GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO
MINISTRY OF TRADE AND INDUSTRY

NATIONAL Quality POLICY

2018–2030 FOR TRINIDAD & TOBAGO

THE LINK TO COMPETITIVENESS AND SUSTAINABLE DEVELOPMENT

NOVEMBER 2017

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Acronyms and Abbreviations

Acronyms	Meanings
AOP	Annual Operating Plan
APETT	Association of Professional Engineers of Trinidad and Tobago
ASTM	American Society for Testing and Materials.
bbl.	Barrel - Unit of volume for crude oil and petroleum products. One barrel equals approximately 159 litres
BIPM	Bureau International des Paid et Measures/International Bureau of Weights and Measures
BOETT	Board of Engineering of Trinidad and Tobago
BSJ	Bureau of Standards Jamaica
CABs	Conformity Assessment Bodies
CAF	Andean Development Corporation
CAHFSA	Caribbean Agricultural Health and Food Safety Agency
CARICOM	Caribbean Community
CARIRI	Caribbean Industrial Research Institute
CaRLs	Caribbean Reference Laboratories
CASCO	International Organization for Standardization Committee on Conformity Assessment
CDB	Caribbean Development Bank
CEBR	Centre for Economics and Business Research
CEDA	Caribbean Export Development Agency
CENAM	National Metrology Centre of Mexico
CFDD	Chemistry, Food and Drug Division, Ministry of Health
CIC	Inter-Sectoral Commission for Quality in Colombia
CIQ	Caribbean Institute for Quality Ltd.
CMC	Calibration Measurement Capability
COFEMER	Mexican Federal Commission for Regulatory Improvement
CONAC	National Council for Quality of Costa Rica

Acronyms	Meanings
COPANT	Pan American Standards Commission
COPOLCO	ISO's Committee on Consumer Policy
CROSQ	CARICOM Regional Organization for Standards and Quality
CRU	Cocoa Research Unit
CTB	Central Tenders Board
CTO	Caribbean Tourism Organization
DEVCO	ISO's Committee to support Developing Countries
DHSS	Department of Health and Social Services
DLG	German Food Association/ Deutsche Lebensmittelgesellschaft
ECA	Costa Rica's Acreditation Body/ Ente Costaricence de Acreditación
ECLAC	Economic Commission for Latin America and the Caribbean
EDAB	Economic Development Advisory Board
EDF	European Development Fund
EM	Environmental Management
EMA	Environmental Management Authority
ENN	Colombian National Standard Body/ Ente Nacional de Normalización
FAO	Food and Agriculture Organization
F.A.S.T	FairShare Assisted Standards Training
FSMA	Food Safety Modernization Act of the United States of America
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GEI	Government Electrical Inspectorate
GORTT	Government of the Republic of Trinidad and Tobago
GRP(s)	Good Regulatory Practice(s)
HSE	Health, Safety and Environmental
IAAC	Inter-American Accreditation Cooperation
IAF	International Accreditation Forum

Acronyms	Meanings
IAS	International Accreditation Service
ICONTEC	Colombian Institute of Technical Standards and Certification/ Instituto Colombiano de Normas Técnicas y Certificación
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
ILAC	International Laboratory Accreditation Cooperation
ILO	International Labour Organization
IMPACTT	Improving Marketing and Production of Artisanal Cocoa from Trinidad & Tobago
INM	National Metrology Institute of Colombia
INMETRO	Brazilian Metrology Institute
ISM	Institute for Supply Management
ISMS	Information Security Management System
ISO	International Standards Organization
ISO/IEC	International Standards Organization/International Electro-Technical Commission
ISPS	International Ship and Port Facility Security
ITC	International Trade Centre
JANAAC	Jamaica National Agency for Accreditation
KCDB	Key Comparison Database
LACOMET	Costa Rican Metrology Laboratory/ Laboratorio Costarricense de Metrología
LED	Light Emitting Diode
LRQA	Lloyd's Register Quality Assurance Ltd
LSQA	Merger of Laboratorio Tecnológico del Uruguay (LATU) and Quality Austria (QA)
MAGLA	Ministry of the Attorney General and Legal Affairs
MALF	Ministry of Agriculture, Land and Fisheries
MARPOL	International Convention for the Prevention of Pollution from Ships
MC	Municipal Corporations
MOH	Ministry of Health

Acronyms	Meanings
MOPD	Ministry of Planning and Development
MOWT	Ministry of Works and Transport
MPAC	Ministry of Public Administration and Communications
MPU	Ministry of Public Utilities
MRA	Mutual Recognition Agreements or Arrangement
MSEs	Micro and Small Enterprises
MTI	Ministry of Trade and Industry
NAB	National Accreditation Body
NAFP	National Accreditation Focal Point
NESC	National Energy Skills Center
NGC	National Gas Company
NGO	Non-Governmental Organization
NIDCO	National Infrastructure Development Company
NIDCO	National Infrastructure Development Company Limited
NIST	National Institute of Standards and Technology
NMI	National Metrology Institute
NQA	National Quality Act
NQI	National Quality Infrastructure
NQP	National Quality Policy
NQS	National Quality System
NSB	National Standards Body
OAS	Organization of American States
ODA	Official Development Assistance
ONAC	Colombia's National Accreditation Body/ Organo Nacional de Acreditación
ORT	Costa Rica's Technical Regulation Body/ Organo de Reglamentación Técnica
OSH	Occupational Safety and Health
PAHO	Pan-American Health Organization

Acronyms	Meanings
PAS	Publicly Available Specifications
PHI	Public Health Inspectorate
PQSL	Premier Quality Services Limited
PSIP	Public Sector Investment Program
PTB	Physikalisch-Technische Bundesanstalt
QI	Quality Infrastructure
RC	Regional Corporation
RIA	Regulatory Impact Assessment
RIC	Regulated Industry Commission
SDGs	Sustainable Development Goals
SDO	Standard Development Organization
SGS	Formerly, Société Générale de Surveillance (French for General Society of Surveillance). A multinational company headquartered in Geneva, Switzerland which provides inspection, verification, testing and certification services. verification, testing and certification services.
SICAL	Colombian National Quality System
SIM	Sistema Interamericano de Metrologia/Inter-American System of Metrology
SMEs	Small and Medium Enterprises
SOLAS	International Convention for the Safety of Life at Sea
SPS	Sanitary and Phytosanitary
STAR	Service. Training. Attitude. Respect (STAR) Programme
STC	Science Technology Innovation
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
SWMCOL	Solid Waste Management Company
TATT	Telecommunications Authority of Trinidad and Tobago
TBTs	Technical Barriers to Trade
THRTA	Trinidad Hotel Restaurants and Tourism Association

Acronyms	Meanings
THTA	Tobago Hotel and Tourism Association
TISTT	Telecommunications Services of Trinidad and Tobago
TRIs	Trade Related Institutions
TTBS	Trinidad and Tobago Bureau of Standards
TTCIC	Trinidad and Tobago Chamber of Commerce and Industry
TTCSI	Trinidad and Tobago Coalition of Service Industries
TTEC	Trinidad and Tobago Electrical Commission
TTLABS	Trinidad and Tobago Laboratory Accreditation Services
TTMA	Trinidad and Tobago Manufacturers' Association
TTTIC	Trinidad and Tobago Tourism Industry Certification Program
UN	United Nations
UNIDO	United Nations Industrial Development Organization
UTC	Coordinated Universal Time
UTT	University of Trinidad and Tobago
UWI	University of the West Indies
VPHI	Veterinary Public Health Inspectorate
WASA	Water and Sewerage Authority
WHO	World Health Organization
WTO	World Trade Organization
WTO-ITC	World Trade Organization-International Trade Centre

Terms and Definitions

The world of trade and quality has its own language. The following table explains important technical terms used in this document. The definitions are inspired by the glossaries published by the BIPM, ISO, WTO and UNIDO and modified to make the ideas more understandable to a wider audience.[1] The terminology is also aligned with the Regional Quality Policy of CROSQ and includes specific terms developed and used in the context of the consultancy.

Table 1: Terms and Definitions

TERMS	DEFINITIONS
Acceptance	The acceptance of the technical regulation or conformity assessment procedure of another party as fulfilling the same legitimate objectives as do one's own technical regulation or conformity assessment procedures, even if this fulfilment is reached through different means.
Accreditation	Third-party verification related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.
Calibration	The determination, by measurement or comparison with a standard, of the correct value of a reading on a measuring instrument.
CALIDENA	A participatory gap analysis of quality in a specific value chain methodology developed by the German Metrology Institute (PTB) and the consultancy company Mesopartner.
Certification	Third-party attestation that products, processes, management systems and persons conform to established standards.
Certificate of Conformity	A document, tag, label, or nameplate, provided on delivery to the buyer that attests a product, process, or service's compliance with standards or technical regulations.
Civil Society	Society considered as a community of citizens; linked by common interests and collective activity, legal or otherwise, and seen as a social sphere separate from both the state and the economic market.
Code of Good Practice	The Code of Good Practice, Annex 3 of the WTO TBT Agreement, provides disciplines, including those related to transparency, for the preparation, adoption and application of standards by standardizing bodies. The Code's acceptance is voluntary and open to any standardizing body, whether central government, local government or non-governmental and regional standardizing bodies.

[1] BIPM 2008: International vocabulary of metrology – Basic and general concepts and associated terms (VIM) 3rd edition; ISO 9000:2015(en) Quality management systems — Fundamentals and vocabulary and WTO Glossary and WTO Term, https://wto.sdlproducts.com/multiterm (accessed on October 10, 2017).

TERMS	DEFINITIONS
Competent Authority	Any person or organization that has the legally delegated or vested authority, capacity, or power to perform a designated function.
Competitiveness	Definitions for different levels:[2] For the company, competitiveness is the ability to provide products and services as or more effectively and efficiently than the relevant competitors. At the industry level, competitiveness is the ability of the nation's firms to achieve sustained success against (or compared to) foreign competitors, again without protection or subsidies. For the nation, competitiveness means the ability of the nation's citizens to achieve a high and rising standard of living. In most nations, the standard of living is determined by the productivity with which the nation's resources are deployed, the output of the economy per unit of labour and/or capital employed.
Compulsory Standard or Mandatory Standard	A declared national standard, which has been accorded compulsory status by the Minister of Trade and Industry, in accordance with Section 18 of the Standards Act. A compulsory standard has the force of law. A compulsory standard falls under the definition of Technical Regulation of the WTO TBT Agreement and has the obligation to comply with the accords included in said agreement.
Conformity Assessment	Demonstration that specified requirements relating to a product, process, system, person or body are fulfilled; typically conducted through quality assessment services such as inspection, testing and certification.
Conformity Assessment Procedure	Technical procedures such as, testing, verification, and certification – used to determine that goods or services fulfil the requirements laid down in technical regulations and standards.
Consumer Protection	A group of laws and organizations designed to ensure the rights of consumers, as well as fair trade, competition, and accurate information in the marketplace. The laws are designed to prevent the businesses that engage in fraud or specified unfair practices from gaining an advantage over competitors. They may also provide additional protection for those most vulnerable in society.
Demand-Oriented	A customer-driven good or service
Enquiry Point	A focal point, established under the WTO Agreement on Technical Barriers to Trade, where other WTO Members can request and obtain information and documentation on

[2] Based on www.tci-network.org/media/download/1185 (accessed on October 10, 2017).

TERMS	DEFINITIONS
	a Member's technical regulations, standards and conformity assessment procedures, whether impending or adopted, as well as on participation in bilateral or plurilateral standards-related agreements, international or regional standardizing bodies and conformity assessment systems.
Environmental Protection	Any activity designed to maintain or restore the quality of environmental media through preventing the emission of pollutants or reducing the presence of polluting substances. Initiatives relating to energy efficiency, renewable energy and the sustainable use of natural resources also play a role in this regard.
Equivalence	A government decision recognizing other countries' regulations as acceptable even if they are different from its own, so long as an equivalent level of protection is provided.
Formal Standards or Standards	A document, approved by a recognised body, that provides, for common and repeated use, rules, guidelines and characteristics for products or related processes and production methods, with which compliance is not compulsory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method.
Goods	Inherently useful and relatively scarce tangible items which are the subject of trade or commerce.
Good Regulatory Practice (GRP)	Internationally recognised processes, systems, tools and methods for improving the quality of new and existing regulations. GRP systematically implements public consultation and stakeholder engagement as well as impact analysis of Government proposals, before they are implemented, to make sure they address important problems, and for purpose, and will deliver what they are set out to achieve.
HACCP or Hazard Analysis and Critical Control Points	A system which identifies, evaluates and controls hazards which are significant to food safety.
Health Protection	A term used to encompass a set of activities within the Public Health function. It involves ensuring the safety and quality of food, water, air and the general environment, preventing the transmission of diseases.
Industrial Metrology	The area of metrology which assures the accuracy of the instruments used and measurements made.
Innovation	The implementation of a new or significantly improved product or service process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.
InQbator	A technological park supported by QI institutions and QI

TERMS	DEFINITIONS
	Services to generate new or improved goods and services.
Inspection	Examination of a product design, product, process or installation and determination of its conformity with specific requirements or, based on professional judgement, with general requirements.
Intrapreneurship	The act of behaving like an entrepreneur while working within a large organization. Intrapreneurship is known as the practice of a corporate management style that integrates risk-taking and innovation approaches, as well as the reward and motivational techniques that are more traditionally thought of as being the province of entrepreneurship.
Legal Metrology	That area of metrology that concerns the regulation of weighing and measuring instruments used in commercial transactions.
Legitimate objectives	The WTO TBT Agreement specifies that technical regulations shall not be more trade-restrictive than necessary to fulfil a legitimate objective. Legitimate objectives specified under the TBT Agreement are, *inter alia*: national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment. In assessing such risks, relevant elements of consideration are, *inter alia*: available scientific and technical information related to processing technology or intended end-uses of products.
Metrology	The science of measurement and its application. Branches of the discipline extend to scientific (artefact type standards), industrial (calibration) and legal (verification) metrology.
Mutual Recognition Agreement and Arrangement (MRA)	An international agreement by which two or more countries agree to recognize one another's conformity assessments. It is an international arrangement based on such an agreement.
Quality	The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs. It is demonstrated by the degree of customer satisfaction.
Quality Culture	An individual and societal state of being wherein a continual striving for a consciousness of quality improvement is embedded in attitude and personified in behaviour in all things, great or small.
Quality Infrastructure	The totality of internationally recognized standards and technical regulations, metrology, accreditation, conformity assessment services and information, awareness and education programmes involved in strengthening the

TERMS	DEFINITIONS
	quality competitiveness of the goods and services produced or provided at the national levels, with the aim of: increasing and facilitating trade, boosting industrial and State efficiency and effectiveness, promoting consumer welfare and safety and contributing to other sustainable development goals.
Quality Management Principles	The ISO 9001:2000 mentions eight (8) principles: (1) Customer focus, (2) Leadership, (3) Involvement of people (4) Process approach, (5) Systems approach (6) Continual improvement (7) Factual approach to decision making, and (8) Mutually beneficial supplier relationships.
Quality Intelligence	The appreciation of quality as a way of life by consumers, business people and policymakers. The ability to make decisions according to quality principles. The path to quality culture.
Service	The result of at least one activity performed at the interface between the supplier and customer that is generally intangible.
Testing	The determination of a product's characteristics against the requirements of the standard.

Executive Summary

The Government of the Republic of Trinidad and Tobago (GORTT) herein presents its National Quality Policy (NQP). This Policy has been developed in alignment with Trinidad and Tobago's National Development Strategy (Vision 2030) and Sustainable Development Goals (SDGs) and is the result of a participatory multi-stakeholder process led by the Ministry of Trade and Industry (MTI) and supported by the Trinidad and Tobago Bureau of Standards (TTBS).

The GORTT recognizes the merit and impact of establishing National Quality Infrastructure (NQI).[3] Over the last few decades, important elements of the NQI have been developed to contribute to industrial development, trade competitiveness in global markets, the efficient use of natural and human resources, food safety, health, and the environment. In facing the new challenges of trade globalization and the need for more sustainable economic development, there is a need to readjust and further develop a more integrated NQI.

The NQP is an instrument to contribute to higher levels of productivity, innovation, competitivenes s and consumer health and environmental protection, over the next twelve (12) years, while at the same time creating a quality culture that supports a diversified and competitive economy leading to sustainable economic development.

This Policy is intended to help Trinidad and Tobago's business sector to exploit commercial opportunities, to compete in global markets and to participate in international value chains. It aims to overcome the difficulty of local firms in demonstrating compliance with quality requirements and trade rules, and benefiting from the globalized economy.

The NQP seeks to address several weaknesses and inconsistencies in the current arrangement of the NQI, namely:

- the low demand for quality infrastructure and conformity assessment by local businesses, government bodies and consumers. Stakeholders operate in markets where quality management and quality marks are not explicitly required by buyers and by public procurement;
- the lack of understanding and the inconsistency in the use of terms critical to the operation and application of quality infrastructure. Government ministries, which are responsible for the development and enforcement of regulations, and regulatory agencies with competences in regulations and inspections, do not systematically follow good regulatory practices (GRPs);
- the lack of enforcement of compulsory requirements in the regulatory area;
- the limited human resources, limited laboratory space, and outdated equipment of public laboratories to perform reliable services. This is clearly against the interest of consumer protection, and makes access to foreign markets very difficult.

[3] http://www.news.gov.tt/content/national-quality-policy (accessed on October 10, 2017).

This Policy is designed so that Quality Infrastructure (QI) services may respond to the real demand of private firms and public organizations. This demand-driven quality infrastructure is intended to promote a quality culture in the private sector, government and civil society.

A central proposal of this Policy is the creation of an overarching framework for an adaptive QI, and the coordination and use of good regulatory practices in strategic sectors. This will require legislative and institutional reform; and a technical regulatory system that uses regulatory quality assurance to improve state interventions, including national processes and the quality of goods and services being used and sold in Trinidad and Tobago.

The successful implementation (Annex 1) of the Policy rests on the commitment and coordination of all stakeholders in the public and private sectors. In this regard, the Ministry of Trade and Industry, in conjunction with other ministries, key institutions and agencies, will ensure this policy is purposely implemented. The Implementation Plan is structured around four (4) key components:

1. Governance and Institution Building
2. Regulatory Reform and Policy Integration
3. Physical Infrastructure Development, Capacity Building and Organizational Strengthening
4. Enabling a Quality Culture and Proactive Environment

The Communication Plan (Annex 2) outlines and includes awareness building of the roles and functions of key parties in the governance of the NQI, and awareness aimed at developing and enabling quality-intelligent and proactive users and consumers. Through the Communication Plan, it is anticipated that there will be an increase in the utilization and application of NQI services by stakeholders.

