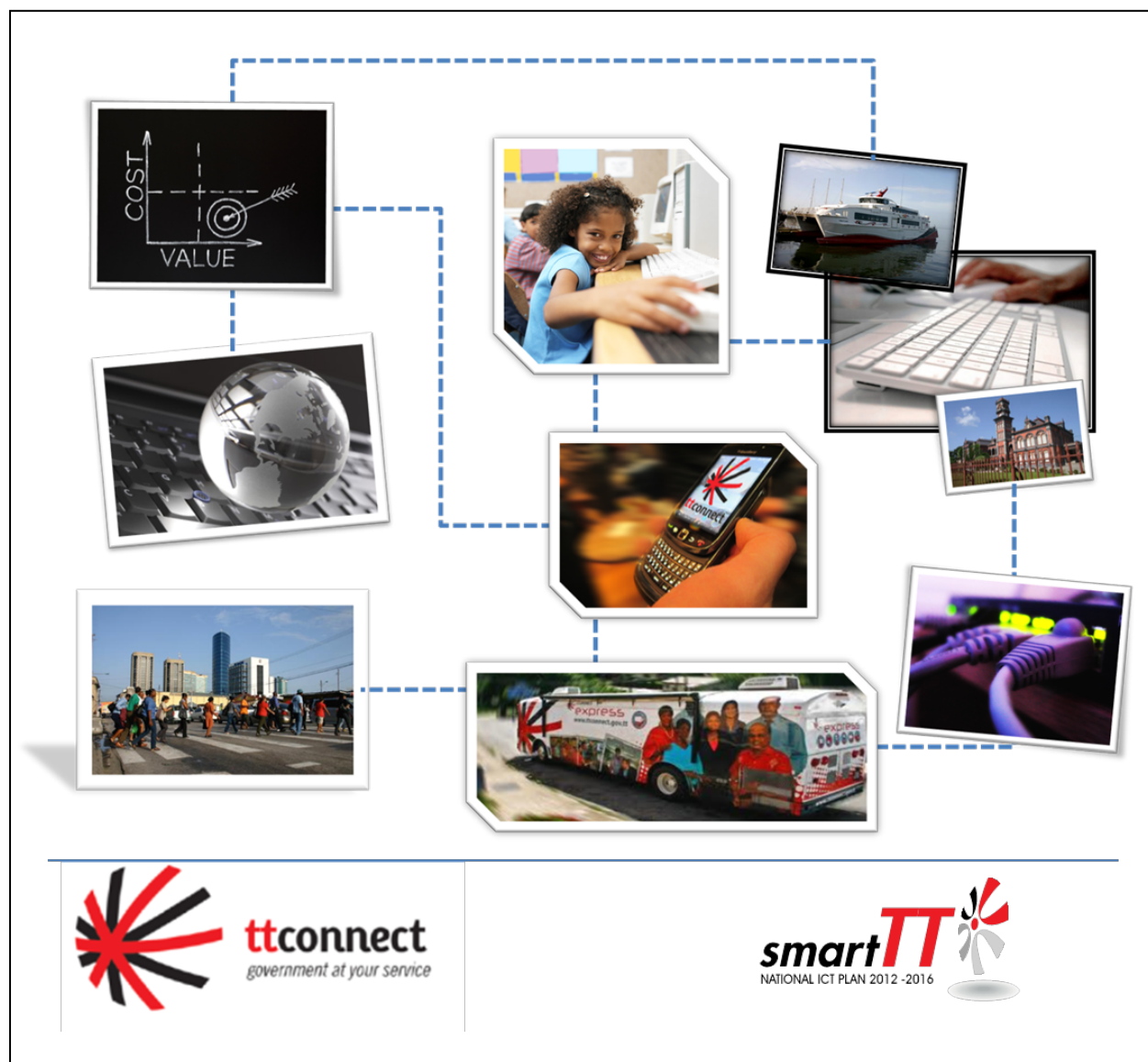


TRINIDAD AND TOBAGO National ICT Plan 2012-2016





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1 Introduction

This is a DRAFT version of the Trinidad and Tobago's *smartTT* 2012 – 2016 National ICT Plan.

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This document is available from our website at <http://ictconsultations.igov.tt>.

Published, July 2012.

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1.2 Acknowledgements

Development of the 2012 - 2016 National ICT Plan tapped into the collective wisdom of the people of Trinidad and Tobago. The process involved a diverse group of individuals representing their communities, organizations, industries and Government.

The Plan benefitted richly from the contribution of individuals acting in advisory roles, as members of focus groups and review panels and as interested citizen, participating in online consultations.

Special mention must be made of the Ministry of Science Technology and Tertiary Education (STTE), the e-Business Roundtable and the Project Working Committee comprising officers of the Ministry of STTE, the National ICT Company and IDA International, all of whom provided direction and support for this master-planning exercise.

We are also grateful for the generous support of public sector leaders and technology sector experts who set aside time to share their perspectives on the strategic thrusts and critical success factors of the Plan.

Interviews were conducted with the following persons and we thank them for their valuable contributions:

- Minister and Permanent Secretary – Ministry of Planning and the Economy
- Permanent Secretary – Ministry of Health
- Permanent Secretary – Ministry of Tobago Development
- Permanent Secretary – Ministry of Finance
- Permanent Secretary – Ministry of Public Utilities
- Permanent Secretary – Office of the Prime Minister

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1.4 Foreword

Countries around the world are leveraging Information and Communication Technologies (ICT) in the push towards socio-economic development. In this regard, the Government of the Republic of Trinidad and Tobago (GoRTT) has identified ICT as one of seven inter-connected pillars for sustainable national development. It is envisioned that ICT will connect Trinidad and Tobago and play a pivotal role in building a new economy.

The intention is to leverage ICT to enhance delivery of government services to citizens. ICT will also serve as an enabler for improving service delivery, increasing productivity and securing a competitive advantage for Trinidad and Tobago in regional and international markets.



*Mr. Atiba Phillips
Chairman, iGovTT*

In the future, ICT-enabled government services will be complemented by one-stop service centres. The private sector and non-governmental organisations (NGOs) will participate in and benefit from the delivery of these services. ICT will increasingly be incorporated into the delivery of education, health, food production and other services essential to national development. It will be an important facet in the daily lives of citizens, spurring innovation, providing opportunities and facilitating development for all.

It is against this backdrop that the new National ICT Plan for Trinidad and Tobago, dubbed smartTT, has been drafted. smartTT is a comprehensive five-year strategy that was informed by needs and priorities identified by the people of Trinidad and Tobago in a broad consultative process. The Plan draws from the Singapore experience in national ICT planning, e-Government and building one of the most connected nations in the world. It also leverages Trinidad and Tobago's experience in pioneering a National ICT Plan in 2002 – an achievement that has positioned the country as one of the Caribbean's leading e-Government implementations. With increasing computerization within the Government and business sectors, and with continual enhancement of the ICT infrastructure, the country is now well-poised to transform Government service delivery. The stage is set for Trinidad and Tobago to leverage its ICT investments for economic and social development.

This document provides a coherent framework for the identification and channeling of economic and human resources in keeping with the nation's stated development goals. The return on the country's technology investment, in economic and social terms, will be tracked and reported, and existing programmes have been included, ensuring continuity. The result is a national plan of action that can be implemented across the community, the business and public sectors over the period 2012 to 2016 to achieve the vision of a developed and progressive Trinidad and Tobago.

2 Executive Summary



The 2012 - 2016 National ICT Plan, dubbed smartTT, has been formulated under five (5) themes to guide the implementation of ICT development agenda for Trinidad and Tobago. The five themes are Innovation and Human Capital Development, Access and Digital Inclusion, e-Business and ICT Sector Development and e-Government. The Plan focuses on enhancing the quality of life, improving service delivery, increasing national competitiveness and creating new opportunities for citizens and businesses.

The 2012 -2016 Plan succeeds Trinidad and Tobago's first National ICT Plan (2003 – 2008), dubbed *fastforward*, and seeks to address future planning from the platform of the country's current state of e-readiness. The strategies and outcomes of smartTT have been aligned to the larger Government Policy (Pillar 4ⁱ of the Seven Interconnected Pillars for Sustainable Development) and the ICT vision of the country. The National ICT vision is "to create a dynamic knowledge-based society, driven by the innovative use of ICTs to enhance the social, economic and cultural development of the people of Trinidad and Tobago".

The Plan proposes a five-year implementation roadmap and identifies five key areas where ICT can best be used as a catalyst for transformation - Education, Community, Business, Infrastructure and Government. The desired outcomes for each of the key areas have been identified as people-centred development; poverty eradication and social justice; a modern and competitive economy; connected Trinidad and Tobago; and effective and efficient government. The Plan describes each of these five desired outcomes.

For this implementation blueprint, up to five ICT programmes have been recommended for each key ICT initiative. At the programme level, the outcomes, key performance indicators, lead agency ownership, estimated budget and areas for change management have been recommended.

From past experience and international best practice, it is noted that effective governance, performance management and public awareness are critical success factors to the achievement of the ICT vision. The Plan therefore recommends an appropriate national ICT governance structure to facilitate and monitor its implementation.

The Plan also recommends the establishment of two funding sources. Firstly, a central fund for development and implementation of cross-agency shared ICT systems. Secondly, a "3P" fund to encourage public, private, partnerships. Programmes under the Plan will be prioritized to channel resources effectively. Reporting on the investment, estimated returns and cost savings is a key part of the implementation approach.

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The 2012 - 2016 National ICT Plan is an important step in the country's evolution into a knowledge-based economy. The overarching priority is for Trinidad and Tobago to be equipped to use ICT to adapt to new ways of learning, living, doing business, delivering public services and advancing our national development agenda.

2.1 Overview of Key Themes, Strategic Thrusts and Initiatives

	THEMES	STRATEGIC THRUSTS	INITIATIVES
1	INNOVATION AND HUMAN CAPITAL DEVELOPMENT	Fostering a Creative e-Ready Generation	1.1 Building an e-Ready Society through ICT enriched learning 1.2 Creating and Promoting Local Digital Content 1.3 Develop a culture of Research and Development
2	ACCESS AND DIGITAL INCLUSION	Bridging the Digital Divide	2.1 Providing ICT Services for Digital Inclusion 2.2 Increasing the Accessibility and Affordability of Technologies 2.3 Increasing ICT Learning and Awareness 2.4 Develop and R&D Culture Focused on Bridging the Digital Divide
3	e-BUSINESS AND ICT SECTOR DEVELOPMENT	Building a Pro E-Enterprise Environment	3.1 Stimulating ICT Demand to Encourage e-Commerce Adoption 3.2 Developing e-Business Capacity 3.3 Enabling the Production, Distribution and Promotion of Local ICT products and services 3.4 Enabling Other Sectors through ICT 3.5 Facilitating Leadership and Coordination of Efforts among Key Stakeholders
4	INFRASTRUCTURE DEVELOPMENT	Enhancing Internet Governance, Accessibility and Usage	4.1 Enhancing infrastructure, access, ICT policies and regulatory oversight to facilitate sustainability. 4.2 Instituting appropriate Governance Structures to drive Infrastructure Planning and Development 4.3 Building Information Society Governance and Capacity to Ensure the Availability of Internet Resources and Viability of the Internet Economy 4.4 Building government infrastructure to develop and support a vibrant e-government ecosystem
5	e-GOVERNMENT	Working as an Integrated Government	5.1 Collaborating to implement shared ICT systems and processes 5.2 Delighting customers through multi-channel delivery of quality services

ⁱ Pillar 4 of the Seven Interconnected Pillars for Sustainable Development guides the design and execution of policy measures geared towards achieving the desired economic and social transformation.

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3 Consultative Process



3.1 Global Context

Technology affects every facet of modern life. From distance learning, health care and food production to broadcasting, border protection and social networking, ICT touches us all. In Trinidad and Tobago, ICT plays a pivotal role in the thrust for national development and economic diversification. It is one of the Seven Interconnected Pillars that have been articulated in the Government's Framework for Sustainable Development¹.

Over the past few years Caribbean countries have been steadily moving up in global ICT ratings. Despite these gains, the region continues to lag behind developed countries that dominate the upper levels of international benchmarking indices. Development and advancement in the global economy demands greater integration of ICT into the everyday activities of all citizens.

The Government of the Republic of Trinidad and Tobago (GoRTT) is committed to diversifying the economy towards more services-driven, knowledge-based industries through the development and integration of ICT. This journey commenced with the 2003 – 2008 National ICT Plan, dubbed *fastforward*, and was focused on "Connectivity" - linking the nation's communities, schools and the Government. Now that the foundation for a connected society has been laid and efforts to increase "uptake and usage" are ongoing, the 2012 – 2016 National ICT Plan focuses on creating opportunities and improving the quality of life. This will be done through centering the Plan on Innovation and Human Capital Development. In this context, ICT is seen as a significant catalyst in Trinidad and Tobago's transformation to a secure, prosperous and sustainable nation.

