



# Appendix A

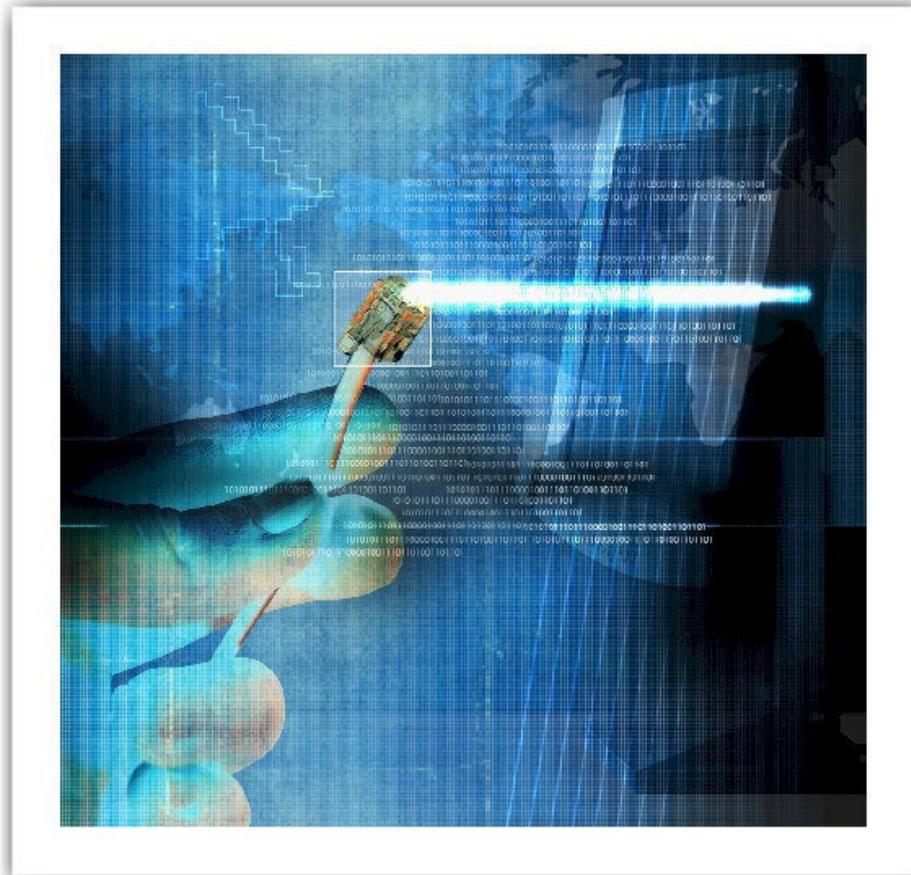
## E-Readiness Assessment





# National ICT Strategy Development: **E-READINESS ASSESSMENT**

*Examining Trinidad and Tobago's  
Current State of ICT Development*



## **APPENDIX A**





## A1. INTRODUCTION

### “What is e-Readiness?”

e-Readiness is the degree to which a community is prepared to participate in the networked world. It is gauged by assessing a community’s advancement in the areas that are most critical to the adoption of Information and Communication Technologies. An assessment of a community’s e-Readiness can be used to help the community identify its strategic priorities in using ICT to foster social and economic growth.

### e-Readiness Assessment Purpose

The e-Readiness Assessment provides a current snapshot of the ICT capacity in several different areas including:

- Economy and Finance
- Government
- Human Resources
- Infrastructure
- Policy and Legal

This snapshot can be used as a baseline when evaluating the feasibility of desired ICT plans. It is intended to give us an indication of where Trinidad and Tobago is so we can determine what must be done to achieve our goals in ICT. For example, if a significant e-learning initiative is a planned project, but the e-Readiness Assessment indicates that the current network capacity is not sufficient to support such an initiative, then steps will have to be taken to improve the network.



## Approach Used

As part of Trinidad and Tobago's National Information and Communication Technology Plan, Working Groups were established for each of five key areas of study: Economy and Finance, Government, Human Resources, Infrastructure, and Policy and Legal.

An international consulting firm, PSTG Consulting, was used to facilitate the development of the NICT Plan, including the Benchmarking and e-Readiness studies. As the foundation of the e-Readiness Assessment, PSTG Consulting provided each Working Group with a focused e-Readiness survey. The surveys contained questions relevant to each area of study. The Working Groups through a combination of consultation, and researching existing reports answered these questions. The results of the e-Readiness surveys have been collected and presented in this Assessment report.

### **About the “Harvard +” Methodology**

#### **What is the “Harvard +” e-Readiness Methodology?**

The “Harvard +” e-Readiness Methodology is an instrument of analysis that systematically organises the assessment of numerous factors that determine the Networked Readiness of a community in the developing world. It is based on the well-known tool developed at Harvard University, updated with additional measures of e-Readiness to more thoroughly reflect the current state of ICT development. It examines 19 different categories of indicators, ranking each by levels of advancement in Stages One through Four, with “One” representing a society at the very outset of ICT development, and “Four” representing advanced connectivity.

The methodology does not attempt to identify a total score representing an overall estimation of e-Readiness. It seeks only to offer a starting point in an ICT planning process, and to stimulate discussion on the relative strengths and weaknesses within each category.

The categories are linked, each driving the others, such that a community cannot concentrate solely in one area, but must pay attention to each, noting where it might be able to capitalise on synergies among the categories. Lastly, it is an excellent tool for measuring ICT development progress on an ongoing basis.



## A2. ICT SECTOR ANALYSIS

### Infrastructure

*The minimum necessary condition for e-Readiness is access to adequate network infrastructure. Without access to global communications networks, no community can participate in the Networked World. Access is determined by a combination of the availability and affordability of use of the network itself, as well as of the hardware and software needed for network interface. The quality and speed of the network are also important in determining how the network is used. The customer service orientation of access providers is a major factor in network application adoption and usability.*

*Because of the growing importance and unique character of the Internet, which provides a global platform for both data and (increasingly) voice services, the assessment of network access should be carried out in the context of Internet access, rather than access to either voice or data. The significance of the Internet will only continue to grow in terms of global trade and communication.*

“Readiness for the Networked World: A Guide for Developing Countries”, Center for International Development, Harvard University, 2000

#### *Key Statistics*

#### **Approximately:**

- 78% of homes have telephones;
- 50% of adult population uses mobile phones (450,000 phones);
- 9% of the population is considered ‘regular internet users’;
- 417,000 TV sets with 2 to 3 viewers per set;
  - 1.2 TV sets per household;
- 23% of total households has cable TV (82,000);
  - 52% of households has potential access (183,000 households in Trinidad);
  - 50% of households has potential access (6000 households in Tobago)
- 530,000 radios including units in motor vehicles;
  - 1.5 radios per household.