This Policy promotes a dynamic multi-stakeholder system of monitoring, learning and adaptation. Agile planning and continuous monitoring will make the NQP flexible and resilient to a rapidly changing environment.

Finally, this Policy will enhance Trinidad and Tobago’s ability to penetrate world markets with products and services of high quality and, as a result, place the country in the global economic arena as a respected and highly valued trading partner and beneficiary, as well as a more innovative and creative society that promotes economic sustainability.

1 Introduction

Government commitment to National Quality Policy

The Government of the Republic of Trinidad and Tobago (GORTT) is promoting a sound, demand-driven, adaptive, and integrated National Quality Policy (NQP). In this regard, the Ministry of Trade and Industry (MTI) and the Trinidad Tobago Bureau of Standards (TTBS) have engaged the support of the international consultancy firm Mesopartner PartG to develop the National Quality Policy, inclusive of an Implementation and Communication Plan. The development of the NQP has received funding under the CARICOM Single Market and Economy Standby Facility for Capacity Building, under the 10th European Development Fund (EDF) managed by the Caribbean Development Bank (CDB).

The policy development process was guided by a Steering Committee, chaired by the Permanent Secretary of the MTI, and comprised of public sector (Ministry of Agriculture, Land and Fisheries, Chemistry, Food and Drugs Division, Ministry of Health, Trinidad and Tobago Bureau of Standards and the Tobago House of Assembly) and private sector representatives (Trinidad and Tobago Manufacturers' Association, Trinidad and Tobago Coalition of Services Industries and Trinidad and Tobago Chamber of Industry and Commerce).

The development of the NQP is aligned with Trinidad and Tobago's National Development Strategy (Vision 2030), and aims to strengthen the National Quality System and promote trade-related regulatory reform leading to international competitiveness and sustainable development for Trinidad and Tobago. It is also aligned with the timeframe of the Sustainable Development Goals (SDGs).[4]

The NQP is an essential instrument to develop a quality culture in all sectors of Trinidad and Tobago's economy and society, which ultimately supports the diversification and growth of the economy, improves productivity, increases safety and security, protects the environment, and contributes to the long-term well-being of all citizens of Trinidad and Tobago. The NQP seeks to guide the integration and coordination of Trinidad and Tobago's Quality Infrastructure.

Challenging economic context

The development of the NQP has been strategically and purposely done within the context of the high volatility of crude oil prices, and the current low oil and gas prices. These developments have served as an alert for policymakers and the citizens of Trinidad and Tobago, and highlight the urgency to accelerate the transition to a more diversified and resilient economy.

Globalization and rapid technological progress have resulted in substantial long-term changes in commerce and industry. Markets, industries and companies have become global in scope, with few products being made entirely in a single country.

[4] Annex 5 relates the Quality Infrastructure development to the SDGs.

Because of these developments, the GORTT has identified opportunities for the country to create a more viable and robust economy with a strategic focus on knowledge-based industries and non-traditional sectors such as the creative and cultural industries, manufacturing, agriculture, business services and tourism.

The aim for Trinidad and Tobago in these areas is to develop a global niche in selected products so that exports can be strengthened in international markets while being supported by an environment that is conducive to business and characterized by an increased emphasis on quality in products and services, value creation and productivity.

Participatory methodology for the development of the NQP

The NQP was developed over a six-month period (May to October 2017) by an interdisciplinary team of consultants from Antigua and Barbuda, Argentina, Colombia, Jamaica, Germany, and Trinidad and Tobago.[5] The consultants have used the guidelines for the development of a National Quality Policy[6] through similar processes in Latin America and the Caribbean and other parts of the world. A draft version of the Regional Quality Policy developed by the CARICOM Organization for Quality (CROSQ), of which Trinidad and Tobago is a member, also served as a guiding framework.

The policy development process also included an international benchmarking exercise for Trinidad and Tobago's Quality Infrastructure development and performance, in comparison with other similar countries (See Annex 3). Proceeding from the assumption that the development of National Quality Infrastructure needs to respond to the needs of the country, the consultancy team was careful with the transfer of foreign experiences. The policy received input and feedback through consultations with a wide range of stakeholder groups in Trinidad and Tobago.

[5] The team is composed of Dr Ulrich Harmes-Liedtke, Hermon Edmondson, Ramón Madriñán Rivera, Joseph Khan, Julie-Ann Laudat and Andrea Davis.

[6] UNIDO, Guide for the Development of National Quality Policies, Vienna/ Austria, 2016; Kellermann, Thoughts on National Quality Policy, PTB, Germany, 2011; CROSQ, Regional Quality Policy (Final Draft - unpublished), Barbados, 2017.

2 The National Quality Policy

2.1 Government commitment

Trinidad and Tobago's present development focus is to diversify its economy. This new economic development strategy can be achieved through the production and trade of innovative products and services that are quality-centred to meet specific requirements in the local, regional and global markets.

In this regard, the NQP has been developed to address, among other things, issues related to service, process and product quality. Its effective implementation will ultimately have a significant effect on Trinidad and Tobago's ability to treat present and emerging issues related to market access, diversification, international competitiveness, integration into the global economy, private sector development and sustainable economic development.

The NQP has also been developed with key interventions to foster quality intelligence and promote a culture of quality. Both are necessary for sustainable trade developments, through the design and establishment of National Quality Infrastructure comprising the key elements of metrology, standardization, accreditation, inspection, testing and certification appropriate for the needs of Trinidad and Tobago.

2.2 Policy Vision

A strong national quality culture in support of a diversified and competitive economy which contributes to sustainable development and the well-being of the citizens of Trinidad and Tobago.

2.3 Policy Objectives

The NQP aims to facilitate the achievement by Trinidad and Tobago's firms of a higher level of productivity, innovation, competitiveness and meeting of international requirements. The policy also supports consumers' health and environmental protection. Over the next twelve (12) years, Trinidad and Tobago should have developed strategically an internationally recognized quality infrastructure characterized by accessible and affordable attendant services.

The Policy objectives are as follows:

- Trinidad and Tobago's QI operating framework and network integrated in a strategic, pragmatic, participatory and coordinated manner;
- legal reform for the integration of QI in commerce, trade and all relevant social activities in Trinidad and Tobago. This reform also covers the changes in the QI institutional arrangements in place and provides for the legal basis to implement Good Regulatory Practices in the country;
- human capital and physical infrastructure developed, as well as agencies and stakeholders empowered; and
- a system of continuous learning, adaptation and communication established.

2.4 Expected results

Through the effective implementation of the NQP by 2030, Trinidad and Tobago should have:

- a demand-driven quality infrastructure which encourages a culture of quality in the private sector, in government and the civil society;
- an integrative quality policy framework which supports other policies;
- an effective technical regulatory mechanism, product certification and conformity assessment, to protect consumer rights;
- a stronger presence of Trinidad and Tobago's companies in global markets;
- a diversified economy based on productivity and creativity; and
- an innovative and creative society that promotes sustainable development.

2.5 Core principles

The success of the NQP requires that the GORTT, the private sector and civil society organizations commit to:

- accepting responsibility for decision-making, to enhance the level of quality consciousness in society;
- expanding the offering of national quality infrastructure services to support the National Development Strategy;
- participating in international trade to improve levels of productivity, innovation and competitiveness;
- increasing levels of consumer, health and environmental protection; and reduce technical barriers to trade;
- supporting international recognition for national quality infrastructure services, through the adoption of international standards;
- fostering inter-sectoral cooperation, coordination and sharing of resources in support of the development and effective utilization of national quality infrastructure services as a public good; and
- building capacity through the promotion of education, training, re-training and continuous learning and development.

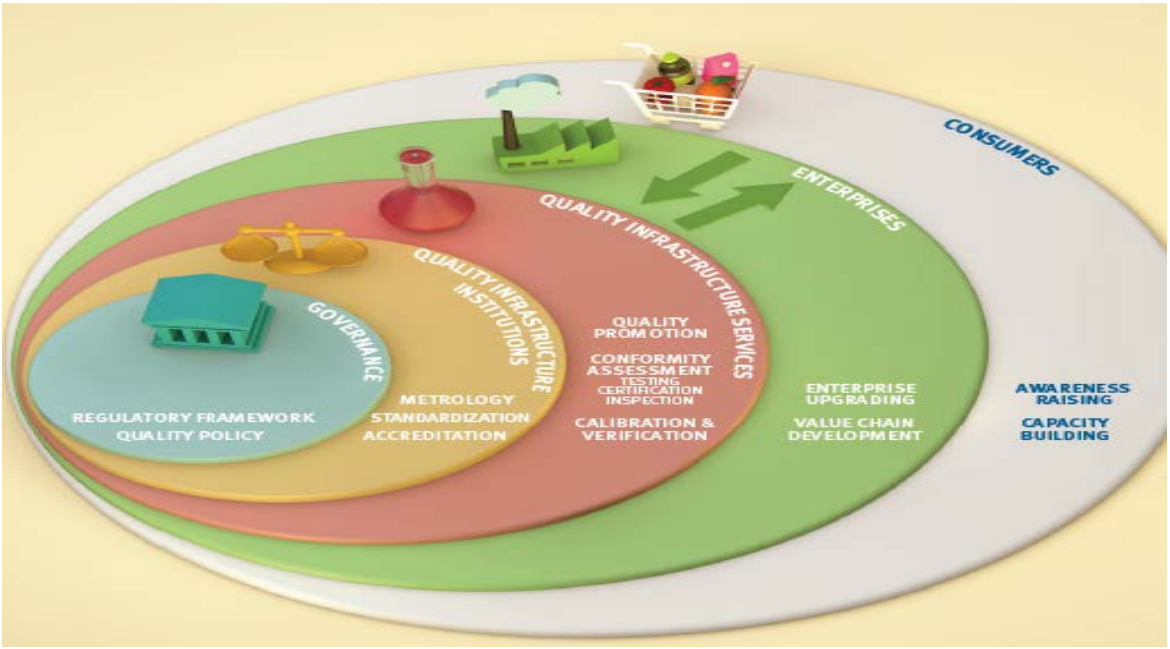
3 The Current Situation of the National Quality Infrastructure

3.1 Definition of National Quality Policy

The National Quality Policy (NQP) is the basic government instrument that sets out the objectives and strategies of the country regarding the development and use of the Quality Infrastructure in relation to its economic and societal needs and the building of a quality culture (adapted from UNIDO 2016).

The NQP will provide the formal expression of the intentions and direction of the government and stakeholders regarding recognized standards and technical regulations, metrology, accreditation, conformity assessment services and information, awareness and education programmes involved in strengthening the quality competitiveness of the goods and services produced or provided.

Figure 1: Elements of National Quality Infrastructure



Source: UNIDO 2016.

A National Quality Infrastructure (NQI) is the totality of internationally recognized standards and technical regulations, metrology, accreditation, conformity assessment services and information, awareness and education programme. Figure 1 illustrates that multiple organizations work together to increase and facilitate trade, to boost industrial and State efficiency and effectiveness, to promote consumer welfare, safety and sustainable development.[7]

The Demand Side of the QI in Trinidad and Tobago

[7] The contribution of NQI to the Sustainable Development Goals (SDGs) is explained in Annex 7.

A demand-oriented QI development must start with consumer's needs (Figure 1). Educated and quality-conscious consumers in the country, and in foreign markets, are the drivers of quality. Therefore, the promotion of a quality culture begins with awareness raising and capacity building of the consumers. Enterprises articulate the quality requirements by using standards. When companies participate in the global value chains, the use of quality infrastructure services increases as a result. The immediate contact of enterprises to quality infrastructure is through the use of conformity assessment services such as testing, certification and inspection, or calibration and verification. These services are guided by National QI institutions, which are the National Institutes for Metrology, Standardization and Accreditation. Their mandate is regulated by a National Quality Policy framework, which itself is embedded in a regional and international context.[8] (Figure 2 on page 26 shows an elaboration of the interaction of the QI stakeholders in Trinidad and Tobago).

There is sufficient evidence that, in Trinidad and Tobago, a culture of quality is not highly ranked. Terrence W. Farrell (2017) describes in his book, "We like it so? The Culture Roots of Economic Underachievement in Trinidad and Tobago," several characteristics of the values, attitudes and behaviours which hinder the generation of wealth and economic progress. The inheritance of the colonial past contributed to low commitment to rules (p. 85) and a work ethic which is satisfied with "good enough is good enough!" instead of looking for excellence (p. 130). These cultural patterns are not unchangeable, but need to be understood and recognized first, so that the proper management of expectations regarding the NQP is possible.

The lack of a quality culture could also be explained by the limited use of product liability in lawsuits, or the practice of large corporations to purchase from their own subsidiaries. Technical regulations are not always enforced and local companies seldom use voluntary standards and certification. Even when government supports temporary private certification schemes (like in the case of the National Tourism Certification Programme) the effort is not sustained. Without using QI services, Trinidad and Tobago's SMEs would be unable to access lucrative markets, and would find it difficult to meet their goal of trade expansion.

3.2 Government and Private Sector Commitment

The successful implementation of the policy rests on the commitment and coordination of government and all QI stakeholders in the public and private sectors.

The Ministry of Trade and Industry (MTI) is responsible for commerce, trade and investment and has oversight responsibility for the NQI. Under the aegis of the MTI, the Trinidad and Tobago Bureau of Standards (TTBS) is responsible for the quality of goods and services which are subject to trade, except food, drugs, cosmetics, medical devices, pesticides and agricultural products;[9]. Its

[8] TTBS is a member of CROSQ, and joins the regional framework for QI in CARICOM. Trinidad and Tobago is connected to the global trade region by its membership of The World Trade Organization. TTBS participates actively in Inter-American QI organizations responsible for Metrology (SIM), Standards (COPANT), and Accreditation (IAAC), but the technical capability of Trinidad and Tobago's NQI is not fully recognized by the international organizations for Metrology (BIPM), Standards (ISO), and Accreditation (IAAC and IAF).

[9] Based on the Standards Act of 1997.

Metrology Division provides "metrological traceability", i.e. an unbroken chain of all calibrated measurement instruments to international measurement standards.[10] Under the Standards and Metrology Acts, the TTBS is mandated with responsibility for the development of the NQI. It is also designated commensurate responsibility as:

- the National Metrology Institute;
- the National Standards Body;
- the National Quality Certifying Body – testing, calibration, inspection and certification; and
- the National Laboratory Accrediting Body

Quality Infrastructure is closely related to the Technical Regulation Framework (TRF). Within this framework, the major player in NQI activities is the Chemistry Food and Drugs Division (CFDD) of the Ministry of Health. This department is the competent authority for the regulation of food, drugs, cosmetics, medical devices and pesticides.[11]

The mission of the CFDD is to:

- ensure safe quality of an equitable standard for use by consumers of food, drugs, cosmetics and medical services;
- ensure safety in use, the proper management and acceptable standards for pesticides and toxic chemicals;
- provide technological and laboratory services in the areas of food, drugs, cosmetics, medical devices, pesticides and toxic chemicals.

Other Ministries and agencies are competent authorities in other trade-relevant areas like public utilities, telecommunications, environmental protection, energy, transport, and public procurement (Figure 2).

Ultimately, the private sector businesses gain the most from having an NQI, since it helps to enhance the competitiveness of businesses. As a result, the private sector should be committed to:

1. assisting in the development and structure of the NQP;
2. their essential role in the governance of the NQI, such as being actively involved in the National Quality Council and other related entities;
3. contributing to technical committees charged with the implementation of the NQP and QI and implementing standards and technical regulations;
4. participating beyond the national boundaries and expanding to regional and international arenas, since Trinidad and Tobago holds membership in several regional and international QI organizations;

[10] Based on the Metrology Act of 2004.

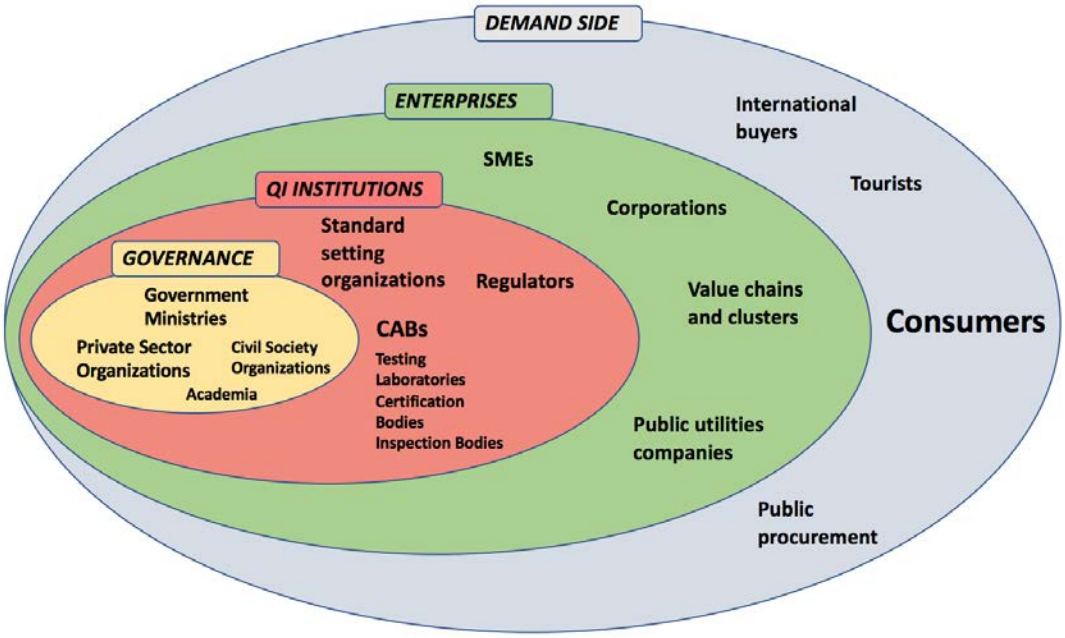
[11] Based on the Food and Drug Act of 1960 (Amended and updated to December 31st, 2007) and the Pesticide & Toxic Chemical Act of 1979.

5. upgrading its products and services to meet the requirements of markets nationally, regionally and internationally; and
6. building the capacity of its members (e.g. through awareness, education, training) and playing a leading role in the transfer of the knowledge and skills to enhance the quality of product and services.