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¹ GORTT Medium Term Policy Framework 2011-2014 - <http://www.finance.gov.tt/content/Medium-Term-Policy-Framework-2011-14.pdf>



3.2 Planning Process and Methodology

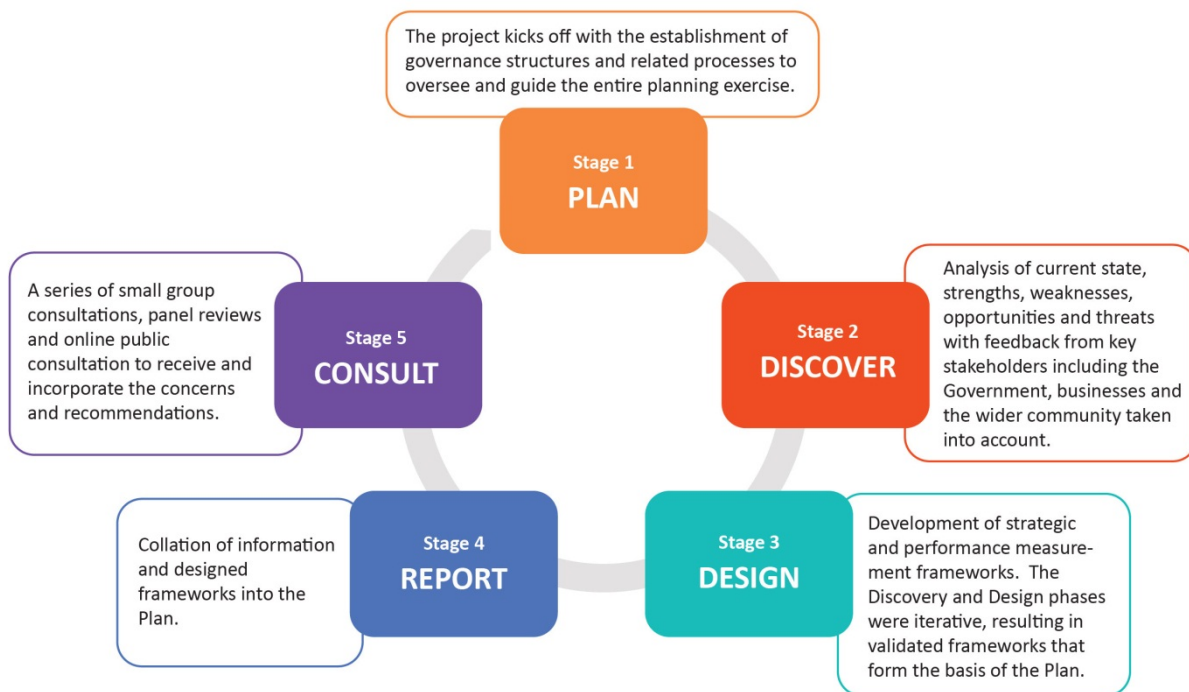
The 2012 – 2016 National ICT Plan allows the GoRTT to map out an accelerated development agenda for the local ICT sector. It also allows for coordinated approaches to increasing the levels of ICT adoption in the society. GoRTT has taken note of guiding sentiments such as those expressed in the UNDP Comprehensive Guidebook to ICT Policy Formulation and e-Strategy Development, which states that “in order for countries to benefit fully from the information economy, vision, discipline, planning and method are required”.

A five-stage, highly consultative approach was adopted for the master-planning exercise. Guided by the tenets of good and effective governance, the “voice of the people” was taken into account through a participatory, consensus oriented, transparent and inclusive process. Draft versions of the Plan were released for small group consultations, panel reviews, and online public consultation. This ensured direct citizen participation in a highly structured consultative process. The comments and recommendations received were incorporated into updated drafts of the Plan.

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3.2.1 5-Stage Master-Planning Methodology

The 5-Stage Master-planning Methodology is summarized in the diagram below.



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4 The Journey to 2012



An analysis of the current state of ICT development in Trinidad and Tobago was performed as part of the master-planning process. The analysis considered the period 2003 (the initiation of *fastforward*) to May 2012. Some significant highlights of the review are listed in the sections that follow. A more detailed description is provided in the Appendix 1. The Appendices to the Plan are available as a separate document.

4.1 *fastforward: The First National ICT Plan*

In 2003 the Government of the Republic of Trinidad and Tobago defined a National ICT Plan, dubbed *fastforward*, which focused on a connectivity agenda across a five year period which ran to 2008. The *fastforward* implementation positively impacted the national development agenda in areas in the areas below.

Developing Innovative People and Nurturing a Caring Society



Implementation of SchoolNet and LibraryNet bringing connectivity to students and communities.

Enabling Competitive Business

Establishment of the e-Business Roundtable to drive ICT transformation in the private sector and electronic interaction with the Government.

Set up of smeXchange, an online marketplace to facilitate transactions amongst Small and Medium Enterprises.

Liberalization of the telecommunications sector.



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Investing in Sound Infrastructure and Telecommunications Environment



Establishment of the Telecommunications Authority (TATT).

Development of Cable Landing Station with 5 cables in T&T.

Concession to new telecom sector brands (more than 325K fixed lines, more than 1.6M mobile subscribers).

Promoting Effective Government

Delivery of award winning *ttconnect*, the vehicle for multi-channel Government services delivery.

Rollout of GovNeTT to enable inter- and intra-ministerial communications and information sharing to 512 individual sites, all ministries and agencies, 132 schools, 61 sites in Tobago.



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4.2 Progress Since *fastforward*

4.2.1 *ttconnect*

In 2005, the government developed a single on-line government portal, dubbed “*ttconnect online*”. The portal now offers a range of information and services to citizens, businesses and other visitors. The portal currently focuses on provision of information and downloadable/printable, electronic application forms. At the present time there is limited on-line transaction capability.

To complement on-line service delivery, physical *ttconnect* service centres were established in 2007.

ttconnect ‘s suite of services now include:

- *ttconnect online*: Internet Application
- *ttconnect mobile*: Mobile Web Application
- *ttconnect self-service kiosks*: ATM-like Machines
- *ttconnect Express*: Travelling Centre (services to rural areas)
- *ttconnect* Service Centres; Physical locations
- *ttconnect* Hotline: Free phone number to access information



4.2.2 Legislation

2011 saw the milestone introduction of the Electronic Transactions and Data Protection Bills. The Electronic Transactions Bill 2011 is designed to promote the development of e-Commerce in Trinidad and Tobago by supporting the use of electronic transactions. It also provides clear guidelines and protection for electronic signatures. It further promotes the development of legal and business infrastructure to support secure e-Commerce. The Data Protection Bill 2011 provides security for electronically formatted, personal information.

4.2.3 National ICT Business and Innovation Symposium

The National ICT Business and Innovation Symposium is a biennial event established in 2008 by the Ministry of Public Administration in collaboration with the e-Business Roundtable. The first event (2008) attracted over 400 participants from 14 countries around the world. The Symposium creates a forum for discussion and debate among local, regional and international businesses and acts as a catalyst for them to make greater use of ICTs. The event is now regarded as one of the premiere ICT events in the Caribbean.

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4.2.4 TTBizLink

In 2011, e-Business services received a major boost with the introduction of TTBizLink. This service facilitates online interaction between businesses and Government agencies responsible for trade. TTBizLink allows companies and individuals to apply for various permits and licenses, register businesses and conduct other trade related activities via a single document online. Applications and submissions are automatically routed to the relevant Government Agencies for electronically transmitted approval. TTBizLink is the first phase of the Single Electronic Window (SEW) initiative for lodging documents at a single entry point for import, export and transit-related regulatory requirements.

4.2.5 E- Connect and Learn (eCal)

The eCAL Programme, or Student laptop initiative, is an initial step in realizing a comprehensive programme of educational transformation. eCal seeks to facilitate delivery of seamless, high quality, comprehensive education. Through the programme, over thirty thousand laptops have been provisioned to students entering Form 1. These laptops are used to deliver curriculum and enhance the learning process. They have improved security and monitoring features and pre-installed software, educational content and resources, as well as links to the National Library and Information System Authority' (NALIS) recommended e-resources for secondary school projects, the laws of Trinidad and Tobago and the Ministry of Education's Guidelines for Laptop Usage.

4.2.6 iGovTT

iGovTT is a state enterprise incorporated 2009 with a mandate to provide ICT consulting and support services to Government ministries, divisions and agencies. It is also tasked with ensuring effective alignment, co-ordination and cost effectiveness across Government for ICT related projects and initiatives.

iGovTT serves as a model for other governments in the region seeking to revolutionize the way in which the public sector manages and takes advantage of technology. iGovTT plays a vital role in Government's strategy for using ICT as a key driver for socio-economic development in Trinidad and Tobago.

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4.3 Overall State of ICT in Trinidad and Tobago



The e-Readiness of a country provides an overview of the current state of ICT with respect to:

- The extent of ICT availability and usage by the three major stakeholder groups, namely individuals, businesses and government; and
- The availability of an enabling environment for ICT i.e. ICT companies and manpower capabilities, and policies and legislation that support further ICT development.

4.3.1 ICT Availability

Based on the Market and Opinion Research International (MORI) ⁱⁱ Household Survey of 2010, ICT penetration stood at 93% of all households that were equipped with mobile phones, 42% with computers, and 30% with Internet access at home.

Sentiments from the WEF – GITR 2010/11 Executive Opinion Survey and Survey of the Trinidad and Tobago e-Business Roundtable indicated that while companies saw themselves as aggressive in embracing new technology, and while ICT technologies were widely available to local businesses, the extent of Internet use by businesses was perceived to be moderate for Business-to-Business (B2B), or Business-to-Consumer (B2C) transactions. Notably, Trinidad and Tobago ranked 97th out of 133 countries in this area in the GITR list.

Government's achievements since 2003 point to an increasingly "connected" Government. However, there are no transactional electronic services. Hence, the WEF – GITR 2010/11 Executive Opinion Survey ranked the country poorly in these aspects:

- Government ICT use and Government Efficiency rated 3.8 on a 1-7 scale where 7 is the best score;
- Government Online Service Index rated 0.34 on a scale of 0-1 where 1 is the best score;
- e-Participation Index rated 0.13 on a scale of 0-1 where 1 is the best score.

4.3.2 Environmental Conduciveness

ICT development requires an enabling environment in the form of a vibrant ICT sector, available and capable resources and supporting legislation and policies. The continued lack of legal and regulatory frameworks has impeded the growth of e-Commerce among the business communities, as well as ICT initiatives by the Government. With the proclamation of the Electronic Transaction Act and the Data Protection Act in January 2012, the perception that laws relating to the use of ICT are in place (currently ranked at 113th of 142) should begin to improve.



4.3.3 International Benchmarking



The Networked Readiness of a country is an indication of the economy's competitiveness relative to that of other countries. It provides an overview and snapshot of the current state of ICT with respect to the following:

1. The extent of ICT availability, readiness, usage and impact by the three major stakeholder groups, namely individuals, businesses and government; and
2. The availability of an enabling environment for

ICT i.e. ICT companies and manpower capabilities, and policies and legislation that support further ICT development.

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Multi-national corporations often use international benchmarks to gauge the viability and ease of doing business before investing in a country. As part of the analysis on the current ICT landscape in Trinidad and Tobago, authoritative benchmark reports were utilised. These included the UN e-Government Survey, the WEF - Global Information Technology Report, and the World Bank's Doing Business Report.

Benchmarking by Authoritative International Bodies

United Nations e-Government Survey 2012	67 th out of 190 countries
WEF Global Information Technology Report 2011/2012	60 th out of 142 economies
EU e-Readiness Rankings 2010	48 th out of 70 countries
World Bank's Doing Business 2012 Report	68 th out of 183 economies
United Nations Measuring the Information Society	61 st out of 152 economies

International Benchmarking of Trinidad and Tobago's ICT Landscape

ⁱⁱ MORI Caribbean, a subsidiary of leading UK research company, MORI was engaged by the Ministry of Public Administration to conduct a Household Survey in Trinidad and Tobago.

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5 2012 – 2016: National ICT Agenda



5.1 National ICT Vision

“To create a dynamic knowledge-based society, driven by the innovative use of ICTs to enhance the social, economic and cultural development of the people of Trinidad & Tobago”

5.2 Introduction

The 2012-2016 National ICT Plan focuses on social and economic transformation by “Creating Opportunities and Enhancing the Quality of Life”. The plan places emphases on supporting ICT-based innovation and developing human capital in the ICT sector. It also aligns with the strategic priorities within the National Development Plan.