## Information Architecture

Many countries that are developing their ICT capacities rely heavily on their traditional telecommunications network. Since more than  $\frac{3}{4}$  of the population has, at least, one house telephone line, a large percentage of the population has the basic information architecture to get Internet access. Most of the population, urban and rural has access to a telephone though it is deemed to be 'easier to get a phone in a rural area than the city'.

### ***Infrastructure: Tobago***

*As a sparsely-populated island, separated from Trinidad by culture as well as geography, Tobago has a set of infrastructural challenges that are uniquely its own. The islands are currently connected by 4 DS3s. Without the population density provided by having major centres, it can be difficult (and expensive) to install and support ICT infrastructure. Despite this, Tobagonians are getting connected. Communications infrastructure is much improved over the past year (11 cellular sites). Telephone service is generally reliable, and cellular usage is quite pervasive. Dial-up Internet connections are much slower than Trinidad, and modems drop calls regularly. Cable TV is available to 50% of the population from one cable provider; and about 6000 households have the service. Service is only available on the western part of the island.*

The cost of mobile phones (TT\$600- 6000) seems prohibitively high globally relative to the GDP (TT \$45,000). An estimated 50% of the adult population uses mobile phones. If mobile phone plans are affordable then it can be a sustained means of communications.

Greater access to wireless services, however, would reduce the need for continued investment in traditional infrastructure and may offer more competitive rates. In some developing countries, mobile phones have been more accessible to remote populations and these populations have skipped the fixed telephone stage and moved directly to use of mobile phones.

Since a small percentage of businesses have dedicated data lines it is less likely that businesses will make heavy use of the Internet as a medium for conducting business unless a number of businesses dedicate one of their telephone lines for dial-up access. Most companies of the 40,000 businesses, however, have computers and dial up access.

Almost all households have television sets; and about 22% of households also have cable television, with a further 30% having the potential to access cable television. About 6% of households can also



access the Internet via a cable TV connection. Access is more prevalent in more urban areas as opposed to remote ones. Tobago has one cable company; however the service provided is not available throughout the entire island.

Almost all households have radios.

## Internet Availability

While one in three has Internet access, only an estimated 9% of the population is considered to be “regular Internet users” (i.e. use the Internet several times a week). Most users focus on e-mail, surfing and browsing. About 20% of Internet users have made an on-line purchase within the last year.

There are an estimated 40,000 businesses with computers and approximately the same number is estimated to have Internet access. However, only an estimated 9% of inhabitants are regular Internet users, which suggests that employed persons do not have access, or do not have reason, to use the Internet at their places of work. There are only limited opportunities for public access to the Internet which appears to be a contributing factor to the limited number of users.

It does appear that dial-up and high-speed access is available across the country though there are some issues around cost. Digital Subscriber Line (DSL) services are available and there is some choice between a limited number of plans. It is a generally reliable service although there are reportedly occasional outages during peak hours. Availability in rural areas is far more limited but improving. High costs would certainly make it difficult for private operators to offer access through establishments such as Internet cafes at affordable prices.

There are approximately nine established Internet service providers in the country. These ISPs offer web-hosting services and according to customer satisfaction surveys, dial-up and high-speed services are fair. With adequate numbers of public Internet centres, increased wireless service solutions, Internet availability in Trinidad and Tobago would reach an advanced level of readiness.



## Internet Affordability

Since the country seems largely reliant on traditional telecommunications networks, dial-up access to the Internet is currently most feasible. The cost of telephone installation does not seem prohibitively high and since it is a one-time cost, it should not be a great constraint. For TSTT customers, telephone charges are not limiting Internet access, as calls are toll-free. However, charges are incurred when other ISPs are used, which can be high if the call does not originate within the same charging area as the Point of Presence.

Internet cost is not extremely high (TT \$125 for 50 hours of use per month) but in proportion to GDP per capita (~TT\$45,000) is not affordable for most citizens. Some packages are available but exceeding the allotted hours results in additional, expensive charges. The average rate of Internet access is very high relative to other neighbouring countries in South and Central America (\$81.71USD in T&T versus \$54.35 in Venezuela, the highest average rate in any neighbouring country). Competitive rates would facilitate increased use. Further investment in wireless technologies may lower costs and offer more competitive rates.

Affordability may be a significant obstacle to accessibility and an impediment to an advanced state of readiness. About 67% of the population does not own a computer because of high cost. However, among those who do not have access to the Internet, and would want some Internet-related service at a community centre, 76% would be willing to pay \$TT10 per hour to access the Internet at a community access point.

## Network Speed and Quality

The quality of telephone service is very good with a 98% success rate of calls completion. Maximum dial up speed is 56kbps and ISDN is available at 64kbps. Leased lines for high speed can offer 1.5Mbps but are very expensive. ADSL is available. "Readiness for a Networked World" suggests that an advanced telecommunications infrastructure has fewer than 10 faults per 100 main telephone lines. In Trinidad and Tobago, there is typically only 4-6. There is clearly a need for reduced costs of high-speed access. With improved speeds, at affordable prices,



the country's network speed and quality could easily transition from Stage 3 to Stage 4 of the "Harvard +" e-Readiness Methodology.

## Hardware and Software

The fact that only 16% households have computers in spite of their widespread availability is due largely to unaffordable costs of hardware and software. At present, locally assembled hardware is competitively priced but not of the highest quality, and consumers often find it better to use the web as a source. There is minimal locally developed software.

Hardware and software are imported, typically from the United States of America. The hardware and software market is regarded as 'vibrant': products are readily available, in the appropriate language (English), and at global market prices. However, given the country's per capita GDP levels, ICT is unaffordable for much of the population (67%). Only a small percentage of citizens with sufficient purchasing power can afford to buy computers. The lack of affordability is likely the major reason for low usage of computers in homes and possibly, low availability of public access centres.

## Service and Support

Customer service is generally perceived to be poor. Problems take a long time to solve. There are a limited number of IT professionals (3,000) in the country, and precise numbers of support technicians are unknown. Web designers are a very small community. The support services industry is growing though, service quality varies widely. In some areas, service is perceived to be quite poor.

