of both islands is approximately 90,000 people, with about 1,500 living on Barbuda. The natural resources are the pristine white, sandy beaches, blue skies, and sunny conditions. In 2013 the Eastern Caribbean Central Bank reported the gross domestic product (GDP) as XCD 3,397M (ECCB 2014). During the 2014 Budget Speech, delivered in January 2014, the Minister of Finance, the Honourable Harold Lovell reported that XCD 612.3M in revenue was collected in 2013, while XCD 667.1M were

expended, leaving a deficit of XCD 54.8M. In the same year, Antigua and Barbuda realized economic growth of 1.2% over 2012.<sup>5</sup>

For the purposes of telecommunications, the Antigua and Barbuda is seen as a contiguous land mass and the cost of communicating between both countries is no more than the cost of communicating within Antigua or within Barbuda. The primary reason for this is that the local infrastructure is owned by the government utility company, the Antigua Public Utilities Authority (APUA).

The main industry is tourism. Visitor arrivals recorded by the Ministry of Tourism in 2011 (Tourism, 2011) is 893,638, as shown in Table 1, below. There is an annual yacht regatta, named Sailing Week, which takes place in April each year and a yacht show in November/December. These events generate a significant number of visitors and economic activity for the country.

Table 1 - Visitor Arrivals

Visitor Arrivals	
Arrival via Air	241,331
Arrival via Sea	606,496
Arrival via Yachts	45,811
Total	893,638

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<sup>5</sup> The National Budget 2014, presented by the Honourable Harrold Lovell.

There is very little rainfall so agriculture is a challenge. The Ministry of Finance has started awareness campaigns on radio and television in an effort to increase interest in agriculture and farming. This has yielded some success, but by and large, most of the food consumed by locals and visitors must be imported.

There are no known deposits of ore or fossil fuel and there are very little tangible goods to trade internationally.

The country is kept buoyant by its services sector which includes tourism, offshore banking and online gaming.

## **2.2 Online Gaming – The Dispute with the United States**

Prompted by the available local Internet Infrastructure in Antigua and Barbuda, several companies started providing online gambling services to customers around the world. The government saw this as an opportunity for employment and to generate revenue from taxes. It implemented appropriate legislation and licensed players in the industry. At its peak, the gaming industry included over 90 organisations, employed 1,900 persons and generated in excess of US\$90M (EC\$243M) in revenue (Wohl, 2009). About 1998, the United States commenced prosecuting foreign based online gambling companies. The action decimated the industry, so that by 2013 there were fewer than 10 online gaming companies on the twin island state.

Antigua and Barbuda criticized the US for their actions citing contravention of the WTO GATS agreement. In 2005 the WTO awarded damages to Antigua to the tune of US\$21M. Much negotiation ensued between the US and Antigua and Barbuda, but nothing was settled. In 2007 Antigua and Barbuda appealed to the WTO Dispute Settlement Body (DSB) for “authorization to suspend the application to the United States of concessions and related obligations of Antigua and Barbuda under the WTO’s General Agreement on Trade in Services (the “GATS”) and the Trade Related Aspects of Intellectual Property Rights (TRIPS) as a result of the failure of the United States to implement the recommendations and rulings of the DSB...” After more than 15 years, the issue is still under negotiations, and Antigua and Barbuda has yet to receive the awarded damages from the United States.

### **2.3 Antigua and Barbuda’s Future for ICT**

In their manifestos, both the ruling Antigua and Barbuda Labour Party and the opposition United Progressive Party agree to the importance of ICT as well as to the development objective of the OECS to use e-government applications “to enhance the efficiency, quality and transparency of the public service.” According to the former and present Prime Ministers<sup>6</sup> and the former and

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<sup>6</sup> Dr. the Honourable Baldwin Spencer, Prime Minister from March 2004 to June 2014 and the Honourable Gaston Browne, Prime Minister from June 2014 to present (September 2014).

present Ministers of Information Technology and Telecommunications<sup>7</sup>, Antigua and Barbuda has a plan.

## 2.4 The Plan

The Plan started in the early 1990's when access to information technology, through the use of microcomputer systems, became affordable. The plan included using ICTs to educate the workforce and generate economic activity. It was consolidated by the mandates of the Organisation of Eastern Caribbean States - through the Electronic Government for Regional Integration Project (EGRIP) - which aimed to use ICTs to improve the quality, efficiency and transparency of the public service (Francis, 2012).

Though this is no known single document which articulates it, Antigua and Barbuda intends to use information and communication technologies (ICTs), among other initiatives, to ensure that it can transform its public sector, survive in the current era and remain competitive for the future. These postulations have been made on political platforms, in the manifestoes of the two major political parties<sup>8</sup>, through discussions with leaders in the public service and

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<sup>7</sup> Dr. Edward Mansoor was the Minister of Information Broadcasting, Telecommunications, Science and Technology from 2004 to June 2014. He was replaced by the Honourable Melford Nicholas during the last general election in 2014.

<sup>8</sup> The two main political parties are the Antigua and Barbuda Labour Party (ABLP), formally known as the Antigua Labour Party (ALP) which took office in June 2014 following the general elections and the United Progressive Party (UPP) which governed the country from 2004 to 2014.

during project negotiations with donor agencies going as far back as the early 1990. The plan is simple and requires the following action:

1. Train the students, who will become the workforce of the next generation, to use information and communication technologies;
- 2. Implement e-government solutions;**
3. Create opportunities, through ICTs, which will improve the daily lives of the Antiguan and Barbudan population;
4. Ensure that these opportunities generate economic activities so that citizens, residents and businesses can generate income and pay their taxes;
5. Use the taxes to build the nation, create services and generate additional opportunities, and more recently, meet the mandate of the Heads of government for the economic integration of the OECS countries;
6. Ensure that the ICT initiatives are easily accessible and readily available.

## **2.5 Government as a Driver**

Due to the small size, limited population and scarce resources of the country, the government is often a driver in many economic initiatives. The government finds itself having to create the enabling environment, spearhead many ICT initiatives, and secure funding. This is not unusual for small states, and was cited by Singapore as an essential element in its e-government implementation success (Chua, 2012).

## CHAPTER 3 - LEARNING FROM THE EXPERIENCE OF OTHERS

Implementing e-government initiatives are expensive, long term and have far reaching consequences. Hence, it is prudent to, where possible, to benefit from the experience of others who have implemented successful e-government initiatives.

This chapter will look at the e-government experience of three countries:

1. Barbados, a small island developing state with similar demographics as Antigua and Barbuda;
2. Singapore, a former British colony which was propelled to first world status within four decades of using ICT to improve its economy;
3. Korea a significantly larger state with significantly more resources which has repeatedly been ranked as the #1 country for e-Government initiatives.

### 3.1 The Experience of Barbados

#### **Brief History**

Like Antigua and Barbuda, Barbados is a small island developing state located between the Caribbean Sea and the Atlantic Ocean, at the south eastern end of the Caribbean archipelago. It is 432km<sup>2</sup> and has a population of approximately 278,000 people. About 93% of the population is of African descent.

The main industry is tourism from which it derives most of its foreign exchange. According to 2012 estimates, the nominal GDP is BBD4.49billion or USD2.245billion. Barbados is a unitary parliamentary constitutional monarchy. Elections are constitutionally due every five years.

### **Barbados' e-Government Journey**

Barbados has recognized that implementing e-government initiatives will take the government to the people rather than forcing the people to come to the government. This transforming power has been embraced by Barbados and has allowed the implementation of several policy decisions, legislations, strategies, and information systems which has allowed that country to be ranked #59 in the UN e-Government Survey 2014 - the ninth highest rated country of the Americas behind the United States, Canada, Uruguay, Chile, Argentina, Columbia, Costa Rica and Brazil.

Barbados embarked on its e-government journey in the early 1990's. Its success has been in the ability to implement programs which have included developmental as well as technological components. It has well developed (for a small island state) policies and strategies along with a disciplined civil service. Everyone, including the Prime Minister, is expected to abide by the law of the land. As a result, as the country develops, it has introduced several solutions which has enhanced its developmental process, increased the transparency of government processes and made the services provided more efficiency. Some of the programs implemented by Barbados include:

1. Modernization and streamlining of the government's ability to manage its finances and human resources using SmartStream as the software resource;
2. Creation of an Enabling Environment for Private Sector Investment (Eepsi) which is designed to be a one-stop-shop facility for investors wishing to do business in Barbados. This facility is available 24 hours per day, year round. This program is web based and includes links to fourteen ministries (Eepsi, no date) with which investors must do business;
3. Development of the Education Sector Enhanced Program (EDUTECH), which is designed to strengthen the ability of the government to manage its education system. ECUTECH aims to "integrate all available information and communication technologies within the school system (Browne, no date);
4. Implementation of a Community Technology Program (CTP) which focuses on providing training in basic IT and Internet use for all residents and citizens of Barbados. The program includes the creation of 10 community resource centres which have Internet access.
5. Computerization of the process required for creating and issuing machine readable passports;
6. Creation of a single ID card which will be used and accepted by all agencies requiring identification and verification for services. The card meets the requirements of the Electoral and Boundaries Commission for a voter's card; the requirements of the licensing authority for a Driver's license; and the requirements of the National Insurance Department for a health card, to name a few.
7. Modernizing the criminal justice system;

8. Implementation of a modern tax administration system which includes online tax file and payment;
9. Implementation of the Automated System for Customs Data which is designed to streamline the customs clearance processes, improve tax revenue assessment and collection and enhance data collection on trade;
10. Creation of an integrated portal to allow access via a single gateway to all e-government systems. There is presently a rudimentary portal available via <http://www.gov.bb/bigportal/big/> (Brown, no date)

In order to facilitate the e-government initiatives, Barbados made several bold steps in creating the enabling environment. These steps included:

- a. Assigning e-government transformation to the Ministry of Civil Service in 2003;
- b. Creating an e-government strategy from which it developed an e-government program;
- c. Establishing an institutional framework for managing the e-government program. This initiative entailed the creation of an Information Management Agency (IMA) from the Data Processing Department;
- d. Designing and implementing a government wide area network (WAN);
- e. Sourcing funding to implement the e-government program;
- f. Creating a government Interoperability framework (GIF), which is designed to facilitate the smooth flow of information between and among government agencies;
- g. Implementing several pieces of legislation required for e-governance including:
  - a. The Electronic Transactions Act;

- b. The Data Protection Act;
- c. The Computer Misuse Act;
- d. The Freedom of Information Act.

The e-government strategy established in 2006 gave rise to the e-government program with stated goals to:

- a. improve the delivery of services to its citizens and businesses;
- b. increase productivity and efficiency in operating government agencies;
- c. increase transparency and governance through broadening public participation in the governmental process.” (Ministry of Civil Service, 2013)

### **e-Government Issues**

Studies conducted by the Barbados e-Government Unit revealed that the e-government success will be impacted by several issues as outlined below:

- a. Ownership of and access to data and information;
- b. Availability of interconnectivity and information sharing between the various ministries/departments;
- c. Presence of adequate physical infrastructure to allow new information systems to be deployed;
- d. The need for a centralized support of ICT by a single unit instead of the three distinct units which currently share the responsibility. These units are the e-Government Unit, the Data Processing Department in the Ministry of the Civil Service and the Ministry of Commerce and Trade which is responsible for e-Commerce and ICT Strategy;
- e. The need to implement common standards, policies and procedures;
- f. The need for adequate IT personnel to support existing and new projects;

- g. The need to ensure that only licensed software is used by Government agencies (Public Sector Reform, 2013).

## 3.2 The Experience of Singapore

### **Brief History**

Modern Singapore is a former British colony which received its political independence from Britain in 1963. It then united with other former British territories in the region to form Malaysia but was expelled from that union, by an “unanimous act of Parliament” in 1965 (Wikipedia, no date) and became an independent state. Over the years Singapore has developed to become one of the four Asian Tigers.

The country consists of 63 islands and is approximately 716.1 km<sup>2</sup> with a population of 5 million persons and a nominal GDP of USD296.7 billion. Although there is ethnic diversity, 75% of the population is Chinese (Wikipedia, no date).