5.3 ICT Roadmap for Trinidad and Tobago (2012 – 2027)



THE 2012-2016 NATIONAL ICT PLAN is the first part of the ICT Roadmap for Trinidad and Tobago covering the period 2012-2027. The end goal is to become an industrial and consumer ICT research centre and a net exporter of ICT services. Over the period 2012 to 2016, the Plan will focus on Government's thrust to increase ICT utilisation and uptake within the public sector. The Plan seeks to foster opportunities in education and trade through new technology-based service delivery mechanisms. Government plans to take a leadership role in creating the service delivery and policy conditions which encourage businesses and citizens to adopt ICT.

FOR THE PERIOD 2017 TO 2021, the focus shifts to sectoral transformation. Emphasis in this phase will be on developing strategic advantages in specific industries to enhance Trinidad and Tobago's value proposition in regional and international markets. As national development goals evolve, this roadmap can be re-aligned to reflect any changes in priority areas.

BEYOND 2022, Trinidad and Tobago seeks to realise significant gains from sharing its ICT expertise and reap the benefits of being a true knowledge-based society.

5.4 Alignment with the National Development Plan

smartTT is aligned to the National Development Plan and seeks to contribute to the sustainable development of the country. The Plan elaborates the near-term strategic thrusts, key initiatives and programmes for the ICT sector. It is aligned to five key themes:



5.5 Themes, Strategic Thrusts and Desired Outcomes

STRATEGIC FRAMEWORK – ICT , A PILLAR FOR SUSTAINABLE DEVELOPMENT

PILLAR 1	PILLAR 2	PILLAR 3	PILLAR 4	PILLAR 5	PILLAR 6	PILLAR 7
People –Centred Development	Poverty Eradication and Social Justice	National and Personal Security	Information and Communication Technologies	A More Diversified, Knowledge Intensive Economy	Good Governance	Foreign Policy
Connecting Trinidad and Tobago and Building the New Economy						
THEME 1	Innovation and Human Capital Development	Strategic Thrust 1	Building an e-Ready Society through ICT enriched learning	1.1 Building an e-Ready Society through ICT enriched learning 1.2 Creating and Promoting Local Digital Content 1.3 Develop a culture of Research and Development		
THEME 2	Access and Digital Inclusion	Strategic Thrust 2	Bridging the Digital Divide	2.1 Providing ICT Services for Digital Inclusion 2.2 Increasing the Accessibility and Affordability of Technologies 2.3 Increasing ICT Learning and Awareness 2.4 Develop and R&D Culture Focused on Bridging the Digital Divide		
THEME 3	e-Business and ICT Sector Development	Strategic Thrust 3	Building a Pro E-Enterprise Environment	3.1 Stimulating ICT Demand to Encourage e-Commerce Adoption 3.2 Developing e-Business Capacity 3.3 Enabling the Production, Distribution and Promotion of Local ICT products and services 3.4 Enabling Other Sectors through ICT 3.5 Facilitating Leadership and Coordination of Efforts among Key Stakeholders		
THEME 4	Infrastructure Development	Strategic Thrust 4	Enhancing Internet Governance, Accessibility and Usage	4.1 Enhancing infrastructure, access, ICT policies and regulatory oversight to facilitate sustainability. 4.2 Instituting appropriate Governance Structures to drive Infrastructure Planning and Development 4.3 Building Information Society Governance and Capacity to Ensure the Availability of Internet Resources and Viability of the Internet Economy 4.4 Building government infrastructure to develop and support a vibrant e-government ecosystem		
THEME 5	e-Government	Strategic Thrust 5	Working as an Integrated Government	5.1 Collaborating to implement shared ICT systems and processes 5.2 Delighting customers through multi-channel delivery of quality services		

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The framework above depicts the interconnected relationship between the National Development Plan and the National ICT Plan. The Strategic Thrusts, together with their supporting initiatives, all contribute to the Development Pillars of the National Development Plan.

Drawing from local and international best practices, national ICT planning can be considered in five dimensions – Capacity, Community, Business, Infrastructure and Government. The themes for the 2012 – 2016 National ICT Plan are based on these five dimensions.

5.5.1 Theme 1: Innovation and Human Development



The Plan will entail a strategic thrust of “Fostering a Creative e-Ready Society”. This theme is geared towards people-centered development. ICT will be seamlessly incorporated into learning at all levels of the education system. ICT will be a compulsory subject at the appropriate education levels. In addition to theory, there will be an emphasis on practical, creative application. This theme builds the “Capacity” dimension.

5.5.1.1 Strategic Thrust 1 - Fostering a Creative e-Ready Generation

Trinidad and Tobago’s Medium Term Policy Framework recognizes that human capital development is critically important to all aspects of national development. The Framework acknowledges that innovation and production are inextricably linked and that innovation and talent have become valued assets in the local and global knowledge economy. However, despite a high literacy rate of 98.7 percent and enrolments rates at the Primary and Secondary education levels of 92.8 percent and 88 percent respectively, enrolment at the tertiary level falls drastically and is amongst the lowest in the world at 11.6

percent. This places Trinidad and Tobago at 103/142 countries in the tertiary education enrolment index in the World Economic Forum's Global Competitiveness Report 2011-2012.

Under this strategic thrust, initiatives to ensure that innovation and human development needs are strategically addressed in the period 2012-2016 will be implemented.

5.5.1.1.1 Innovation

Innovation is the ability to solve challenges using novel solutions. In order to create the knowledge based economy, an innovative class is needed to drive national development. Fostering innovation is integral to diversifying the economy. The nation, however, is ranked as one of the most poorly performing countries globally with respect to innovation. The Global Competitiveness Report 2010-2011 placed Trinidad and Tobago amongst the lowest countries in the world in innovation at 137/139. Although an improvement was gained in 2011-2012 with a rank of 120/142, this still places the country lowest among countries of similar size and economy.

Trinidad and Tobago needs to quickly improve and catch up with the rest of the world in innovation. The National ICT Plan proposes a bold set of initiatives to aggressively target the various components of innovation and human capital development².

In order to promote innovation as the driving force for global competitiveness and economic stability, the Ministry of Planning and the Economy, in collaboration with the Economic Development Board and the Council for Innovation and Competitiveness, will champion the development of a National Innovation Policy which includes the elements necessary to support financing, intellectual property protection and linkages between research and development and commercialization. The National ICT Plan is closely aligned to this policy in order to ensure that synergies are created and sustained to promote multi-sectoral collaborations.

5.5.1.1.2 Human Capital Development

Human Capital Development refers to the training and skills building of citizens. The Medium Term Policy Framework envisions that citizens are able to *"create and generate knowledge then transform this knowledge into value-added products and services that can create niche markets and high paying jobs"*. Further, the uptake and absorption of ICT's into the everyday activity of citizens and businesses depends on *"the level of development of our human capital to absorb and deploy them."*

The Medium Term Policy Framework proposes development of a Human Capital Policy and the establishment of a Human Capital Development Committee. The committee will include key stakeholders such as the Labour Movement, the Ministry of Planning and the Economy, the Ministry of Labour, Small and Micro Enterprise Development, the Economic Development Board, the Ministry of Education, the

² The table has been extracted from the Global Competitiveness Report 2011-2012 which ranks nations out of 142 across all indices.

Ministry of Science, Technology and Tertiary Education, the Ministry of Trade and Industry as well as businesses and civil society groups.

5.5.1.2 Initiatives

5.5.1.2.1 Key initiative 1.1: Building an e-Ready society through ICT enriched learning

Training is a key strategy to address the growing demand for an ICT savvy workforce. A formalised training framework that caters to the different levels of ICT competencies across both the public and private sectors is necessary to build an e-Ready workforce. The ICT courses must be internationally accredited, so that the ICT training and certification attained is widely recognised. Further, the interest in ICT must be cultivated from an early age and sustained through life. Accumulation of ICT literacy skills is crucial to employability in the knowledge economy.

5.5.1.2.2 Key Initiative: 1.2 Creating and Promoting Local Digital Content

As Trinidad and Tobago shifts focus from “Connectivity” to “Usage and Creation”, citizens and local organisations, must also be encouraged to transition from merely being electronic content consumers to content creators. This will entail inculcating a responsible culture that celebrates development and sharing.

5.5.1.2.3 Key Initiative: 1.3 Develop a Culture of Research and Development

A strong culture of research and development is necessary for creativity; rigorous testing of new ideas to ensure their validity and value; and problem-solving using structure, logic and discipline in a knowledge-based economy. Knowledge intensive activity creates additional wealth from innovative ideas, products, expertise and services. At the same time it requires continual adaptation and change. In this context research and development provides for a continuing feedstock of new ideas.

5.5.1.3 Theme 1 Programmes

The programmes under this theme are listed in the following diagram:

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1 INNOVATION AND HUMAN CAPITAL DEVELOPMENT

1.1 BUILDING AN E-READY SOCIETY THROUGH ICT ENRICHED LEARNING

- Computers and Connectivity for all
- Electronic Document Preparation and Management
- Create a System/Culture to Challenge Traditional Ways of Thinking and Operating
- M-Learning
- Develop and ICT Training Framework
- Marry Human Capital Development / Education/ Training with Industry needs

1.2 CREATING AND PROMOTING LOCAL DIGITAL CONTENT

- Digitize Heritage Related Indigenous and Social related Content
- Create Digital Content for use at all levels of education
- Web Production Incentives
- Encourage and Develop local software to address different and Individual styles of learning
- Establish and ICT Awards and Incentives Scheme
- Establish Incubator for Technology/Solution Transfer and Commercialization
- Leverage the Diaspora and Wider Caribbean to Fund/Promote Digital Content

1.3 DEVELOP A CULTURE OF RESEARCH AND DEVELOPMENT

- Offer scholarships in identified areas of research
- Regional Research Forum
- Department of Research and Development in ICT
- Research and Development in Public Sector Innovation
- Develop enforceable Intellectual Property (IP) legislation
- Strategic Partnerships
- Attract and retain ICT professionals

5.5.1.4 Theme 1 Expected Outcomes



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5.5.2.1 Strategic Thrust 2 – Bridging the Digital Divide

For Trinidad and Tobago, *Bridging the Digital Divide*, involves identifying the circumstances and social conditions that lead to digital exclusion and providing programs to reduce individuals and organizations prohibited by these factors. The National ICT Plan advocates a phased approach to closing the digital gap.

TRINIDAD AND TOBAGO 2012 - 2016 NATIONAL ICT PLAN (DRAFT)

The National ICT Plan proposes specific initiatives for Bridging the Digital Divide:

1. Identify, adapt and develop Government e-Services that are accessible to all citizens;
2. Ensure accessibility, availability and affordability of ICT tools necessary to allow all citizens to utilize Government e-Services;
3. Develop programs to train and certify citizens to use specialized and standardized ICTs and to raise awareness of the usefulness and risks of ICTs;
4. Encourages public and private sector innovations to aid all citizens in bridging the Digital Divide.

5.5.2.2 Key Initiatives

5.5.2.2.1 Key Initiative 2.1: Providing ICT Services for Digital Inclusion

Tools to assist citizens in ICT must be accessible and affordable. Similarly, infrastructure, including basic utilities and network connectivity, must be enhanced in less developed areas of the country to enable citizens and businesses in these areas to access and benefit from Internet-enabled services.

This Key Initiative aims to bridge the digital divide by providing citizens with basic ICT literacy skills, good and reliable infrastructure (the “means”), and computing devices with Internet access (the “tools”).

Citizens will be encouraged to own at least one Internet enabled computing device in each household. The computer will become a necessity for school-going children to practice and to complete school activities. Different technology tools and financial assistance schemes will be made available to accelerate computer ownership among students, educators, differently-abled, and SMEs.

5.5.2.2.2 Key Initiative 2.2: Increasing the Accessibility and Affordability of Technologies

As Government e-Services become available to citizens, the tools and Internet connectivity needed to access these services must be affordable and accessible. Government e-Services will be available via *ttconnect* service centres and kiosks.

As the available e-Services increase, the number of *ttconnect* service centres and kiosks will also be increased. For citizens living in remote areas, additional *ttconnect Express* (mobile service centres) will extend the reach to more remote areas of the country.

5.5.2.2.3 Key Initiative 2.3: Increasing ICT Learning and Awareness

The incorporation of ICTs into the education curriculum will be supported through ICT education and training for students and educators. Awareness campaigns, programs, workshops, etc. will be created and made accessible to all citizens.

Emphasis will be placed on data privacy, security and safe usage of the online medium through formal curriculum training and outreach programmes. There will be a special focus on children, young adults, parents and guardians, educators and business owners.