### *"Harvard +" Findings*

#### **Information Architecture – Rating: 3.55**

- Telephone service is widely available throughout the country – in fact, it can be easier to get a phone in some rural parts of the country than in the city
- With approximately 450,000 mobile phones in the country (+60,000 in the past six months), usage is pervasive
- Cable service is limited to certain parts of Trinidad and Tobago

**Internet Availability – Rating: 3.49**

- Dial-up Internet access is fairly common, and high-speed access is being made available to more people
- Service is generally reliable, although service outages occasionally occur during peak hours

**Internet Affordability – Rating: 2.57**

- While telephone service costs are relatively affordable, (particularly residential service), Internet costs are expensive relative to income levels, and are not affordable by a majority of citizens and businesses
- There is little personal ownership of computers likely due to lack of affordability

**Network Speed and Quality – Rating: 3.63**

- While there is always room for improvement in network speed and quality, Trinidad and Tobago enjoys 98% call completion success, and only six faults per 100 lines – good
- There is growing availability of high speed access (up to 256kbps download speed). Broadband service (>1.5Mbps) is not common
- ISPs have experienced frustration in getting assistance from the incumbent in linking to the local infrastructure backbone

**Hardware and Software – Rating: 3.45**

- “Vibrant marketplace” – can get hardware and software anywhere, at any time in appropriate language, although there are limited local software solutions

**Service and Support – Rating: 2.78**

- Improving, but not evenly – service and support quality varies widely

## Human Resources

*Without an educated, ICT-savvy populace, no community can fully participate in the Networked World. To foster this resource, information*



*and communication technologies must be incorporated into the learning system. Lamentably, although the use of ICTs in education is one of the*

*most powerful catalysts to Networked Readiness, it is an opportunity that is often squandered, misunderstood or underestimated.*

*Readiness also depends upon the community's incorporation of information and communication technologies into the fabric of its activities in order to maximise the gains of joining in the Networked World. In society-at-large, ICTs can have a profound effect upon people's professional and personal lives by providing easier access to information, more efficient ways to communicate and powerful organisational tools. To understand how a community is using ICTs, it is important to assess not only how many members of the community have access to the technologies, but also how they are using them.*

“Readiness for the Networked World: A Guide for Developing Countries”,  
Center for International Development,  
Harvard University, 2000

### **Key Statistics**

#### **Approximately:**

- 16% of homes have computers;
- one in three of all age groups has used a computer; with the 15-19 year age group having the highest usage (54%);
- 75% of the population in rural areas lives more than 15 minutes away from public access centres;
- ~3000 I.T. professionals;
- 95% of population view ICT as an appealing career; 2% consider an ICT career not appealing.

### **Human Resources: Tobago**

*There are 33 primary schools in Tobago. 13 of these have Internet access, including five to which TSTT provides free access. It is proposed that five additional schools be connected in 2004, but funding needs to be identified. There are currently seven primary schools involved in a pilot project examining ICT use in the curriculum. Eight secondary schools also receive free access.*

*In general, ICT usage is not as widespread in Tobago as in Trinidad, although there are some notable exceptions:*

- Tour operators utilise the Internet as part of their marketing efforts.
- A growing community of expatriate Europeans work virtually from Tobago, forwarding their completed assignments via the Internet.



## Schools Access to ICT

Increased IT education in schools will help prepare the population for advanced studies and professional development in ICT fields. There are six hundred and thirty-six schools in Trinidad and Tobago. It is clear that the majority of schools do not have Internet access at this time. Currently some schools, mainly secondary, feature some form of “computer laboratory”, and computer courses taught by IT teachers. Secondary schools students taking computer classes receive an estimated two to four hours of instruction per week. However, few schools are equipped with internal networks. Outside of their schools, students living in areas with Internet cafes continue to have regular access.

The Secondary Education Modernisation Programme (SEMP) includes plans to network an additional 81 schools by September 2003. A pilot program for seven schools is currently underway. Generally, the SEMP programme is expected to significantly increase the availability and usage of ICT in schools.

Higher education institutions, such as the University of the West Indies (UWI), benefit from a greater degree of ICT sophistication, including greater Internet access for students, and course-related ICT use.

Currently, there is incomplete information available regarding the level of ICT education included in the general curricula, however the importance of ICT education and training, and its role in ensuring a sustainable connectivity agenda, is widely understood.

## Enhancing Education with ICTs

The ability of both educators and students to use technology has a significant impact on building the country’s capacity for using ICT now and sustaining it in the future. Currently, educators have little access to networked computers. Outside of ‘international schools’, educators have a low level of proficiency and, not surprisingly, computer education is not widely integrated into the school curricula. At present, there are no defined standards for professional development that educators are expected to adhere to. Most programs are restricted mainly to secondary school institutions. The SEMP programme is expected to significantly increase the usage of ICT in curriculum preparation and in teaching with ICT.



## Developing the ICT Workforce

Employee access to ICT is very low with few individuals having their own PCs, Internet connections and e-mail addresses. While many firms have some form of Internet access (a recent e-commerce survey found that 87% of firms were Internet-enabled), relatively few employees have individual access (9%). Employees that do have their own e-mail accounts typically work for large firms. The total number of corporate websites is unknown, but is thought to be quite high. However, these sites are typically modest in nature, with limited information that is not updated regularly.

In terms of computer applications, some office automation software is in use. Larger firms have some enterprise application software.

## People and Organisations On-line

The literacy rate in Trinidad and Tobago is high for the population over the age of 15: 91.7% for females and 95.5% for males. About 5% of the population has no formal education. Only 35% of the 16 year old students taking Mathematics pass the CXC examinations. While less than 5000 students take science subjects, and only 7% take technology subjects. These are low numbers for the future development of the human capital in the ICT area.

According to a global survey conducted by the World Economic Forum the quality of education is 4.6 on a 7-point scale (7 being equal to the best in world; mean of 4.2) meaning individuals who come through the education system are likely to be adequately prepared to make use of technology and participate in connectivity and the knowledge economy.

The Internet usage is becoming increasingly popular. According to recent World Bank estimates, 120,000 citizens are getting on-line, or 9% of the population. Beyond this, anecdotal evidence suggests that a majority of people, perhaps 75%, is interested in using the Internet. There are many barriers to expanding the total number of people and organisations on-line. While approximately three-quarters of households have telephones, less than 7% have Internet connections. Cost, lack of Internet Service Providers in certain areas, and lack of public access centres are all factors contributing to the low rate of Internet usage.