The country is a unitary, multi-party parliamentary republic with a Westminster system (Wikipedia, no date). It has been governed by the same party, the People’s Action Party (PAP), for over 50 years. This together with its low rating for press freedom and civil liberties has caused it to be classified as a semi-authoritarian state.

## **Singapore's ICT Journey**

Singapore successfully implemented e-government initiatives, integrated many of its services and have made them available online. As a result the country received an international e-government ranking of #1 from Waseda University of Tokyo, Japan, in 2013. In 2014, the United Nations (UN) ranked Singapore #3, behind Korea (#1) and Australia (#2), in its bi-annual e-government survey (UNDESA, 2014).

Singapore's information technology journey started in the 1960's when the country invested heavily in assembly plants which imported parts, assembled then re-exported computer products and consumer electronics. This initiative took advantage of the available supply of low-waged workers and a strategically positioned deep water harbour from which the finished products could be exported. The journey continued in the 1970's when Singapore encouraged a technology-based economy by improving education in science and math, streamlining manufacturing processes, and increasing productivity. By the 1980's Singapore had started the development of an ICT Master Plan which aimed to transform Singapore to an intelligent island by computerizing the Civil Service, making the systems available to the private sector and improving the availability of IT manpower. It continued by implementing e-government action plans and finally creating a technology integrated government which extends to 2015 (Chua, 2012). Figure 1 provides a brief of the plan.

Singapore's information technology master plan spanned some 30 years. The plan was pragmatic and according to Chua (2012), *"If the solutions were thought to work and fitted into the strategic long-term framework, they were*

*implemented, even though they may not be politically correct or fashionable at the time.”*

Chua informed that “The public sector drove practically all aspects of the development of the Singapore economy and society.” However, “The Public Sector worked hand-in-hand with the political leaders to mold and shape the values and ethos of the Singapore society” (Chua, 2012).

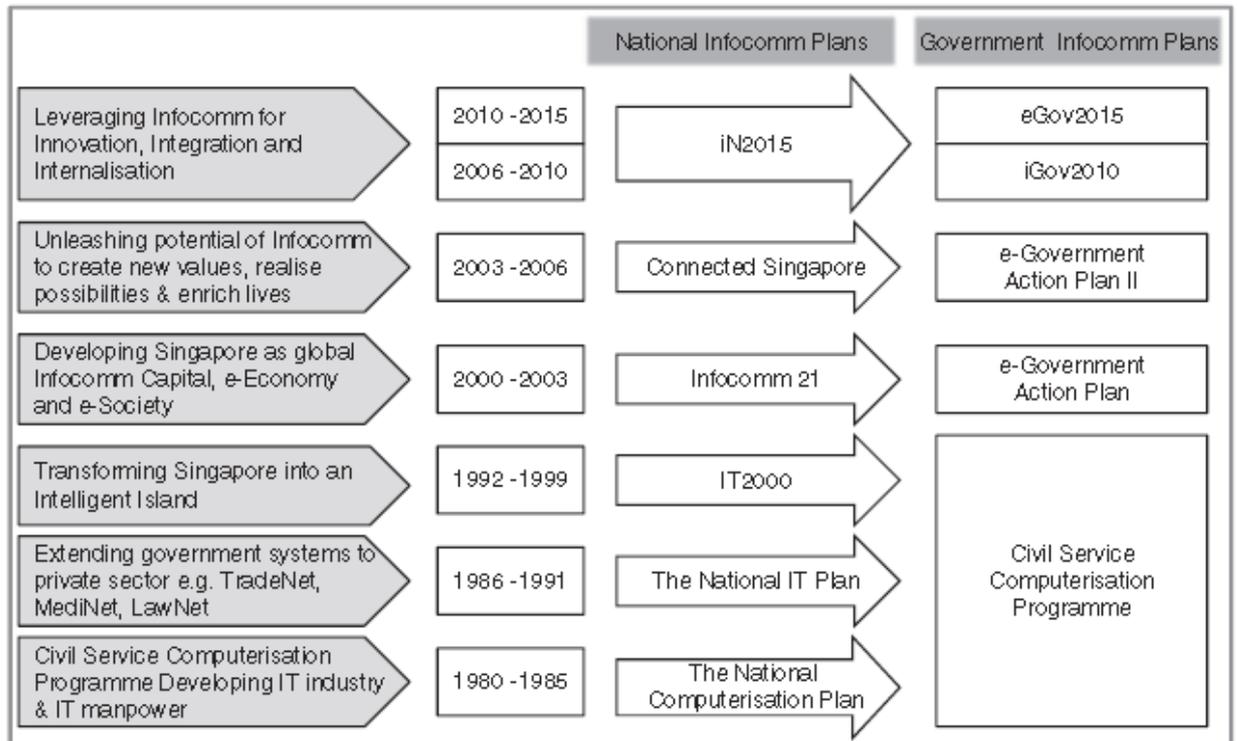
In defense of this action, Chua noted that “The small size, lack of resources and tenuous security situation [of Singapore] made it inevitable that the government would take the lead in developing the economy and the country” (Chua, 2012).

Some of the hallmarks of the ICT Master plan were that:

1. The plan had to be dynamic, changing to meet new needs or address the exigencies of new situations;
2. The plan had to be continuous, regardless of the government administration;
3. The plan had to be long term;
4. The plan had to be practical. The quotation made in May 2008 by Teo Chee Hean, Minister in Charge of the Public Sector that, “The Public Service is different from the private sector in that we cannot choose our customers. Likewise, our customers make use of public services not so much out of choice. For this unique relationship to work effectively, there must be a common understanding between the two parties. The Public Service must strive to deliver its services with excellence. In return, customers must understand that the Public Service has to balance serving

the needs of individual customers against the collective needs of the public.” This statement effectively communicated that the plan had to meet the needs of the many above the needs of the individual (Chua, 2012)

Figure 1 - Singapore’s ICT Master Plan



### **ICT Governance Requirements**

In order to meet its goals, Singapore was required to make changes to some of its governance structures which managed ICT. These changes required establishing an iGov Council to provide strategic direction for all e-government initiatives. This council is chaired by the Permanent Secretary in the ministry of Finance and includes Permanent Secretaries, known as e-Town mayors of its government ministries.

The governance bodies also include a public sector-private sector body, known as the iGov Advisory panel. This is also chaired by the Permanent Secretary in the Ministry of Finance.

Implementing e-government initiatives required implementing appropriate e-government legislation to create the enabling environment. It also required the creation of, disband of or changes to statutory bodies/boards. For example, historically, information technology and computer science was managed by the National Computer Board (NCB) which reported to the Ministry of Trade and Industry. Telecommunication was the responsibility of the Telecommunication Authority of Singapore (TAS), which reported to the then Ministry of Communications. Broadcasting was the responsibility of the Singapore Broadcasting Authority (SBA) which reported to the Ministry of Information and the Arts (MIA). In order to improve governance of ICTs, three main actions were taken. Firstly, the government separated the regulatory arms of the ICT and ICT related organisations from their commercial arms. As a result, TAS remained as the regulatory telecommunications arm while SingTel was created to handle corporate matters. Similarly, SBA remained as the regulatory body for broadcasting while Singapore Broadcasting Corporation (SBC) was created to handle commercial matters. Secondly, the government consolidated the agencies which had overlapping promotional and regulatory responsibilities for ICTs to a single agency. This created the Information Communication Development Authority (IDA) and disbanded agencies including TAS and the SBA. Thirdly, the government privatized the ICT implementation operations undertaken by the National Computer Systems Pte Ltd.

IDA then sought to improve ICT capabilities in country and create international markets in ICTs for Singapore. In order to do this IDA partnered with A\*STAR to create and grow local research and development in ICTs, and with Standards, Productivity and Innovation Board (SPRING) Singapore to transform small and medium enterprises (SMEs) through the use of ICTs.<sup>9</sup> IDA also partnered with International Enterprise (IE) Singapore to help local ICT companies reach overseas markets and become international players, and with the Economic Development Board (EDB) in planning and executing strategies to make Singapore an ICT hub for business and investments.<sup>10</sup>

### **Financing of e-Government**

The various constraints within the country ensured that government of Singapore lead the e-government initiative. That action also identified the Ministry of Finance as the champion and owner for e-government activities. This meant that financing could readily be obtained, as long as the government had the required funds, since there was already government buy-in.

### **Benefits Accrued**

As a result of its actions, Singapore benefited tremendously. Some of the benefits accrued include:

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<sup>9</sup> Extracted from the e-Transformation Journey of Singapore, page 47 (Chua, 2012)

<sup>10</sup> Extracted from the e-Transformation Journey of Singapore, page 46 (Chua, 2012)

1. Increased foreign investments resulting in improvements in economic activity;
2. Increased wages for residents and citizens of Singapore and better quality of life;
3. Development of the country's infrastructure;
4. Improved knowledge of technology by citizens and residents;
5. A more efficient Civil Service;
6. One-stop-shop government services and better service integration between government agencies.

### **Problems / Issues / Disadvantages**

For Singapore, development did not come without a price. The main disadvantage of the system which has transformed the Singaporean economy from a "third world" to a "first world" state is that Singaporeans do not have their own autonomy...they live where they are told to live and do what they are told to do. This dictating, along with poor civil liberties and press freedom rating has resulted in Singapore being branded a semi-authoritarian state (Wikipedia, no date).

Legal trial is done by a judge rather than a jury of peers. Many of the punishments are harsh by Western standards. Offenders can be caned for crimes such as rape, rioting and drug trafficking; murder brings a mandatory penalty of death. However, the World Justice Project, Rule of Law Index ranks Singapore at #10 with regard to order and security, out of 99 countries surveyed in 2011 (Wikipedia, no date). As a result of their system of

government, Singapore is a disciplined society where agreed to changes can readily be implemented.

### 3.3 Korea (South)

#### **Brief History**

Korea is located in north-east Asia in the Sea of Japan. It is south of Russia, south and south west of China and north-west of Japan. Korea was a part of several Asian dynasties, the most recent being the Qing Dynasty. It has had a history of invasion from Japan and was separated into two distinct states of North Korea and South Korea after the World War II. North Korea is aligned with Russia and South Korea is aligned with the United States of America. Since 1948, South Korea has been governed by a single military government.

The Korean land mass is measured at about 220,000km<sup>2</sup> and supports a combined population of 74 million. Koreans speak a single language, Korean, and use a single currency, the Korean won or KRW. Although each state is under military rule, each has a different leader.

#### **E-Government Journey**

According to a presentation made by Korean representative Huh Soo Jin, at a SEMCAR<sup>11</sup> seminar, held in Antigua in 2012, Korea's success at e-government results from achieving the following success factors:

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<sup>11</sup> SEMCAR is the acronym for Supporting Economic Management in the Caribbean. It is a multi-donor funded project, funded by the Canadian International Development Agency (CIDA), the World Bank and the International Monetary Fund (IMF).

1. Identifying visionary leadership which could lead the country forward with information technology. Plans created, and policies and strategies agree upon would have to transcend all political administrations;
2. Developing effective governance through appropriate governance structure such as enabling legislation and action-oriented e-government committees;
3. Engaging in strategic investments with an organisation which could fund the various initiatives. The selected investor was LG.

Korea developed a 20 year plan, prioritized activities and stuck to the plan.

The plan transcended administrations which allowed the government of Korea to benefit from initiatives which spanned many years.

## CHAPTER 4 - ANTIGUA AND BARBUDA'S E-GOVERNMENT JOURNEY

### 4.1 Genesis of e-government in Antigua and Barbuda

Antigua and Barbuda's e-government journey started in the mid 1980's at about the time that micro-computers became affordable and commercially available. Antigua and Barbuda procured several of these micro computers through various government initiatives and regional and international projects.

### 4.2 ASYCUDA, The First e-Government Application

The first major ICT project was the implementation of the Automated System for Customs Data (ASYCUDA), in the Departments of Customs. This initiative commenced in 1989, but was not implemented until 2004 (Zachariah 2013). The project was executed by the OECS Economic Affairs Secretariat (EAS) in Antigua and Barbuda, on behalf of the nine OECS beneficiary states<sup>12</sup>. The software was provided by the United Nations Conference on Trade and

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<sup>12</sup> The nine OECS beneficiary states are Anguilla, Antigua and Barbuda, the British Virgin Islands, Dominica, Grenada, Montserrat, Saint Lucia, St. Kitts and Nevis and St. Vincent and the Grenadines.