Efforts will also be channeled towards the development of ICT security guidelines and an incentive framework to help the SMEs to improve their protection against online intrusion, and handle customers' data securely. These efforts are aimed at increasing consumer confidence in transacting online.

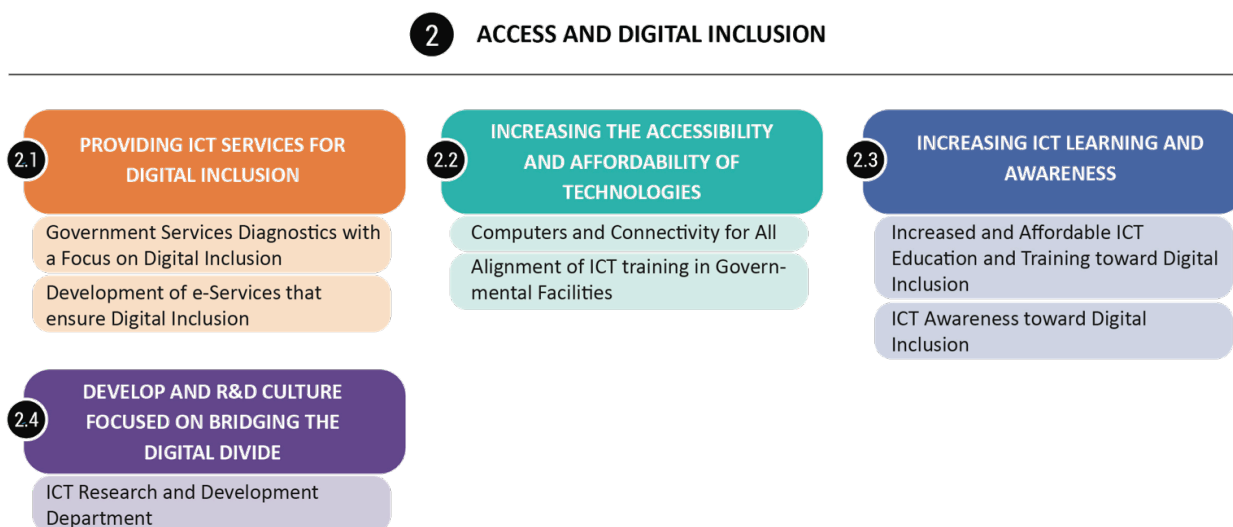
Endorsement programs for institutes that provide technical training will be developed based on standardized criteria. Partnerships with tertiary level institutions will be encouraged to accredit organizations that offer ICT certifications.

5.5.2.2.4 *Key Initiative 2.4: Facilitate R&D Focused on Bridging the Digital Divide*

In order to continue to bridge the digital divide, and ensure that the majority of society is equally engendered through ICTs, further research into the needs of the citizens is required. A research facility within Government will be commissioned to analyse and report on the nature of the Digital Divide in Trinidad and Tobago and the ways in which it can be addressed.

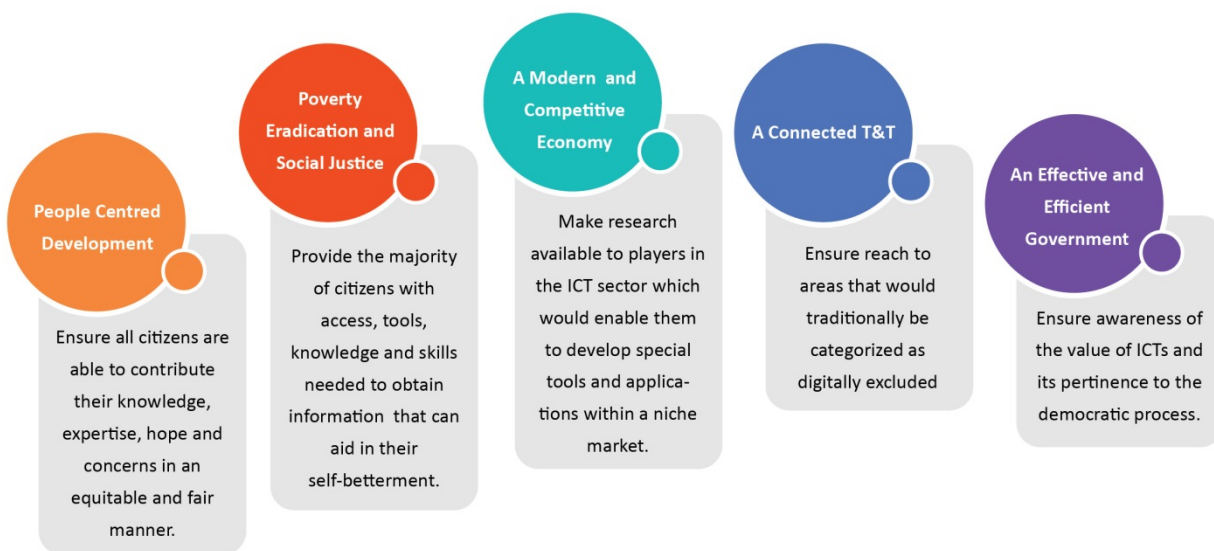
5.5.2.3 *Theme 2 Programmes*

The programmes under this theme are listed in the following diagram:



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5.5.2.4 Theme 2 Expected Outcomes



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5.5.3 Theme 3: e-Business and ICT Sector Development



A modern, competitive economy requires the “**Building of a Pro-Enterprise Environment**”. This strategic thrust requires creation of a vibrant ecosystem of ICT consumers, service providers and resources in the “Business” dimension.

5.5.3.1 Strategic Thrust 3 - Building a Pro-Enterprise Environment

Technology is a key enabler for economic diversification. ICTs improve business market opportunity and strengthen business processes to create efficiencies that ultimately improve national competitiveness.

Developing electronic commerce capabilities is essential to enable both the production and exportation of knowledge products and services. The Government is committed to developing an ICT-enabled, pro-enterprise environment geared towards increasing technology driven commercial and business activity that can result in the continued growth and development of Trinidad and Tobago.

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5.5.3.2 Key Initiatives

5.5.3.2.1 Key Initiative 3.1: Stimulating ICT Demand to Encourage e-Commerce Adoption

This Key initiative focuses on the development of specific programmes around various consuming publics (Government, Businesses, and Consumers) directed towards driving ICT demand so that businesses can become sufficiently persuaded of the viability of e-Commerce adoption.

5.5.3.2.2 Key Initiative 3.2: Developing e-Business Capacity

A significant barrier to e-Business adoption is the lack of know-how, and awareness of the existence of business funding, business support services and useful technological tools. Furthermore, the provision of funding for ICT adoption requires accompanying business support services.

The programmes under this initiative are designed to increase national e-Business capacity.

5.5.3.2.3 Key Initiative 3.3: Enabling the Production, Distribution and Promotion of Local ICT products and services

Efforts will be directed towards strengthening of government trade infrastructure and adjustment of the regulatory environment for starting and operating a local business.

5.5.3.2.4 Key Initiative 3.4: Enabling Other Sectors through ICT

The rationale for enabling other sectors through ICTs is much the same as the rationale for promoting e-business adoption in general. The Medium Term Policy Framework outlines several new strategic sectors with potential to contribute to economic growth. These include the creative industry (composed of various sub-sectors inclusive of the Music Industry, Film and Television, Advertising, Book and Magazine Publishing Industry, Fashion and Glamour and the Performing Arts and Visual Arts) and the Environmental Services Sector inclusive of Eco-Tourism. The Agriculture sector has also been identified as a key area for diversification.

Related programmes will therefore address the specific projects that will culminate in the overall improvement of these industries which will ultimately translate into greater prospects for businesses.

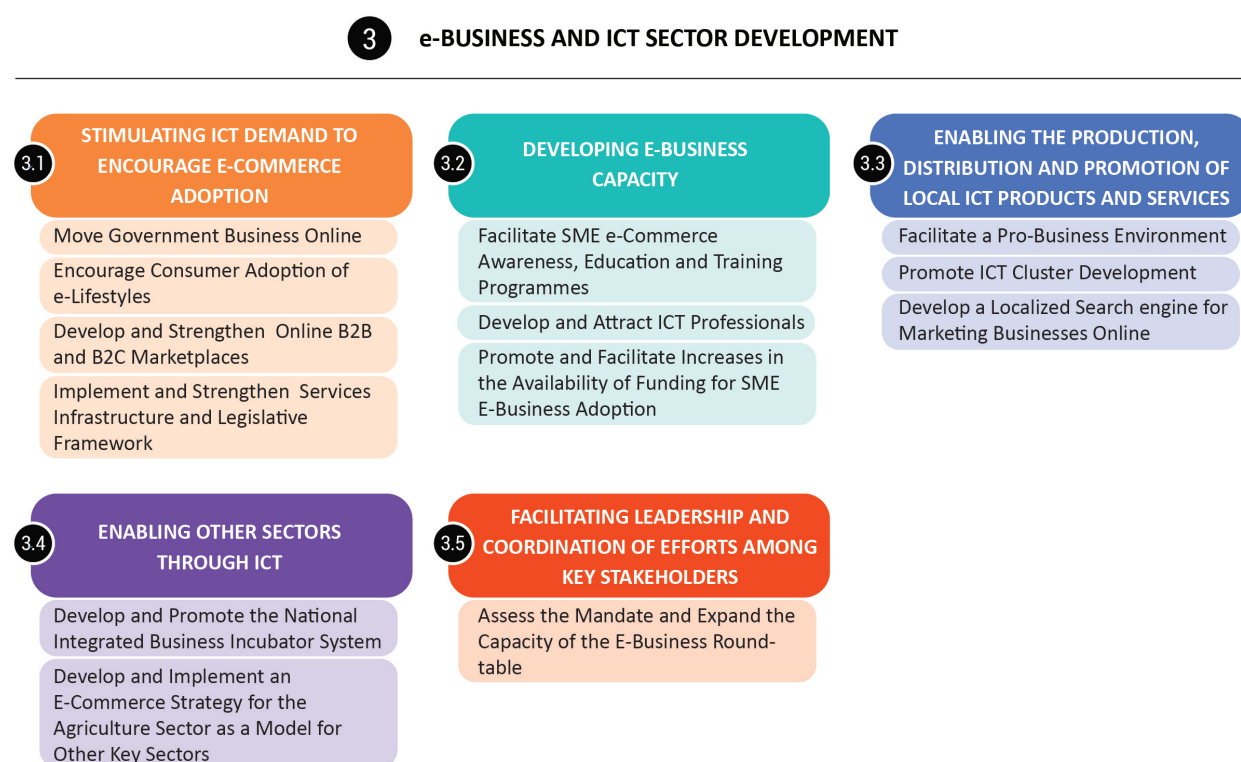
5.5.3.2.5 Key Initiative: 3.5 Facilitating Leadership and Coordination of Efforts among Key Stakeholders

Government role in e-business adoption and ICT Sector growth is facilitative. The e-Business Roundtable is a key multi-stakeholder advisory group that communicates their position and recommendations to Government in matters related to e-Business. The group also transfers information on new business opportunities and influence supportive action within the business and academic community.

The e-Business Roundtable will remain a key pillar in the governance structure that will be set for the implementation of 2012 – 2016 National Plan. The group will be empowered to identify domestic, regional and international business opportunities and assist in coordinating efforts in the areas of e-business integration, technology exporting, cluster development, R&D innovation and venture capital funding.