## Locally Relevant Content

The availability of local content is important in addressing local needs and interests, which can help provide people with a “compelling reason” to get on-line. There is currently a general shortage of local community and business Web content in Trinidad and Tobago. Few websites are hosted locally. What local content exists is largely basic information, which is not updated regularly. Among the 120,000 Internet users in the country, electronic communications have proven quite popular, both for domestic and international purposes. With a large number of Trinidadians living abroad, e-mail communication has become a popular method of corresponding with the Diaspora. Individuals who have Internet access make frequent use of it.

## ICTs in Everyday Life

The accessibility and affordability of telephones, fax machines, pagers and computers has allowed people in Trinidad and Tobago to incorporate information and communications technologies into their daily lives. 437 per 1000 people have fixed line telephones, which translate to more than 75% of households. This suggests that a large percentage of the population has access to this technology. Furthermore, there are now more than 450,000 mobile phones in use in Trinidad and Tobago. These data suggest that telephones are the most widely used form of ICT.

According to survey data, only 16% of people own personal computers. Usage statistics may be higher, as this figure does not include the use of computers in the workplace. Nonetheless, public Internet access centres could play a vital role in providing access to ICT and integrating their use to enhance daily life. Public Internet access centres are not numerous and confined mainly to urban areas. Tobago is known to have very few. About 4% of the population accesses the Internet through the public library system, and about 5% from schools/colleges/universities. There are about 121 computers in the new National Library in Port of Spain with Internet access for use by the public; and Internet access is also provided at about 25 other library branches. An estimated 75% of the rural population does not have Internet access because most people live more than fifteen minutes away from currently available access centres.



## ICTs in the Workplace

The use of ICTs in the workplace is also fairly limited. Although virtually all businesses have computers and access to the Internet via telephone dial-up, a significant number of employees share computers and only a few have personal e-mail addresses for use in the work environment. Government programs, educational institutions and workplaces can contribute to building Trinidad and Tobago's capacity for ICT with training and education. ICT training in T&T is fairly widely available, with an array of courses to choose from, including certification courses in MCSE, A+, Oracle, Cisco, and CIW. Quality of training programs varies. Employer-sponsored computer education is available in an estimated 50% of energy sector firms and 15-20% in other sectors.

There has been considerable growth in Internet-related areas over the past five years. A previous Administration established an incentive programme called "Dollar for Dollar" to assist in tertiary education at the University of the West Indies.

### *"Harvard +" Findings*

#### **Schools Access to ICT Rating: 2.52**

- Unknown exactly how many schools have Internet access, but very few, particularly at the primary level

#### **Enhancing Education with ICTs – Rating: 2.86**

- Negligible use of ICT in delivering the core curriculum at primary level – more use at secondary and tertiary levels
- Need to train more teachers in primary and secondary levels
- Eagerness on the part of educators to learn to teach more effectively using ICT

#### **Developing the ICT Workforce Rating: 2.90**

- Large demand for ICT training, but do not always have career path in mind
- Some ICT training programmes and certifications available but high-cost, low availability, and high drop-out rate
- Low company investment in training – "prefer to hire already qualified"



**People and Organisations Online Rating: 3.22**

- Less than 10% of the population uses the Internet, and those who do typically use it for e-mail or entertainment

**Locally Relevant Content Rating: 2.62**

- Few local sites worth visiting – content not regularly updated, cannot compete with traditional means of communicating

**ICTs in Everyday Life Rating: 3.38**

- Some ICT components becoming more common (e.g. cell phones, pagers)
- Very little incidence of Internet access via cafes, libraries, or other public facilities

**ICTs in the Workforce (Government) Rating: 2.45**

- Government felt to be lagging behind business

**ICTs in the Workforce (Private Sector) Rating: 3.44**

- In particular, large businesses (energy, financial sectors) seen to be leaders in ICT investment and adoption

## Economy and Finance

*Businesses that are able to effectively employ information and communication technologies find more sophisticated and efficient ways of managing their external relationships and communications. This growing ICT usage helps form the critical mass of electronic transactions which supports a networked economy, both in terms of the network size and the demand for associated goods, services, labour and*

***E&F: Tobago***

*The tourism industry is more active in Tobago than in Trinidad, and companies in this sector appear eager to embrace ICT. Scotia Bank offers on-line services to the tourism sector, but high initial costs have deterred widespread use. Many operators feature a website with marketing information, with a few accepting on-line reservations.*

*Some progress has been made in the field of medical transcription services. This involves connecting Tobagonian workers, using voice-over-Internet-protocol (VOIP) technology, to hospitals overseas. Students are trained in the development of appropriate skills by the National Energy Skills Center. Although, this is an emerging field it is estimated that 300 jobs have already been created. It is anticipated that this area would create up to 5000 new jobs.*



*policy reform.*

“Readiness for the Networked World: A Guide for Developing Countries”, Center for International Development, Harvard University, 2000

### *Key Statistics*

**Approximately:**

- 30,000 companies have computers
- 100% of companies have access to telephone lines and ISP service (i.e. they have the technical requirements for Internet service)
- 70-87% of companies have Internet access
- ~0% of businesses offer on-line purchases
- 3,000 ICT professionals in the economy

## **ICT Employment Opportunities**

ICT Employment Opportunities in Trinidad and Tobago are extremely limited, particularly within small- and medium-sized enterprises (SMEs). There are approximately 3,000 IT professionals in Trinidad and Tobago – not a large pool of workers considering the overall size of the labour market. The majority of these people are concentrated in three main areas:

1. IT/telecom services (31%)
2. The public service (19%), and
3. The financial services sector (16%).

Demand is high for specialised IT managers, as evidenced by the top salaries these positions command. The chart below summarises typical annual compensation packages for these roles (all figures in TT\$).

<b>ICT Professional Role</b>	<b>Base Pay (Annual)</b>	<b>Total Compensation</b>
Information Systems Executive	~195k – \$240k	~215k – \$255k
Network Manager	~165k – \$215k	~180k – \$245k
Information Systems Dev't Manager	~160k – \$205k	~175k – \$225k
<i>(approximate GDP per capita: \$TT45,000)</i>		

*Source – Susan Hale of Caribbean Resourcing Centre*



However, the vast majority of ICT-related opportunities are in lesser-paying roles such as data entry and simple programming (COBOL, RPG). Skills in “Oracle”, a popular database software suite, are also highly desired by employers. Compensation for these roles varies greatly, but is generally a small fraction of that paid for executive ICT roles.