Development (UNCTAD) and technical expertise was drawn from its headquarters in Geneva. Funding for the implementation was managed by the United Nations Development Program (UNDP) office for the Eastern Caribbean and Barbados, which was located in Barbados.

When the project commenced, Customs officials had little knowledge of computerization and computer technology. The Customs and Excise Division relied heavily on the technical expertise of expatriate officials hired through UNDP, regional officials hired through the OECS and a few computer literate nationals. Although it included a tremendous amount of functionality, ASYCUDA never gained the prominence it deserved in Antigua and Barbuda until its implementation in 2004. By this time (2004), the menu driven technology employed by ASYCUDA was outdated, but had not yet been replaced by a windows based system. ASYCUDA used a client/server UNIX based platform. Users connected through a WAN facilitated through leased lines. Support was made possible through dial-up to the UNIX server. The software did not allow online processing by the trader. However Customs and other government agencies could connect, retrieve information or process transactions if required.

### **4.3 The National Computer Centre**

By the end 1990, Antigua and Barbuda had created a rudimentary plan for computerization of the government service. This plan created the National Computer Centre (NCC), headed by Mr. Gladwin Henry. The main functions of the NCC were to:

1. install computer systems in government offices;
2. install available software;
3. provide training in the use of the computer systems, office automation software and other available software packages, in an effort to increase computer literacy among civil servants;
4. provide support for the computer software and hardware.

Some organisations in the government service requested specialized software. Some software development was done in an effort to address the needs. However, the limited resources at the NCC prevented large scale software development, and many employees were disillusioned by the inability of the NCC to meet their specific needs. Without doubt, the NCC was overwhelmed by the sheer demand for software, support and training.

#### **4.4 The Free Zone Institute of Training and Technology & ABIIT**

In 1997, the government created the Free Zone Institute of Training and Technology (FZITT), which as located on Old Parham Road. The objective of this institution was to “bring about 100 percent computer literacy of the island’s labour force within a five year period.”<sup>13</sup> FZITT trained more than two thousand persons in using Microsoft Office Products and the Internet. It became the precursory institution to the Antigua and Barbuda International Institute of Technology (ABIIT). ABIIT was completed in August 2001 and

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<sup>13</sup> Extracted from the History of ABIIT, <http://abiit.edu.ag/about/history-of-abiit/#content>

commenced accepting students in September of the same year. Students can pursue associate degrees in the following areas:

- Computer Science
- Computer Information Systems
- Compute Network Engineering
- Graphic Design
- Banking and Finance
- Accounting
- Business Administration.

ABIIT instructors communicate online with their students. Course work and tests are administered through the Moodle system which is accessed via the Internet.

#### **4.5 National IT Centre**

In 2002, the government created a national IT Centre which was separate and apart from the National Computer Centre. The IT Centre was headed by Mr. Eban Thomas and included Mr. Luxmore Edwards as a senior technician. Mr. Edwards became the Director of the IT Centre upon Mr. Thomas' departure in 2004. The mandate of the national IT Centre was to spearhead and coordinate the ICT projects in the country.

The organisation developed a preliminary set of ICT policies and strategies, and conducted the first ever computer technology fest in the twin island state. This technology fest later gave rise to an annual ICT Fest.

## 4.6 ICT Policy

In 2004, under the guidance of the Minister of Information, the government proposed the following ITC policy statement:

***Integration and adaptation of state-of-the-art information and communication technologies in all spheres of daily life, in education, health, production, commerce, services, governance systems, law enforcement, entertainment and social interactions.*** (UPP Manifesto, 2004)

This policy statement gave rise to several other policies and strategies including the Intranet/Internet Acceptable Use policy, which is applicable to all government employees. The policy commits the government to providing Internet/Intranet access to all employees. It speaks to removal of the service as a result of abuse by employees. It informs that the government reserves the right to route traffic through firewalls and other security devices for monitoring or filtering. URL

[http://www.antigua.gov.ag/article\\_details.php?id=201&category=55](http://www.antigua.gov.ag/article_details.php?id=201&category=55) provides details of the policies.

## 4.7 Other e-Government Initiatives

Between 1989 and 2014, Antigua and Barbuda implemented several e-government initiatives. These are identified in the table below:

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
1	Ministry of Information, Broadcasting, Telecommunications, Science and Technology	GATE Government Assisted Technology Endeavour	The objective of this initiative is to create a cadre of computer literate persons who understand the technology. The initiative focuses on broadband internet connectivity, innovation, entrepreneurship, job creation and sustainability. The components include an ICT cadet program, improving Internet connectivity through 4G connectivity.	<ul style="list-style-type: none"> <li>• 8000 Internet enabled tablets procured and distributed to high school students in 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> forms and at the Antigua State College.</li> </ul>
2	Ministry of Education	EMIS	This is a system for organizing information in a systemic way for the management of educational development. Information Centre in the Ministry of Education is responsible for	<ul style="list-style-type: none"> <li>• The use of EMIS is being expanded to secondary schools</li> </ul>

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
			collection, processing, analyzing, publishing, distributing and rendering information services for users of educational information.	
3	Ministry of Education	LMIS	This system updates students, researchers, employers, job-seekers, investors and other interested persons on the status of labour and training opportunities on the job market. The system also informs policy makers, analysts, employment organizations and other interested individuals through research data, on employment issues such as sector and	<ul style="list-style-type: none"> <li>• Ongoing</li> <li>• Being financed from resources from the 10th EDF regional program</li> <li>• The initiative seeks to contribute to the establishment of the OECS Economic Union as a single economic and financial space</li> </ul>

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
			gender distribution and job skill sets.	
4	Ministry of Health	CLINNET / CLINNEXT	Health information System which allows t automation of several clinical functions including emergency room, laboratory, radiology, nursing station treatment..	Data on ER visits, laboratory results, radiology requests and patient census is available.
5	Ministry of Finance	ASYCUDA and CASE	This system allows the Customs and Excise Division, trade operators and other government agencies to electronically process their import documents via the Internet. Many of their transactions including customs declarations, cargo manifests, transit documents, certifications, licenses and authorizations given by other government	<ul style="list-style-type: none"> <li>• Completed</li> </ul>

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
			agencies.	
6	Finance	Free Balance (IFMS)	This system manages and reports on government revenue inflows and government expenditure. It supports the payroll and human resource management functions of the government. In conjunction with the employee data update, this allows relevant, accurate and complete management reports to be generated automatically.	Better management of government's revenues and expense.
7	Department of Statistics	EUROTRACE	This system aggregated trade data obtained from the Customs and Excise Division and generated trade statistics for use by	Trade Statistics are available but are not current

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
			the Ministry of Trade, the OECS and CARICOM. These statistics are used by CARICOM's Regional Negotiating Machinery during European Union negotiations.	
8	Department of Statistics	EBOSS		
9	Inland Revenue	SIGTAS	This system allows government to improve tax compliance and thus increase collected revenue.	Requires focus on tax payment, tax evasion and avoidance
10	Courts, Ministry of Legal Affairs	CCRIS Caribbean Civil Registry	This system records and generates certificates for marriages, deaths and births.	More secure certificates (tamper proof)
11	Courts, Ministry of Legal Affairs	JEMS	This system aims to modernize the courts offices by computerizing the record keeping, including matters before the court, judgments, and	Better record keeping

**Table 2 – E-Government Initiatives**

No.	Department/ Ministry	Project/ Initiative	Description	Successes
			court officers.	
12	The Courts, Ministry of Legal Affairs	LIBERTY	This system facilitates court reporting	Improved court reporting.

#### 4.8 Service Delivery Platforms

Antigua and Barbuda's e-government solutions facilitate G2G, G2E, G2B and G2C access. Solutions are accessed via the Internet, wide area and local area networks. The wide area networks use either leased lines or the Internet. Solutions such as Landfolio, CCRIS and CLINET are accessible through a LAN. Access to these solutions is internal. The service delivery platform for Free Balance is a WAN connection. It facilitates G2G and G2E access only. The most widely used e-government solutions are the Custom CASE declaration processing and clearance system and the official government website [www.antigua.gov.ag](http://www.antigua.gov.ag). Both are accessible via the Internet by G2G, G2E, G2B and G2C clients. The table below shows access and service delivery platforms for the currently implemented e-government solutions.

#### 4.9 Implementation Deficiencies

Although there is a basic plan in place and some initiatives, particularly in the areas of training, ICT implementations have been as successful as they ought

to have been. In fact, overall Government ICT implementation has been disjointed. One of the primary reasons for this is that there is no national ICT policy and strategy plans which can be referred to ensure that the government stays focused on its objectives. In fact, as of this writing (December 2014), neither a full ICT policy nor an ICT strategy exists.

The Prime Ministers and Ministers of ICT agree that ICT will transform the public sector and facilitate Antigua and Barbuda's competitiveness in the region and the world. However, without a long term plan, it is difficult to ensure that successive administrations will focus on what needs to be done. The EGRIP project recommended that Antigua and Barbuda, like the rest of the OECS member states, adopt the Digital Strategy which was created through the CARICOM Secretariat.

**Table 3 – Service Delivery Platforms**

<b>Solution</b>	<b>Platform</b>	<b>Accessibility</b>
JEMS Court/Legal Case Information System	LAN	G2E, G2C
CD/RMS Budget Information System	LAN	G2E
CASE / ASYCUDA World	Internet	G2B, G2C, G2E, G2G
CCRIS Vital Records Solution	LAN	G2E
Centralized Personnel Information System - Module of Free Balance	WAN	G2E, G2G
CLINNET Hospital Management Information System	LAN	G2E
EMIS	Internet	G2E
EMIS / LMIS	Internet	G2E, G2G, G2C, G2B
e-Procurement (through the electronic pooled procurement system for the Pharmaceutical Procurement Service [ePPSS] and the expansion of the electronic Procurement System).	Internet	G2B, G2C, G2E, G2G
Free Balance Treasury Management Information System.	Internet	G2E, G2G
Government Portal / Official website	Internet	G2B, G2C, G2E, G2G
Landfolio Land Records Information System	LAN/WAN	G2E, G2G
Payroll System – Module of Free Balance	WAN	G2E, G2G
SIGTAS – Inland Revenue Tax Information System	LAN	G2E

## CHAPTER 5 - REQUIRED E-GOVERNMENT SOLUTIONS

### 5.1 e-Government Solutions Requested by Citizens and Residents of Antigua and Barbuda

During ICT Fest 2012, the EGRIP Country Based Specialist for Antigua and Barbuda, Desiree Zachariah, conducted a survey of e-government solutions required by citizens and residents of Antigua and Barbuda. The survey sought to identify the gender, age range, occupation, sector of employment and top ten e-government solutions required of each respondent. The survey allowed the participant to indicate his own choices, but also provided a list of 40 potential solutions as a guide. One hundred surveys were reviewed. None of respondents identified their own choices for e-government solutions.

The survey indicated that the top choice for an e-government solution is applying for a passport online. Three solutions tied for second place. These were online application for a government scholarship, online application for a driver's license and statistics on schools to include gender, location, principals and school specialty.<sup>14</sup> The table below identifies the top ten choices along with their ranking. A copy of the survey is attached.

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<sup>14</sup> The school specialty identifies the school's focus. This includes academic programs, technical schools, business schools and so on.

The male/female ratio of respondents was 54:46. The survey also showed that most respondents were in the 16-25 age range (34%), followed by the 12-15 age range (25%), with the 46-60 age range (13%) in third place. The survey also showed that 58% of the respondents were students; 28% of respondents were employed persons of which 17% were employed in the public sector and 11% in the private sector. Three percent of the respondents were self-employed while 2% were unemployed.

It is not unexpected that educational information (scholarships and schools statistics) ranked high or that 4 of the top ten requirements were related to education, since 58% of the respondents are students. Neither is it unusual that vacancies in the public service was among the top 10 required initiatives, since students would likely want to determine the jobs available to them when they leave school. What is most interesting is that the top e-government initiative was application for a passport online. This may speak to the fact that travel is a priority for persons on a small island state, and travel requires a passport. Requiring online applications for birth, death, marriage and naturalization certificates may have been selected because these documents are required when applying for a passport. Statistics on this information may have been requested for the same reason.