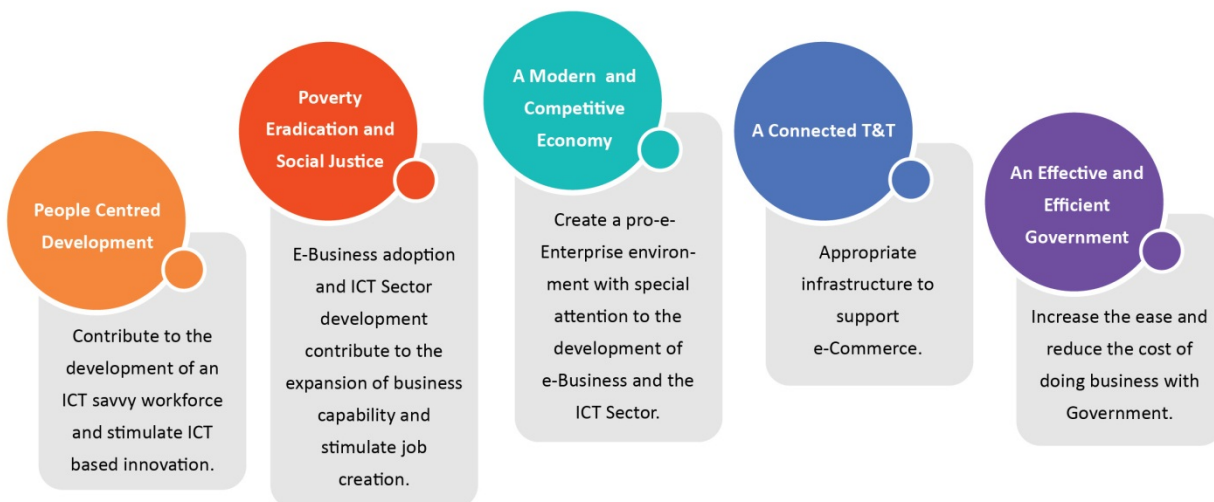
5.5.3.3 Theme 3 Programmes

The programmes under this theme are listed in the following diagram:



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5.5.3.4 Theme 3 Expected Outcomes



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5.5.4 Theme 4: Infrastructure Development



A connected Trinidad and Tobago requires a strategic thrust toward “**Enhancing Internet Governance, Accessibility and Usage**”. This will involve the continual deployment and refresh of infrastructure, particularly Internet and telecommunications infrastructure and the simultaneous development of the “Infrastructure” dimension.

5.5.4.1 Strategic Thrust 4 – Enhancing Internet Governance, Accessibility and Usage

ICT facilitates social growth and inclusion, improves living standards by broadening access to ICT services and improves the quality of life by providing new economic opportunities. At the World Summit on Information Society (WSIS) governments of the world committed to the pursuit and objectives of building information societies and laid a mandate for its achievement. The role of public governance authorities and all stakeholders in the promotion of ICTs for development entail:

- Information and communication infrastructure
- Access to information and knowledge
- Capacity building
- Building confidence and security in the use of ICTs
- Enabling environment

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- ICT Applications: e-government; e-business; e-learning; e-health; e-employment; e-environment; e-agriculture; e-science

Infrastructure is defined as multi-dimensional as it enables the development of an information society based on the objectives set above and comprises:

- An **enabling set of physical equipment**, components and technologies that function to convey data and information across specified transmission routings and electronic interfaces, directly to or from different geographic locations or points of connection.
- **service-custom applications** together with physical equipment and components that form the process and delivery platforms for the many ICT services.

The effectiveness of ICT infrastructure as a factor that contributes to economic and social growth is established only when governed by rules, laws and regulations. These governance models determine how ICT must interact or be made to interact, with the different environments that it serves or, has to contend in meeting the social, economic and political demands of society.

Infrastructure development will be addressed within this context, confining its discussion and initiatives within these following areas:

- 1) Network planning and construction and the measures required to bring the physical network into being;
- 2) Governance of the overall development process;
- 3) Initiatives that concern financing and investment;
- 4) Changes to the regulatory framework to foster infrastructure development;
- 5) Developing the human capacity to continuously operate, maintain and develop the infrastructure.

The National ICT Plan addresses the provisioning of adequate telecommunications and broadcasting networks at the national-level. Two high level objectives guide the move to full infrastructure resource are:

- 1) **Broadband Vision:** To deliver a future-proof broadband infrastructure capable of delivering access speeds of 100 Mbps and above to the majority of the population by 2016.
- 2) **High-Level Broadband Objective:** To promote widespread access to high-speed broadband services throughout the country as a significant driver of economic growth, job creation, and

development and a critical element in the GoRTT's broader objective of building a knowledge-based economy.

5.5.4.2 Key Initiatives

5.5.4.2.1 Key Initiative 4.1: Enhancing Infrastructure, Access, ICT policies and Regulatory Oversight to Facilitate Sustainability.

Ubiquitous connectivity of ICT infrastructure is important to support both the telecommunications and broadcasting infrastructures and the services provided. The availability of broadband ICT infrastructure and related services is critical to the realization of the broader benefits of ICT. The availability of spectrum resources to effectively meet the demands of emerging technologies such as 4G mobile and Long Term Evolution (LTE) is a key priority.

5.5.4.2.2 Key Initiative 4.2: Instituting appropriate Governance Structures to Drive Infrastructure Planning and Development

It is estimated that currently there are approximately 6,000 km of fibre deployed within Trinidad and Tobago, the majority belonging to the two major telecommunications providers. The fibre runs, however, are not complimentary. There is much duplication and parallel build-out along the same locations, leaving around 30% of the islands yet to be served with an adequate primary fibre optics backbone.

In enhancing infrastructure and connectivity, network development and build out in un-served and under-served communities is therefore essential. Another key area of focus will be to convene a national infrastructure taskforce to examine infrastructure requirements for the information society.

5.5.4.2.3 Key Initiative 4.3: Building Information Society Governance Capacity to Ensure Availability of Internet Resources and viability of the Internet Economy

This Key Initiative focuses on the global Internet landscape that shapes and influences the evolution and existence of interconnectivity between the domestic and international ICT infrastructure and services. These services allow Trinidad and Tobago's citizens to actively participate and utilise ICT in the evolving global knowledge-based society. Emphasis for physical interconnection will be on:

- a) Establishment of a domestic Internet eXchange Point (IXP) to facilitate domestic Internet traffic exchange and encourage and increase the amount of locally hosted content and services.
- b) Provision of a direct international connectivity to Tobago and development of routing diversity and redundancy to ensure network resilience in the instance of disasters.
- c) Establishment of carrier hotel for the purpose of co-location of international infrastructural facilities.

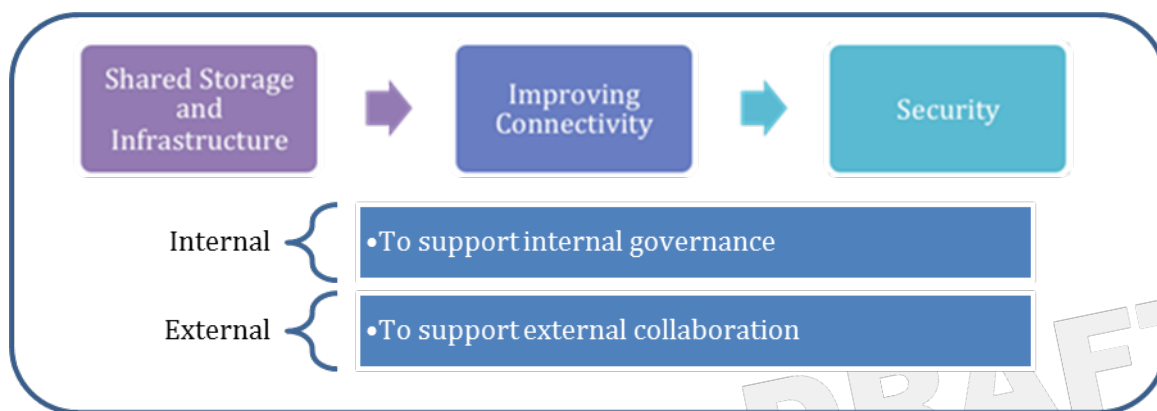
Interconnectivity at the logical infrastructural level ensures interoperability of ICT devices, enables the efficient routing of data packets to the desired destination and / or ICT device, and guarantees compliance with appropriate network security. Emphasis will be placed on:

- a) The management of the domain name system to guarantee the efficient routing of data, including the installation of a local copy of DNS root server;
- b) Transitioning government networks to IPv6 and developing policies to encourage IPv6 adoption within other national networks;
- c) The management of the .TT country code Top Level Domain (ccTLD) to ensure efficient utilisation of national Internet resources; and
- d) Development of national computer incident response capability to protect critical infrastructure and systems against malicious threats.

Building ICT institutional capacity and the professional capital stock for managing Internet Governance related issues is critical to a number of Key Initiatives identified under smartTT. Provision will be made to have Trinidad and Tobago consistently participate in and be represented at international Internet Governance fora. In addition, development of local Internet Governance capacity will be strengthened via a number of capacity building programs, training and public awareness activities.

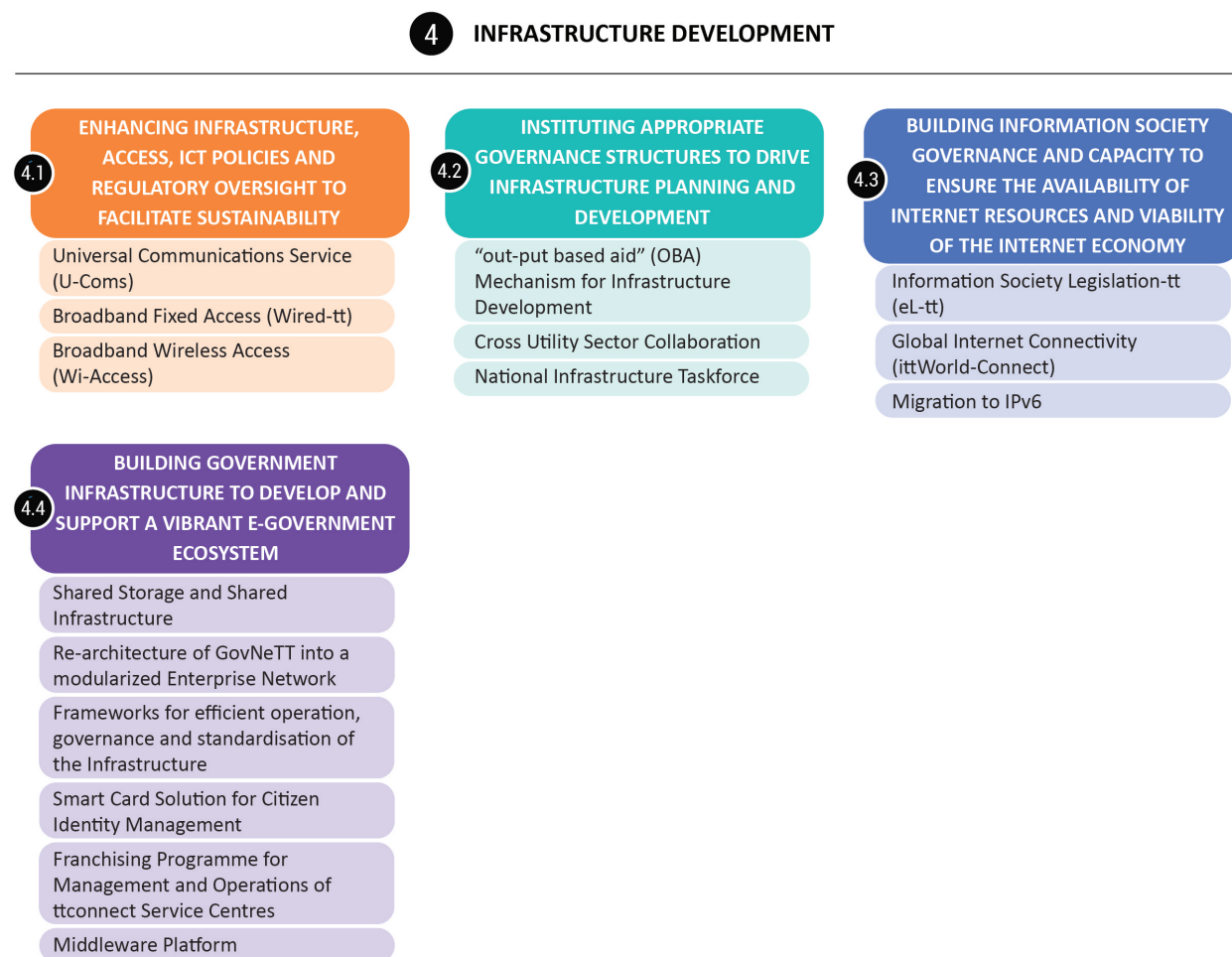
5.5.4.2.4 Key Initiative 4.4: Building Government Infrastructure to Develop and Support a Vibrant e-Government Ecosystem

In order to support Government's thrust towards a more integrated e-Government, there needs to be a focus on the sharing of common data through standardization of hardware and software platforms and the development of a modularized enterprise network system. There is a need for a middleware solution which provides an end-to-end electronic service to make it easier for Ministries to configure e-Services.