According to local experts, a number of ICT professions are currently expanding in Trinidad and Tobago. These include:

- Telecommunications Equipment and Services
- Data Processing
- Software Development
- Networking Systems
- Database Management
- Internet Development
- Telemarketing, Teleservicing and Call Centres

Some co-operative education placements are available in ICT-related areas. Technology Institute of Trinidad and Tobago, National Institute of Higher Education Science & Technology, and UWI organises these positions.

#### *The Island of Tobago*

*There is also the danger of brain drain of ICT trained people from Tobago into Trinidad where more attractive and relevant jobs and opportunities are available.*

As a result of the limited job market in ICT, a number of highly trained people are seeking employment overseas, leading to a significant “brain drain”. Talented IT resources tend to get bored if not challenged, and local

opportunities to apply their skills are not meeting this criterion.

## **Business-to-Consumer (B2C) e-Commerce**

The Internet is only beginning to become an important retail medium in Trinidad and Tobago. While the majority of businesses (approximately 70-87%) use the Internet, it is typically for simple uses such as e-mail or research. Commercial websites are not yet commonplace, and electronic commerce still has a long way to go before it is widely available and



accepted. Many companies lack the skills and resources to upgrade their sites to move beyond simple marketing (i.e. basic Web page).

If B2C e-commerce is not highly developed in Trinidad, it is likely in response to very limited demand from consumers. Only a very small percentage of households have access to the Internet and of these, most (62%) use it primarily for e-mail. Since a mere 20% reported using e-commerce transactions, the current demand for e-commerce is very small indeed, with the domestic customer base likely measuring in the hundreds – not enough to sustain a viable B2C marketplace. Of the few consumers who made Internet-based purchases, 79% purchased books and magazines, 65% purchased computer related items, 61% purchased music/movies, and about 23% purchased airline tickets.

The marketplace is further hampered by the lack of widely available electronic payment processing services. The only on-line payment processing capability available in-country is that of Scotia Merchant Bank, which provides these services for some of their key companies.

Privacy and security concerns are another barrier to the widespread acceptance of B2C e-commerce. Among Internet accessible households, 29% of people surveyed were “very concerned” about security, while 36% were “somewhat concerned”. Among this same group over 83% feel that new laws are required to protect consumer privacy.

## **Business-to-Business (B2B) e-Commerce**

The only evidence of electronic commerce activity between businesses is the exchange of financial data with the banks, which seem to have the most highly developed electronic transaction processing systems. There is little or no B2B activity within the SME sector. The only integration between front-office and back-office systems exists within two commercial banks, Scotia Bank and First Citizens Bank. There is no sophisticated B2B functionality, such as the integration of supply chain information between buyers and suppliers.

Although B2B e-Commerce holds the promise of greater operational efficiencies, it has not taken hold with Trinidadian and Tobagonian companies, which are reputed to be “closet-like” in the way they treat information. In this environment, communicating through ICT “reeks of



infiltration”. This worldview may be a major factor contributing to the low levels of B2B development.

### *“Harvard +” Findings*

#### **ICT Employment Opportunities – Rating: 2.03**

- Some demand for ICT skills, but typically for “commodity”-type roles (e.g. COBOL or RPG programming) or entry-level (e.g. data entry)
- Other employers “want one person to do a million (ICT) jobs”, (e.g. convert legacy systems while programming in COBOL and managing the website)
- A shortage of IT managers capable of implementing ICT initiatives is seen as an inhibitor to more wide-spread use of technology

#### **B2C e-Commerce – Rating: 2.09**

- B2C e-Commerce a low priority for businesses and customers alike – reasons cited include geographic proximity, “no returns” policy, and preference to do business in-person
- There is some prevalence of e-Commerce utilisation in the tourism industry, which focuses on international customers
- In general, the Internet has not been used effectively by companies – those who do have a website do not promote or update it properly

#### **B2B e-Commerce – Rating: 1.69**

- B2B e-Commerce has not been widely accepted due in part to companies’ reluctance to share information with competitors
- Trinidad and Tobago’s main industries, the energy and financial sectors, have made the greatest progress in this area, although little progress has been generally made to date



# Government

*The primary function of governments is to provide citizens with information and services necessary to maintain a high quality of life. Governments can take advantage of information and communication technologies to improve connections with their constituents, including using the Internet to post information online and to offer interactive services for the public. Governments can also lead by example and become a catalyst for the networked economy by investing in information and communication technologies for their internal use, leading to more efficient operations and the creation of a local market for ICT equipment and services. Relationships with government contractors and procurement mechanisms can be streamlined by putting them online. ICTs can make government activities more transparent to citizens and other observers. They can also enable the government to signal to foreign investors that the country is modern, efficient, and worthy of investment.*

“Readiness for the Networked World: A Guide for Developing Countries”, Center for International Development, Harvard University, 2000

### Key Statistics

#### Approximately:

- 50% of Ministries have a website
- 25% of Ministries offer downloadable forms
- 0% of services delivered on-line
- 700 unique e-mail identities
- IHRIS, a sophisticated Human Resource Information System is being implemented using PeopleSoft HR
- 1 sophisticated document management system in place at Office of the Prime Minister (OnBase)
- 5% of population would prefer to pay for services via the Internet, compared with 47% who would prefer to do so face-to-face in a one-stop shop. 39% are happy to leave it as is.

### Government: Tobago

*The Tobago House of Assembly website is currently being updated to provide downloadable forms. At present it features only basic information. While there are local branches of government offices in Tobago, service tends to be slow. Certain services still require that one go to Trinidad (e.g. receiving an import license).*

*It is estimated that 30% of public servants in Tobago have computers.*

*IHRIS currently in place in Trinidad is scheduled for roll-out in Tobago in late 2003.*

*Key e-government service opportunities in Tobago include:*

- Any “transactional” services
- Tax returns
- Assistive “benefits finder” applications
- Online company registrations and land registrations



## e-Government

The Government has made considerable investments in ICT to-date. Some Ministry offices feature modern computer and telephony equipment. They communicate with citizens, businesses, and other Government offices via telephone, e-mail, and the Internet, in addition to face-to-face. An e-Government agenda is being advanced, although not uniformly. There is a need for a comprehensive plan for e-Government, which must be part of the larger agenda for public sector reform.