Another interesting discovery is the request for online filing of income taxes. This is particularly noteworthy because the payment of income taxes was reintroduced only ten years ago and according to a former Minister of Finance, Dr. Errol Cort, less than 25% of the working population pays income taxes. The question to be asked therefore is whether the requirement for payment of

online taxes has anything to do with the desire to pay taxes, the need to receive tax refunds expeditiously, a requirement to keep track of taxes paid so that employees can verify that employers have paid the deducted taxes into the system, or some other need.

**TABLE 4 – REQUIRED ICT SOLUTIONS FOR ANTIGUA AND BARBUDA**

	<b>ICT Solution Option and Description</b>	<b>Percentage</b>	<b>Rank</b>
23	Online Application for a Passport	5.1%	1
21	Online application for a government scholarship	3.9%	2
24	Online application for a driver's license	3.9%	2
40	Statistics on schools, e.g. population by gender, location, principals, school specialty	3.9%	2
14	List of government scholarships available along with eligibility	3.6%	5
8	Government policy on education	3.5%	6
18	List of vacancies in the public service	3.4%	7
20	Online application for birth, death or marriage certificates	3.1%	8
37	Statistics on births, deaths, marriages, naturalization applications	3.1%	8
28	Online filing of income taxes	2.7%	10

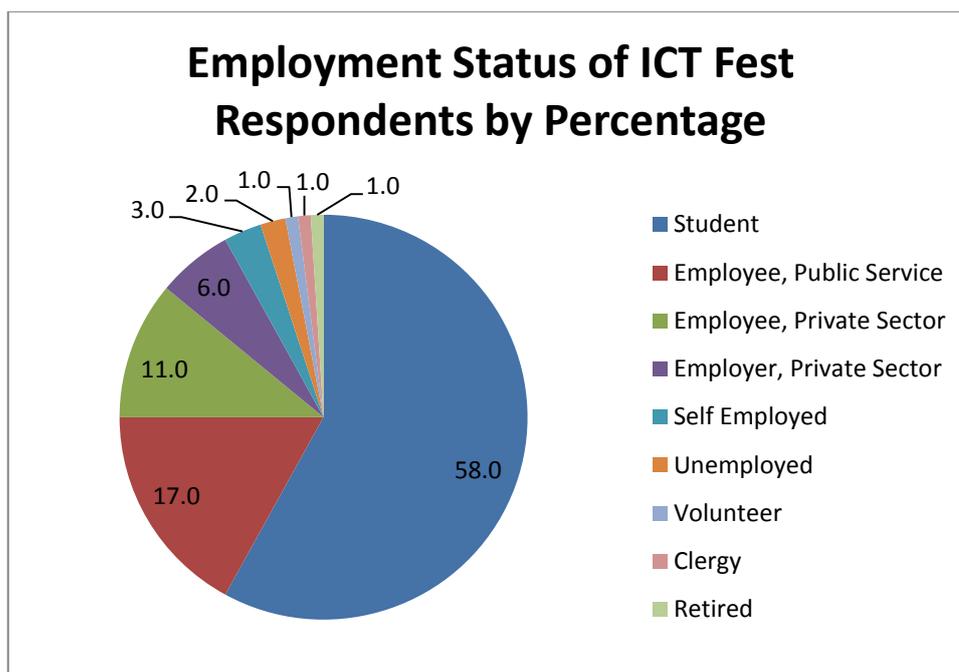
**TABLE 5 - AGE RANGE OF SURVEY RESPONDENTS**

<b>Age Ranges of Participant</b>	<b>Percentage</b>	<b>Typical Employment Category</b>
5-11	6%	Primary School Students
12-15	25%	Secondary School Students
16-25	34%	Secondary School Graduates, College/University Students, Young Employees
26-35	9%	Implementers, Junior Managers
36-45	8%	Middle Management
46-60	13%	Senior Management and Policy Makers
60+	5%	Policy Makers, Board Members, Retirees

**TABLE 6 - EMPLOYMENT STATUS OF ICT FEST RESPONDENTS**

<b>Employment Status</b>	<b>Percentage</b>
Student	58.0
Employee, Public Service	17.0
Employee, Private Sector	11.0
Employer, Private Sector	6.0
Self Employed	3.0
Unemployed	2.0
Volunteer	1.0
Clergy	1.0
Retired	1.0
Total	100.0

Figure 2 – Employment Status of ICT Fest Respondents



## 5.2 E-Government Solutions Recommended by KPMG, E-Government Consultants

In 2013, at the request of the EGRIP, KPMG conducted an e-government consultancy for Antigua and Barbuda and St. Kitts and Nevis. The objectives of the consultancy for Antigua and Barbuda were to:

1. Review the e-government environment;
2. Catalogue existing e-government services;
3. Identify required ICT solutions for Antigua and Barbuda;
4. Categorize the solutions into short, medium and long term time horizons;
5. Identify and provide business plans for five (5) quick win ICT solutions.

KPMG recommended approximately 40 solutions/initiatives over 10 different departments/divisions and sectors (KPMG, 2013). A complete catalog of all 40 solutions and initiatives can be found in Attachment 1. Of the 40 recommended solutions/initiatives, Antigua and Barbuda had commenced work, at some level, on 17 of these. Some of these solutions such as the wide

area network, Mobile ICT Units, Digital Resource Centres and the Customs and Excise Solutions have been implemented, or are in the final stages of implementation. Others like the Treasury Information System, the Court Case Information System are ongoing, but require more activities and/or resources or a need to implement additional modules in order to be completed. However, some solutions such as the Centralized Personnel Information System and the e-Procurement system were at the beginning stages in development or in the planning phase. The e-government solutions/initiatives which are currently implemented in Antigua and Barbuda can be found in Table 7, below:

**TABLE 7 – E-GOVERNMENT SOLUTIONS/INITIATIVES COMMENCED TO DATE IN ANTIGUA AND BARBUDA**

<b>Initiative</b>	<b>Status</b>
Wide Area Network	In place. Completed through the government IT Centre.
Mobile ICT Units	In place. Completed through Connect Antigua Barbuda Initiative.
Digicel Resource Centres	In place. Completed through Connect Antigua Barbuda Initiative.
Government Portal	In place. Available at <a href="http://www.antigua.gov.ag">www.antigua.gov.ag</a> . Some revamping may be required.

**TABLE 7 – E-GOVERNMENT SOLUTIONS/INITIATIVES COMMENCED TO DATE IN ANTIGUA AND BARBUDA**

<b>Initiative</b>	<b>Status</b>
Hospital Management Information which included a component for clinical decision support	In place. Some of the required functionality is available through Clinnet <sup>15</sup> . However, that software may need to be replaced if the service providers do not provide the fixes required to enable its proper functioning.
Computerization of the treasury through the use of Free Balance, a treasury management and information system.	In place. Additional modules need to be commissioned in order to gain maximum benefit.
Budget Information System	In place through the use of CS-DRMS.
Land Records Information System	In place through the use of Landfolio which is used by the Lands Division of the Ministry of Agriculture.
[Court/Legal] Case Information System	In place through the use of JEMS. JEMS is used by the Court system.
Academic and Examination Processing System (through the use of EMIS)	In place through the use of EMIS. Used by the Ministry of Education and schools.
Automation of Customs and Excise Taxes	In place through the use of the CASE system. Used by the Customs and Excise Division.
Payroll System	In place through the use of the Free Balance Payroll module.

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<sup>15</sup> Unfortunately, CLINNET did not realize many of the expected benefits, primarily because of the instability of the software and the inability of the software providers to produce the requires fixes and upgrades in a timely manner.

**TABLE 7 – E-GOVERNMENT SOLUTIONS/INITIATIVES COMMENCED TO DATE IN ANTIGUA AND BARBUDA**

<b>Initiative</b>	<b>Status</b>
	Used by the Treasury Department with input from the various ministries and government agencies which are paid through the Treasury.
Centralized Personnel Information System	In place through the use of the Free Balance HR Module.
e-Procurement (through the electronic pooled procurement system for the Pharmaceutical Procurement Service [ePPSS] and the expansion of the electronic Procurement System).	New procurement legislation is in place. Antigua and Barbuda has signed on to be a part of a wider OECS e-procurement project which will ultimately standardize procurement procedures and customize an existing e-procurement software which is currently used by the OECS Pharmaceutical Procurement Service.

## **CHAPTER 6 - INNOVATIONS WHICH SHOULD ASSIST THE E-GOVERNMENT PROCESS**

Most of the e-government initiatives are accessed or will be accessed via the Internet. Internet access must be available, affordable and sustainable, to all residents and citizens in order for the e-government initiatives to enjoy maximum success. Due to its limited resources, Antigua and Barbuda must partner with other entities to remain reliable, accessible and affordable. Recently, the twin island state created several initiatives through public/private partnerships. Additionally, regional and international initiatives have been developed to look at telecommunications issues. It is believed that these innovations should assist Antigua and Barbuda in enhancing its telecommunications and Internet infrastructure, e-government reach and impact.

Below are a number of national and regional initiatives which should facilitate Antigua and Barbuda e-government efforts.

### **6.1 Agreement for CARICOM Countries to Develop a Digital Economy Using C@ribNET**

Heads of Government of CARICOM agreed to the creation of a single ICT space as the digital layer of the CARICOM Single Market and Economy (CSME). In his address, Prime Minister of Grenada, Mr. Keith Mitchell, who is the CARICOM lead on government IT, stated that “a single ICT space logically complements the single economic space being created by the CSME” (Business Focus, 2014). This space could be fostered by C@ribNET, the regional research and education network facility. However, regional governments must develop their national research and education networks (NRENs) in order to take advantage of the connectivity and security available through C@ribNET (Business Focus, 2014A).

## **6.2 Commonwealth Ministers Adopt a Common Approach Towards Cyber Governance - Which Will Guide National Policy Development.**

In a meeting held in London between March 3 & 4, 2014, ICT Ministers of Commonwealth countries “adopted a Commonwealth cyber governance model to guide national policy development of their national cyberspace,” (Business Focus, 2014B). The guiding principles of the model included:

- Requiring that member states of the Commonwealth contribute to a safe and effective cyberspace;
- Using the cyber governance model to support more encompassing economic and social development;
- Requiring that countries act individually and collectively to address and solve cybercrime issues;
- Ensuring that through government leadership, citizens can exercise their rights and uphold their responsibilities in cyberspace.

### **6.3 Digicel Solutions in Antigua and Barbuda**

Digicel has proposed several solutions (Business Focus, 2014C) which are available for adoption by the government. The first is the use of dedicated Internet access (DIA) lines which will guarantee high speed connectivity to the Internet. A second is a vehicle tracking solution which will allow central government to track the whereabouts of its vehicles using a global positioning system satellite receiver unit and a Digicel Sim card. Like most governments, vehicle use is subject to much abuse by employees who use them to conduct more than government business. A third solution is cloud computing hosting which frees the government from having to maintain storage space. However, a downside to this is ensuring the security of the information. A fourth solution is the CCTV Crime Fighting initiative which uses wireless technology. The initiative will install cameras in the capital city of St. John's, with video surveillance which monitors activity.

### **6.4 4G LTE Solutions**

In September 2013, Digicel launched its 4G Long Term Evolution (LTE) solution in Antigua and Barbuda. This marked the first 4G LTE installation in the English speaking Caribbean. By the end of the second quarter 2014, Cable and Wireless (trading as LIME) launched its 4G LTE platform. The availability of this platform for cellular phone, home and business Internet access will significantly improve user experience in accessing the Internet,

particularly for resource intensive downloads required for online training and use of video and graphics (Business Focus, 2014C)

## **6.5 CTU Encourages Greater Technology Enabled Innovations**

The Caribbean Telecommunications Union (CTU) encourages the use of technology-enabled innovations in an effort to increase entrepreneurship in the Caribbean. This effort is facilitated through the conduct of workshops for young people of the Caribbean region, in developing mobile, open government applications. The initiative is funded by the World Bank through its CARCIP program. The objectives of the initiative include:

- exposing college-age students to application development;
- diminishing the effect of wide scale migration of qualified Caribbean persons seeking employment opportunities outside of the region, thereby creating a brain drain.