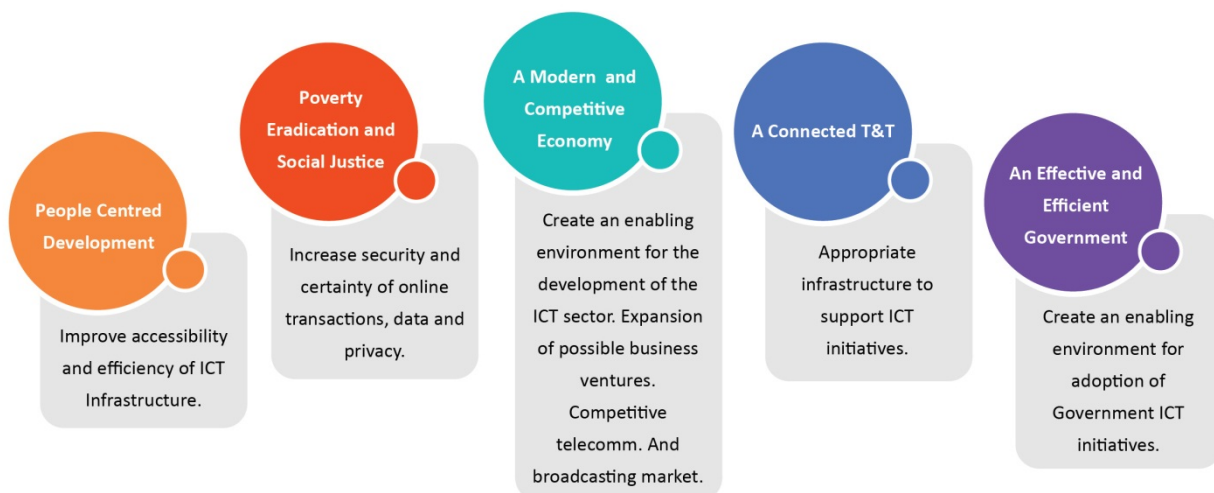
5.5.4.3 Theme 4 Programmes

The programmes under this theme are listed in the following diagram:



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5.5.4.4 Theme 4 Expected Outcomes



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5.5.5 Theme 5: e-Government



ICTs are necessary to facilitate government's strategic thrust of ***“Working as an Integrated e-Government”***. The prioritization of ICT in government service processes will facilitate collaboration across the public service to deliver quality public service in the customers' choice of delivery channel – the “Government” dimension.

5.5.5.1 Strategic Thrust 5 – Working as an Integrated Government

ICT in Government is about facilitating the process of bringing the Government closer to the people through major improvements in the delivery of Government Services. As stated in GoRTT's Medium Term Policy Framework 2011-2014, *“in order to sustain higher levels of growth, Government will continue to strengthen the foundations of the economy, diversify and restructure it and establish a formidable IT platform.”*

The underlying principle of e-government, supported by an effective e-governance institutional framework, is to improve the internal workings of the public sector. It seeks to establish 'better processes and systems' aimed at greater efficiency, effectiveness, inclusion, transparency and sustainability. Government e-Services provide citizens access to the tools and content needed to seamlessly incorporate ICTs into their daily lives.

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5.5.5.2 Key Initiatives

5.5.5.2.1 Key Initiative 5.1: Collaborating to implement shared ICT systems and processes

This Key Initiative focuses on leveraging ICT to improve the efficiency of government processes; the effectiveness of government policies; and ensuring sound ICT investment.

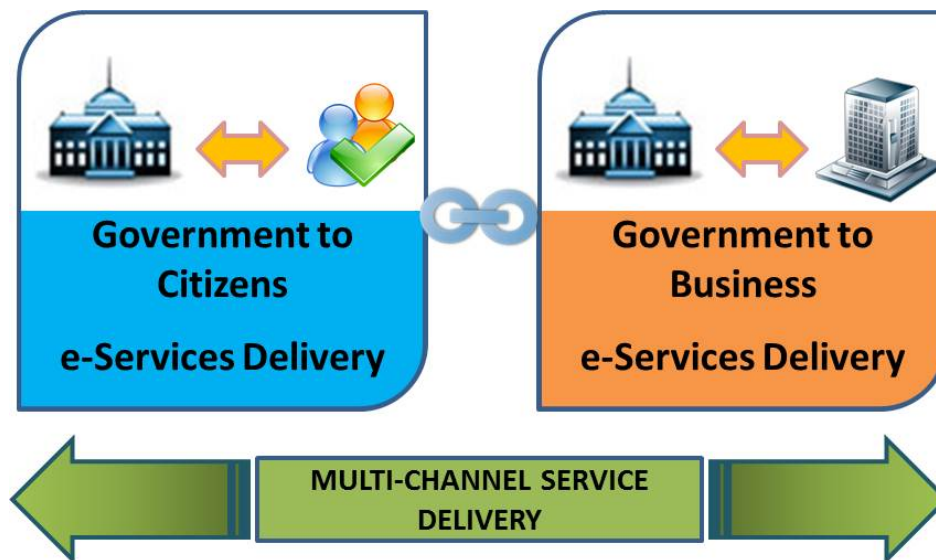
The deployment of common ICT infrastructure has proven to be a challenge for many Governments. Agencies must understand the need to streamline existing processes; relinquish control over common ICT infrastructure; and focus on their core businesses. Successful deployment of common ICT infrastructure, systems and policies calls for top-down directive, timely and clear communications to the various levels of government, tangible consequence for non-compliance and relevant support from government agencies. By consolidating the ICT infrastructure requirements of GoRTT, the Government as a whole also stands to reap cost savings, to build in redundancy and exercise better control by enforcing ICT infrastructure standards and government-wide ICT policies.

5.5.5.2.2 Key Initiative 5.2 Delighting customers through multi-channel service delivery

In the near term, this Key Initiative will seek to put key G2C and G2B services online and ensure that all e-Services are of high quality. Customers of government services must be provided with convenience and choice. Providing the option of services via electronic means allows customers the convenience of access at a time and location of their choosing. It also allows the Government to be more responsive, flexible and efficient in service delivery and more transparent with its processes. Customers need not understand the complex structure of the Government to obtain government services. Integrated e-Services offer the opportunity to provide a single entry point to a range of different services.

These programmes aim to deliver integrated, personalised and value-adding Government e-Services.

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Government service delivery has to go beyond 'transactional' to personalised. Areas where personalised e-Services will add value include:

- a) **Content Subscription:** Customers can subscribe to receive electronic versions of policies opened for public consultations, budget debates, parliamentary proceedings etc.;
- b) **Personalised Notifications:** Customers can subscribe to receive weather and traffic alerts by location; government fees and fines payment schedules; reminders for events such as court hearings; and
- c) **Personalised Page:** Customers can maintain and manage personal data and interactions with the Government.

Change management will be important to the implementation and adoption of e-Services. The process will be aided with public awareness and education programmes. There will also be a review to ensure that the **ttconnect** business model is viable for sustained service delivery.

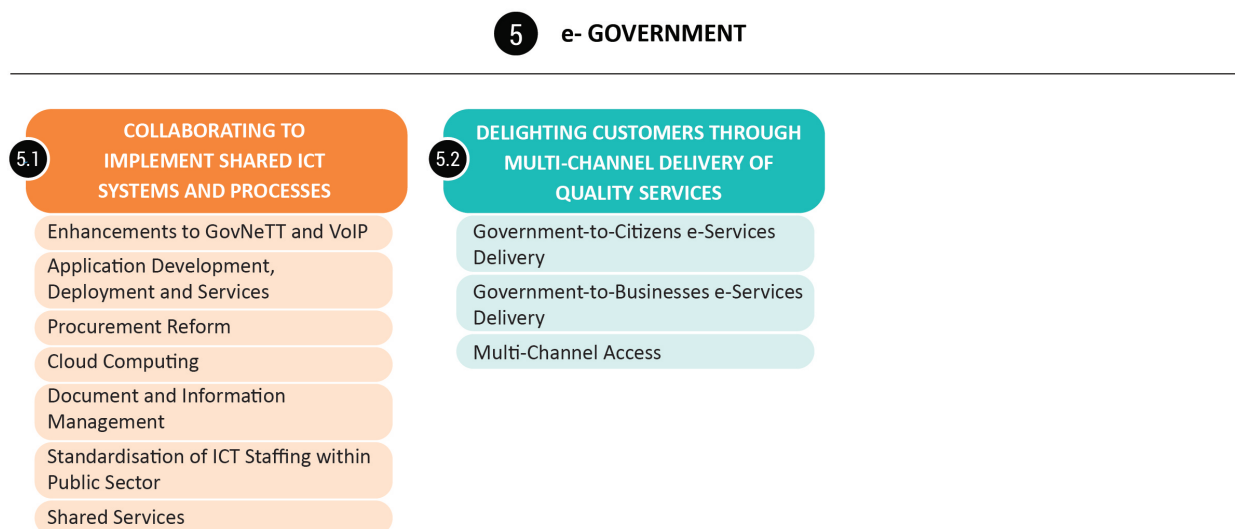
In the longer term, all feasible Government services will be put online.

In addition, to ensure growing mass adoption of e-Services, the government has to also gather and analyze customers' behaviour and needs. The goal is to eventually offer predictive services pushed to customers via advanced messaging and mobile communication services.

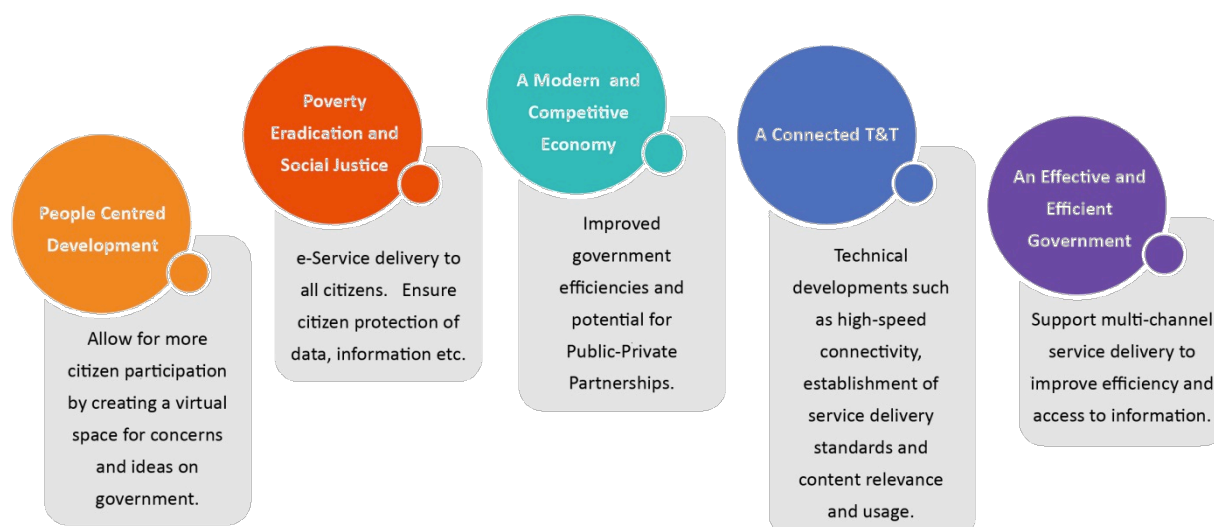
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5.5.5.3 Theme 5 Programmes

The programmes under this theme are listed in the following diagram:



5.5.5.4 Theme 5 Expected outcomes



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5.6 Supporting Mechanisms

5.6.1 *Inter-Island Connectivity*

ICT-based development and service delivery are predicated upon the availability of a robust, reliable, pervasive technology infrastructure that provides appropriate access in an economically viable manner for both the implementer and the consumer. ICT service delivery demands that high priority and significant investment emphasis be placed on strengthening and expanding the country's technology infrastructure. Connectivity is not only a technology hardware issue, it is a social issue as well. Consideration will be given to how people, communities and institutions are connected, what they are connected to do, what content they connect to share and what specific benefits the connectivity ought to bring. Equitable, affordable access must be a non-negotiable goal of the Connected Trinidad and Tobago. It is intended therefore, to provide a direct international connectivity/cable to Tobago. This facility can support redundant service for both Trinidad and Tobago and also serve as a 2nd cable landing station for the nation. There is also a plan for a redundant fibre facility between Trinidad and Tobago to improve connectivity for Tobago.

5.6.2 *Open Government Data*

Generally, information becomes more valuable as it is shared and less valuable when it is not easily accessible. GoRTT recognises that the Internet is the public space of the modern world. Conversely, the Internet allows citizens to participate more fully in government. GoRTT will put attention to making appropriate public data available in a standardized electronic format for public consumption. This initiative is expected to increase civil discourse, improve public welfare, and provide more efficient use of public resources.

GoRTT will take the necessary steps to ensure that the public data, which is not subject to valid privacy, security or privilege limitations, as governed by other statutes, can be easily found, used, cited and understood. This move serves to encourage transparency and democratic control, civil participation, improved and new private products and services, innovation and Governmental efficiency. In order to do so, certain guidelines will be followed, according to clearly defined principles⁴.