According to data collected in a recent survey by the Ministry of Public Administration and Information's e-Government Unit, about half of all Ministries feature a Web site. They include Agriculture, Energy, Finance (Head Office and Budgets Division), Legal Affairs, the Ombudsman Office, Public Administration and Information, Tax Appeal Board, Ministry of Labour, and Trade and Industry. (There is also a directory of all government services featured on the Government's main site, but this page is frequently unavailable.) Government Web sites typically feature static information on the Ministry and its divisions, including mandate, services offered, organisational structure, contact information, and "frequently asked questions". It is useful information, accessible twenty-four hours per day, seven days per week, and it does not require additional staffing in order to provide it. This is an example of how Government is trying to meet the needs of its constituents.

While it does not seem to be part of an overall e-Government strategy, certain public service agencies are expanding the scope of their electronic service delivery offerings. The Ministries of Agriculture, the Ombudsman Office, Public Administration and Information, and Trade and Industry are offering electronic forms. Printable forms are available through the websites of the Ministries of Agriculture, Energy, Legal Affairs, Public Administration and Information, Trade and Industry and the Tax Appeals Board. Other Web functions are also available, such as: appointment booking (Energy); downloadable newsletters, publications, and case studies (Ombudsman), searchable library catalogues (NALIS) and viewable vacancy notices (Trade). These Ministries are moving beyond the electronic publication of static data to provide greater client interactivity and more personalised service.



There is still much to do to enable full e-Government in Trinidad and Tobago. Currently, basic information is now accessible on-line. However, ministries do not yet offer highly valuable electronic transactions such as benefits registration, application for training programs, job applications, and electronic payments. The Ministry of Legal Affairs is fairly advanced in having several databases ready for on-line access. These databases include Births, Deaths and Marriages Registry, Land Registry, Company Registry and Intellectual Property Registry.

The next step is to provide broader access to transactional services (see diagram), as part of an overall e-Government strategy. This strategy must be well-planned. Its architects must strive to understand citizens', businesses' and groups' electronic service needs in order to build a plan that is relevant, efficient and effective. Back office systems (finance, data management, human resources) must be assessed for their ability to efficiently support front-end electronic services. Implementation must be timely, but pragmatic. Understanding the current state of government e-readiness is the first step in the development of this strategy.

## Government Information Management

Information and communication technology, in the form of modern computers, telephones and network solutions, is pervasive throughout government. However, the usage of electronic systems and processes is still very minor compared with the usage of paper-based ones. Desktop computers may be used to produce documents and presentations, but it is very rare that they are used to access vital data. Most people in government do not have access to a PC. Database servers contain some client information, but more often than not it is as a backup for paper files, not the central record itself. Everything is in paper – there are copies of everything, even e-mail! Although more sophisticated information systems are being introduced, such as IHRIS and document management solutions, their usage is still very restricted.



## “Client-centric” Government

The Government of Trinidad and Tobago is starting to more vigorously adopt customer service practices and principles. Service standards are gradually being introduced, accompanied by appropriate service training for employees. While some feel that “Government has passed the state of looking at citizens as customers, and is reorganising itself to adapt to their needs”, others note that they “don’t think customer service improvements have impacted the general public”.

### *“Harvard +” Findings*

#### **e-Government – Rating: 2.59**

- Minimal e-Government functionality – even basic information is not regularly updated, there are few forms available for downloading, and there are no online services to speak of
- Little evidence that telephone service is effective – finding the right person to speak to can be very difficult, and even then only limited information is available
- “Never experienced government service other than in person”

#### **Government Information Management – Rating: 1.75**

- Have some information on desktop computers, but rules and regulations require that paper copies of all important records be retained
- Little information sharing within and across Ministries
- Document management system implemented for the Prime Minister’s Office will be rolled out across government for Cabinet records

#### **Client-centric Government – Rating: 2.00**

- A mandate of the Ministry of Public Administration and Information is assisting public service agencies with changing attitudes toward delivery of services
- Some customer service training and standards being introduced
- Customer service improvement initiatives have not yet shown tangible results – the perception is that the public has thus far been unaffected.



## Legal and Policy

*Public policy can be a help or a hindrance to the networked economy. The favourable climate that public policy can create for Internet use and e-commerce encourages communities, organisations and individuals to invest and use information and communication technologies. Important aspects of networked readiness such as Internet availability, and ICTs in schools, are all influenced by public policy. For a community to become ready for the networked world, the appropriate policy-makers must realise the implications of their decisions upon ICT adoption and use. Proper tax policy can encourage online trade and help enable the growth of electronic commerce, which has the potential to increase the efficiency of enterprises, and the economy, in general. Effective, enforceable intellectual property rights are required in order to catalyse the innovation process in the country. Tax policies, intellectual property right laws (and enforcement), and legal recognition of electronic documents are examples of legal and policy areas of concern to policy makers.*

### **Legal & Policy: Tobago**

In Tobago, the issue of ‘how and when’ to introduce competition to the telecommunication sector is seen as a moot point. Due to the small size of the Tobagonian market, it is unlikely that companies will compete to serve its people. In the end it may be preferable that TSTT continue to serve the connectivity needs of Tobago.

*Although not a specific focus of the legal and policy working group, the topic of law enforcement in the digital age is something that Tobago’s leadership would like considered. At present, the “E-999” system has the capability to connect police stations, court houses, etc., but these facilities lack the required hardware and software to fully and effectively utilise this functionality.*

“Readiness for the Networked World: A Guide for Developing Countries”, Center for International Development, Harvard University, 2000

## Telecommunication Regulation and Market Structure

The incumbent telecommunications operator is Telecommunications Services of Trinidad and Tobago (TSTT), of which the government owns 51%, and Cable & Wireless Plc owns 49%. TSTT is currently the dominant local telephony carrier. Competition exists in all non-voice domestic services such as Internet, paging, wireless and data. All international voice traffic is currently carried by TSTT. However, international data traffic for several industries such as international energy-sector service companies is connected privately.



The Telecommunications Authority created under Act No. 4 of 2001 is vested with the power to grant concessions for public telecommunications network or service subject to conditions, which include providing the elements of interconnection in a manner that is at least equal in both quality and rates. Consideration is currently being given to the best mechanisms for introducing competition in the immediate future. This matter is being reviewed by the Ministry of Public Administration and Information. A policy framework is under development.