Non-governmental organisations should be committed to the aforementioned responsibilities, as well as their participation in advocacy and the promotion of quality and QI.

The media should also be committed to working with government, private sector and civil society to educate and inform the public of the benefits of the NQP and the importance of QI to their daily lives and the competitiveness of businesses.

Figure 2: Stakeholder Map



Source: Authors' own elaboration in relation to Figure 1

Consequently, all QI stakeholders, as highlighted in Figure 2, must work in harmony to achieve the policy objectives set out above. Table 2 lists the stakeholder groups with the names of organizations in Trinidad and Tobago and defines their different roles in the design and implementation of the NQP. A list of Stakeholders needs can be found in Annex 4.

Table 2: Roles of stakeholder groups and organizations

Stakeholder Groups	**Organizations**	**Role**

Stakeholder Groups	Organizations	Role
Private Sector Entities and Umbrella Bodies (Private Sector - National)	Businesses, Business Support Organizations e.g. Trinidad and Tobago Manufacturers' Association (TTMA), Chambers of Commerce, Trinidad and Tobago Contractors' Association, Exporters, Service Providers, Importers, Merchants, Trinidad Hotel Restaurants and Tourism Association (THRTA), Tobago Hotel and Tourism Association (THTA), Association of Professional Engineers of Trinidad and Tobago (APETT) and Board of Engineering of Trinidad and Tobago (BOETT), Trinidad and Tobago Coalition of Services Industries (TTCSI), "inter alia"	Represent the users of NQI; participate in NQI institutions; are consulted about the design of NQI
National and Local Governmental Institutions (Public Sector – National)	Government Ministries and Departments, National Standards Bodies and Agencies, Regulatory Bodies, "inter alia". For example, TTBS, The Caribbean Industrial Research Institute (CARIRI), Chemistry and Food and Drugs Division, Public Health Inspectorate (PHI), Veterinary Public Health Inspectorate (VPHI), Municipal Corporations (MCs), include Regional Corporations (RC) and Department of Health and Social Services Tobago (DHSS)	Competent authorities, develop technical regulations and assess conformity by testing and inspection, need to align own activities to principles of global trade.
QI Service providers	Private and public organizations which are providing conformity assessment services and training e.g. TTBS, TTLABS, CFDD laboratories and WASA, TATT, EMA, CIQ, TISTT, and SGS, LRQA, CIQ, "inter alia".	Set standards; provide certification, calibration and tests, and inspection services
Civil Society	Consumer Groups, Trade unions, Academia, Community-based Organizations, other Non-Governmental Organizations, etc. such as The Cropper Foundation and Friends and Fishermen of the Sea	Articulate consumers' interests, participate in the development of standards and technical regulations; research and promote quality awareness

Source: Authors' own elaboration

3.3 Relationship to Other Policies

The National Quality Policy does not exist on its own. In Trinidad and Tobago, there are several policies already in place that contain references to standards, quality and technical regulations. These policies typically deal with the enhancement of the export trade, consumer protection, food safety, innovation system promotion, environmental controls, infrastructure development, and public procurement. The references to standards, quality and technical regulation within these policies do not always relate to a holistic view of quality infrastructure, nor provide national guidance on a common approach to technical regulation. They do, however, provide very important interfaces for an NQP.

Figure 3: Relationship of National Quality Policy to other Policies

Source: Authors' own elaboration based on UNIDO 2016, p. 18.

Trade Policy: The Trade Policy 2013-2017[12] outlines the priority sectors that are the focus for development and/or expansion and falls within the portfolio of the MTI. Additionally, the MTI is currently developing an updated National Export Strategy, which will establish mechanisms and programs to support the priority sectors. The National Government's Aid for Trade 2016-2019 strategy identifies the strengthening of the NQI and improving the management system in SMEs as priority areas for focus.

[12] http://www.ttcsi.org/wp-content/uploads/2014/06/Final Trade Policy and Strategy for TT 2013-2017 August 22, 2013 - 18.11.13.pdf (accessed on October 10, 2017).

Consumer Protection: The Consumer Affairs Division of the MTI responds to consumer complaints based on the Consumer Protection and Safety Act No. 30 of 1985 (amended by Act No. 22 of 1998), which is only marginally utilized. The Division also undertakes market surveillance.

Draft Food Safety Policy: The Chemistry and Food and Drugs Division (CFDD) of the Ministry of Health executes the Food Safety Policy, the legal basis for which is the Food and Drugs Act No. 8 of 1960 (amended and updated to December 31st, 2007). For trade with agro-food products, it is important that the regulations meet the Sanitary and Phytosanitary (SPS) requirements established by the WTO. Also, the conformity assessment (certification, testing and inspection) must demonstrate their technical competence, which is best done by accreditation.

Agriculture and Fisheries Policy: The Ministry of Agriculture, Land and Fisheries is the competent authority in the primary link of animal production and farming. The integration of animal and farming products in food value chains makes coordination with the Food Safety Policy critical. The increasing demand for private and sustainability standards – like GlobalGap by European retailers – challenges the current system.

Works and Transport Policy: The Ministry of Works and Transport has, under its jurisdiction, multiple responsibilities such as coastal erosion, drainage, bridges, civil aviation, construction, heritage buildings maintenance, mechanical services, roads and highways, traffic management, air services, harbours, maritime services, motor vehicle registration and control, national transportation, ports (including airports), public transport and shipping. Many of these responsibilities are executed by state agencies, which also sets standards and develop technical regulations. Although the relevant standards, regulations and conformity assessment are critical in infrastructure and transport, the link to the National Quality Infrastructure is only rudimentarily developed.[13]

Environment Policy: The Environmental Management (EM) Act No.3 of 1995 (re-enacted as Chapter 35:05 of 2000) guides the protection, conservation, enhancement and wise use of the environment of Trinidad and Tobago. The EM Act established the Environmental Management Authority (EMA) and provided for its composition, administration, financing and role. The National Environmental Policy refers to different standards to limit pollution of water, air and soil. TTBS is already collaborating with EMA in standards and accreditation for the conformity assessment of water.

The activities of public utilities like the Trinidad and Tobago Electrical Commission (T&TEC), the Water and Sewerage Authority (WASA), and the current work of the Government on a National Solid Waste Policy are also environmentally sensitive. Quality Infrastructure supports the reliability of environmental testing laboratories by guaranteeing metrological traceability and accreditation, and assures sustainability of certification schemes.

Public procurement policy: With the Public Procurement and Disposal of Public Property Act No. 14 of 2015, Trinidad and Tobago is updating its purchasing policy. The introduction of quality criteria could leverage the use of quality infrastructure and conformity assessment services in the country.

[13] The compulsory product certification for cement by TTBS is an example.

Innovation Policy: The National Innovation Policy is currently before Cabinet for approval. This policy is aimed at creating an enabling environment that will stimulate the innovation capacity of the country and lead to private investments. The related policy advice by the Economic Development Advisory Board (EDAB)[14] highlights the importance of knowledge transfer from academia to the private sector. However, the relevance of quality infrastructure to promote or hinder innovation is not sufficiently considered in this debate.

Service Policy: The Ministry of Trade and Industry (MTI) is currently developing a National Services Policy. This policy will provide a framework for the development and expansion of the local services sector. The policy will be aimed at increasing the overall contribution of the sector to the economy by providing a framework to increase exports, develop human resources and facilitate adherence to international standards. It has a strong link to quality infrastructure by promoting services and standards and advocating for the protection of consumers of services.

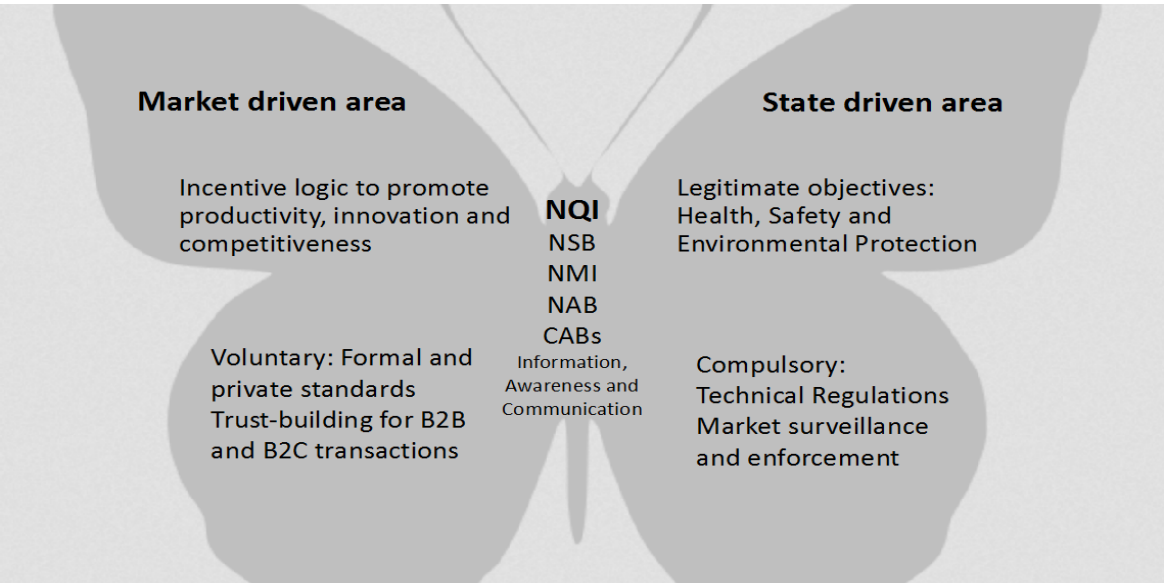
All of these policies make references to or incorporate terms such as standards, certification, inspection, accreditation, testing metrology or technical regulations, and need guidance by an integrated NQI to ensure clarity and uniformity in the use of concepts and terminology. In this regard, an NQP can be understood as a crosscutting policy that has relevance for different government sectors.

[14] SWIFT, K. 2017: Overview of the National Innovation Policy - Reforming the National Innovation Ecosystem, EDAB, Port of Spain, https://edab.org.tt/wp-content/uploads/2017/06/Kieron-Swift_Draft-National-Innovation-Policy.pdf (accessed on October 10, 2017).

3.4 Quality Infrastructure Components

Quality Infrastructure responds to two fundamentally distinctive needs, on one side to improve the performance of markets, and on the other side, to protect the legitimate objectives related to health, safety and security of the population, and the protection of the environment.

Figure 4: The Quality Infrastructure Butterfly



Source: Authors' own elaboration based on CROSQ's RQP.

Using the metaphor of a butterfly,[15] each area is represented by a wing:

The market-driven wing represents the area of voluntary standards, which are developed by formal standard organizations like ISO or IEC at the international level and adapted by Regional and National Standard Bodies like COPANT, CROSQ and TTBS. Here, the private sector is the driving force. These standards support the development of common terminology and requirements which facilitate trade between companies (B2B) or between companies and consumers (B2C). Standards reduce transaction costs and stimulate innovation and competitiveness.

The state driven wing represents the sphere of regulation with technical regulations. Technical regulations can create barriers to trade, and should therefore be limited only to the protection of the legitimate objectives of the citizens. Technical regulations can also be seen as minimum requirements. To reduce possible negative implications to trade, regulators should follow Good Regulatory Practices (GRPs), which includes the use of technical standards.

[15] The metaphor of a butterfly emerged in collaboration with experts working with the National Metrology Institute of Germany (PTB); its content was systematized by Clemens Sanetra and used as a model in the Regional Quality Policy of CROSQ.

Quality Infrastructure and Conformity Assessment Services are required on both wings of the butterfly. In the market-driven area, testing laboratories verify the compliance, calibration services guarantee precise measurements, and certification bodies certify products and management systems. In the compulsory area, there are market surveillance and inspection services which also use laboratory and calibration services. In both areas, the technical capability of the conformity assessment bodies can be validated by independent accreditation bodies like TTLABS in Trinidad and Tobago.

The NQP must act on both wings of the QI butterfly in order to protect consumers while increasing competitiveness at the same time.

3.4.1 Standards

In the modern world, standards have become the most successful tool to achieve economies of scale and to reduce inefficiencies in the market. Several other benefits have been granted by standards, such as: streamlining internal processes or scaling up operations and creating or entering new markets for companies;[16] providing for the adoption of better regulations and giving safety, quality and value for money to consumers.[17]

The economic contribution of standards to the economy has been studied and their wide impact recognized. A study undertaken by the British Standards Institute (BSI) and developed by the Centre for Economics and Business Research (CEBR) in June 2015,[18] shows that the use of standards between 1921 and 2013 has contributed to 0.7% of GDP growth and 37.4% of labour productivity in the UK economy, which translates into an additional 8.2 trillion pounds of GDP, which come from the market-driven use of standards.[19]

Standards are formal documents developed by a consensus process and issued by a recognized body, and they contain the requirements to which a product, process or service should conform. Standards are used as the basis of technical regulations. There are international, regional, national, and private or industry standards. Today, national standards are developed by the adoption or

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[16] ISO Economic Benefit of Standards in https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/ebs_case_studies_factsheets.pdf (accessed on October 10, 2017). See also ICONTEC, Standardisation: Contribution to the Competitiveness of Colombian Organizations. Bogotá, 2016. pp. 29.

[17] See https://www.iso.org/benefits-of-standards.html Visited 9/28/2017.

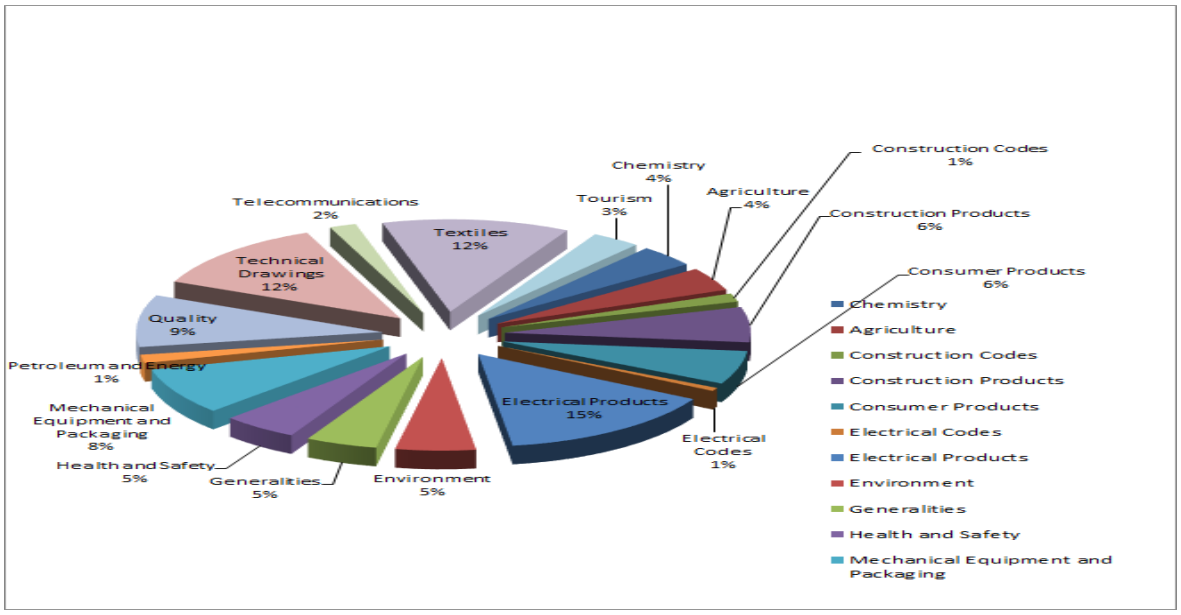
[18] ICONTEC, Standardisation: Contribution to the Competitiveness of Colombian Organizations. Bogotá, 2016. pp. 7.

[19] In another study carried out in 2010 in the UK, entrepreneurs in various sectors were asked if they considered that standardization supports technological development processes. 75% of respondents in the health sector responded affirmatively, as did 67% of the energy sector and 63% of the construction sector. For a study, conducted in 2015 by ISO, 50% of organizations surveyed said that the standards promoted innovation, through the dissemination of new knowledge. ICONTEC, Standardisation: Contribution to the Competitiveness of Colombian Organizations. Bogotá, 2016. pp. 40. See also the industry specific Gerfor Case in http://www.iso.org/iso/home/store/publication_item.htm?pid=PUB100288 (accessed on October 10, 2017).

modification of regional and international standards. The Standards Act No. 18 of 1997 grants TTBS the status of National Standards Body (NSB) for Trinidad and Tobago.[20] Under this legal mandate, TTBS has established processes for the development of national standards based on the consensus approach - as required by ISO/IEC Guide 59 and the principles in Annex 3 of the WTO/TBT Agreement.[21]

The official standards database indicates that TTBS has issued two hundred and sixty-five (265) voluntary standards and eighty-eight (88) mandatory standards, covering twenty-two (22) defined categories (Figure 5 shows the top seventeen (17) categories by percentage of total standards) and three (3) Publicly Available Specifications (PAS). There is evidence to suggest that the process of development, publication, review and withdrawals is properly managed and follows good practices for standardization.[22]

Figure 5: Category and Percentage of Standards



Source: Authors' own elaboration based on TTBS Standard Database as at September 30, 2017

Service standards are less prominent, but there are current initiatives and efforts to change this situation through strategic programmes to assist targeted sectors. In the tourism sector, the TTBS

[20] The 1997 Standards Act covers the areas of standards, "compulsory" and voluntary, accreditation of laboratories, certification and inspection of goods. Although, the Standards Act does not cover metrology, this key is for any NQI was later covered by the 2004 Metrology Act.

[21] WTO TBT Agreement. https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm. (accessed on October 10, 2017).

[22] The TTBS has also been active in withdrawing 288 voluntary standards.

has indicated that it has been able to work indirectly by setting up voluntary programs for certification based on national standards. The Ministry of Tourism developed a National Tourism

Policy of Trinidad and Tobago (2010) in addition to two Sub-Policies, the Sport Tourism Policy of Trinidad and Tobago and the Ecotourism Policy of Trinidad and Tobago.