5.6.3 *Free / Libre / Open Source Software (FLOSS)*

Free / Libre / Open Source Software (FLOSS) refers to any software that provides users with the ability to run a programme and access its source code, for viewing, distribution and or modification, free of charge. It is GoRTT's intention to have an alternative to proprietary software and extend to citizens the benefit of reduced investments in proprietary license.

From a national development perspective, GoRTT will engage in activities that will seek to promote activities that require interoperability with open standards, rather than proprietary standards.

⁴ <http://www.opengovdata.org/home/8principles>

The recommended activities will include:

- the development and execution of a statistical monitor system for the usage of open source in the public as well as in the private sector;
- the development and promotion of a comprehensive policy to improve the usage of open source software;
- help to enable and coordinate open source software migration and implementation in the public sector for small and medium size organizations; coordination and cooperation within open source projects of public interest;
- the development of strategies to adopt the public and private educational sector to open source requirements; support of business models based on open source software; and inform and advise small and medium size enterprises before and in their implementation of open source software.

Issues surrounding security under the Data Protection Act will also be taken into account. Open source software solution providers will be tasked with providing viable alternatives from vendor lock-in and dependence.

5.6.4 Green Computing and Sustainable ICT

The field of green computing is "the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems — efficiently and effectively with minimal or no impact on the environment⁵."

GoRTT intends to establish the necessary administrative, environmental and technical frameworks for efficient and effective e-waste management⁶ for sustainable ICT. This Key Focus Area will address the formal assembly of stakeholders and identification of an effective institutional framework. GoRTT will also develop the requisite legal framework within which specific e-waste requirements will be addressed.

As one of the largest consumers of ICT products and services, GoRTT has the responsibility to ensure that there is a well-defined strategy to include green computing initiatives as well as treat with e-waste for the disposal of end-of-life assets. GoRTT will drive the initiative to seek alternative disposal methods through possible deposit/refund mechanisms, reduction of export costs of "end-of-life" equipment and their waste components and the revitalisation of previous e-waste disposal mechanisms. Establishment of quality standards around e-waste disposal will be a requirement that will encourage the already existing e-waste recycling sector to perform to industry standards.

Monitoring of volumes of computing equipment will become necessary for data collection agencies as national planning for e-waste disposal is conducted. The necessary implication is for both public and private sectors'

⁵ San Murugesan, "Harnessing Green IT: Principles and Practices," IEEE IT Professional, January–February 2008, pp 24-33

⁶ Edison Garraway, Egarr & Associates, 2010. e-Waste Assessment in Trinidad & Tobago Final Report

procurement practices to demand accurate record maintenance of computing equipment inventory. In addition, procurement requirements within the context of e-waste will require a schedule of acquisitions, expected duration for use, storage and disposal practices.

It is noteworthy to mention at this point that Cloud Computing can be viewed as a Green technology. Organisations – both public and private- can reduce their hardware inventory as they adopt cloud technology and consequently lessen the burden for disposal. Additionally, re-purposing equipment to locations and situations where the technology specifications are less demanding, can be utilised in efforts to Bridge the Digital Divide.

5.6.5 Agency ICT Planning

There is a need for a concerted ICT planning effort at the agency-level. An agency's ICT plan is part of a roadmap that will put in place the necessary infrastructure, systems and policies to support its current business needs and pipeline plans. Agency ICT plans should align with the National ICT Plan.

From the agencies' ICT plans, common ICT requirements of infrastructure, systems and policies can be identified for sharing or development. Alternatively, a government-wide Enterprise Architecture (EA) development exercise is a systematic way to do so. A Government EA serves as a framework and a collection of standards that enable the sharing of information and systems across ministries. Such an exercise delivers the Business Architecture, Information Architecture, Solution Architecture and Technical Architecture for the whole of GoRTT.

Demand aggregation of ICT goods and services is another area where there can be reduction in effort and cost. Cost savings will result from economies of scale.


As one of the largest consumers of ICT, the Government will leverage ICT to further augment the capacity of its officers. Strategic Planning and IT executives who were engaged in focus group discussion as part of this exercise indicated these as the areas that ICT tools can facilitate their day-to-day work: Customer Relationship Management or Case Management, information dissemination and workgroup collaboration. Portal technologies support these functions for deployment of agency intranets, the Government Intranet as well as extranets to facilitate Public Private Partnerships.

5.6.6 ICT Cluster Development

An ICT cluster is a geographic concentration of interconnected companies and institutions in the field of ICT. ICT clusters present a dynamic environment where networking, investment and technology transfer can be concentrated. Such an environment creates local jobs and drives the economic growth of a region and a country⁷.

eTeck's 15-year Strategic Plan (2012-2027), is in alignment with the Ministry of Trade and Industry's overall goal for diversification, *"to drive the non-energy sectors for the sustainable long-term growth and development of diversified and knowledge-based economy that contributes to the creation of high quality jobs"*. It provides the relevant and overarching context for the development of ICT Clusters within Trinidad and Tobago. The overarching

⁷ http://www.eteck.co.tt/1content/en/e_news.aspx?articleid=602&zoneid=103



goals of (1) sustainable growth, driven by diffusing ICT to enhance economy-wide competitiveness; and (2) poverty reduction, facilitated by broad-based growth, accelerated human development, and empowerment, can be achieved⁸.

GoRTT's intent to pursue ICT Cluster Development is expected to drive the prioritisation of relevant technology policy, R&D incentives and infrastructure. GoRTT will target the most dynamic segments of the ICT industry for promotion and export, and sequence their entry and systematically upgrade their capabilities towards higher value segments of the global supply chain. GoRTT's will partner with the private sector to promote incubators, develop hi-tech clusters, and develop local knowledge networks. GoRTT will also mobilize the diaspora for capital, technology, entrepreneurship, and market intelligence.

The ICT Cluster environment will also serve to advance other key focus areas namely planning for e-waste management, open government data, cloud computing, and the development of open source software. This environment will foster a cohesive engagement that will optimise the inherent talents, knowledge and skills for overall national development.

⁸ Why National Strategies are needed for ICT-enabled Development, Nagy K. Hanna, Senior Advisor, ISGIA

5.6.7 Infrastructure and Security

To realize its vision of a society where ICT plays a key role in enhancing quality of life, it is critical for the Government of the Republic of Trinidad and Tobago to secure the ICT environment and defend the critical infrastructure of the country from cyber threats. This security enables trust, which encourages adoption of technologies and the rate of uptake. This trust in the security of our ICT environment is crucial as organisations and citizens become increasingly dependent on ICTs for social and economic connectivity.

Seemingly isolated ICT security incidents can bring forth ripple effects to other ICT infrastructures and systems. A secure ICT environment ensures confidentiality, integrity and availability of data. This inspires confidence and trust in the users, generating greater up-take of the various key initiatives proposed under smartTT.

Securing our ICT systems and cyberspace requires continuous examination of our laws, current and upcoming threats, as well as the strategic implementation of technologies that will further enhance our economy.

5.6.7.1 Cyber security

The **Government of the Republic of Trinidad and Tobago** has undertaken many enterprise-wide initiatives to use ICTs to improve the internal communications as well as increase and improve services to the public.


It must be noted that the government hold the largest repositories of citizen data, making it not only a target for the information it stores regarding its operations, but also for the financial, medical and other sensitive information collated by various government ministries and agencies.

Corporations, like government, make heavy use of ICTs. The breadth of technologies is arguably larger for private organizations due to the less-restrictive policies for these entities.

Services such as debit and credit card payment gateways, cloud computing and private wide area networks are but a sample of the ICT services which span internationally and are consumed by businesses in their operations.

Businesses, as a by-product of the services they provide to both government and citizens, also over time amass sensitive data that must be protected. To fail in protecting these assets exposes them to grave reputational, legal and financial risks. Where a business fails to protect its sensitive data, its client data is also, by extension, at risk of loss.

Citizens, generally speaking, are the primary consumers of services provided by government and businesses. Protecting personally identifiable information and data is a legal right for each citizen. Creating a safe cyber-space for citizens involves not only securing the data they pass on to ICT systems, but also necessitates educating people about how to share information in a secure way.



The government must set policy and approve legislation to institutionalize certain rights upon the citizen and the government itself must take measures to secure its data in application such as the population and business registries which catalogues each citizen and legal entity in our nation.

Threats to Cyber Security can take the form of Cybercrime and computer crime; organized crime activities; “hackivist” activities; and national and corporate espionage.

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6 Governance Model

The following governance structure and processes are designed to facilitate the effective implementation of the 2012 – 2016 National ICT Plan. Adjustments may be made to align with the positioning of ICT in the structure of government.

6.1 Guiding Principles

The following are guiding principles upon which the proposed ICT Governance Structure for this National ICT Plan has been developed:

6.1.1 Principle 1:

The Governance Structure will focus on synergising and driving the successful planning and execution of nation-wide, government-wide or major ICT initiatives that affect more than one government agency. Government-wide projects refer to those that cut across government agencies, while major projects refer to those that have profound impact on business e.g. Single Electronic Window for trade and business facilitation.

6.1.2 Principle 2:

The Governance Structure will involve the key public-facing government agencies and business organisations, and will provide platforms for decision makers to discuss and make decisions to drive ICT initiatives that ultimately bring benefits to the nation as a whole.

6.1.3 Principle 3:


The Governance Structure will have the support of the Cabinet and the entire Government.

6.1.4 Principle 4:

The Governance Structure will be empowered by the Cabinet to carry out its Terms of Reference.

6.2 Governance Structure

An ICT governance structure is essential to ensure the successful implementation of the Plan. The structure will ensure participation across GoRTT, businesses, and citizens and will support decision-making, communications and consultation. In particular, it is necessary to establish a high level committee to drive the development and adoption of major ICT projects within the Government, ICT projects requiring cross ministry participation, and ICT projects with nation-wide impact. The Committee will determine the ownership responsibilities for such projects and will also be responsible for monitoring the progress of implementing smartTT. The Committee will further review the performance through measurement of the key indicators set as targets for accomplishment.



The recommended ICT Governance Structure for the implementation of the National ICT Plan is detailed as follows:

6.2.1.1.1 National ICT Steering Committee

The existing Inter-Ministerial Steering Committee (MSC) on ICT will assume the role of the National ICT Steering Committee. This committee is the highest approving and decision-making committee that oversees and drives the suite of major and government-wide ICT programmes as well as nation-wide ICT programmes under the National ICT Plan and provides the strategic direction towards realizing the National ICT Vision. This Committee will be headed by the Prime Minister of the Republic of Trinidad and Tobago.

6.2.1.1.2 ICT Development Board

The ICT Development Board will report to the National ICT Steering Committee. It will complement the work of the Economic Development Board (EDB) and the Council for Competitiveness and Innovation (CCI) as its work will be to inform strategies and projects for economic development through ICTs. The role of the ICT Development Board will include planning, alignment, coordination, advice, monitoring and reporting. An important function of the Board will be to distil information from the ICT Secretariat and the sector as a whole before reaching the National ICT Steering Committee. This should be in tandem with similar agencies within Ministry of Planning and Sustainable Development and leverage off of existing entities with this ministry.

6.2.1.1.3 ICT Secretariat

The ICT Secretariat will support the work of the ICT Development Board and will comprise Sector Specialists who will be liaisons to executing agencies, a policy and research function, monitoring and evaluation, and administration. The Secretariat will co-ordinate, track and monitor progress of all programmes under the National ICT Plan. The work programme of the board/secretariat will inform the submission of ICT related initiatives for PSIP consideration within GoRTT's budgetary cycles.

It will also coordinate and integrate efforts across the various programmes of the Plan, and ensure alignment with other national development efforts. The Secretariat will further identify and address gaps and areas of overlap between the various programmes of this and other National Plans. Opportunities for major Government ICT projects and G2B and G2C e-Services will also be identified at this level.

The Secretariat will comprise representatives of all relevant ICT agencies, authorities and ICT Governances.

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6.2.1.1.4 Agencies and Roundtables

Existing ICT agencies, authorities and Roundtables will report into the ICT Secretariat as follows: the National ICT Company Limited (iGovTT), the Telecommunications Authority of Trinidad and Tobago (TATT), Evolving TecNologies and Enterprise Development Company Limited (eTeck), the e-Business Roundtable and the ICT Governance Roundtable. The work of these entities will continue uninterrupted but monthly reports in keeping with the already established budgetary cycle will be made to the ICT Secretariat to inform planning and decision making.

6.2.1.1.5 Appointment of the Government CIO and Ministry CIOs

The Ministry with oversight of ICT matters will appoint a suitable candidate to undertake the role of the Government CIO. The Government CIO will champion the ICT Governance vision and lead the transformation of the public service through the harnessing of ICT. He / she will be advised by the CEO of iGovTT on technical aspects concerning implementation and usage of ICT across the public service.