There are several key policy/legal issues that are seen to be inhibiting increased growth and development of ICT:

1. TSTT, through its current dominance in telephone services, appears to be able to constrict competition in the Internet service provider and mobile telephone sectors
2. The Trinidad and Tobago Telecommunications Authority, (TTTel) is an inexperienced regulator
3. The profits generated by TSTT are an important part of government revenues, but in light of government's plan to liberalise the sector, the relationship with TSTT needs to be reviewed.
4. The Copyright and Patents Acts are not actively enforced, which may encourage abuses
5. At present, general consumer protection legislation does not adequately protect consumer privacy and security online
6. Historical lack of Government policy that supports universality of access
7. Lack of a Broadband Policy
8. Internet governance policy is weak. There is no institutional framework for the administration of domain names and a policy to govern disputes in respect of domain names.
9. A policy position has not yet been taken on jurisdictional issues related to ecommerce and Internet taxation.

With regard to policy surrounding universality of access, Section 28 of the Telecommunications Act 2001, when proclaimed, will require the development of a Regulatory framework to facilitate the universal development of telecommunication services. It can be anticipated that through the introduction of this telecommunication "backbone", ICT development will thrive.



In addition to telephone communications, alternative infrastructure, suitable for telecommunications does exist. The Cable Company of Trinidad and Tobago has an infrastructure that is being upgraded to provide Ethernet speeds (10/100 Mbps) using cable modems. The infrastructure is built on a fibre ring that links some key towns. Illuminat and other vendors offer national wireless data services. The electricity distribution company, T&TEC, does not offer telecommunications services.

## ICT Trade Policy

Currently there are no incentives to encourage businesses to invest in ICT, however there are no value-added taxes or customs duties imposed on computer hardware and software. Legislation is required to restrict anti-competitive practices. Also, there is need for policies, and a framework, to promote ICT, fair trading and competition policy. Lack of these and the existence of monopolies, further inhibits the flow of investment into the sector.

## Enabling e-Legislation

Legislation exists that would enable the sector, including:

- The Electronic Transfer of Funds (Crime) Act 2000 that regulates the transfer of money by an electronic terminal, by use of a card, for the purpose of instructing or authorising a financial institution to debit or credit a cardholder's account when anything of value is purchased;
- The Computer Misuse Act 2000 that deals with unauthorised access, use or interference with computers and other related matters when anything of value is purchased.

A number of policy initiatives are currently being considered that would change existing laws in order to create a climate more conducive to the proliferation of electronic interactions. These include:

- Full promulgation of the Telecommunications Act
- A policy recommendation that neutralises technology-related constraints in existing laws which restrict the legal acceptance of electronic documentation and transactions;
- The Electronic Transactions Bill 2001, which seeks to give legal recognition to electronic documents and signatures



within a regulated framework, (however, it does not make provision for use of electronic payments). The Bill will also limit the civil and criminal liability of ISPs and intermediaries “in respect of any information contained in an electronic record...”

- The Copyright Act 1997, Patents Act (1996) and Trademarks Act, which address IP infringement in the electronic environment, however further amendments are required to cover e-documents.

The National Electronic Commerce Policy Committee Report recommended that “Government encourage the banking sector to introduce an instrument which would facilitate electronic payment for those individuals who would not normally have qualified for traditional credit cards (e.g., a prepaid electronic debit card)”. Full implementation of this policy recommendation remains outstanding.

With respect to promoting trust and confidence in electronic transactions, the Report further advocated that “Government adopt a flexible and responsive approach to the protection of personal data, including the acceptance of self-regulatory solutions and enact laws that forbid the disclosure of personal data to other persons unless so authorised by the data exporter”. If entrenched in legislation, this recommendation would seemingly provide assurances that personal data could not be used for unethical purposes, (i.e., purposes other than those explicitly stated). This could have significant and positive implications for a population that has yet to fully embrace electronic communications.



### *“Harvard +” Findings*

#### **Telecommunication Regulation – Rating: 2.28**

- A single operator (TSTT) providing a wide range of services (e.g. fixed line telephone, cellular telephone, and both dial-up and high-speed Internet) is able to limit competition in those areas
- Plans for telecommunications sector liberalisation are at “the conceptual stage”, i.e., they are being considered, and are being treated with top priority

#### **ICT Trade Policy – Rating: 1.33**

- Service sectors are not open to trade – domestic regulations create de facto trade barriers
- Telecommunications monopoly has resulted in low levels of foreign direct investment

#### **Enabling e-Legislation – Rating: 2.77**

- Various policies pertaining to electronic communications are currently being drafted (e.g. acceptability guidelines for electronic documents)
- Intellectual property in the electronic realm is thought to be protected by existing legislation





## A3. CONCLUSION

### “Accelerating the e-Economy”

Trinidad and Tobago has transformed its economy once before, leaving behind its agrarian roots to become a significant player in the global energy sector. This wise strategy was properly executed, and it helped usher in a new era of prosperity in the islands. It enabled the development of a modern, efficient public sector. It contributed to a strong educational system. And it helped provide the people of Trinidad and Tobago with a quality of life greater than ever before.

A similar opportunity is at hand today. In order to duplicate this past success, and transition T&T and its people from a resource-based economy to an economy based on knowledge, will require significant effort, investment and commitment. There is a great deal to do to prepare Trinidad and Tobago for the networked world:

- There is a need to improve ICT access, affordability, and bandwidth. A lack of competition in the telecommunications sector (including cellular and ISP) may be a contributing factor. A national broadband policy is required.
- With the exception of telephones, the general public has not embraced the use of ICTs. Fiscal incentives are one possible tool to encourage more widespread adoption of ICT. As a major provider of citizen services, the Government can kick-start ICT development by offering important services electronically and providing public access, giving people and organisations compelling reasons to be online.
- Schools need to be more connected. Educators need to be properly trained to provide instruction using new tools and techniques. ICT needs to be fully incorporated into core curricula at the primary and secondary levels. Hence the SEMP programme must be accelerated so that these objectives can be achieved quickly. Local content needs to be developed and emphasised.