The use of standards is critical in the tourism sector as it has the potential to improve all components of the tourism value chain. The tourism sector has been exposed to two (2) initiatives: the Service. Training. Attitude. Respect (STAR) programme and Hospitality Assured, a Caribbean Tourism Organization (CTO) initiative. Both programmes depended on the use of industry standards to achieve the highest levels of business and service excellence. The Trinidad and Tobago Tourism Regulatory and Licensing Authority (TTTRLA), under the Ministry of Tourism, is mandated to develop, maintain and harmonize Product Quality and Service Standards in all segments of the tourism and hospitality industry, including accommodation, restaurants, transportation, sites and attractions.

In addition, work is being undertaken with respect to SME building. The Ministry of Labour and Small Enterprise Development is promoting the implementation of a management system standard developed specifically for SMEs.[23] In fiscal 2017, the Enterprise Development Division of the Ministry of Labour and Small Enterprise Development partnered with Premier Quality Services Limited (PQSL), a subsidiary of the TTBS, to provide online training and standardization for *TTS626:2013* – Good Management Practices for Micro, Small and Medium Enterprises Certification. The FairShare Assisted Standards Training (F.A.S.T) online training tool was made available to the FairShare Micro, Small and Medium Enterprises. A pilot group of twenty-five (25) Micro, Small and Medium Enterprises commenced the process during this period. As at the end of November 2017, nineteen (19) Micro, Small and Medium Enterprises have been utilizing the online training.

There are existing legislative instruments and market needs for the development and use of standards (e.g. in the telecommunication and petroleum industries) by other standards agencies. Currently, international standard bodies and TTBS provide these standards in the absence of respective standard bodies.[24] The Telecommunications Authority of Trinidad and Tobago is one such body which adopts international standards (after reviews of similar regimes) into technical regulations. Additionally, schedules which have been set as maximum permissible limits for subsidiary legislation can be technical regulations as they are compulsory by law.

Trinidad and Tobago is represented by TTBS in the International Organization for Standardization (ISO). TTBS participates only in ten (10) of currently two hundred and forty-four (244) ISO Technical Committees.[25] The country actively participates in the regional standards setting

[23] Trinidad and Tobago Standards for Good Management Practices for MSEs, see Micro and Small Enterprise Policy for Trinidad and Tobago (2013-2016), http://www.molsmed.gov.tt/portals/0/mse/msedocp.pdf (accessed on October 10, 2017).
[24] MESOPARTNER, Interview with TATT, October 11th, 2017.
[25] ISO/PC 245 Cross-border trade of second-hand goods, ISO/PC 302Guidelines for auditing management systems, ISO/TC 17/SC 16 Steels for the reinforcement and pre-stressing of concrete, ISO/TC 176 Quality

through CROSQ within the CARICOM legal framework to develop and promote harmonization of standards. With over 50 regional harmonized standards, TTBS has adopted only three (3). The reason for this slow pace of adoption by this process is the fact that most of these regional standards are related to foods – a category of standards prohibited by the Standards Act. The CFDD, on the other hand, does not have the status of an NSB to adopt these as national standards. This is a limitation in the NQI legislative arrangement that will negatively affect Trinidad and Tobago's competitive position in CARICOM and internationally. Although the standards development process meets most international benchmarking requirements, there remain some areas that require strengthening, namely:

1. the amendment of the Standards Act and the Food and Drugs Act
    a. to unify the consensus approach to standards development,
    b. to broaden stakeholder participation in the governance process,
    c. to address the use of mandatory standards, and
    d. to rectify any instances of unequal treatment of local and imported products
2. the use of a policy to ensure market relevance of standards, and
3. the assurance of financial sustainability
4. the increase in awareness of stakeholders, including the Board Members and Chairs of Technical Committees (increased use of standards in products and services sectors), and
5. improvement towards best-in-class practices. The legal framework will also need to indicate a clear scope for quality in processes and services and not just for products.

In Trinidad and Tobago, there are other agencies responsible for setting standards in their sectors/sub-sectors e.g. EMA, WASA, TATT. Currently, these authorities are not formally or operatively part of the NQI of Trinidad and Tobago and receive limited technical support from the TTBS. These agencies are viewed as important parts of the QI and should be incorporated formally into NQI. This will allow the country to fully comply with the WTO Code of Good Practice for the Preparation, Adoption and Application of Standards.[26]

3.4.2 Product Regulations

The Ministry of Trade and Industry has the authority to transform voluntary standards into compulsory standards. The TTBS can recommend the declaration of compulsory standards. There are currently eighty-eight (88) compulsory standards that apply to trade and industry.

Under the WTO's Technical Barriers to Trade Agreement (TBT), the definition of a technical regulation is a "document which lays down product characteristics or their related processes and

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management and quality assurance, ISO/TC 176/SC 2 Quality systems, ISO/TC 176/SC 3 Supporting technologies, ISO/TC 228Tourism and related services, ISO/TC 292 Security and resilience, ISO/TC 309 Governance of organizations, ISO/TC 34/SC 18 Cocoa; see https://www.iso.org/member/2149.html?view=participation&t=PT (accessed on October 10, 2017).

[26] WTO TBT Agreement, Annex 3 Code of Good Practices for the Preparation, Adoption and Application of Standards.

production methods, including the applicable administrative provisions with which compliance is mandatory; it may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method ..."[27]

Therefore, Trinidad and Tobago's "compulsory standards" are, according to the WTO "technical regulations". However, the way such regulations are adopted in their entirety in Trinidad and Tobago may not be considered to fully comply with the WTO TBT Good Regulatory Practices (GRPs).[28] To resolve this issue, most countries have moved from a "compulsory standard" to a separate voluntary standard or technical regulation model.[29] This new model separates the development of voluntary standards for the improvement of quality from secondary products regulation legislation that are restrictive. Voluntary standards should be based on a legitimate justifications such as national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment.[30]

Other authorities, like TATT, EMA, WASA, GEI, OSH, NIDCO, under several Acts, also have the power to enact product regulations. The TTBS promotes Good Regulatory Practices (GRP), but regulators who are not under the Ministry of Trade and Industry do not always comply with WTO TBT or SPS obligations. For example, TTBS manages and uses the Trade Enquiry Point of the WTO Technical Barriers to notify procedures related to technical regulations and conformity assessment procedures.[31] However, the authorities outside of the scope of the Standards Act do not notify technical regulations as required under WTO Technical Barriers to Trade Agreement and are not always aware of the benefits of compliance to GRPs for both the regulator and the society at large.

In addition, the Food and Drugs Act does not differentiate between voluntary standards for the quality of food and food compulsory sanitary measures, CFDD's mandate. Similarly, this applies to the Ministry of Agriculture, Land and Fisheries. This situation limits the possibility for Trinidad and Tobago's processed food sector to comply with international standards for export and to enter niche markets and also explains the rare use of sustainable development marks for new food categories of single origin, geographic denomination, and organic category.

[27] See WTO TBT Agreement, Annex 1.
[28] See WTO Annex 8 on Good Regulatory Practices and Principles.
[29] See for example Costa Rica´s Law 8279 of 2002.
[30] See WTO TBT Agreement, Article 2.2.

[31] The WTO TBT Agreement also states that the organization responsible for implementation and administration of the WTO TBT Agreement is responsible for notification procedures related to adopted or drafted Technical Regulations and Conformity Assessment Procedures developed, not only by the NSB, but by other agencies at the national level with the legal authority to do so. This responsibility, along with that for operation of an Enquiry Point, was also given to TTBS by TT Cabinet Note 553.

3.4.3 Metrology

Metrology is the science of measurement and an enabler of international trade. It includes units of measurement and their standards, measuring instruments and their field of application, and all theoretical and practical aspects relating to measurement.

Metrology is classified into three main fields:

1. *Scientific Metrology* is that part of metrology which deals with aspects common to all metrological questions, irrespective of the quantity measured. It covers general theoretical and practical problems concerning units of measurement, including their realization and dissemination through scientific methods, the problems of errors and uncertainties in measurement, and the problems of metrological properties of measuring instruments.
2. *Industrial Metrology* is that part of metrology which deals with measurements in production and quality control. It covers calibration procedures, calibration intervals, control of measurement processes and management of measuring instruments in industry, to ensure that they are in a state of compliance with requirements for their intended use.
3. *Legal Metrology* is that part of metrology which is subject to legal/regulatory control. It provides regulations for the control of measurements and measuring instruments. Legal metrology provides protection of public safety, the environment, consumers, and traders, and is critical to fair trade.

The Metrology Act No. 18 of 2004 is the principal legislation providing for the legal use of measurement in the three main fields of metrology. TTBS is the National Metrology Institute with laboratories for national standards in the areas of length, mass, temperature, time, volume, pressure, electrical units (voltage and current), humidity and torque.

The Metrology Act is supported by the following key regulations:

- Metrology Regulations 2015, which provides for the:
  - Approval for pattern of prescribed measuring devices; and
  - Requirements for prescribed measuring devices; and
- The Metrology (Quantity of Goods) Regulations 2015, which provides requirements and verification procedures for pre-packaged goods.

The Metrology Act also allows for the provision of calibration services and the establishment of the physical metrology, with the support of CROSQ and the Inter-American System of Metrology (SIM).

TTBS and CARIRI are the only two state-owned calibration laboratories, with just about forty (40) calibration service providers (in various configurations) estimated to be operated by the private sector. Users are generally satisfied with calibration services to the industry which are provided in

the areas of Dimensional, Mass, Pressure, Electrical, Volume and Temperature measurements.[32] The TTBS is designated as a Regional Reference Laboratory for Temperature Standards (CaRLs Programme) and offers accredited services for weights (1mg to 20 kg), thermometers (-20°C to 250°C) and static volume calibrations.

Since the proclamation of the two regulations in 2015, the TTBS now has the legal framework to offer services in verification and checking of pre-packaged goods.

This legislative framework provided by the Metrology Act, the attendant regulations and the level of services offered, are indicative of a robust metrology infrastructure in Trinidad and Tobago. There are, however, some areas that must be addressed to respond to the national and regional needs while meeting international requirements:

1. Trinidad and Tobago, does not have full traceability for metrology to the international system, although the TTBS (its National Metrology Institute), is a member of BIPM. This means that Trinidad and Tobago's measurement capability and systems are not recognized by the International Measurement Community as complying with international norms and practices. This can negatively impact on Trinidad and Tobago's ability to effectively trade with its partners and may result in retesting or rejecting of equipment;
2. The general and environmental conditions of the laboratories are not suitable for the maintenance of national standards and calibration work, and the temperature and humidity requirements are not always met;
3. Current laboratory space is not adequate for performing work and providing for expansion of services; and
4. The current stock and measurement capability of equipment is not sufficient for providing traceability to meet national and regional needs in a timely manner (e.g. calibration of E1 mass standards and other national standards within the region).

3.4.4 Accreditation

Accreditation is a third-party verification related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.

TTLABS was created to guide laboratory development in Trinidad and Tobago. Today, public laboratories are rarely accredited, and there is a lack of commitment from the competent authorities to demonstrate technical capabilities using accreditation.

TTLABS has been applying international principles and practices in the Trinidad and Tobago laboratory accreditation programme and continues to seek international recognition. However, TTLABS still has not been able to achieve international recognition from the International Laboratory Accreditation Cooperation (ILAC) for the accreditation of testing, clinical and calibration laboratories under international applicable standards. The process of obtaining

[32] This statement is based on interviews of users of calibration services.

international recognition requires the accreditation body to be evaluated by a team of peers from accreditation bodies that are signatories to the ILAC Mutual Recognition Arrangement.

However, in 2010, this evaluation revealed that the impartiality of the accreditation process currently practised by TTLABS was not compliant with the requirements of the Mutual Recognition Arrangement of ILAC. TTLABS has, since then, made significant progress towards this achievement in building its institutional capacity.

Upon approval and building of the requisite capacity, an independent accreditation body, meeting international standards, will be expeditiously pursued to ensure the availability of internationally recognized accredited laboratory services to support the export and health sectors and the relevant government authorities as needed.

3.4.5 Conformity Assessment Services

Conformity Assessment is the demonstration that specified requirements relating to a product, process, system, person or body are fulfilled and is typically conducted through quality assessment services such as inspection, testing and certification. Regarding relevant quality services, TTBS has the power to:

- provide for the examination and testing of goods;
- establish or designate laboratories and testing facilities;
- encourage and undertake educational programs about standards;
- cooperate with and advise manufacturers in setting up quality control systems; and
- administer the certification of such goods and liaise with foreign, regional and international bodies dealing with standardization and the quality of goods in the preparation of standards.

In Trinidad and Tobago, several public and private organizations provide conformity assessment services. In the compulsory area, TTBS, CARIRI and CABs of ministries and authorities offer laboratory and inspection services. TTBS and CARIRI are also active in the market-driven area and often compete with multinational competitors like SGS, Bureau Veritas and Lloyds Registers. Trinidad and Tobago's oil and gas industry, for example, uses mainly foreign suppliers for conformity assessment services.

3.4.5.1 Testing

Testing laboratories are utilized by firms and regulators to provide objective analytical data on product and process quality. Based on testing standards, testing laboratories assess the conformity to established requirements.

There is no reliable information about the number of laboratories in Trinidad and Tobago.[33] Testing laboratories are offering services to the following sectors, subsectors and service areas:

[33] https://www.findyello.com/Trinidad/LABORATORIES-TESTING

Health, construction, energy, petrochemical, food and beverage, environmental service, and calibration[34]. Most of the laboratories are privately owned. Only eleven (11) laboratories offer services accredited by TTLABS.[35]

The Caribbean Industrial Research Institute (CARIRI)[36] offers laboratory services in analytical and organic chemistry, microbiology, metallurgy and petroleum.[37] CARIRI's laboratories have demonstrated compliance with the ANSI/ISO/IEC 17025:2005 standard. The management system of CARIRI has been assessed and certified by SGS as meeting the requirements of ISO 9001:2008. CARIRI's laboratories have had a history of international accreditation of its test methods since 1997. The laboratory currently uses the services of the United States-based International Accreditation Service (IAS).

3.4.5.2 Certification

Certification is a formal procedure by which an accredited or authorized person or agency assesses and verifies the attributes, characteristics, quality, qualification, or status of individuals or organizations, goods or services, procedures or processes, or events or situations, in accordance with established requirements or standards.

In Trinidad and Tobago, certification services are provided mainly by private, mostly multinational, companies (e.g. SGS, LRQA) and by TTBS's Certification Department.[38] The TTBS seeks to offer product certification to voluntary customers, but also to those who must comply with a mandatory standard that is enforced by the Implementation (Standard Enforcement) Division. This arrangement is likely to be challenged on the principle of impartiality as required for certification bodies (See ISO/IEC 17065).[39] TTBS's Certification Department also offers certifications of management systems, and is currently pursuing the accreditation of its service.

The data of the ISO Survey in Annex 3 shows that the global market for the certification of management systems is constantly growing. In Trinidad and Tobago, there is significant potential

[34] From the List of Accredited Laboratories provided by TTLABS, only two medical laboratories provided accredited tests.

[35] There is an information gap regarding the accreditation of laboratories operating in Trinidad and Tobago, which are accredited by foreign accreditation bodies.

[36] The Caribbean Industrial Research Institute (CARIRI), established by the CARIRI Act of 1971, offers laboratory and field testing, consulting, training, research and development services.

[37] The full list of services is published at http://www.cariri.com.

[38] See Benchmarking data in Annex 3. Available data showed that there are 325 management systems certifications (ISO Survey) issued to companies in Trinidad and Tobago of which TTBS has only issued 27. Only 3 products certifications have been issued.

[39] Mandatory or voluntary product certification schemes may cover the same products the Implementation Division in TTBS inspects. This situation will raise concerns regarding conflicts of interest within TTBS. One such conflict will occur when the same entity works closely with companies to implement voluntary or compulsory standards, while at the same time the entity is monitoring and enforcing adherence to the same standards. If this conflict arises, this position is hardly defensible among international partners and it may be considered unfair competition by other certification bodies the National Quality Infrastructure.

for certification to management system standards, private and other standards in non-regulated areas.

3.4.5.3 Inspection

Inspection refers to the examination of a product design, product, process or installation and determination of its conformity with specific requirements or, based on professional judgement, with general requirements. Inspection services are required for industry and government regulation.

Private inspection bodies include both international (e.g. Bureau Veritas Group and SGS) and local players offering inspection services in the areas of transportation, pre-shipment of goods, petrochemical, oil and gas, labour and utilities, to name a few. The government is also a user of inspection services performed by the private sector, e.g. in the assessment of compliance with occupational health and safety regulations. There is a lack of information to determine how private sector supports its needs for inspection services and whether these services are accredited.

At least twenty (20) public entities[40] (within ministries, state-owned enterprises or statutory bodies) perform an inspection function; their status ranges from being well-developed, for example, TTBS Implementation Division - now accredited to ISO/IEC 17020 - to those considered to be in the early stages of development. These bodies perform critical inspection and enforcement services in sectors such as trade, food, transportation, health, utilities (water, telecommunications and electricity) and building construction.

The Implementation Division of the TTBS is one of the leading inspection bodies operated by the government. The TTBS Implementation Division is accredited to ISO/IEC 17020 and monitors compulsory standards in the following areas:

- Automotive parts: tyres, batteries, and brakes;
- Construction: carbon steel bars, cement, plywood, nails, tiles;
- Appliances and safety products: refrigerant gases;
- Electrical goods: electrical cables, Light Emitting Diodes (LED) bulbs, electronic appliances, labelling;
- Textile products: composition and labelling; and
- Pre-packaged products and toys: labelling and content (processed foods are not covered by statute).

The TTBS Implementation Division performs the inspection of imported and a few locally produced goods to which compulsory standards apply. The Division is considering expanding its offerings to

[40] Based on an assessment of the regulatory work by ministries and Internet search and local enquiries of bodies operated by the private sector.

address emerging needs of the market, and is also pursuing certification under the ISO 27001 standard for information security management system.[41]

In the TTBS business model, the Implementation Division is also the area in the TTBS which generates the income that supports all other areas of the institute, including those such as standards development, accreditation, scientific and legal metrology. These areas are usually supported by government or other funding arrangements, as the specific beneficiaries cannot be readily identified.

Considering that the role of the Implementation Division in the TTBS is critical for the institution, any conflicting service within TTBS may want to give way to this surveillance function. The Implementation Division in the TTBS could expand its services to compete with private inspection bodies. It should be noted that TTBS voluntary inspection schemes may not cover the same products monitored by the Implementation Division in the TTBS.[42]

3.5 International Benchmarking

International benchmarking helps to assess the current development and performance of National Quality Infrastructure in Trinidad and Tobago.[43]

Benchmark countries were selected either by proximity, similarity, and degree of development or ability to compete with its exports. Based on these criteria, a starting point for the challenges that the policy will face was established. The benchmark countries are: Argentina, Canada, Chile, Colombia, Costa Rica, Jamaica, Mexico, Norway, Singapore, South Africa and Uruguay.