It is important to instill a sense of ownership for the National ICT Plan in the public service. This will be done by engaging agencies across the public service both as providers of key e-Services and as users of common ICT systems. Each Ministry will recommend or nominate an officer at the Deputy Permanent Secretary level or equivalent to assume the role of Ministry CIO. The Ministry CIO will be advised and supported by the Ministry's IT and Business Managers / Analysts (these functions can be outsourced). The CIOs are accountable for their respective Ministries' compliance with government ICT policies, budgeting and usage of allocated ICT budget, and e-Services and ICT systems. Collectively, the Ministry CIOs support the Government CIO to drive the entire public service to achieve the ICT Governance vision.

6.2.1.1.6 National ICT Programme Office

We recommend that a National ICT Programme Office comprising experienced programme managers be set up to support the ICT Governance committees to drive the successful implementation of the National ICT Plan. The tenure of the Programme Office should run in parallel with the implementation of the Plan.

Tasked to support the ICT Governance committees to oversee the implementation of the Plan, the Programme Office would manage the ICT budget for central / shared ICT programmes and also maintain an oversight of the ICT budget allocated to fund all other ICT programmes of the Plan. Programme owners would submit budget requirements (both capital cost and recurrent cost) for their programmes throughout the lifecycle of the programmes. The overall ICT budget of the Plan is to be approved by the Cabinet.

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7 Programme and Project Funding

There needs to be two types of funding arrangements to support the deployment of the National ICT Plan. Firstly, a central fund is required to fund the development and implementation of cross-agency ICT shared systems, as well as subsidise the usage of these systems to encourage government agencies' participation. This will steer government agencies towards the use of shared systems and collaboration in the delivery of integrated systems. Secondly, a "3P" fund is required to encourage Public Private Partnerships. Lastly, the usage of these funds must be accounted for to the National ICT Steering Committee that has oversight of e-Government matters. This will be supported by the Programme Management Office using the ICT Budget Processes (see Section 5.1.2).

Indicative budget estimates for each programme and project is listed in the Appendices under the Programme Implementation Roadmap. These figures may be used for budgeting purposes but actual cost of programme / project delivery is subject to a) the priority of the Government at the time of programme / project initialisation; and b) the outcome of the tendering process for procurement of ICT goods and services for the programme / project.

The projects that have been identified to support programme delivery is also subject to change and hence the programme and project funding as well. Unlike programmes that are high level activities and tasks designed around its respective strategic thrust, projects can be replaced with alternatives that contribute towards the same programme outcomes. Some situations that may require a replacement of projects include changes in government policies, and availability of new technology and alliances.

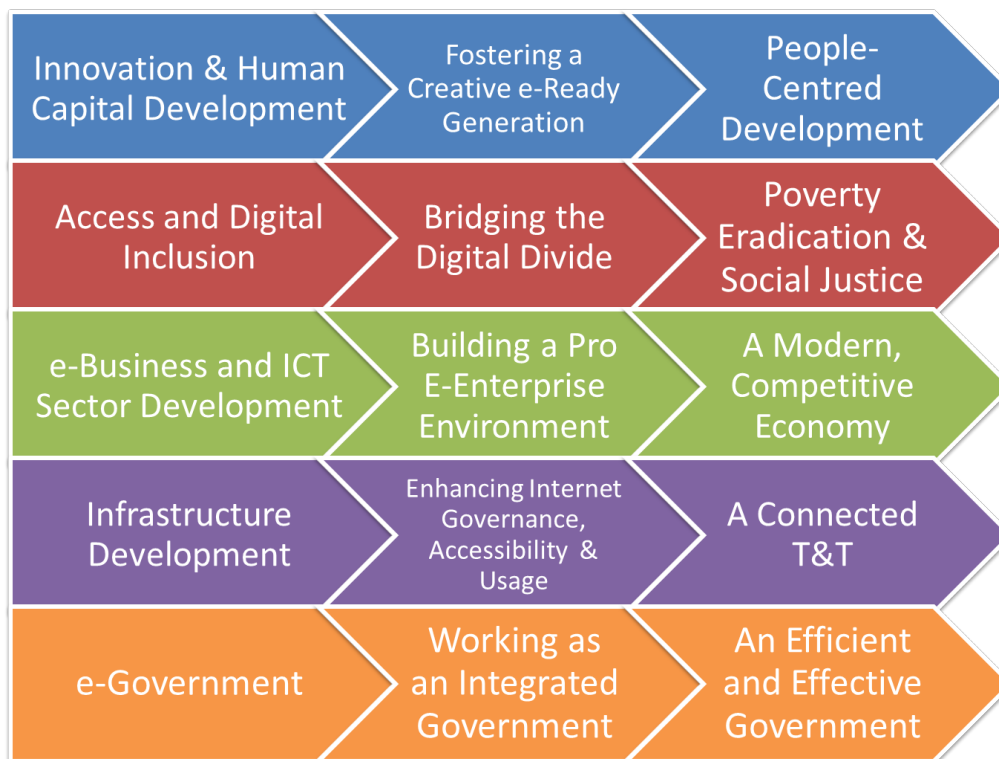
7.1 Performance Management and Reporting

The Government is accountable for the progress and success of the National ICT Plan which must be based on performance measures that are finite and agreed upon by stakeholders.

The Appendices lists the KPIs and year-on-year targets by Strategic Thrusts and Programmes.

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8 Summary Implementation



8.1.1 Implementation Roadmap

The list of initiatives described in **Section 5** will be delivered over a period of 5 years from 2012 to 2016.

Appendix 4 contains the Programme Implementation Roadmap against a 5-year timeline. The Roadmap captures details on the programmes and projects by Strategic Thrusts and Key Initiatives. Details reflected include the Programme and Project Titles, Projected Implementation Cost and Proposed Development / Review / Completion Timeframe.

8.1.2 Programme Implementation Approach

A successful programme consists of these components: Technical, Incentives, Marketing and Public Awareness, Training and Policy.

While all programmes should comprise the key components described above, the sequence and duration of activities pertaining to each component may differ from programme to programme depending on the nature of the programmes.

8.1.3 Next Steps

SmartTTT presents recommendations that stem from the review of *fastforward*, the understanding of the environment through surveys and stakeholder engagements, the alignment to the National Development Policy, and the best practices gleaned from the Singapore e-Government experience. The proposed programme ideas have been validated through stakeholder engagements comprising small group consultations in Trinidad and Tobago, group reviews, and online public consultation.

As the Plan goes through the process for endorsement by the Cabinet, work would commence to put in place the recommended ICT Governance and the communications plan would be developed.

8.1.4 Formalise the ICT Governance

Effective governance is critical to the achievement of the e-Government vision and maximising the value of ICT investments. However, there is currently no formalised ICT governance for GoRTT.

ICT governance needs to be put in place before the Plan can be implemented. This will entail the following:

- 1) The establishment of the National ICT Steering Committee, the National ICT Executive Committee, and the National ICT Advisory Panel;
- 2) The appointment of the Government CIO and Ministry CIOs;
- 3) The set up of the National ICT Programme Office to support the ICT governance committees in driving the implementation of the National ICT Plan including the management of approved ICT programmes and allocated ICT budget; and
- 4) The confirmation of ICT programmes and allocation of funds and performance measurement for the programmes.

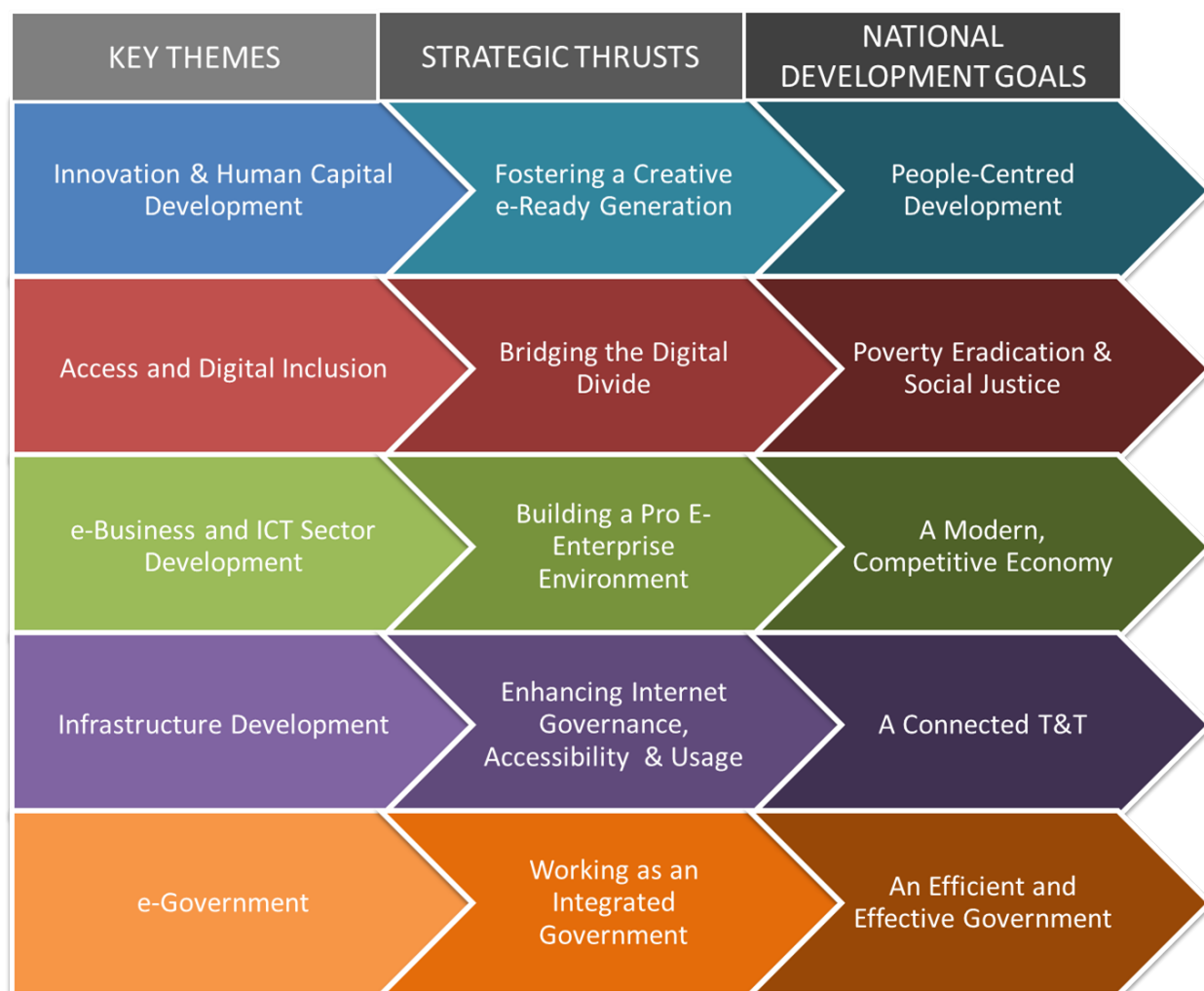
8.1.5 Develop the Communications Plan

There is a need for a communications plan to inform all stakeholders of key information of the National ICT Plan i.e. the rationale, benefits, impact, approach, timeline, and assistance plans. Communications is required at different levels.

The progress of the communication plan should be tabled at the National ICT Steering Committee and National ICT Executive committee.

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8.1.6 Summary of themes Strategic Thrusts and Initiatives



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8.1.7 Conclusion

The 2012 - 2016 National ICT Plan incorporates both remedial and proactive interventions to create opportunities for citizens and enhancing the quality of their lives. The recommendations in this report serves to catalyse the transformation of these five dimensions with ICT: capacity, community, businesses, infrastructure and the Government.

It is premised upon five key themes: Innovation and human capital development; Access and digital inclusion, e-Business and ICT sector development; Infrastructure development and e-Government. Each of these themes is linked to a Strategic Thrust which consists of a set of Key Initiatives. Each Key Initiative consists of programmes for implementation.

This document provides a coherent framework for the identification and channeling of economic and human resources in keeping with the nation's stated development goals. The return on the country's technology investment, in economic and social terms, will be tracked and reported, and existing programmes have been included, ensuring continuity.

For successful implementation of the plan to meet the desired outcomes and strategic thrusts to achieve the National ICT vision, the recommended governance structures and processes must be in place. Strong governance ensures timely mitigation to manage changing priorities and needs of the country.

More importantly, there is a need for a mindset change to transition to a new knowledge-based economy. The people, businesses and the Government of Trinidad and Tobago must be prepared to do things differently and adapt to new ways of learning, living, doing business, staying 'connected' and delivering public services.

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