According to the article in the Business Focus, it is expected that the CARCIP funded workshops will create economic opportunities for young persons, in spite of national challenges of “outmoded physical and institutional infrastructure and diminishing global competitiveness” of Caribbean countries (Business Focus, 2014D).

## **6.5 Cyber Security Agreement Between the OAS and Microsoft on Behalf of Member States of the Americas**

The Organisation of American States signed a co-operation agreement with Microsoft in an effort to strengthen cyber security efforts of member states of the Americas. The agreement will assist governments in investigating, responding to and solving cybercrimes. The OAS recognized that in the current connected world threats posed by cybercrime affects both private and public sector and can be devastating to country economies. Secretary General, Jose Miguel Insulza admits that although cyber security threats are difficult to solve by any single organisation or government, they can be significantly decreased through the collective effort of the OAS and its member countries (Business Focus, 2014F).

## **6.6 OECS Countries Harmonize Telecommunications through CARCIP**

Governments of the Organisation of Eastern Caribbean States (OECS) are seeking to harmonize their telecommunications infrastructure through the Caribbean Regional Communications Infrastructure Program (CARCIP), which is designed to improve the physical communication infrastructure of the region. The US\$25M program is funded by the World Bank and will assist in augmenting areas such as:

- Gaps in submarine cable infrastructure
- Creation of more / augmentation of existing landing stations
- Enhancements to national Internet backbones;

- Creation of national internet exchange points (IXPs) (Business Focus, 2014G). One major benefit of the IXPs will be a thrust towards local and regional content creation, and improved availability, via the Internet, of information about the Caribbean for Caribbean people, the diaspora and international users. The paucity of data generated about the Caribbean by Caribbean people has been the subject of much discussion by Bevil Wooding, Executive Director of Bright Path Foundation.

## 6.7 The HEART Project

The Human Entrepreneurship and Assistive Resources Technologies (HEART) project was launched by the Minister responsible for Telecommunications, Dr. Edmond Mansoor, in the 1<sup>st</sup> quarter of 2014. The HEART project is intended to provide disadvantaged persons with skill in ICT and access to the Internet and opportunities to use these skills for economic enhancement. This initiative is in an effort to make good on the UPP government's promise to "leave no one behind in the ICT revolution," (Business Focus, 2014E). The project is funded by LIME (formerly Cable and Wireless), as one of its socially responsible initiatives.

The initiative will assist persons from various institutions around the island including:

- visually impaired persons from the Unit for the Blind and Visually Impaired, and the Industrial Workshop for the Blind;
- hearing impaired persons from the School for the Deaf;

- mentally challenged persons from the Adele School;
- mentally disabled persons from the Clarevue Psychiatric Hospital;
- chronically ill persons at the Mount St. John's Medical Centre;
- destitute persons at the Fiennes Institute;
- elderly persons from various special care homes and institutions;
- handicapped persons from the Amazing Grace Foundation;
- Behaviourally challenged youth from the Boys Training School and Sunshine Home for Girls (Business Focus, 2014E).

## CHAPTER 7 - INTERNET GOVERNANCE ISSUES

Due to its importance, Antigua and Barbuda is addressing or has addressed several Internet Governance issues. These initiatives will facilitate the success of the e-government initiatives in both the short and long terms. These are identified below:

### 7.1 Availability and Reliability of the Internet Infrastructure

#### **Physical Internet Infrastructure in Antigua and Barbuda**

The Internet infrastructure in Antigua and Barbuda is collectively owned by four Internet service providers (ISPs). These are the Antigua and Barbuda Public Utility Authority (APUA), Antigua Computer Technology (ACT), Digicel and LIME (formerly Cable and Wireless).

APUA provides DSL Internet access over its fiber optic/copper network. They are also the owners of the country's local telecommunications infrastructure.

The copper has existed since the 1980's and has been upgraded from time to time over the last 30 years. ACT, Digicel and LIME provide wireless service through strategically positioned antennae across the twin island state.

ACT provides a 45M, high volume connection which is shared by most government offices. The main users of this link are national Information Technology Centre, the MSJMC public hospital, the Treasury Department, the Court system, the Medical Benefits Scheme and the various satellite clinics in Antigua and Barbuda.

Corporate arrangements between the ISPs allow use of each other's infrastructure. Where required LIME and Digicel use APUA's copper/fiber infrastructure.

These four ISPs work together to ensure the reliability and availability of the Internet on the twin island state.

### **Physical Connection Between Antigua and Barbuda and the Rest of the World**

Connection between Antigua and Barbuda and the rest of the world is achieved through one of two routes. The first, owned by LIME, is a backbone running from the Cayman Islands, in the north, to Trinidad and Tobago in the south. The second, allegedly co-owned by Columbus Communications – trading as FLOW – and referred as the southern Caribbean fiber, runs from the United States Virgin Islands in the north, to Trinidad and Tobago in the South.

### **Concerns About Aged Internet Infrastructure**

One concern has been the ability of the ISPs in Antigua and Barbuda to maintain/upgrade aging internet infrastructure, since some of the copper

network used for the Internet has been in place since the 1980's, while portions of the fiber optic network was installed in the early 1990's.

Digicel invested heavily over the last two years and was the first to introduce 4G communication through its 4GLTE platform. LIME followed closely and introduced its 4GLTE platform at the end of the summer 2014.

Columbus Communications, trading as FLOW, a local cable company, announced a merger with LIME. One benefit of this merger will be the use of the new FLOW fiber optic network, by LIME, for the provision of Internet services.

The new investment in the fiber optic and wireless networks will serve to keep the Internet infrastructure robust for some time.

### **Internet Coverage**

Internet can be accessed via subscription service or via cellular service. Each ISP boasts over 90% coverage in their product literature. Between them Antigua and Barbuda enjoys about 99% Internet coverage across the twin island state according to the Ministry of Information. Wireless coverage augments Internet service delivery through copper/fiber optic lines. Mobile routers which use cellular infrastructure augment the subscription services available from APUA, Digicel and LIME.

### **Cost of Internet Service**

The average customer can obtain a service which provides 1M Internet access at a cost of between EC\$100 (US\$40) and EC\$150 (US\$65) monthly

from any of the four ISPs. APUA's service is least expensive ranging between EC\$100-\$120 per month.

Access to Internet from a cell phone is normally available for about EC\$10 per week, but there is an additional cost for downloading data. The three cellular service providers, which are APUA, Digicel and LIME, offer EC\$40/month data packages which allows download of up to 500M of data.

### **Domain and IP Addresses**

In keeping with a policy established by ICANN, countries are allowed to own their top level country domain. For Antigua and Barbuda, this is ".ag". This cc TLD was acquired by a group headed by Dr. Patrick Lay in the early 1990's. According to Mr. Luxmore Edwards, Director of the Information Technology (IT) Centre in the Ministry of Information, ".ag" cc TLD used by the government of Antigua and Barbuda is free of cost. Use of the .ag cc TLD by commercial or personal interests are leased at amounts starting at about US\$100 per annum. Antigua has found itself in good position in that the ".ag" cc TLD suffix is the same one required for companies in Germany.

Currently sale of domain names including the .ag cc TLD and others such as .org.ag, .com.ag and .co.ag are managed through an international domain registration company named MARCARIA.com.

The privately owned organisation which owns .ag continues to provide access to that cc TLD free of cost to the government of Antigua and Barbuda, which ensures that the government website [www.antigua.gov.ag](http://www.antigua.gov.ag) is not maintained due to lack of funds to pay for the cc TLD.

## **Is the Internet Available and Reliable?**

The Internet infrastructure has proven to be reliable and available, so much so that Antigua and Barbuda is a well-known hub for online gaming companies which conduct their via the Internet.

### **7.2 Universal Access**

Universal access to the Internet, by all Antiguan and Barbudan citizens, is a policy of the government. To facilitate this, the government has created several Community Access Centres (CACs), through public/private partnerships with Digicel and LIME. Citizens or residents can connect to the Internet, free of cost, using wireless Internet, twenty-four hours per day, from these centres. The centres are generally located centrally in villages or at primary or secondary schools across the twin island state.

Additionally, the Ministry of Information has issued Samsung tablets to most 5<sup>th</sup> and 4<sup>th</sup> form students and some 3<sup>rd</sup> form students<sup>16</sup> and has configured these tablets to be able to access free Internet between 7:00am and 7:00pm.

It is not unusual to see young people sitting on the sidewalks near to CACs, connecting to the Internet, in the evening hours after school or work. Since Antigua and Barbuda enjoy summer temperatures all year round, accessing the Internet from the sidewalk does not present a health issue.

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<sup>16</sup> In Antigua and Barbuda, Primary Schools consist of Kindergarten to 6<sup>th</sup> Grade. Secondary school starts in 1<sup>st</sup> Form and ends in 5<sup>th</sup> Form. 1<sup>st</sup> Form is equivalent to Year 7 in the UK school system and Grade 7 in the US system.

## **Access for Disabled or Disadvantaged Persons**

Access for disabled and disadvantaged persons is a very important Internet governance issue. If implemented as intended, the HEART project should provide ready and reliable access for disabled and disadvantaged persons on the twin island state.

### **7.3 Capacity Building through the Internet**

Since its inception, the national ICT training center, the Antigua and Barbuda International Institute of Technology (ABIIT) has been an advocate for online training, and has incorporated online technology in the delivery of course work, testing and communication with its students, although it does not yet offer online courses. However, it does partner with Monroe College, in the United States (US), to offer online courses.

University of the West Indies (UWI) offers distance learning programs where the physical lecturer, stationed in Barbados, Trinidad or Jamaica, the campuses of the university and students, conducts online classes. Civil servants in the middle and upper management positions have been encouraged to acquire diplomas and degrees through distance learning and online degree programs offered by UWI.

Working persons and professionals avail themselves of online courses, where they are required to read material and submit coursework by specific deadlines, but do not necessarily have to attend classes at specific times.

Online courses are particularly popular for bankers, and persons pursuing degrees at the masters and doctoral levels.

Additionally, several United Kingdom (UK) universities advertise online courses and degree programs in the local newspapers.

## 7.4 Economic Advantages / Disadvantages of the Internet

### **Economic Advantages**

In Antigua and Barbuda, the Internet has the potential of increasing economic activities by providing many of the opportunities below:

- Creating international markets for small businesses by allowing an online presence. Hotels have benefitted through increases in reservations and stay over visitors. Local event management organisations have become more prominent from an online web presence. Businesses providing provisioning for yachts have benefited by allowing the yacht owners and managers to procure their supplies online, so that upon arrival into Antigua and Barbuda, they are able to obtain their goods immediately; Events in the country are more readily known and potential visitors are better able to evaluate whether to stay in Antigua and Barbuda or some other destination for vacation;
- Decreasing the cost of procuring goods for resale. Since there is little manufacturing in Antigua and Barbuda, the majority of good purchased for resale have to be imported. Historically purchasers were required to travel periodically to identify goods required for purchase. Now much of

this is done online, thereby decreasing the cost of goods sold and hence the final price to the consumer;

- Increasing the ability of the Customs and Excise Division in classifying and valuing goods imported into the twin island state. As a result of the Internet, Customs officials are better able to research and classify goods, thereby allowing more precise valuations. They are also able to interact with regional and international colleagues in classifying and valuing emerging products, including electronics. This potentially decreases the amount of time for the customs clearance process creating savings for the trader and increases the cash flow of the government, since they are better able to collect duties and taxes due;
- Improving the ability to combat crime and thwart the effort of criminals through ready contact with regional and of immigration and security officials. This allows the twin island state to spend less on security, and main a good low-crime record, which is important for countries, like those in the Eastern Caribbean, which depend on tourism as the main industry;
- Decreasing the cost of education so that persons who cannot afford to travel can obtain diplomas, bachelors, masters and doctoral degrees online.
- Increasing the availability of education for persons who are not able to take time off to obtain same due to work, family or other commitments.