- There is a negative supply-and-demand cycle of ICT use among businesses. There is very little demand for e-commerce, based on low Internet usage, lack of interaction between firms, and cost barriers to ICT investment. Employers, who do not see it as a priority, do not extensively use ICT. Firms will have to adopt ICT in a more meaningful way if skilled workers are to be encouraged to seek appropriate opportunities in this country. For the T&T economy to realise the benefits of ICT, these trends must be reversed.

Fortunately, Trinidad and Tobago is blessed with many favourable qualities when it comes to ICT. These strengths must be leveraged in order to accelerate the e-economy, and develop the knowledge-based society:

- The country has a good telephone infrastructure, with reasonably good availability, speed and quality. Dial-up Internet access is fairly reliable, and accessible, but its price structure must come down – it remains too expensive for adoption by the general population.
- A strong educational system has created an informed, communicative population that is prepared and eager to learn. Much work has already been begun in introducing ICTs to schools, but these efforts need to be expanded upon.
- There is a modern, effective government that reliably provides services to citizens and businesses. Public sector modernisation projects are already underway. Sustainability remains the watchword when it comes to ICT.
- Policy and legal frameworks have laid the groundwork for sweeping changes in how ICT is managed and used.

In many ways, Trinidad and Tobago resembles the typical “small-island developing state”, with its considerable network build-out, competition issues, and gap between the technology “haves” and “have-nots”. Despite these challenges, the country is well positioned for advancement into the next tier of network ready countries. The development of the National ICT Vision and Plan is a bold step in that direction. Certain actions can be taken in the short term to accelerate the realisation of this Vision.

This assessment of the current state of networked readiness in Trinidad and Tobago suggests three initial strategies that, if adopted, could help to stimulate ICT use among the general public, and accelerate the e-Economy.



### *1. Facilitate Improved Access and Affordability*

This can be achieved using a series of tactics including:

- Providing financial or other incentives for individuals or companies looking to acquire, or donate, computers
- Providing increased numbers of community access points for individuals who cannot afford computers in the homes
- Encouraging increased levels of bandwidth from service providers
- Introducing increased levels of competition into the telecommunications sector to encourage a reduction in price and an increase in service and quality

### *2. Increase Promotion, Awareness and Education*

Even with improved access, additional bandwidth and a reduction in costs, Trinidad and Tobago will still need to invest in a wide-ranging program to make citizens and business owners aware of the benefits of increased connectivity, promote ICT usage and prepare the general population for life in the global information society. A comprehensive educational strategy will need to be developed that examines areas such as:

- ICT content and curriculum for all levels of education – including adult training
- Future skill development requirements for ICT professionals
- Teacher training and development
- Enhancement of the library network
- School connectivity requirements
- Computers for Schools
- Measures and incentives to address the threat of the Brain Drain
- Sensitisation for those less familiar with modern technology

### *3. Acceleration ICT Programs, with Government Taking the Lead*

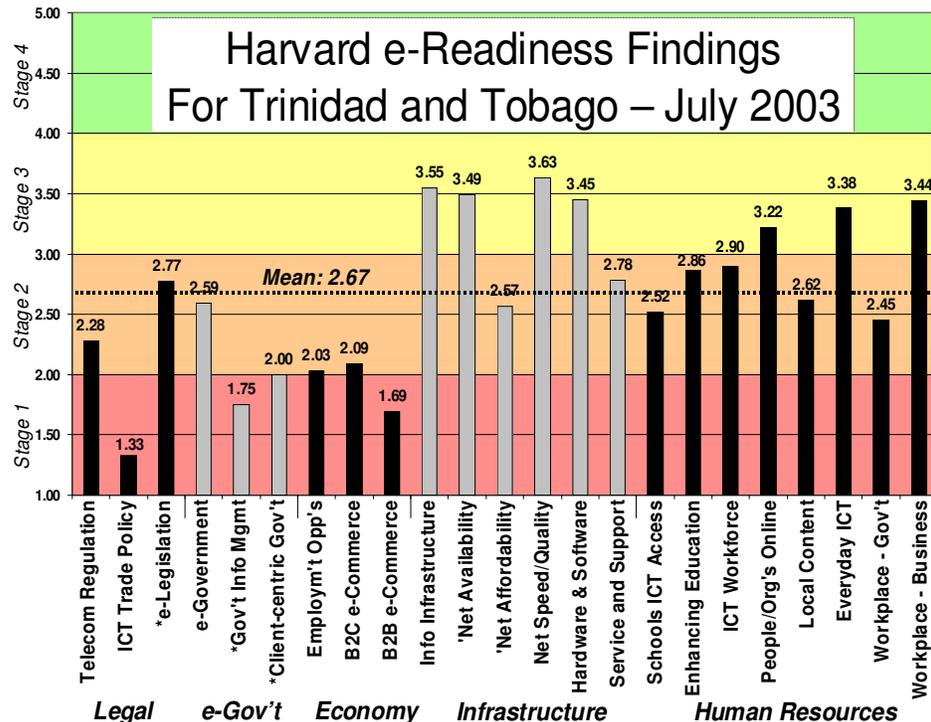
There are a number of ICT related programs planned or currently in their early stages. Hopefully, Trinidad and Tobago's National ICT Strategy will serve as a catalyst to accelerate these programs into implementation. Government "touches" all elements of society in Trinidad and Tobago and will play a pivotal role in stimulating ICT take-up and sustainability. In addition to providing enabling legislation and appropriate fiscal incentives, a well designed e-Government strategy can assist by providing value-added, and tailored electronic services to both citizens and businesses.



### Epilogue: “Harvard +” Findings

The application of the “Harvard +” methodology was a highly productive exercise that generated meaningful discussion in each area of analysis. e-Readiness workshop participants had the opportunity to debate what they felt were the “real” issues behind Trinidad and Tobago’s connectivity progress, or lack thereof, and assign each area a numeric score from 1.0 to 4.9. The quantitative results indicate that while some areas are in the very early stages of development toward networked readiness, others are showing signs of advanced e-readiness. For example, infrastructure components rated highly on the “Harvard +” scale largely due to the pervasiveness and quality of telephone networks. These same networks are being used to support domestic Internet usage that, while unaffordable by many, is available and reliable in most parts of the country. At the other end of the spectrum, ICT Trade Policy, e-Commerce and e-Government were areas identified as needing significant improvement.

The Government now has a baseline of e-Readiness information. This exercise will be repeated on an ongoing basis, either annually or semi-annually, so that e-Readiness progress from ongoing ICT initiatives can be measured.





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