To have a snapshot of the position of Trinidad and Tobago in the international context, the current state of the quality infrastructure was analysed according to objective indicators that measure the integration of the system with the international quality infrastructure, as well as with the local productive sector value chains. The amount of services that metrology, certification, accreditation, and standards offer locally and internationally is measured, and based on these parameters.

Trinidad and Tobago ranks low in terms of QI development and competitiveness. There are significant shortcomings in the areas of metrology, standardization, conformity assessment and

[41] ISO/IEC 27001:2013 is an information security standard that was published in September 2013. It supersedes ISO/IEC 27001:2005 and is published by the International Organization for Standardization (ISO) and the International Electro-Technical Commission (IEC) under the joint ISO and IEC subcommittee, ISO/IEC JTC 1/SC 27. It is a specification for an information security management system (ISMS). Organizations that meet the standard may be certified compliant by an independent and accredited certification body, on successful completion of a formal compliance audit.

[42] This situation will also raise concerns regarding conflicts of interest within TTBS activities. In the event this conflict arises, the case among private competitors and internationally recognized accreditation bodies will prove difficult to defend. TTBS should assess and take adequate preventive measures to avoid the occurrence of such conflicts of interest. In addition, competition for private inspection shall be made at market prices to ensure vibrancy in the market. Notwithstanding these issues, there is still significant potential for TTBS to provide inspection services in non-regulated areas. For the provision of these services, accreditation will help to ensure inspection services are maintained at an adequate level in the country.

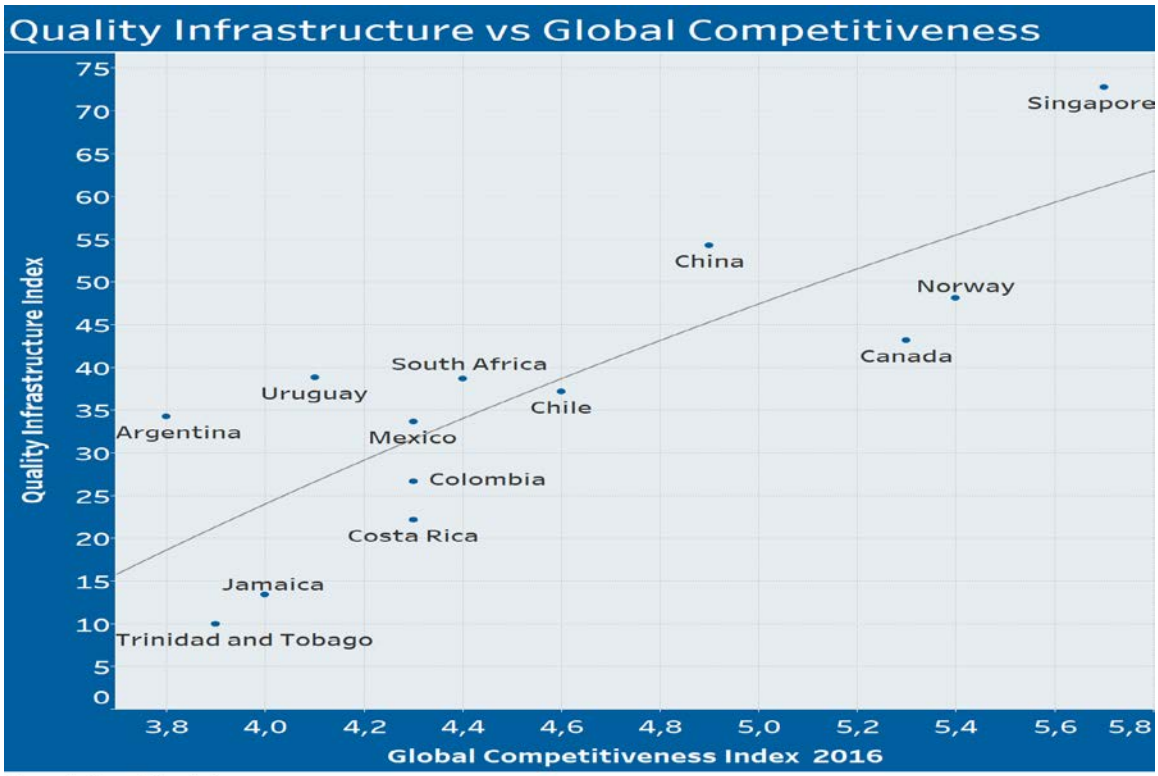
[43] Details of this analysis can be found in Annex 3.

accreditation[44] when compared with the countries of reference. In addition, the development of these factors will be accompanied by greater economic competitiveness (among other economic indexes). This challenge is linked not only to the capacity of the productive sectors regarding innovation, but also to the demand of world-class quality services as a main driver.

Figure 6 shows the position of Trinidad and Tobago in terms of quality infrastructure and global competitiveness. The relationship between quality infrastructure and competitiveness is very strong, and this supports the idea that the aim to increase Trinidad and Tobago's competitiveness, will require substantial investment in quality infrastructure services.

[44] The Regional Quality Policy suggests considering also the areas of marketing, information, knowledge creation and dissemination, R&D and education, and communication of QI. Because of data availability reasons across all countries in the benchmark sample, we are not measuring this key component of our definition of QI and NQP. However, feedback from stakeholders supports the hypothesis that there is an absent role of this pillar in each of the previously mentioned four technical areas. That is, information and awareness is the key QI demand and innovation driver and it is not present in TT's metrology system and civil society. There is a need to build this aspect going forward, which should be addressed by all NQPs (e.g.: education in primary, secondary and tertiary schools). In the end, the intention is to be able to compete on quality instead of price, at least in the Caribbean area, so information and awareness must be considered as an area itself and therefore should be resourced to grow accordingly to meet the NQP goals.

Figure 6: - International Benchmarking Competitiveness and Quality Infrastructure Development



Trend Line Model

A logarithmic trend model is computed for Quality Infrastructure Index given Global Competitiveness Index 2016. The model may be significant at p <= 0,05. R-Squared = 65,8%. p-value (significance) = 0,001.

Sources: Authors' own elaboration based on Data of Global Competitiveness Index and QI Data. (See Annex 3).

3.6 Summary of the analysis

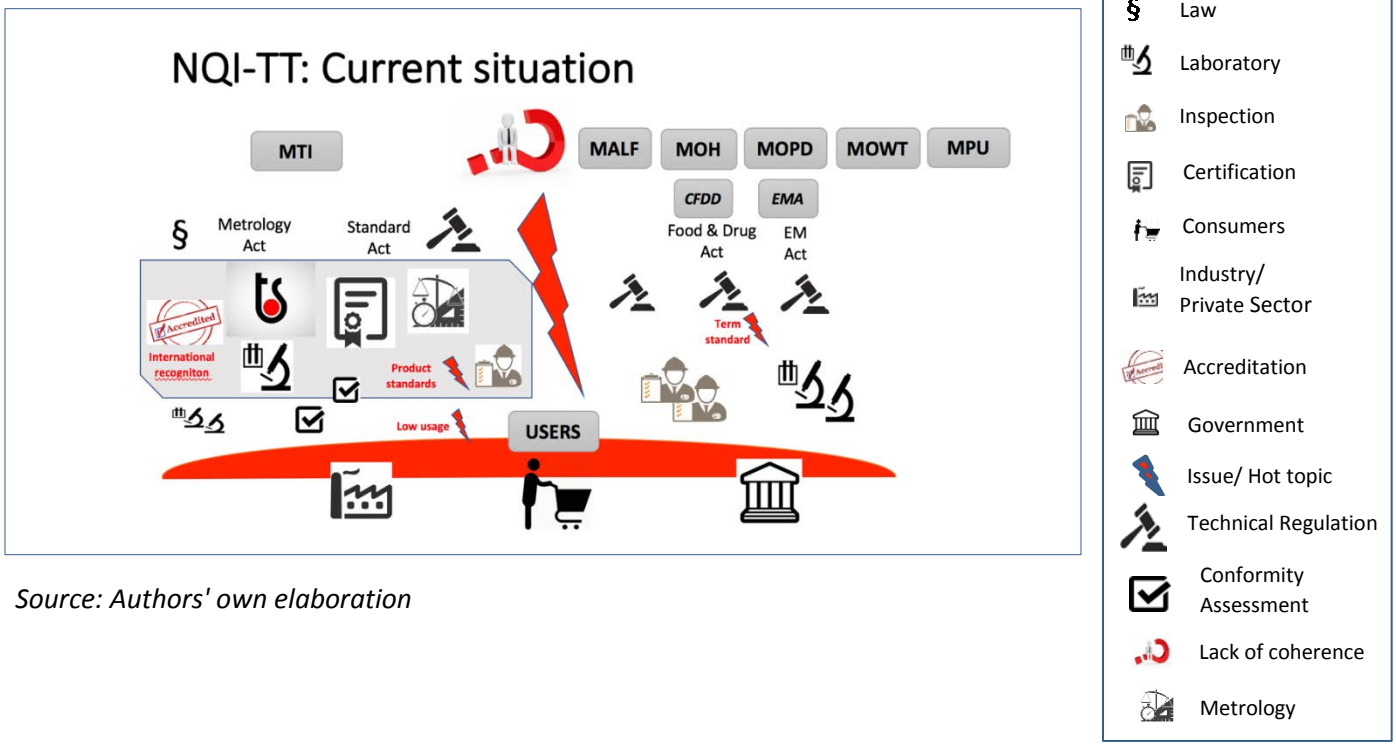
The aim of National Quality Policy is to create or improve a quality culture in the country. This can be understood as "an individual and societal state of being wherein a continual striving for a consciousness of quality improvement is embedded in attitude and personified in behaviour in all things, great or small" (See CROSQ 2017: Regional Quality Policy). At the societal level, the concept refers to multiple stakeholder groups, business people, employees, workers and consumers, policy makers, regulators and personnel of conformity assessment bodies.

A driving force of quality is educated and powerful consumers, which also includes the procurement practices of government organizations. There should be a positive return of investment in quality for companies and service providers to satisfy consumers' needs, and to meet their expectations. In the case of non-compliance, there is a need for systems for consumer protection and penalties in place. It is impossible to declare a culture of quality by law. As with other social institutions, the attitudes and behaviour regarding quality evolve and become shaped and changed only in the long term.

As mentioned previously, in Trinidad and Tobago, a culture of quality is not highly ranked. These cultural patterns are not unchangeable, but firstly need to be understood and recognized, so that the proper management of expectations regarding the NQP is possible.

The lack of a quality culture could be also explained by the limited use of product liability in lawsuits, or the practice of large corporations to purchase from their own subsidiaries. Technical regulations are not always enforced and local companies rarely use voluntary standards and certification. Even when government supports temporary private certification schemes (like in the case of the National Tourism Certification Programme) the effort is not sustained. Without using QI services, Trinidad and Tobago's SMEs will be unable to access lucrative markets, and neither will they meet their goal of trade expansion. The current situation of the National Quality Infrastructure including the compulsory area of regulation, testing and inspection is summ Key Figure 7:

Figure 7: Current Situation of the NQI in Trinidad and Tobago



Source: Authors' own elaboration

The question mark in Figure 7, indicates the missing cohesion of the whole National Quality Infrastructure (NQI). What is currently referred to as NQI evolved over several decades, and is built on the Standards Act No. 38 of 1972 and other legal documents like the Food and Drugs Act No. 8 of 1960. During the past few decades, the legal framework experienced several changes and adaptations, and the supply and demand of quality infrastructure and conformity services have significantly expanded (Annex 10). The current arrangement of NQI shows several weaknesses and inconsistencies, which require policy intervention.

Figure 7 also shows a division between the area of trade on the left-hand side and the area of regulation of all other policy fields, like agriculture, health, transport, education, public utilities, on the right-hand side.

The area of trade is partly regulated by the Standard Act and the Metrology Act, and is mostly in line with the principles of global trade. In this area, the TTBS is providing services as a National Metrology Institute (NMI), as a standard, certification, accreditation and inspection body, with laboratories for calibration and testing. The issues include the lack of the international recognition of the accreditation body (TTLABS) and possible conflicts of interests within TTBS between compulsory standard setting, product certification and inspection.

Figure 7 also shows that there are other providers of conformity assessment services in trade. For example, private certification bodies have a much larger market share than the certification division of TTBS. A similar situation is found in testing laboratories services, where CARIRI and other private laboratories cover the larger portion of the samples testing market.

The users in Figure 7, demonstrate the low demand of quality infrastructure and conformity assessment by local businesses, government bodies and consumers. Most of these entities operate in markets where quality management and product certification are not explicitly required by the buyers.

The right side of the diagram shows the Ministries: MALF, MOH, MOPD, MOWT and MPU. These Ministries operate under their own specific Acts, i.e. the Food and Drugs Act, the Consumer Protection and Safety Act, the Fertilisers and Feeding Stuffs Act or the Environmental Act, to name a few. In the terminology of the WTO, these Acts define Technical Regulations which are compulsory. One concern is that those Ministries and other Government Agencies with competencies in regulation and inspection do not systematically follow good regulatory practices (GRPs). There is still a terminological confusion in calling these technical regulations “standards”, which WTO has reserved for the voluntary area. Specifically, this creates a problem in Food and Drugs regulation and trade where an institutional framework of voluntary standard setting is missing.

Under the Acts and regulations, monitoring, surveillance and conformity assessment (mainly inspection and testing) services are provided to regulate industry, government and the public. Inspections are performed by bodies within ministries, state-owned enterprises or statutory bodies, as well as the private sector. These bodies perform critical inspection and enforcement services in sectors such as trade, food, transportation, health, utilities (water, telecommunications and electricity), pre-shipment of goods, petrochemical, oil and gas, labour and building construction. Private inspection bodies include both international (e.g. Bureau Veritas Group and

SGS) and local players. Inspection services support decisions that are critical to the protection of health, safety and the environment in the trading of goods and services. Inspection services play a key role in industry development and competitiveness, and require the demonstration of competence through accreditation to be internationally recognised. Only one local inspection body is known to have achieved accreditation.

In the regulatory area, the main problem identified is the lack of enforcement of compulsory requirements. In addition, some public laboratories and inspection bodies have limited human resources, limited laboratory space and outdated equipment to perform reliable services and sufficient accredited tests or inspections. These limitations do not work in the interest of consumer and public protection, and hinder access to promising foreign markets and the overall competitiveness of Trinidad and Tobago.

4 The Future of the National Quality Infrastructure

4.1 The Need for a Policy Intervention and the Proposed Model

The need for a policy intervention in quality and standards can be justified by three (3) main factors:

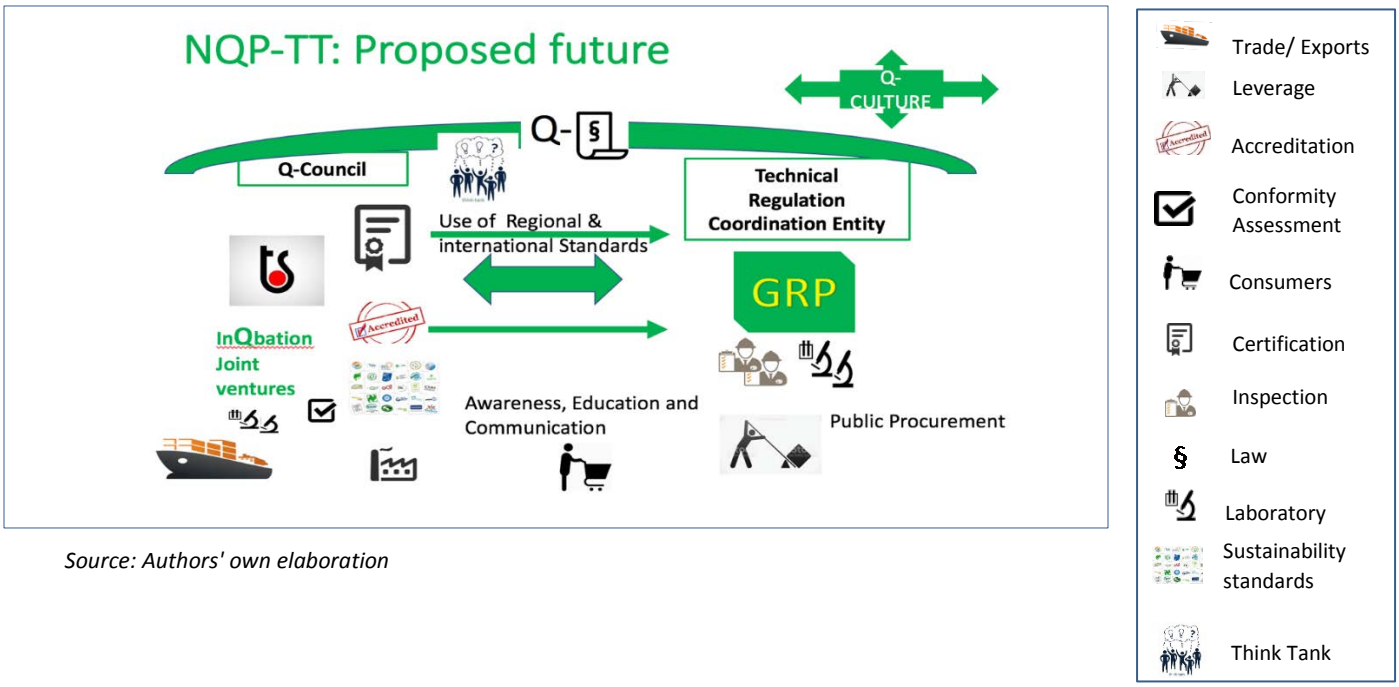
1. the need to address the weaknesses in the current arrangement of the current National Quality Infrastructure and Trade Regulation to support the country's trading and export strategies;
2. the response to the interest of Trinidad and Tobago's consumers for safe, secure and environmentally friendly products, and to protect the local industry from unfair competition from abroad; and
3. the Government of the Republic of Trinidad and Tobago's medium-to-long term development plan to create a diversified and innovation-driven economy.