## 7.5 Content Creation

The Caribbean has a rich history and much of it is documented through calypso lyrics. Incidents such as the uprising in Anguilla when the British sent

their troops to retain order (dubbed “war in a teacup”) between 1967 and 1969, the polio myelitis outbreak in 1971, in Trinidad, which threatened to spread through the rest of the Caribbean, the coup in Trinidad in 1990, political corruption in Antigua and Barbuda between 1980 and 2004, and many other events which are not documented in any history book, are chronicled by calypso. Unfortunately, most of these calypsos lyrics are not available online although some popular tunes can be found through the [www.youtube.com](http://www.youtube.com) website. It is important that Antigua and Barbuda, like other countries of the Caribbean document their activities online, instead of waiting for organisations such as Wikipedia to do so.

Antigua and Barbuda attempted to encourage content creation through several workshops, including one hosted by the Ministry of Information in 2013, where several local, well-known, literary personalities such as Barbara Arrindell and Joanne Hillhouse were instructed in how to make their material accessible as e-books.

Bevil Wooding, Executive Director of the non-profit, educational organisation, Bright Path Foundation, has been an advocate for content creation, particular for data which may be used to “learn about customers”, “optimize business processes”, and “better customize products” (Business Focus, 2014H). He indicates that the use of open data, particularly government data, can become a multi-million dollar business and cites the example of Climate Corporation which used 30 years of government weather, soil and crop data to create a software which was sold to agricultural multi-national corporation Monsanto (Business Focus, 2014H).

Mr. Luxmore Edwards, Director of the government IT Centre, has also promoted content creation and has encouraged the implementation of Internet Exchange Points (IXPs) as a means of decreasing access time and cost.

## CHAPTER 8 - IMPEDIMENTS TO SUCCESS

### 8.1 Implementation Issues

Implementation of computer systems in Antigua and Barbuda was fraught with many issues. These problems can be placed into several categories including:

1. Misunderstanding of what computerization is all about;
2. Inability/unwillingness for senior management to take ownership for computerization process;'
3. A Lack of Understanding of the Importance of Process Flows / Process Re-Engineering
4. Difficulty in implementation due to unwillingness of staff to follow instructions.

#### **Misunderstanding of What Computerization is All About**

Historically, computerization to many meant placing computer systems on employees desks and asking them to use the software installed on them. There was little understanding that use of the computer system was a small portion of the entire process, and that the success lay with the willingness to modernize procedures to include the computerized processes.

During the early days of computerization, software systems were marketed as the solution to end all problems. As result a popular cynical remark was that “computerization could do everything but get up and make the coffee.”

Management and staff were told, or understood, that all their problems would be solved once the software was installed. For instance, with the implementation of the Customs ASYCUDA computer system, management believed that installing the system would automatically allow them to collect more revenue with little or no action on their part. The fact is that in order to realize increased revenues, Customs staff was expected to ensure that traders correctly declared their imports using the appropriate customs procedure codes (CPCs), classification their goods and used proper valuation methods, so that the applicable taxes could be assigned. Additionally, the Customs and Excise Division was expected to impose the applicable fines on traders who habitually misclassified or undervalued goods in an effort to evade the taxes. At that time, very little effort was placed in regulating valuation and classification by imposing fines on traders who habitually misclassified or under/overvalued their goods. The skill level required for valuation/classification needed improvement for both traders and Customs officials.

When the promises that the software would solve all the problems did not come to fruition, employees dismissed the software solution as ineffective and unable to live up to expectations, and were reluctant to embrace it again.

### **Inability/Unwillingness to Take Ownership for Computerization Process:**

Many of the staff members in management were intimidated by the technology and therefore delegated the use of the system and the associated decision making to computer consultants or junior staff. While consultants understood the technology, and junior staff were comfortable with the technology, they often did not have the organizational authority to effectively make changes to process flows. The result was that some of the actions to be taken were not completed when they were required. This slowed down the implementation process and staff lost interest.

Additionally, some of the software systems were implemented by persons who did not have the requisite expertise in system implementation. A number of mistakes were made. Implementers and employees found it difficult to regain the trust that was present during the initial implementation of the software systems, and implementation activities waned.

### **A Lack of Understanding of the Importance of Process Flows / Process Re-Engineering**

Not much attention was given to process re-engineering during software implementation. As a result, new IT processes were merely inserted into existing, and sometimes inefficient, manual processes. The result was that both service provider and service receiver were frustrated.

Many senior administrators did not realize that computerization was not merely the use of software, but required changing of existing processes and operational procedures, and the use of new forms. As a result, instead of getting involved in the implementation process, senior managers relegated the

activities to the computer consultants and junior staff who may not have fully understood the processes. The result was that the implementations were often ineffective in solving the initial problems. Additionally, many implementations took unnecessarily long and were often viewed as burdensome.

## **8.2 Lack of Funding**

Prior to embarking on implementation activities, the government of Antigua and Barbuda would normally acquire funding through a funding agency. The rules of funding and/or the available funds left little wiggle room for errors. Delays in the implementation, resulting in increased costs often required cutting corners. Therefore Antigua and Barbuda could not receive the anticipated full benefits since they did not have the financial resources to hire continue hiring competent staff or did not have sufficient staff to understudy the consultants.

## **8.3 Lack of Infrastructure / Inferior Infrastructure**

Although Antigua and Barbuda enjoys good physical network infrastructure, it took some time to build. Even today (2014), the government WAN does not extend to all government offices and maintenance of the existing infrastructure is an ongoing challenge (Zachariah, 2013). To assist the process of creating and maintaining modern telecommunications networks, the government has

entered into public/private partnerships with all the telecoms providers.<sup>17</sup> ACT is credited with investing in landing some of the cable which connects Antigua and the World. LIME has invested in the telecoms infrastructure which extends from the north to south Caribbean and will soon augment this infrastructure through its merger with Columbus Communications trading as FLOW.

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<sup>17</sup> The telecommunications service providers in Antigua and Barbuda are APUA, ACT, Digicel and LIME formerly Cable and Wireless.

## **CHAPTER 9 – ANALYSIS OF THE SITUATION IN ANTIGUA AND BARBUDA**

### **9.1 Analysis of the e-Government Solutions Required by Antiguan and Barbudans**

The survey choices included simple, though important online facilities which could readily be implemented and usable by citizens and residents but did not include more complex choices such as transportation and e-payment systems which would require legislative changes or large infrastructure installations. None of these requested e-government solutions was included in KPMG's list of 40 ICT solutions.

The survey may have been flawed in not providing a large enough pool of e-government choices. Additionally it may have prejudiced the respondents. Alternatively, it could be that since e-government solutions are limited, the residents and citizens wanted quick wins which could boost their confidence in the government's ability to deliver worthwhile online solutions.

## 9.2 Analysis of e-government Solutions Recommended by KPMG

Antigua and Barbuda has been successful in implementing seven of the ICT solutions suggested by KPMG. Some of the solutions implemented include the Government WAN, the Mobile ICT Units and Automation of customs and Excise Taxes (please refer to Attachment 1 for a complete list of all recommended e-government solutions). Work has commenced on ten additional solutions. Some of these solutions, such as the Treasury Information System/Computerization of the Treasury and the Hospital Information system contain multiple modules. Although some modules are fully implemented, others are not.

Two solutions are not a priority. These are the Automated Treasury Bill Passing System and the Video Linkage System. The Automated Treasury Bill Passing System is not a priority, because there is currently a mature manual process which determines payment priority for bill payment. This process is based on regular meetings between the Minister of Finance, Financial Secretary, Accountant General and other persons in the Ministry of Finance, along with priorities established by the government Cabinet. In cash strapped countries like Antigua and Barbuda having hands on knowledge of the cash flow takes priority over an automated system. The Video Linkage System is also not a priority because the Court is a seven-minute walk from the Prison where criminals are remanded, so transportation between places is not a critical element. Additionally, there are currently no criminals who need to be kept in isolation due to their threat to society, so these persons can be readily transported between the prison and the Court.

Of the remaining 21 unimplemented ICT solutions, e-Payment is probably the most important because of the impact of commerce and the economy. Local merchants have had talks with the bankers on island and are unable to subscribe to a local e-payment system. The result has been that online transactions must be facilitated through a North American or European e-payment system.

During the last quarter of 2014, the Eastern Caribbean Central Bank has announced the Eastern Caribbean Automated Clearing House (ECACH), which is a precursor to e-payment facilities. It is expected that e-payment will be implemented across the Eastern Caribbean shortly as a joint venture to include ECCB, ECACH, and the Caribbean Credit Card Corporation (4Cs).

Although KPMG has provided the government with a detailed list of ICT solutions, it is the opinion of the author that the report should have included the following ICT solutions:

- An ICT solution for tracking movement of persons within Antigua and Barbuda. This is particularly important with the implementation of the OECS free movement which affords all OECS citizens the same rights to entry and stay in Antigua and Barbuda natural born citizens. It would also be important to monitor the movement of persons which have benefitted from the citizenship by investment program, which confers citizenship on investors which meet specific criteria;
- Surveillance systems for monitoring the beaches, bays and coves in the twin island state, since these can be used for illegal trafficking of goods, especially illegal items;

- Vital statistics portal which allows for the application of birth, death and marriage certificates and the management of issuance of the same. This is especially important as there have been several instances of persons illegally applying for birth certificates in an effort to obtain passports in the name of persons who are currently deceased;
- Online application for a passport, since this is the single most important document used to verify a person's identify;
- A trade portals connecting the Customs and Excise Division with the Ministry of Trade which generates import licenses; the Department of Agriculture, Lands and Fisheries, which generates phyto-sanitary certificates for the importation of plants, animals, fish and marine products; the Environment Division which vets and approves/disapproves the importation of specific chemicals and pollutants.

### 9.3 Analysis of How Internet Governance Issues Can Assist in Improving the e-Government Success

#### **Availability and Reliability of the Internet**

At the present time, the Internet is readily available and reliable. The cost of 1M access ranges between EC\$100 to \$150 per month for ISP subscription service. Data service via cell phones cost as low as \$40 per month.

#### **Universal Access**

Universal access will ensure that the majority of residents and citizens have access to and can use the e-government services. As a result most citizens

will benefit from improved and efficient service. CACs and mobile ICT sites provided by the ICT busses will allow persons in villages and even the disabled to access sites online. The HEART program will ensure that disabled and disadvantaged persons also have access to the Internet.

### **Capacity Building via the Internet**

The goal of any development is to improve the lot of its residents and citizens. The current trend of online or distance learning will allow persons, particularly young people to pursue degrees at whatever level they choose, at any university which offers online facilities.

## **9.4 Critical Success Factors**

Antigua and Barbuda has a history of failed or delayed implementation for several reasons. Chief among these reasons is the unwillingness of some persons to carry out instructions issued to them. Another impacting reason is lack of funding to complete required activities or procure essential goods or services.

Therefore pivotal to successful implementation of e-government solutions is the presence of the following critical success factors:

1. Leadership which is decisive and goal oriented;
2. Employees who will accomplish goals in the assigned timeframe;
3. Sufficient financing to procure goods and services when required;

4. Departmental/Divisional heads who understand their role in the ICT implantation plan for the country as a whole and their department/division in particular and are willing to take the lead;
5. Sufficient training so that staff understand the ICT plan along with their role in the success of the plan;
6. Buy-in for the ICT implementation plan by citizens and residents. Buy-in is often based on trust that the objectives will be met and the product will be delivered. It is therefore long term, and may require the implementation of some easy, high impacting solutions such as online application for government scholarships, list of vacancies available in the public service; statistics on trade, education, cost of living available from the Department of Statistics.

## **9.5 Analysis of Why Korea and Singapore May Have been Successful**

Having read the literature and listened to the presentation made by Korea in 2012, the author believes that the success of both countries in implementing e-government solutions is multi-fold and included the following:

1. Both countries had clear policies on where they wanted their countries to go;
2. Both countries had plans for implementing their policies over the long term.

Their plans ensured that the ICT initiatives could be implemented regardless of the political administration. In the case of Singapore, their government has not changed in over 50 years while Korea had a plan which transcended the change in government;

3. Both countries sought financing for the ICT initiatives. Korea partnered with LG. In Singapore, the Ministry of Finance was actively involved in all implementation initiatives, so they were only passed if the funding was available.
4. Both countries implemented the required legislation;
5. Both countries had effective leaders were willing to lead their departments/divisions and chart the way forward in the implementations;
6. Both countries had employees who willingly followed instructions.