The challenge is to further develop and redesign the current institutional framework in trade related standardization and regulation to contribute to competitiveness and sustainable development. Additionally, the NQI needs to be compatible with the Regional Quality Policy recently developed by CROSQ.[45] In the regional context, there is a special opportunity for Trinidad and Tobago, as one of the larger and more economically advanced CARICOM member states, to create regional centres of excellence in the provision of quality infrastructure services. Becoming a regional service centre can meet the demands from other regional and international countries and overcome the limitations of the domestic market.

The proposed model of NQI provides a framework for a demand-driven NQI where the roles and structure of the organizations are clarified, international requirements are met, the regulatory framework is reformed, the participation of the private sector is increased, and a modern structure for governance and a responsive feedback system of review and learning adaptations are in place.

[45] CROSQ is the CARICOM organisation for Quality. TTBS is one of its founding members.

Figure 8: Proposed model for Trinidad and Tobago's National Quality Infrastructure



Source: Authors' own elaboration

The model visualized in Figure 8 shows a holistic understanding of NQI and responds to the challenges identified in the previous chapter on the weakness of the current NQI situation. The primary goal of the system is to promote a quality culture in Trinidad and Tobago. The elaboration of an overarching legal framework which integrates all trade-relevant regulatory areas is therefore important. The legislative reform will affect several Acts, particularly the Standard Act and the Food and Drugs Act, the Animal Act[46] and the Plant Protection Act[47]. A Quality Policy Act is also envisaged.

The use and demand of conformity assessment services should be stimulated by awareness raising, education and communication (Annex 2). The introduction of quality requirements in public procurement is a win-win strategic use of QI to address existing standards and quality issues (in procurement) while at the same time increasing demand and demonstrating the value of investment in these services. Equally, joint ventures with international private conformity assessment providers and promotion of intrapreneurship and entrepreneurship in the QI and CAB entities will contribute to a broader and more cost-effective service offer.

The leadership in the NQI would consist of a National Quality Council where all key stakeholders[48] can be represented to discuss policy implementation and performance matters. This Council

[46] Animals (Diseases and Importation) Act Chapter 67:02
[47] Plant Protection Act No. 13 of 1975 Chapter 63:56
[48] The steering committee for the NQP development already includes several key institutions which should be part of the National Quality Council. Additionally, all Ministries and other Public Authorities with trade-relevant regulatory competences, as well as, the academia, need to be integrated or included.

would be chaired by the Ministry of Trade and Industry and will include public and private sector representatives.

4.2 Strategic proposals

The following strategic proposals are categorized into four components: 1. Governance and institution building; 2. Regulatory reform and policy integration; 3. Physical infrastructure development, capacity building and organisation strengthening; and 4. Enabling a quality culture and proactive environment.

4.2.1 Governance and Institution Building

Objective: To improve Trinidad and Tobago's QI operating framework and networks in a strategic, pragmatic, participatory and coordinated manner.

The Ministry of Trade and Industry with oversight responsibility for QI shall take the lead to establish a National Quality Council. The role of the National Quality Council (NQC) is to coordinate the actions of institutions that oversee quality related activities, leading to enhanced export performance while at the same time protecting the health and safety of consumers and the environment. More specifically, the NQC is responsible for: the coordination of quality promotion and dissemination activities; prioritization and justification of the areas for funding by the various Ministries/Agencies; the design and management of a multi-stakeholder approach to accomplish Policy goals; and recommendation of appropriate changes in the NQI. Furthermore, the National Quality Council will discuss policy implementation and performance matters.

The members of the Council will consist of officials from different Ministries, representatives of the Private Sector, civil society and academia. These representatives would possess expertise in the areas of trade, quality and health. It is suggested that the NQP Steering Committee could transition to the role of the Council. The members of the Council will consist of different ministries, and representatives of the private sector, civil society and academia and will discuss and coordinate periodically the National Quality Policy at the level of Permanent Secretaries and Directors. It is recommended that the Minister of Trade and Industry chair the Council and oversee its Secretariat.

Micronarrative Box 1: Costa Rica´s Quality Law and National Quality Council

Costa Rica's National System for Quality (SNC) is a framework for the development of activities related to development and demonstration of conformity, to improve the competitiveness of domestic enterprises and to provide confidence in the transaction of goods and services. The SNC also includes other support, diffusion and coordination activities established in the National Quality Law and its secondary legislation. The system is coordinated by the National Quality Council (CONAC). The CONAC is responsible for the coordination of quality promotion and dissemination activities and can make recommendations for appropriate changes in the NQI. See Annex 9 for more details.

The Quality Council has been established to articulate the participation of the public and private sectors, and promotes conformity assessment; quality management practices and technical capabilities; the quality of domestic and export goods; the incorporation of quality at all levels of national life; coordinates public entities that protect human, animal or vegetal health, the environment, consumer rights, and prevents practices that may be misleading. The Quality Council articulates the public and private collaboration in metrology, standardization, technical regulation and conformity assessment, and seeks to eliminate

technical barriers to trade.

Source: http://reventazon.meic.go.cr/informacion/legislacion/metrologia/8279.pdf Visited 21/9/2017

Considering that the National Quality Infrastructure is dynamic, and needs to learn and continually evolve, a high-level think-tank for quality is proposed.

The success of this Policy depends on all parties being committed to accepting responsibility for decision-making, and enhancing the level of Quality Intelligence required in Trinidad and Tobago. Intensive dialogue and sensitization of different stakeholder groups is key. Private conformity assessment bodies and Standard Setting Organizations should be positioned in a more visible place in the new National Quality Infrastructure. Fostering functional cooperation, coordination and sharing of resources in support of the development and effective utilization of QI and QI Services should become a shared priority.

Micronarrative Box 2: Colombia's Sectoral Standardization Units

Recognizing that industry normalization is an advanced stage of the standardization process in the developed countries, Colombia´s NSB, ICONTEC has established an agreement with the government to technically support entities willing to prepare standards specific to a sector or industry. These entities are called Sectorial Standardization Units (SSUs) and may be constituted by private or public entities that are authorized or capable of carrying out standardization work. These groups are representative of the interests of a given economic sector or industry and can guarantee both the technical infrastructure and the technical suitability necessary to promote the development of technical standards in the considered sector(s). To receive state recognition and support, the SSUs need to be authorized by the Ministry of Commerce and execute a technical support arrangement with ICONTEC. Currently there are nine (9) active SSUs. In addition, to foster the production of standards in the country, ICONTEC has entered collaboration agreements with trade associations like those for petroleum, banking, concrete, universities, the General Archive of the Nation and the Nation´s Geographic Institute. See Annex 9 for more details.

Source: http://www.mincit.gov.co/publicaciones/35902/seccion_1_disposiciones_generales (accessed on October 10, 2017). See also ICONTEC, Standardisation: Contribution to the Competitiveness of Colombian Organizations. Bogotá, 2016. pp. 25 and 26.

The policy goal is to expand the offering of QI and QI Services to support Trinidad and Tobago's national development agenda. Overall, to be successful, this policy requires continuous improvement of the understanding of quality as a way of life of doing things and the adoption of best practices in industry, the public sector, civil society (including consumers) and academia.

Micronarrative Box 3: Quality Marks of German SDOs

The German Food Association/ Deutsche Lebensmittelgesellschaft (DLG) awards a quality mark or seal of quality. A company of the German Standard Organization, DINCertco, awards the mark. It is however legally autonomous, to avoid any conflict of interests. Another example is the uniform Product Quality Mark for European Consumers called KEYMARK.

Source: http://www.dlg.org/faq.html, www.dincertco.de/de/ and http://www.dincertco.de/en/dincertco/produkte_leistungen/management_keymark/management-keymark.html (accessed on October 10, 2017).

The NQI Institutions of Trinidad and Tobago participate actively in the work of the international and regional QI organizations and programmes, as well as in the WTO TBT and SPS Committees. Under the new model, TTBS and the other QI institutions will continue to work to achieve international recognition for measurement capabilities and accreditation, while maintaining membership and participation in international and regional standard and trade-related bodies. In addition, QI institutions should remain strategically active at regional levels to promote and improve the competitiveness of Trinidad and Tobago.

Accreditation: The Ministry of Trade and Industry has taken the right step to establish an Accreditation Body to provide internationally recognized accreditation services. This will improve the services provided while at the same time, allowing the entity to focus on the most important issues.

While it is critical to prioritize the accreditation of testing laboratory methods (especially for foods for export), the accreditation of calibration laboratories and inspection bodies performing services to protect health, safety, the environment and to support export, should be given equal priority. Operators of these entities should be made aware of this policy and the important role of accreditation to their clients and businesses.

The TTBS, as the National Metrology Institute and National Accreditation Focal Point (NAFP) respectively, must be charged with the responsibility to build calibration and conformity assessment capacity in the country.

4.2.2 Regulatory Reform and Policy Integration

Objective: To undertake a regulatory reform which supports the integration of QI in government, commerce, trade and all relevant social activities. This reform covers the changes in the QI institutional arrangements in place, provides for the legal basis to implement GRPs in the country (WTO Annex 8: Principles of Good Regulatory Practices), and ensures compliance with international trade agreements and regional obligations.

In Trinidad and Tobago, there are several policies already in place that contain references to standards, quality and technical regulations. These policies typically deal with the enhancement of the export trade, consumer protection, food safety, innovation system promotion, environmental controls, infrastructure development, and public procurement.

The National Quality Policy does not supersede or replace any of these policies, but is intended to consolidate and support (Figure 8) regarding the quality infrastructure and technical regulation regime in Trinidad and Tobago. Further, it is intended that, using this policy, a coherent and effective quality infrastructure, its terms and usage will be integrated into the respective sector/crosscutting policies, related legislations, technical regulations, standards and conformity assessments activities.

Where these policies make references to or incorporate terms such as technical regulations, standards, metrology, accreditation and conformity assessments (certification, inspection, testing, verification and validation), the NQP provides guidance for their definition and ensures clarity and uniformity in their use.

The reformed/re-engineered technical regulation administration should address the use of the risk assessment approach and market surveillance. Furthermore, the technical regulation administration should not be unnecessarily trade restrictive. Local and imported products should be dealt with in similar manner. The regulatory system shall ensure the full use of QI (standards, metrology, accreditation and conformity assessment) and facilitate effectiveness and uniformity in its use to achieve relevant objectives while leaving the responsibility of adopting and maintaining product regulations to proper Ministries and other regulatory authorities.

It is recommended that a Technical Regulation Coordination Committee be established to support the integration of all regulatory and conformity assessment activities of the government sector in the new QI framework. The positioning of this Unit and its authority level are key to ensure that the necessary cultural and institutional changes are made. This should help to disseminate Good Regulatory Practices, and demonstrate the technical capability of public testing laboratories and inspection services via accreditation. It is suggested that this Unit be located in the Ministry of Trade and Industry.

The use and demand of conformity assessment services should be stimulated by awareness raising, education and communication (Annex 2). The introduction of quality requirements in public procurement is a win-win strategic use of QI to address existing standards and quality issues (in procurement) while at the same time increasing demand and demonstrating the value of investment in these services. Equally, joint ventures with international private conformity assessment providers and promotion of intrapreneurship and entrepreneurship in the QI and CAB entities will contribute to a broader and more cost-effective service offer.

Regulatory Framework

To achieve the development changes indicated in this policy, a National Quality Act is a necessary instrument as it is central to integrating a quality policy and advancing regulatory reform. The proposed Act will ensure compliance with applicable legislation and collaboration among authorities. It will provide a framework for the development of Trinidad and Tobago's NQI. It will create the National Quality Council, and a Technical Regulation Coordination Committee.

The Act will also respond to the need to amend the Standards Act[49] and ensure that the National Accreditation Body strengthens its required independence.

Micronarrative Box 4: Overarching Legislation Examples

Costa Rica´s National Quality System Law (No 8279/2002) is a successful overarching legislation covering all bodies related to the National Quality Infrastructure. Included are the reasons for the establishment of the NQS, the National Coordinating Body (CONAC), the NMI (LACOMET), the NAB (ECA), the National Regulatory Body (ORT) and the NSB (ENN). See Annex 9 for more details.

[49] In addition, with the amendments of the Standards Act of 1997, the Public Health Ordinance of 1917 should also be adjusted to clearly define the difference between quality and safety of food for human consumption, to allow higher growth of the food sector in TT. These amendments should also make clear that quality of food is mainly driven by formal and sustainability standards that cannot be adopted or implemented counter to food regulations in the country.

Source: http://reventazon.meic.go.cr/informacion/legislacion/metrologia/8279.pdf (accessed on October 10, 2017).

Colombian Law 155 of 1959 allows the national Government of Colombia to introduce by secondary legislation rules related to the establishment of quality in the country, with some exceptions (new agencies, establishing fees, etc.). In 2015, the Government of Colombia issued Decree No. 1595. This covers all the leading institutions of the Colombian National Quality System (SICAL) i.e. among the Colombian National Standards Body (ICONTEC), the National Accreditation Body (ONAC) and the National Metrology Institute of Colombia (INM). In addition, the Decree provides rules for regulators of products in the country, considers issues of conformity assessment and traceability, development of reference materials and the provision of proficiency testing. The Decree provides rules for regulators in the country and mandates the use of Regulatory Impact Assessment (RIA). The body in charge of coordinating the National Quality Infrastructure is the Inter-Sectoral Commission for Quality (CIC). This body coordinates actions among the different regulators in the country.

Source: http://www.mincit.gov.co/publicaciones/35902/seccion_1_disposiciones_generales (accessed on October 10, 2017)

There are many points of intersection between Quality Policy and Food Safety Policy. Today, there is an increasing public and political interest to promote food safety. The new Food Safety Act, which already exists in a draft form, needs to consider the protection of all consumers for foods both foreign and domestic. The revised Act shall seek to establish a coordinating agency for agricultural health and food safety matters, as this has been confirmed to be a great need by several reports and stakeholders. This will bring to realization the initial work done in the National Agriculture Health and Food Safety Agency. This new Act should also make allowance for collaboration with regional agriculture health and food safety agencies such as WHO, CAHFSA, IICA, FAO and PAHO.

Under the Ministry of Health, the CFDD should become an independent regulatory agency and operate its own laboratory (with accredited service) for food control. The agricultural laboratories within the MALF need to be upgraded, fully staffed and accredited to provide competent and recognized services. In addition, the improved Standards Act of 1997 should allow for the coordination of food and standards authorities to work in the Codex Alimentarius and CROSQ work groups. It is recommended that international standards be adopted or be used as the basis for sanitary and phytosanitary measures or technical regulations.

Regulatory Reform Programme: As a complement to policy integration, complete reform of the technical regulatory practices in the country is needed. To ensure that relevant regulations have a positive impact on the economy and society, a new arrangement will ensure that a technical regulation framework is established across the board for the country.

The regulatory practice will transition from the adoption of compulsory standards to the enactment of technical regulations, through a separate but coordinated procedure, different from that used to set formal “voluntary” standards. With the support of significant training and sensitization activities, regulators will follow applicable GRPs such as the requirements that technical regulations must be based on international standards and that regulations meet a defined threshold. Regulators need to develop Regulatory Impact Assessments (RIAs) and will comply with applicable WTO TBT and SPS rules, among others. The Quality Act should be the legislative instrument to promote the needed change in the government culture.

Technical Regulation Coordination Committee

It is recommended that a Technical Regulation Coordination Committee be established to support the integration of all regulatory and conformity assessment activities of the government sector in the new QI framework. The positioning of this Unit and its authority level are key to ensure that the necessary cultural and institutional changes are made. This should help to disseminate Good Regulatory Practices, and demonstrate the technical capability of public testing laboratories and inspection services via accreditation. It is suggested that this Unit be located in the Ministry of Trade and Industry.

To ensure sustainability of regulatory policy, a Technical Regulation Coordination Committee will be instituted under the aegis of the Ministry of Trade and Industry. This entity will neither develop technical regulations for the respective regulatory authorities (e.g., ministries and local governments) nor be involved in their management.

The main tasks of this body will be to:

- implement a Code of Practice for the preparation, adoption, application and review of Technical Regulations;
- provide for the training of regulatory authorities in the country on the use and application of GRPs and RIAs;
- facilitate the harmonization of product regulation practices and impact assessment methodologies to comply with applicable international obligations, especially those under WTO TBT and SPS agreements; and
- ensure the continuous improvement in the quality of regulations.

Micronarrative Box 5: Mexico´s GRP Institution

The Mexican Federal Commission for Regulatory Improvement (COFEMER) is a decentralized administrative body, with technical and operational autonomy, under the Secretariat of Economy of the Federal Government of Mexico. COFEMER's mandate is to promote transparency in the elaboration and application of the regulations and that they generate benefits superior to their costs and the maximum benefit for the society. COFEMER is the leading RIA agency in Latin America. It performs the following leading functions: (1) reviews the national regulatory framework to improve regulation in specific economic sectors or sectors; (2) administers the Federal Register of Procedures and Services, which is an inventory of the procedures of the Federal Public Administration; (3) provides technical advice on regulatory improvement; and (4) reviews both current and proposed regulations in terms of their regulatory impact, considering the comments made by stakeholders and participants from different sectors of society.

Source: https://www.gob.mx/cofemer/acciones-y-programas/quienes-somos-y-que-hacemos (accessed on October 10, 2017)

4.2.3 Physical Infrastructure Development, Capacity Building and Organizational Strengthening

Objective: To build the human capital, develop the physical infrastructure needed and strengthen agencies and stakeholders.

Structure and functions: The National Quality Infrastructure comprises different public and private organizations around standards and technical regulations, metrology, accreditation, conformity

assessment services and information, awareness and education programmes. Regardless of the central role of the TTBS in the NQI, this Policy highlights the need for a broader understanding of the involved stakeholders, highlighting the role of the private sector and competent authorities in trade and consumer protection.

The structure and activities of the TTBS are to be further examined for potential conflicts of interest and to ensure alignment with international best practice with regards to standards development and inspection (standards implementation) and legal metrology and calibration activities.

Metrology: By way of the Metrology Act No. 18 of 2004, TTBS has already strengthened its role as the National Metrology Institute. It is recommended that the TTBS expand the services of metrological traceability according to existing and future demand.

Micronarrative Box 6: SIM Time Network

TTBS is part of the Inter-American Time Network, which complements the world's official time scale, Coordinated Universal Time (UTC), by providing real-time support to operational timing and calibration systems in the SIM region. The stability of SIM Time is superior to most SIM local time scales and SIM Time also provides a good approximation of UTC timing accuracy (±15 ns). The clock displays SIM Time, UTC, and your local time.

Traceability of time frequency is critical for financial and telecom services. Other NMIs in the Americas already have important clients like banks and cell phone companies. These kinds of services could be developed and marketed by TTBS. Potential partners are Telecommunications Authority of Trinidad and Tobago (TATT) and the Central Bank of Trinidad and Tobago.

Source: http://tf.nist.gov/sim/ (accessed on October 10, 2017)

Currently, the TTBS participates in BIPM by CROSQ's membership arrangement. Following the example of Jamaica, the TTBS should evaluate its own membership to BIPM. This membership could improve international traceability of measurement and help to upgrade Trinidad and Tobago's NQI and meet better national industry needs.

Standards: The standards development process meets most international benchmarking requirements, but has some areas that will need strengthening. These include:

1) the promotion in the use of standards in all areas of the economy and society. This requires additional effort to increase awareness in different product and service sectors;
2) the application of standards to develop technical regulations;
3) active participation of the National Standards Body in growing the trend of sustainability standards; and
4) the use of the financial model for the development of national standards and the income generated by conformity assessments for cross-financing.

Micronarrative Box 7: Australia's GSPs Institution

Australia is a signatory to the GATT/WTO Standards Code. While not a government agency, Standards Australia is Australia's leading standards development organization. Australia still has in place various standards that can affect product entry, and while these may require product modifications, they are not insurmountable obstacles to importing companies.

Standards Australia develops and maintains more than 7,000 Australian Standards, and provides input into the development of approximately 18,000 International Standards by ISO and IEC. Standards Australia has a policy of adopting International Standards wherever possible. This policy is in line with Australia's obligations under the World Trade Organization's Code of Practice, which requires the elimination of technical standards as barriers to international trade. As a result, approximately 33% of current Australian Standards are fully or substantially aligned with International Standards.

Areas of industry where no significant International Standards exist include building, construction, and occupational health and safety. Around one third of Australian Standards haps to achieve independence of ACCREDIT-T (TTBS's accreditation division) from TTBS. As a matter of urgency, this action should go further until finalised. The independence of the National Accreditation Body is a condition to become recognized through the ILAC/ IAF multilateral arrangements.

In addition, from its inception, ACCREDIT-T should start its business model considering a risk management based approach to the accreditation of laboratories and other conformity assessment that have no international equivalent.

Source: http://www.trade.gov/td/standards/markets/East%20Asia%20Pacific/Australia/Australia.pdf (accessed on October 10, 2017)

Certification: The certification of both management systems and products is mainly done by large international certification bodies (e.g. SGS, Lloyd's Register), but TTBS's Certification Division and other local players are increasingly active in this competitive area.[50] To improve effectiveness and viability of these services, TTBS and private certification bodies operating in the country should:

1. examine the product certification program in the broadest sense possible to explore new approaches and establish a more demand-driven service[51] such as the request by public procurement that products have been certified;[52]
2. consider a business model that includes certification to sustainability/private standards (e.g. exploring joint ventures and other cooperation models in the market of sustainability standards and certifications), management system standards and non-regulated products;
3. have the accreditation necessary to offer a management system certification that is internationally recognized; and

[50] The Energy Chamber started the Safe TO Work programme (STOW) in 2004 after hearing the complaints from its members in the energy service sector, who were experiencing challenges in meeting the range of health, safety and environmental (HSE) requirements among the major oil and gas operating companies, http://www.stowtt.info. (STOW).

[51] Promising new clients for certification could be the areas of food safety (food feeding programme, public food providers, voluntary food safety schemes), energy management systems (as a response to climate change, and to promote a Green Economy), quality management for local governments (to support state modernization), public and private schools, universities and hospitals; use of standards, testing and calibration in the gambling sector.

[52] There are opportunities to promote the certification of large public or private infrastructure projects. In 2012/ 2013, WASA engaged TTBS to verify a $250M project financed by the Inter-American-Development Bank (IDB). This kind of service could be converted into a specific certification offer, but would require significant investment in testing facilities.

4. offer certification services to a wider market, especially for smaller CARICOM member states.

Micronarrative Box 8: Uruguay's NMI Joint Venture

LSQA is the result of the association of the "Laboratorio Tecnológico del Uruguay" (LATU) and Quality Austria. This strategic alliance allows LATU access to knowledge on training and product certification, processes and management system integration. LSQA possesses international prestige and vast experience in several fields of activity. See Annex 9.

From a pragmatic viewpoint, LSQA provides the guidance needed to comply with new requirements and adapt to new trends to be a successful competitor in the global market. LSQA is a limited liability company owned by LATU and Quality Austria, and it is financed by certification and training services fees.

Laboratories: In the medium to long term, the Government of the Republic of Trinidad and Tobago shall seek to design and build a new state-of-the-art Multi-Laboratory Facility, to function as the National Metrology Centre and as an InQbator for NQI and related services to support the strategies of both the National Innovation and Quality Policies.

This laboratory will:

1) provide the space and suitable environment required for national metrology (measurement) standards and measurement dissemination/traceability work, including chemical metrology to support emerging industries;
2) provide for additional space and environment for TTBS testing laboratories and those to be operated by other players (Government or private sector, e.g. Biotechnology);
3) be located close to other research/testing laboratories and/or innovation supporting facilities (e.g. CARIRI); and
4) serve as the National (or regional as appropriate) Reference Laboratory for metrology and testing in selected areas.

Micronarrative Box 9: National Metrology Laboratory Upgrade in Jamaica

Although a leading NMI in the region, the Mass and Dimensional laboratories of the Bureau of Standards Jamaica (BSJ) suffered from environmental stability issues (particularly for humidity) that limited their ability to offer calibration services to meet emerging higher level needs of industry and their commitments to offer services as a Caribbean Reference Laboratory (CaRL).

With support from the World Bank, the BSJ undertook a major laboratory upgrade to address these limitations. The upgrading project was completed and reopened in October 2017. The BSJ is now able to offer mass calibration at the level of E-2 (and even possibly E-0), and for Dimensional Metrology, it will be able meet the objective of gaining international recognition for calibration of gauge blocks capabilities.

Source: Data collected from BSJ via interviews

The participation of the private sector in testing (especially of food products), calibration and legal metrology (in accordance with the Metrology Act and regulations) and in other areas should be encouraged in competition with government/state-owned laboratories. An aggressive programme must be undertaken to accredit laboratories (methods), beginning with those that support exports and provide results for compliance with technical regulations (e.g. medical and environmental testing laboratories).

Where such public laboratories lack the resources required to gain accreditation, a special programme shall be developed to assist these laboratories (Annex 1).

The continued development of human resources to acquire new skills to address challenges identified on both demand and supply sides of the NQI is to be encouraged and supported.

Micronarrative Box 10: URUGUAY´S NMI Technology Park

The LATU Technology Park promotes the sustainable development of the country and its international integration through innovation and the transfer of value solutions in analytical, metrological, technological and management services, and conformity assessment in accordance with applicable regulations.

The Technological Laboratory of Uruguay (LATU) was created in 1965 as a joint effort of the government and the private sector. Initially it was called the Analysis and Testing Laboratory, but began to use its current name in 1975. It is a public non-governmental organization, and is administered by a board composed of: a representative of the Executive branch of the government (Ministry of Industry, Energy and Mining), who holds the presidency, and two representatives of the Chamber of Industries of Uruguay and the Banco República, as directors. See Annex 9.

LATU occupies 11 hectares, with 23,500 m² built, and is in Montevideo. Facilities include the main building, 11 modules with laboratories and pilot plants, the business incubator Ingenio, the Exhibition Park and the Science Museum. Since January 2007, it also holds the Knowledge Development Centre, dedicated to training human resources for the information technology sector.

It offers a wide range of services to add value to technologies and management processes used by public and private companies, seeking to promote the development of the whole community in Uruguay.

Source: www.latu.org.uy/index.php/latu-english (accessed on October 10, 2017)

Micronarrative Box 11: Chile´s National Metrology Network of Primary Designated Calibration Laboratories

The National Network of Metrology, RNM, is the National Institute of Metrology of Chile and, through the Designated Institutes, guarantees and disseminates the traceability of the measurements of the country and achieves its international recognition. These Designated Institutes provide standard calibration services to Calibration Laboratories, and Reference Material Certifying Testing Laboratories. In addition, they act as pilot laboratories in the Proficiency Testing that are organized at the national level.

The Chilean National Metrology Network (RNM) has been established to assure the measurements required in Chile so that they are comparable, traceable and accepted in other countries. Therefore, Chile has no one NMI, but a network of primary designated metrology labs.

The Designated Institutes are primary metrology laboratories and are responsible for all or part of an area of metrology, in accordance with requirements established in the CIPM MRA. The Designated Institutes represent the country internationally vis-á-vis other countries, Regional Metrology Organizations, BIPM and others of an international character.

The areas covered by designated laboratories are: Mass, Temperature, Length, Force, Pressure, Electrical Magnitudes, Flow, Humidity, Chemistry - Metals and Alloys, Ionizing radiation, Microbiology and Food Chemistry and Chemistry for Water and Food.

Source: http://www.metrologia.cl/link.cgi/Empresa/ (accessed on October 10, 2017)

Micronarrative Box 12: EU´s Reference Laboratories for the Food Safety Network

EU Reference Laboratories (EURLs) aim to ensure high-quality, uniform testing in the EU and support Commission activities on risk management and risk assessment in laboratory analysis. Regulation (EC) No

882/2004 on official controls defines tasks, duties and requirements for all the EURLs. The Commission can establish new EURLs or change the designation of existing ones. Reference Laboratories are tasked to: Provide National Reference Laboratories (NRLs) with analytical methods and diagnostic techniques, coordinate their application, and train staff from National Reference Laboratories; provide the European Commission with scientific and technical expertise in relation to laboratory analysis (e.g. assist actively in the diagnosis of animal disease outbreaks); and collaborate with the competent laboratories in non-EU countries.

Source: https://ec.europa.eu/food/safety/official_controls/legislation/ref-labs_en (accessed on October 10, 2017)

Inspection and other conformity assessment services:

The development of technical regulations and SPS measures must consider accreditation of inspection and other conformity assessment bodies offering services in the evaluation of compliance. Where there are no such regulations, the use of accreditation may be considered as an acceptable means of reducing risks and improving reliability in results required for conformance/compliance and general acceptance of conformity assessment services.

The continued participation of the private sector in the offering of these services nationally, regionally and internationally will be encouraged to ensure stability and provide clients with options for these services.

4.2.4 Enabling a Quality Culture and Proactive Environment

Objective: To develop a system of continuous learning, adaptation and communication among all users of the Quality Infrastructure.

To reach specific needs of Trinidad and Tobago's economy, the Policy suggests doing rapid assessments of prioritized sectors (e.g. aviation services, construction, creative industries, financial services, food and beverages, gambling, software development, fishing industries, maritime services (Annex 6). TTBS already has the experience of rapid assessment of quality infrastructure needs in selected value chains (see application of CALIDENA methodology in the poultry and cocoa[53] value chain). The methodology should be applied systematically to promising subsectors, clusters and value chains, in order to contribute to economic diversification. Consequently, the information about specific needs and gaps in the quality infrastructure service supply could guide further investment strategies.

Micronarrative Box 13: Belize's Shrimp Exports

Belize exported 6.489 million kg of shrimp in 2014, accounting for 13% of all major domestic exports. Market requirements for this product include meeting safety, quality and sustainability standards. To meet these requirements, the Belize Shrimp Growers' Association embarked on a quality journey and has already

[53] The CALIDENA rapid appraisal of quality issues in value chains is compatible with other efforts to improve quality in value chains, like the project "IMPACTT" (Improving Marketing and Production of Artisanal Cocoa from Trinidad & Tobago) which aims to develop standards, cocoa origin tracking tools, a certification system and a range of marketing tools to aid growers in selling their beans for the highest value. It is a partnership of Trinidad & Tobago Fine Cocoa Company (TTFCC) Ltd, the Inter-American Development Bank (IDB) and the Cocoa Research Centre of the University of the West Indies.

reaped success: more than half the producers attained certification from the Aquaculture Stewardship Council (ASC). Furthermore, through the CALIDENA value chain mapping, the industry identified opportunities to reduce the cost of conformance using recognized local and regional services in testing and calibration.

Source: Mesopartner/CROSQ Project CALIDENA Project in Belize, 2015

A specific project should relate the quality policy to the public procurement process. The new Public Procurement and Disposal of Public Property Act is an opportunity to include incentives for accreditation and certification of suppliers of products and services. A Quality Procurement Program should inform the procurement officers about Quality Infrastructure and support, especially Small and Medium-sized Enterprises, to use Quality Management Systems. The new trend of Sustainable (Public) Procurement is an additional opportunity to disseminate environmentally-friendly standards in Trinidad and Tobago.

Micronarrative Box 14: Colombia's Quality in Procurement Initiative

Colombia's Ministry of Commerce collaborates with the National Public Procurement Agency to facilitate the use of product standards in public tenders. The initiative seeks to include requirements for the procurement offices of each agency to indicate the standards to which the products and services will need to comply to be accepted in the public tender office.

Another programme should promote compliance with technical regulations and conformance to standards to ensure that goods and services meet technical requirements and are fit for purpose. This programme should facilitate enforcement of technical regulations (including legal metrology) on one hand, and the wide use of standards on the other. Additionally, a programme for a compulsory accreditation of all publicly-owned laboratories and inspection bodies should be implemented. This will increase the use of the services of the national accreditation body (ACCREDIT-TT) significantly, and provide practice which is relevant for international recognition.

4.3 Operationalising the Policy

4.3.1 Quality Infrastructure as a Business

The continuity and long-term success of the NQI will increasingly depend on how NQI-related entities are structured, respond to the expectations of stakeholders, and are financed. However, in economies like Trinidad and Tobago, the identification of the appropriate funding model and mix of financing strategies for the development and operationalisation of the NQI is one of the most critical tasks to be undertaken. In this regard, the GORTT must become the facilitator to ensure effective institutional governance, strategic direction and support, and sustained funding arrangements. In terms of the sustained funding arrangements, the GORTT must consider:

- the importance of the NQI services to economic support and development;
- the vulnerability of Small and Medium Enterprises;
- the policy of government to the funding of entities;
- the risk of changes in the sources of funding; and
- economic volatility that can affect its QI implementing agencies

Specifically speaking, the GORTT should seek to provide and facilitate the appropriate level of financial support to institutions such as TTBS, the National Accreditation Body and other Government-owned NQI Entities, so that these institutions can offer QI-related services to stakeholders (especially start-ups and small and micro enterprises). In turn, users of these services will invest in their businesses by using and paying for QI services that will contribute to their ability to compete in the various markets and sectors.

4.3.2 Funding for the Implementation of the Policy

The National Quality Policy consists of projects that are in support of its strategic vision and the Government's mandate in relation to building Trinidad and Tobago's competitiveness and productivity levels. These projects will require substantial financial and human resources over its implementation period. Consequently, the GORTT must ensure that funding for these projects is made available on a timely basis.

According to the World Bank, Trinidad and Tobago is classified as a "high-income economy".[54] This situation closes the possibility to fund the NQP directly by official development assistance (ODA). Given the current situation of Trinidad and Tobago's economy, the funding by the national budget is necessary, but difficult, because there is a strong demand from different ministries and interest groups for resources.

Therefore, this Policy proposes a double strategy:

1. to present budget spending for NQI as a profitable investment with a high return; and
2. to explore alternative funding streams beyond ODA.

The Public-Sector Investment Program (PSIP) provides for funding opportunities in the competent areas of different ministries, state agencies and institutions i.e.

- Ministry of Trade and Industry, TTBS, EtecK, ExporTT, InvesTT, TTCSI/TTMA/TTCIC, and sector specialists (Food and Beverage, Printing and Packaging, Film, Music and Entertainment, Merchant Marine, Yachting, Consumer Affairs Division)
- Ministry of Planning and Development with CARIRI, Environmental Management Authority and the Ozone Management Unit
- Ministry of Agriculture, Land and Fisheries with NAMDEVCO, Plant Quarantine, Veterinary Health, Fisheries
- Ministry of the Attorney General and Legal Affairs
- Ministry of Education, UWI and UTT
- Ministry of Energy and Energy Affairs, Petrotrin, NGC, NESC
- Ministry of Health, the Chemistry Food and Drugs Division, Regional Health Authorities
- Ministry of Labour and Small Enterprise Development
- Ministry of Local Government
- Ministry of National Security, the Forensics Centre
- Ministry of Public Administration

[54] With a gross national income, per capita of US$32,637 (2015) Trinidad and Tobago is far beyond the threshold of US$12,236.

- Ministry of Public Utilities, WASA, TATT, SWMCOL, T&TEC, Trinidad and Tobago Meteorological Services
- Ministry of Tourism, the Tourism Regulatory Authority
- Ministry of Works and Transport
- Tobago House of Assembly

The importance of quality infrastructure and the investment opportunities in quality infrastructure services and quality sensitization should be evaluated for all ministries and agencies. These exercises could be coordinated by the National Quality Council and combined with participatory analyses of different sectors.

The investment in quality infrastructure should be included in the loan negotiations with development banks, like the Andean Development Corporation (CAF), Caribbean Development Bank (CDB), Inter-American Development Bank (IDB) and the World Bank (WB).

Even if direct financial support is limited, the following agencies may be accessed for relevant knowledge in training and expert support:

- International, foreign and regional organizations for standards, metrology and accreditation like ASTM[55], CROSQ, FAO/ Codex Alimentarius, Accreditation Cooperation (IAAC), International Electrotechnical Commission (IEC), International Standards Organization (ISO) with its specialized agencies – (CASCO, DEVCO, COPOLCO), International Telecommunication Union (ITU), Inter-American Metrology System (SIM)
- QI-organizations for partner countries like the National Metrology Centre of Mexico (CENAM), Brazilian Metrology Institute (INMETRO), German Metrology Institute (PTB) and the National Institute of Standards and Technology (NIST).
- International and regional organizations for trade promotion like the Caribbean Export Development Agency (CEDA), International Trade Centre (ITC) and the Aid for Trade facility of the World Trade Organization (WTO).

Studies and impact assessments could be conducted in collaboration, for example, with the Economic Commission for Latin America and the Caribbean (ECLAC), United Nations Industrial Development Organization (UNIDO) and the Organization of American States (OAS)[56].