## **9.6 Critique of Antigua and Barbuda's Plan for ICT and e-Government**

The government has done an impressive job in training its students and teachers to use ICTs. Students and teachers have received classroom training in the basics of using computer systems, office automation software and computer programming. The Government Assisted Technology Endeavour (GATE) program has provided free [computer] tablets to all 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> form students in Antigua and Barbuda and some 3<sup>rd</sup> form students across the twin island state. It has also provided all teachers of the Antigua State College with computer tablets. Another private/public partnership with Cable and Wireless has provided laptop computers to most of the secondary school teachers, some primary school teachers and all nurseries around the twin island state. The success of the GATE program has “forced” CXC to expand its Notesmaster e-learning website (Government of Antigua and Barbuda Official Website, 2013). Students have used their tablets to create their school based assessment (SBA) requirement for the CXC secondary school education certificates (CSEC), and according to a news clip from the

Ministry of Education in August, 2013 the number of SBAs submitted for the 2012/2013 academic year has increased. Young people entering the workplace come equipped with knowledge of basic office automation packages, which has increased their productivity in generating documentation, and manipulating numbers. This is particularly true of interns provided by the Ministry of Labour according to feedback received from Ms. Jacqueline Yearwood, Director of the Enterprise Development Division of ABIA. This fact was also demonstrated to the author while conducting training in using Microsoft Excel in business management, a course designed by ABIA for small business owners and their employees. Young employees had the requisite skills in using the Excel product and only required tuition in the concepts while the older course participants required training in both the application and the concepts.

These new entrants to the workforce have made implementing e-government solutions easier, since the learning curve to use the various e-government solutions has been much shorter. This was evident at the Treasury Department, the Customs and Excise Division, The Land Registry, the Ministry of Legal Affairs and all other departments where e-government initiatives were introduced. In fact, some of these young people were given supervisory responsibility in implementing some of the e-government programs.

Several of the new graduates became entrepreneurs and used their programming skills to create cell phone applications. Others used their skills to create enterprises like online newspapers, online advertising, advertising through social media, website design and more.

Unfortunately, there is currently no measure to determine how or whether the various technology initiatives have helped to increase the amount of taxes collected. Additionally there are no know programs to assist these technology entrepreneurs to market their businesses or products locally, regionally or internationally.

## **9.7 Commentary on How National, Regional and International ICT Programs And Processes Might Assist e-Government Initiatives**

### **A Digital Economy Using C@ribNET**

The agreement to develop a digital economy using C@ribNET should strengthen the existing network infrastructure since Antigua and Barbuda will be required to implement and maintain various network standards, resulting in the augmentation of the existing local network and regional network connectivity. This initiative should ensure better connectivity between the twin island state and its OECS and CARICOM partners and should also facilitate the requirements of the OECS heads to “implement regionally integrated e-solutions which take advantage of economies of scale.”

### **Cyber Security**

Cyber security is a challenge faced by countries, industries and large companies, which have budgets several times greater than the national budget of Antigua and Barbuda. In 2007, Estonia suffered a denial of service (DoS) which significantly restricted Internet access. This was particularly concerning since Estonia’s is heavily dependent on its e-government systems and all of its banking services are Internet based. In 2010, the Stuxnet worm

is alleged to have successfully damaged the Iranian nuclear program by attacking Siemens industrial programmable logic controllers (PLCs) and destroying nuclear centrifuges (Wikipedia Stuxnet, no date). In December 2014, Sony was hacked by a group which threatened to expose the company's internal data. Additionally, the hackers paralyzed the telephone and email service (Deadline Hollywood, 2014).

Security breaches can significantly cripple an organisation's ability to function. It is therefore prudent to have a well thought-out cyber security policies and robust plans, such as the one being proposed for countries of the Commonwealth. Implementing cyber governance initiatives, such as the one being implemented by Microsoft on behalf of countries of the OAS, which have the benefit of input from several nations, will allow small island states like Antigua and Barbuda, with limited resources, to implement first world solutions, at reasonable costs.

Citizens, employees and businesses are more likely to use e-government systems if they are assured that those systems are secure. Hence the commonwealth cyber security policies and the OAS/Microsoft security initiatives could become two pillars on which the twin island state builds confidence in the use of its e-government initiatives.

### **Digicel and LIME Solutions**

The DIA solution proposed by Digicel would assist in ensuring that e-government services are readily accessible to its stakeholders as a result of increased bandwidth and higher Internet connection speeds. This initiative, together with the 4G LTE provision by LIME will allow citizens and residents

from Antigua and Barbuda to benefit from a faster, more robust Internet service.

Digicel's cloud computing solution should significantly decrease the amount of storage in which the government must invest to facilitate its e-government solutions and hence the cost of the solutions. However, the disadvantage is that cloud computing allows the government of the cloud storage service provider legal access to confidential government data, as a result of the national laws of the service providing country. It can be argued that governments of cloud service providers already have access to the sensitive government data of Antigua and Barbuda using existing technologies. However, this access may not be legal and recourse can be sought through the GATS agreement.

### **Internet Infrastructure**

The World Bank funded CARCIP project will augment the existing cable infrastructure for countries of the Caribbean. This will facilitate better communication between countries of the OECS and allow for the use of common e-government solutions. National and regional IXPs could possibly lower Internet cost and encourage stakeholders, particularly from civil society, to provide more local content.

## **9.8 Engaging Local ICT Expertise**

There is a tendency to ignore the contribution that local ICT expertise can bring to the table. The reason for this may be that most of the ICT contracts

are executed through donor agency funding which brings with it a wide range of expatriate expertise. Notwithstanding this broad expertise, local ICT experts understand the environment and can circumvent many of the hurdles which expatriate expertise know little about.

## 9.9 Can Antigua and Barbuda Really Implement the Required e-Government Solutions?

It is the opinion of the author that Antigua and Barbuda **can** implement the required e-government solutions required to transform its economy. The people of Antigua and Barbuda have shown a great propensity to work towards a common goal when challenged. The country has survived several hurricanes which decimated the tourism industry and their main livelihood; used their savings to re-build the nation when 95% of the country experienced damage after Hurricane Luis in 1995; been the forerunner in the use of OECS e-Education initiatives EMIS; successfully marketed “Mind Your Business”, a small business program, to Saint Lucia; successfully implemented the GATE program, thereby forcing CXC to expand the scope of its online notes system Notesmaster and more. In order for Antigua and Barbuda can be truly successful at implementing its e-government initiatives, it must:

1. Develop a national e-government policy which will guide its implementation plan. This policy should be consistent with the e-government requirements of the OECS and the digital strategy of CARICOM, since the twin island state is a part of economic partnership among countries of the OECS and CARICOM respectively;

2. Select the list of e-government solutions required based on input from its residents and citizens, its private sector, its ICT technicians, its financial institutions and ECCB, the financial authority. These solutions should then be prioritized over the short, medium and long terms. This activity **MUST** have input from the governing party, the opposition, the fraternity of technical contributors and specialists, private sector concerns, and civil society, since the solutions to be implemented will transcend the tenure of any one political party that will head the government, and should meet the need of the majority of citizens and residents;
3. Identify funding for the initiatives. Some initiatives may be funded through taxes. Others can be funded through investments by citizens and residents, while others may be funded through public/private partnerships.
4. Select decisive, action-oriented, knowledgeable, honest leaders who understand their function and are willing to work towards the objective of implementing the requisite ICT solutions;
5. Engage both the local technicians and subject matter experts in identifying appropriate ICT solutions. For examples, e-education solutions should have the blessings of both education experts for the appropriateness of the solution and ICT technicians for the soundness of the technology.

In essence, Antigua and Barbuda should adopt many of the administrative policies and strategies in place in Barbados. This should assist in creating a more disciplined civil service.

Like Singapore, the country should allow the government to take the lead in e-government policies and strategies, since it is the main entity on the twin island state which has the resources so to do. The country should also be

willing to allow the persons charged with implementing e-government initiatives the autonomy to do so even when decisions are not favourable.

The twin island state should also create a long term implementation strategy similar to those used by [South] Korea, which includes a strong financial plan.

## **CHAPTER 10 - RECOMMENDATIONS**

The author makes the following recommendations for the implementation of e-government solutions which are intended to transform the public sector:

### **10.1 Recommendations Related to Policy and Strategy**

Antigua and Barbuda should:

- a. Create a national ICT and e-government policy based on the Digital policy available from the CARICOM Secretariat and the requirements for e-government articulated by the heads of government of the OECS and implemented by the EGRIP;
- b. Create a national ICT and e-government strategy based on the respective policies.

### **10.2 Recommendations Related to Legislation**

Antigua and Barbuda should:

- a. implement the draft legislation approved by the OECS heads of Government soonest. The required legal instruments are:

- i. The Electronic Evidence Bill
  - ii. The Data Protection Bill
  - iii. The Electronic Crimes Bill
  - iv. The Electronic Filing Bill
  - v. The E-Filing Rules and Regulations
- b. Amend the Electronic Funds Transfer Act to include all new elements of the OECS approved Electronic Funds Transfer bill.

### 10.3 Recommendations Related to Leadership

Antigua and Barbuda should:

- a. Identify committed leaders who will drive the e-government and ICT implementation;
- b. Create a national ICT/e-government Steering Committee;
- c. Assemble a committee of committed persons, spanning all functionality of the public service, to serve on the ICT/e-government steering committee.

All persons do not necessarily have to serve at once. Instead, the committee may consist of a core including the Financial Secretary, Accountant General, Director of Planning, ICT Director, Director of Education (since education is the primary focus) and Director of Tourism (since tourism is the chief economic driver). Subject matter participants may be included when plans related to their specialty are up for discussion or implementation. However, it would be best if all persons were a part of meetings and discussions, but only the core and relevant subject matter experts have voting rights;

- d. Instill in employees of the civil service a need to be hard working and to follow instructions. This is best done by human resource professionals who have the tools to change culture. A system of rewards and punishments is normally known to change behavior and guide the workforce along the required route.

#### **10.4 Recommendations Related to ICT Implementations**

Antigua and Barbuda should:

- a. Create a comprehensive e-government implementation plan based on its e-government and ICT policies and strategies;
- b. Create annual ICT and e-government implementation plans which will allow the completion of the comprehensive implementation plan;
- c. Implement several easy, quick wins, so as to gain the confidence of the public, employees and department heads and engender buy-in;
- d. Ensure that Department heads understand the national e-government policy, strategy and implementation plan and their respective roles in their success;
- e. Sensitize members of the civil services as to the e-government and ICT policy, strategy and implementation plans and the need to ensure that required activities are completed as required, along the consequences of failing to follow directives;
- f. Sensitize citizens, residents and businesses as to the ICT/e-government policies and strategies, and their role in ensuring success;
- g. Engage local ICT experts in the planning and implementation of the e-government initiatives.

## **10.5 Recommendations Related to Financing**

The e-government Steering Committee leadership should decide on how each e-government initiative will be funded. The Minister of Finance, Financial Secretary and Accountant General should be a part of the funding discussions. Funding options could include:

- a. Appropriation of percentage of the local value added tax (VAT) known as the ABST, which is paid on the sale of electronic goods and services;
- b. Creation of a bond issue which will be used to fund the e-government initiative;
- c. Encouragement of citizens and residents to invest in the country's e-government initiatives by purchasing said bonds;
- d. Identification of private sector partners that are willing to invest in the country's development and provide investment incentives to encourage the required investments. Local and OECS businesses should be given additional incentives for investing.

## **10.6 Recommendations Related to Internet Governance Issues**

Antigua and Barbuda should:

- a. Continue to focus on ensuring that the Internet Infrastructure remains robust and available;

- b. Monitor the cost of access to the Internet so that it does not become prohibitive. As data needs increase, the bandwidth required by residents will also increase, possibly from the current 1M to 4M;
- c. Continue to ensure that the Internet is accessible by all through the use of mobile access points (available through buses equipped with Internet equipment) and community access centres;
- d. Sensitize school aged and college students to the importance of creating content for Antiguan and Barbudans;
- e. Encourage content creation in schools. This can be done as CXC school based assessment (SBA) projects for 5<sup>th</sup> formers;
- f. Engage artists, media personalities, professionals and other interested persons in creating content by providing information in their areas of expertise to the organisation which is charged with leading the content creation initiative;
- g. Create Internet Exchange Points to decrease the volume of traffic generated while completing internal searches.

## CHAPTER 11 - CONCLUSIONS

It is likely that Antigua and Barbuda will be able to successfully implement e-government solutions and thereby transforming the public sector to a more efficient entity. Residents of this country are known for being resourceful, particularly in the face of adversity. In fact over the ten year period spanning 1989 to 1999, Antigua and Barbuda rebounded from five major hurricanes.<sup>18</sup> This is no easy feat for a country with a population of only 90,000 people. Residents and citizens have developed survival instincts which present themselves as a tendency to do what is most judicious rather than what is asked. As a result of this mindset, getting persons to do what is asked, when it is asked will be a major challenge. Establishing discipline in the civil service must be a priority.

Leaders should also ensure that other obstacles, including sufficient funding, is available to procure the goods or services required for implementation. The leaders selected must also be willing and able to marshal the e-government cause and must be strong, goal oriented, knowledgeable about the ICT environment but willing to forge ahead in the quest.

Success may not be easy, but will be possible as long as the country does the required planning. Some of this planning includes creating a national e-

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<sup>18</sup> Hurricanes include Hugo in 1989, Luis and Marilyn in 1995, Georges in 1998 and Lenny in 1999.

government/ICT policy and strategy which will drive the ICT- e-government implementation plan. Appropriate legislation will need to be implemented to underpin much of the e-government initiatives. Both the ruling party and the opposition will be required to give their support to the initiatives which will likely transcend the tenure of any one political party.

[21,577 Words]

(Attachment KPMG Recommended e-Government Solutions - 1416 words)

(Attachment E-Government Survey - 558 words)

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ATTACHMENT 1 – *Table of e-Government Solutions Proposed by KPMG for Antigua and Barbuda*

No.	Department/ Ministry / Sector	Projects/ Initiatives	Description
1	General e-Government Solutions	Government Portal	Initiative aimed at providing a single entry point to Government information and services. It should be organized according to the interests and needs of its consumers i.e. business, citizens and visitors.
		Single Window Clearance System	This would provide a central point for the receipt and delivery of various applications/ utilities related to different branches/ agencies of the government.
		Wide Area Network (WAN)	Technical infrastructure and backbone that would act as a vehicle for effective implementation of e-governance within the country.
		e-Procurement	IT based solution for automation of procurement transactions, which reduces human errors, enhances the integrity of data and incorporates transparency into the procurement processes.
		Grievance Management System	E-governance project that establishes a facility of direct communication between the citizens and the Prime Minister to record grievances, identify solutions and keep track of performance by the government in response to citizen requests. Grievances are logged online, transmitted and made available electronically to the officers responsible for dealing with the relevant matter.
		E-government Communication Infrastructure Project	The main objective of this initiative is to support the government's efforts to lower communication costs by utilising international capacity to extend the geographic reach of the broadband networks and contribute to improving the efficiency and transparency of e-government applications.
		Mobile ICT Unit	Increases the number of ICT skilled resources in the country by providing various ICT training courses to users in remote locations who may traditionally be isolated from ICT facilities.
		Digital Resource Centres	Centres that are designed to help concentrate ICT infrastructure and skills in a specific location. They serve as a single entry point for ICT deployment and activity, stimulate local demand and use of ICT, support capacity building and development of local content.

No.	Department/ Ministry / Sector	Projects/ Initiatives	Description
		e-Payment System	This system would enable payments of any kind being credited directly to the bank accounts of payees. This would help reduce the burden on government employees at cash receiving points.
		Centralized File Movement and Tracking Information System	This system would increase the speed of file movement within departments and provide up-to-date tracking of the status of the files.
2	E-Government Solutions for the Health Sector	Hospital Management Information System (HMIS)	A total hospital and patient care management solution to provide better care to patients through a patient record system and IT based hospital services.
		Mother and Child Tracking System	An IT based management tool to plan, deliver and monitor quality mother and child healthcare services, track dropouts and ensure complete service delivery.
		Clinical Decision Support System	A system that intends to reduce clinical errors especially adverse drugs events via evidence-based decisions and transparency of 'route to decision'.
		Online Medical Inventory System	A system that facilitates the process of procurement and monitoring of availability of medicines in all the hospitals and other health institutions across the country.
		Blood Donors Directory	An online portal that can be used by both the donor and recipient by registering to offer or request blood. A mobile phone number should be provided to ensure the authenticity of the persons registering.
		SMS based Integrated Disease Surveillance System	This initiative facilitates reporting to the concerned authority, the occurrences of disease and number of persons affected from the area.
3	E-Government Solutions for the Finance Sector	Treasury Information System	This initiative would facilitate the issuance of receipts upon the payment of bills, printing of cheques, etc. It should function as a dashboard providing access to relevant management information system reports.
		Computerization of the Treasury (Cyber Treasury)	Comprehensive online treasury computerization project. This project would result in the computerization of all treasury related activities of the government. The system should track all financial activities of the government, from the approval of the budget to the rendering of payments to the government.
		Computerization of Commercial Taxes	This initiative provides an online facility to apply for registration, filing of returns, online payment of taxes, generate commercial sales tax forms, etc.
		Audit Monitoring	The main aim of this system is to bring to the notice of the

No.	Department/ Ministry / Sector	Projects/ Initiatives	Description
		System	relevant authority, cases of irregular expenditure, for example expenditure which is beyond the scope of the authorization made by the legislation, loss of public money caused by default, excess or short collection of taxes, erroneous assessments of taxes, etc.
		Audit Planning System	Software for the field offices who conduct audits, e.g. tax and national insurance agencies to assist in planning and monitoring of the auditing schedule. The schedule can be developed based on various factors e.g. according to the total weightage points given to the company to be audited or on the man power available.
		Automated Treasury Bill Passing System	This system is aimed at automating the manual bill passing system. It would assist in processing treasury bills and the compilation of accounts. It should provide a centralized workflow based system to capture details of bills, facilitate bill auditing and generate daily transaction reports.
		Budget Distribution and Expenditure Monitoring System	This is a web based system which allows the budgetary grants to be distributed instantaneously throughout the country and also permits specifying and enforcing monthly cash flows by each spending entity.
		Budget Information System	This is an online system for the management of the annual budget maintained by a ministry, department or agency.
4	E-Government Solution for the Planning / Statistics Sector	Department Website	This initiative provides a face to the department with all the relevant information and statistics displayed for use by different stakeholders.
5	E-government Solution for the Land Development / Land Use & Agriculture Sector	Land Records Information System	This is a central repository of all the details pertaining to the ownership of land across the country. The system offers a number of citizen centric services such as registration, certificates, land tax payment records etc.
6	E-Government Solution for the Legal Services	e Courts	This initiative provides online filing facilities, generation of advocates' personal boards, generation of orders and judgments, display boards highlighting ongoing cases and other relevant information.
		Video Linkage System	This project aims to reduce the time taken and efforts made to present prisoners for court hearings. Video Conference like facilities would have to be installed at all the relevant places to facilitate faster resolution of the cases.

No.	Department/ Ministry / Sector	Projects/ Initiatives	Description
		Case Information System	This system facilitates the monitoring and management of court cases. It should provide information on pending cases, status of court cases, case registration, summary of daily proceedings, statistical reports etc.
7	e-Government Solutions for the Education Sector	Academic and Examination Processing System	Comprehensive examination results processing system with results being published online.
		Admission Counselling	Online counselling system for students providing features including career planning and counselling to enable students to make better decisions about education and courses selected.
		Teacher Database	Centralized database of all teachers in government schools. This enables easier and more efficient vacancy management, hiring, deployment of teachers, etc.
8	e-government Solutions for the Customs and Excise Division	Automation of Customs and Excise Tax	Centralized, web-based, work flow based software system that aims to automate the main processes of the Customs and Excise department.
		Excise Program for Effective Revenue Tracking	Management information system/ dashboard to track and monitor the generation and consumption of taxes collected.
9	e-Government solutions for the Human Resource / Administrative Section of Government	Employment Exchange Management System	Software used for the registration of unemployed citizens. Should be able to provide various reports including matching against the available vacancies, number of unemployed persons, total enrolled persons etc.
		Payroll System	Software tool utilised for processing employees' monthly salary bill.
		Centralized Personnel Information System	This initiative would enable administrators and policy makers to obtain information on staff in order to rationalize the staffing pattern and re-deploy staff for efficient and effective service delivery.
		Employee Work Management System	Tool for monitoring the work efficiency of employees working in various government ministries and departments. It can keep track of work-load and processing speed of individual employees.
		Online Job Application System	System that manages the recruitment process within government offices. It can store and maintain application forms, maintain results of interviews and exams and arrange short lists of suitable candidates.

## KEY

Colour	Meaning
Blue	ICT solution has been implemented or in advanced/final stages of implementation
Green	ICT solution has commenced, but is in the initial stages of implementation.
White	ICT solution has not been implemented. No decisions have been made to implement in the immediate term.
Yellow	ICT solution is not a priority due to the existing situation.

ELECTRONIC GOVERNMENT FOR REGIONAL INTEGRATION PROJECT (EGRIP)

*e-Government Questionnaire*

The EGRIP is charged with assisting governments of the OECS in optimizing Information Communication Technology (ICT) solutions.

You can assist us by identifying ICT solutions which you would like the government of Antigua and Barbuda to provide to its citizens, residents, employees, businesses and other government agencies. Please complete this questionnaire and tell us what you want. Look at the reverse side of this questionnaire for several possible ICT solutions.

1. What is your gender?  Male  Female

2. What is your age range?  5-11  12-15  16-25  
 26-35  36-45  46-60  
 60+

3. What is your occupation?  Student  Employee Public Sector  Employee Private Sector  
 Employer  Other .....

4. If employed, in what sector do you work?  Agriculture  Beauty  
 Construction and Eng.  Education  Entertainment  Food and Bev.  
 Financial  Health  ICT  Manufacturing  
 Media  Retail Clothing  Retail Food  Social Services  
 Travel and Transportation  Tourism  Other .....

5. Please identify the top ten services which you would like the government to provide online. Use the list on the reverse of this page as a guide:

1.	
2.	
3.	
4.	

5.	
6.	
7.	
8.	
9.	
10.	

#	Sample e-Government Solutions / Services
1	Annual fiscal priority of the government
2	Annual government developmental priority
3	Annual government land distribution plan
4	Annual list of services required by the government
5	Duties and responsibilities of each post in each government agency
6	Duties and responsibilities of the various government agencies
7	Government Departments, Ministries, Permanent Secretaries and Ministers
8	Government policy on education
9	Government policy on information, communication technology (ICT)
10	Government policy on procurement
11	Information on what happens if someone dies without making a will
12	List of beneficiaries of government scholarships to tertiary institutions (colleges and universities)
13	List of employees of the Public Service by ministry, department or agency
14	List of government scholarships available with eligibility criteria
15	List of professional organizations and criteria for admission
16	List of services offered by the government clinics
17	List of services offered by the public hospital, Mount St. John's Medical Centre
18	List of vacancies in the Public Service
19	National Budget; income for previous 5 years; expenditure for previous 5 years.
20	Online application for a birth, death or marriage certificate
21	Online application for a government scholarship
22	Online application for license to import goods
23	Online application for a license to import goods
24	List of statistics available from the Department of Statistics
25	Online application for a drivers licenses
26	Online application for utility services
27	Online application for utility subsidies
28	Online filing of income taxes
29	Online management of student performance for primary and secondary school students
30	Online submission of invoices to the Treasury for payment
31	Population Statistics, Births, Deaths, Marriages, Naturalizations
32	Procedure for applying to the Development Control Authority (DCA) for approval to build
33	Proceudre for bidding for government contracts
34	Procedure for importing livestock, pets and other animals
35	Procedure for procuring / purchasing government land

36	Procedure for transferring property from owner to beneficiary
37	Statistics on births, deaths, marriages, naturalization applications
38	Statistics on goods imported into Antigua and Barbuda annually
39	Statistics on savings, e.g. per capita savings; total savings compared to other OECS countries
40	Statistics on schools, e.g. population by gender; location; principals; specialty if any

[558 Words]