The regional context is an appropriate gate to indirect access for different types of support. Of relevance are programmes like Compete Caribbean[57], the European Development Program (EDF) whose QI-component is executed in collaboration with CROSQ,[58] and the Inter-American Institute for Cooperation on Agriculture (IICA).

Special attention should be paid to the exploration of new funding streams for QI development related to the mitigation and adaptation to Climate Change, Biodiversity, Energy Efficiency and

[55] American Society for Testing and Materials.
[56] QI is the fourth pillar of the Science, Technology and Innovation Policy (STC).
[57] http://competecaribbean.org/.
[58] The European Union which will facilitate trade by the 11th EDF. CROSQ is currently planning to continue the support of a Regional Quality Infrastructure which will have a TBT Component.

Renewable Energies. QI development should be presented as part of environmental programmes like the Global Environmental Facility (GEF).

In general, a strategy of creative fundraising should be adopted to include looking for new partners and sources beyond the traditional NQI funding schemes.

4.3.3 Communication of the Policy

The Communication Plan (Annex 2) outlines the steps to be taken to communicate the policy and the implementation plan to service providers, users, policymakers, civil society, the public and private sectors. It is expected that the plan will guide the actions of both the TTBS and the MTI, as they seek to implement the National Quality Policy in Trinidad and Tobago.

It is the intention that messages will be branded to ensure that, over time, persons will recognise the messages and become more aware of the NQP. These messages will seek to nurture a quality culture in Trinidad and Tobago.

Sustainability of the Communication Plan beyond the life of the project will depend on the plan being incorporated into the annual work plan of the MTI and TTBS. To deepen the engagement, the MTI and TTBS should partner with key stakeholders such as companies and organisations who provide QI services, for the dissemination of the NQP and QI messages on their websites, including the messages in their own quality assurance promotions. An annual budget for the Communication Plan should be made readily available for the execution of the plan.

4.4 Monitoring, Learning and Adaptation

Objective: **To develop a system of monitoring, continuous learning and adaptation in the governance and development of the QI.**

The success of this Policy requires continuous improvement of the understanding of quality as a way of life, and the adoption of best practices in industry, the public sector, civil society (including consumers) and academia. However, in today's world, best practices are evolving rapidly and the Trinidad and Tobago QI will need to learn and adapt to these new requirements on an ongoing basis.

Since this NQP requires a demand-driven Quality Infrastructure, then all the users must become aware and knowledgeable of the use of quality and the quality infrastructure. It is important to communicate clearly that quality is an investment with a significant return, and not only a cost factor.

Therefore, research needs to be promoted to calculate the return on investment using conformity assessment services at the company level. Additionally, the return on investment of quality infrastructure in general should also be analysed at the national level. Methodologies already

applied to other countries should be adapted and implemented in Trinidad and Tobago (Micronarrative Box 15).[59]

Micronarrative Box 15: Impact studies on Quality Infrastructure

The first study carried out in the United Kingdom on the macroeconomic impacts of the standards was published in 2005 by the Department of Industry and Commerce. The study (the first of three that were carried out) used data from the period 1948 to 2002 to determine the long-term relationship between the updating or the cancellation of the norms and the growth of productivity.

The study found a positive and statistically significant relationship between standards and productivity growth in the United Kingdom. The authors, however, asked for caution in interpreting the results, since normalization is not an independent actor of other factors that contribute to productivity. The increase in productivity is the combination of different factors (such as research, development and education, for example).

The study carried out in this period revealed that the norms contribute 0.3%, to the growth of the gross domestic product (GDP) of the country, and to 13% of the growth of labour productivity. The British Standards Institute (BSI) updated this study in 2015 through the Centre for Economics and Business Research (CEBR), a centre for economic studies. The result of the research was that the standards between 1921 and 2013 have contributed to 0.7% of GDP growth and 37.4% of labour productivity, which translates into 8.2 billion extra pounds in GDP, which come from the good use of standards.

Source: Temple, Witt, & Spencer, 2005

In the short-to-medium term (3 to 5 years), the Policy's goal, objectives and results will need to be assessed[60], monitored and aligned by way of a logical measurement framework that includes risk assessment, a multi-stakeholder action plan, indicators and targets. These will then assist in evaluating and determining the nature of the progress being made, the risk exposure, responsible agencies and lessons learnt. This information can then be used to communicate information and good practices, take corrective actions, and create structured progression for the long term.

In the mid-term, implementation of the Policy at the national and regional levels will need to be evaluated for impact, relevance, efficiency, effectiveness, sustainability and adaptation of the strategies, and will also be required in those cases where success is not achieved.

In the long term, the development of Trinidad and Tobago's National Quality Infrastructure should show significant progress in the International QI Benchmarking Ranking (Annex 3).

It is therefore recommended that by way of the Quality Council being established, a representative of each of the key stakeholder groups should commit to sessions to discuss, design and manage a multi-stakeholder at the national and regional level, to accomplish the Policy goals indicated herein.

[59] The National Standard Body of Colombia recently carried out a similar impact assessment study (See INTECO 2016).

[60] Assessment methodologies should take into consideration the objectives and core principles of this policy as well as the quality principle of Factual Approach to Decision Making. The monitoring system should be based on the collection and use of appropriate data in the metrics developed.

Acknowledgments

This document is the result of the collaborative work of many people and institutions. The Ministry of Trade and Industry (MTI) initiated the development of a National Quality Policy (NQP), and mobilized resources from the European Development Fund to get the support of a multinational consultancy team. The Trinidad and Tobago Bureau of Standards (TTBS) contributed its experience and supported the MTI in the stakeholder involvement.

Thank you to all the persons who have shared their knowledge and contributed to the National Quality Policy document. A special acknowledgement goes to the members of the Project Steering Committee and their organizations: Norris Herbert (Permanent Secretary of the MTI); Candice Lackhansingh (Programme Coordinator, MTI), Adrian McCarthy (Deputy Director of the Chemistry, Food and Drugs Division, Ministry of Health), Joan Lewis (Planning Officer II, Ministry of Agriculture and Fisheries), Tricia Coosal (Director of the Trinidad and Tobago Manufacturers' Association TTMA), Lorraine Pouchet (Director, Trinidad and Tobago Coalition of Services Industries), Langdon Phillips (Tobago House of Assembly (THA), Theodore Reddock (Acting Executive Director of the Trinidad and Tobago Bureau of Standards), Lisa Daniel Douglas (Trade and Research Economist, Trinidad and Tobago Chamber of Industry and Commerce) and the invited guests Daniel Plenty (Senior Manager at WASA), Karen Lee Lum (Project Manager at Cocoa Research Centre), Kevin Johnson (Supply Officer, Trinidad and Tobago Electrical Commission), Mark Kumar (Research Assistant of the Ministry of Planning and Development), Christian George (Trade Specialist, Trinidad and Tobago Manufacturers Association), and Marcus Solomon (Senior Planning Specialist, Ministry of Planning and Development).

The Consulting Team extends condolences and would like to acknowledge the contribution of Mr. T'Vaughn Lewis who represented the Chamber of Commerce on the Steering Committee. He was a passionate and dedicated member and made valuable contributions to the effort while he served. He will be greatly missed.

Finally, the team greatly appreciates the contribution of quality infrastructure experts who shared their international experience and provided inspirational examples from their countries. Special thanks to Alex Inklaar, Alexis Valqui, Clemens Sanetra, Beatriz Paniagua, Haygas Kalustian, Mauro Rivadeneira and Manfred Kindler.

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Annexes

Annex 1

Implementation Plan

See separate document

Annex 2

Communication Plan

See separate document

Annex 3

Trinidad and Tobago's Quality Infrastructure Data and Benchmarks

Figure 9: Category and Number of Standards

Categories	Number of Standards
Agriculture	13
Chemistry	14
Construction Codes	5
Construction Products	21
Consumer Products	20
Electrical Codes	3
Electrical Products	50
Environment	18
Funeral Homes	2
Generalities	16
Health and Safety	17
Mechanical Equipment and Packaging	28
Metrology	2
Petroleum and Energy	5
Quality	31
Renewable Energy Systems	4
Social Responsibility	1
Societal Security	2
Technical Drawings	42
Telecommunications	6
Textiles	42

Tourism	11

Source: Standards Database TTBS

Figure 10: Number of Certifications from TTBS

Type Certification	Standard Used	Number of Companies/Products Certified
Management Systems	ISO 9001	24
	ISO 14001	2
	OHSAS 18001	1
Products	TTS 69:2012: Steel Roofing Sheets	1
	TTS 584: Parts 1 & 2: 2002/Amendment 1 (2007): Cement	1
	TTS 477:2013: Safety Matches	1

Source: Authors' own elaboration based on TTBS Standards Database

Figure 11: Number of ISO Certifications worldwide

Standard	Number of certificates in 2016	Number of certificates in 2015	Change	Change in %
ISO 9001**	1106356	1034180	72176	+7%
ISO 14001***	346189	319496	26693	+8%
ISO 50001	20216	11985	8231	+69%
ISO 27001	33290	27536	5754	+21%
ISO 22000	32139	32061	78	0
ISO/TS 16949	67358	62944	4414	+7%
ISO 13485	29585	26255	3330	+13%
ISO 22301	3853	3133	720	+23%
ISO 20000-1	4537	2778	1759	+63%
ISO 28000	356			
ISO 39001	478			
TOTAL	1,644,357	1,520,368		+8%

Source: ISO Survey 2017

Calibration Services of TTBS

In 2016, the TTBS performed 1277 calibrations and 26 verifications, serving a total of 114 Customers:

- The customers who primarily utilize the service for commercial reasons: (1) Manufacturers, (2) Agro-Processors, (3) Oil and Gas producers, (4) Government and (5) Service Providers.
- Those using the service under a regulatory requirement are: (1) Supermarkets, Groceries, Markets, (2) Shippers and Exporters, (3) Manufacturers, (4) Fuel stations and (5) Regulators.

Benchmarking

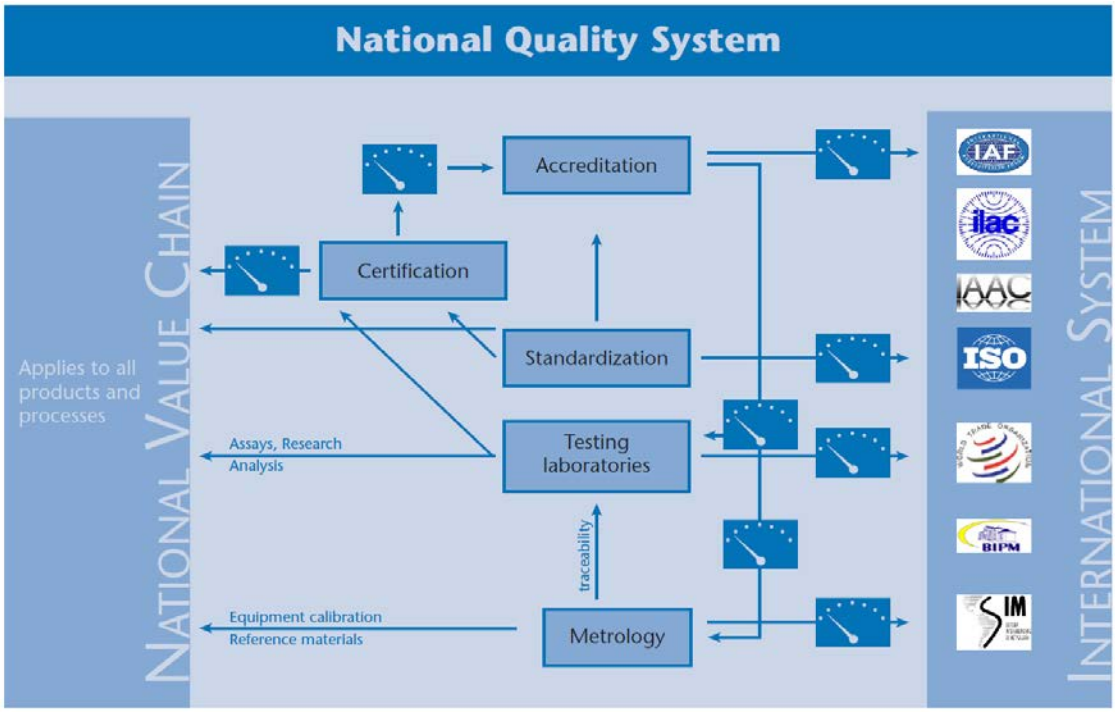
Aligned to the main objective of this consultancy, a QI benchmarking exercise was conducted at a country level to evaluate the status of NQI of Trinidad and Tobago from an objective perspective. A comparison was made between Trinidad and Tobago with best practice models of leading and comparable countries. The benchmark group was selected following some pragmatic rules such as: economy driver's similarity with Trinidad and Tobago, geographic location, recognized leading NQI, and consultancy team member's origin country.

The methodology applied in this section is based on Harmes-Liedtke/Oteiza 2011, developed for PTB and sponsored by the International Technical Cooperation agency. This methodology is in fact a proposal for measuring the Quality Infrastructure of countries, and allows the identification of gaps between the targeted NQI and the benchmark group members.

Key components of QI (Metrology; Standards; Certifications and Accreditation) are included in the calculations of the proposed national QI measurement. For each component, statistical data was analysed at the country level. The data was sourced from the internet and international and local QI institutions. The output is a composite indicator that combines quantitative and qualitative data, based on the rankings of each of the countries. The higher the score obtained, the higher the QI development for a given country.

The diagram below is an adaptation of a graphic used frequently in PTB documentations on Quality Infrastructure and Value Chains (SANETRA/MARABA 2007). Each gauge shows the location of the measures of our main indicator in the NQS. Note that connections on the left side of the diagram were given little consideration due to the unavailability of sufficient information.

Figure 12: National Quality Infrastructure with Indicators



Source: Authors' own elaboration

The right-hand side of the above diagram shows that a country (or organization) could be classified by membership or non-membership; categories of membership (full or body member, associate, participant, partner, observer, etc.); signatories or non-signatories to some agreement (MRA, MLA); and participation in committees. This set of information has been understood as the input of the NQI, and reveals some evidence about the stage of development achieved by each system from a qualitative perspective.

On the other hand, the gauges represent the system output in terms of quantity of bodies and issued certificates. These can be easily interpreted and compared within the benchmark participants.

The above considerations are summarized in Figure 13, from which the basic matrix for the measurement of the QI will be obtained.

Figure 13: QI System Inputs/Outputs

QI system	Inputs	Outputs
Accreditation	· Membership of: IAF, ILAC · Signatories to: MLA, MRA · Regional agreements	· Total Accredited Bodies (TAB) by national accreditation bodies
Metrology	· Membership of: CIPM, OIML · Signatories to CIPM MRA	· Calibration and Measurement Capabilities (CMC) issued and recognized · Key and Supplementary comparisons practiced
Standardization	· Membership of: ISO, IEC, ITU · Participation in ISO committees	· Participation in Technical Committees · Number of standards by country (local and international)
Certification	· Accredited certification bodies (not used because of missing data)	· Number of ISO 9001 certifications issued

Source: Authors' own elaboration

Both inputs and outputs are converted into a score using the formula for the QI Index.

The output side of the formula components (mostly the number of bodies and certificates issued) have been calculated in relative terms considering population size of the NQI host country. That is, countries with large populations and low QI will be given lower ranking positions. If an economy is to be highlighted in the field of quality infrastructure with international recognition, a large population must be accompanied by a well-developed QI.

Countries that favour the internal versus external market are not expected to achieve the best scores in the rankings, because they will need a less internationally recognized QI to meet the demands. Small countries with large export profiles will be the best candidates for upper positions. Thus, the population size serves to drive the QI and partially mitigate the problems of scale, efficiency, and quality of systems, but, on the other hand, incorporates some bias.

The input side plus the Key and Supplementary count and the Participation in Technical Committees will be observed in absolute terms since this expresses the participation in the international system of QI. It is proven to have no correlation with the size of the economy, but with the dissemination of good practices, learning spaces and knowledge sharing, and the benefits of being recognized by other club members.

The QI Index for Trinidad and Tobago and the benchmark group is seen in the figure below:

Figure 14: QI Index Components

QI Index Components

Sort: descending by QI Index score

# Country	QI Index	Calibration and Measurement Capabilities	Total Accredited Bodies	ISO: 9001, 14001, 16949, 22000	Technical Committees participations	Memberships of international QI System	Key and Supplementary Comparisons	Population 2015
1 Singapore	72,8	284	564	23.223	165	7	154	5,54M
2 China	54,3	1.661	3.347	1.225.714	731	8	361	1.371,00M
3 Norway	48,1	132	196	10.724	328	8	58	5,19M
4 Canada	43,1	460	363	26.701	374	8	213	35,85M
5 Uruguay	38,8	210	44	3.662	52	6	45	3,43M
6 South Africa	38,6	475	846	16.403	435	8	130	55,01M
7 Chile	37,1	70	1.288	17.442	165	7	46	17,95M
8 Argentina	34,3	285	236	25.704	373	7	133	43,42M
9 Mexico	33,6	726	2.244	28.486	130	7	233	127,02M
10 Colombia	26,6	50	88	50.025	160	8	35	48,23M
11 Costa Rica	22,1	67	130	1.070	38	5	40	4,86M
12 Jamaica	13,4	22	19	109	40	4	16	2,79M
13 Trinidad and Tobago	10,0	0	9	326	63	3	6	1,36M

Sources

-Calibration and Measurement Capabilities issued according to BIPM data base

-Total ISO certificates 9001, 14001, 16949, 22000 issued during 2013-2015

-Total Accredited Bodies declared by IAF members

-Technical Committees participations in ISO Standards

-Memberships of international QI System including: WTO, IAF, ILAC, CIPM, OIML, ISO, IEC and ITU

-Key and Supplementary Comparisons practiced under the auspices of the CIPM MRA

-Population according to World Bank 2015

Source: Authors' own elaboration

Figure 15: Global Quality Infrastructure Ranking Formula

$$\textbf{Index(QI/Pop)} = \frac{Index\left(\frac{CMC}{Pop}\frac{ISO}{Pop}\frac{TAB}{Pop}\right)+Index\ (K\&SComp.,\ Tech.\ Comm.,\ Membership)}{2}$$

- $Index\left(\frac{CMC}{Pop}\frac{ISO}{Pop}\frac{TAB}{Pop}\right)=\left(\frac{CMC_i/Pop}{max.\ value}+\frac{ISO_i/Pop}{max.\ value}+\frac{TAB_i/Pop}{max.value}\right)x\frac{100}{3}$

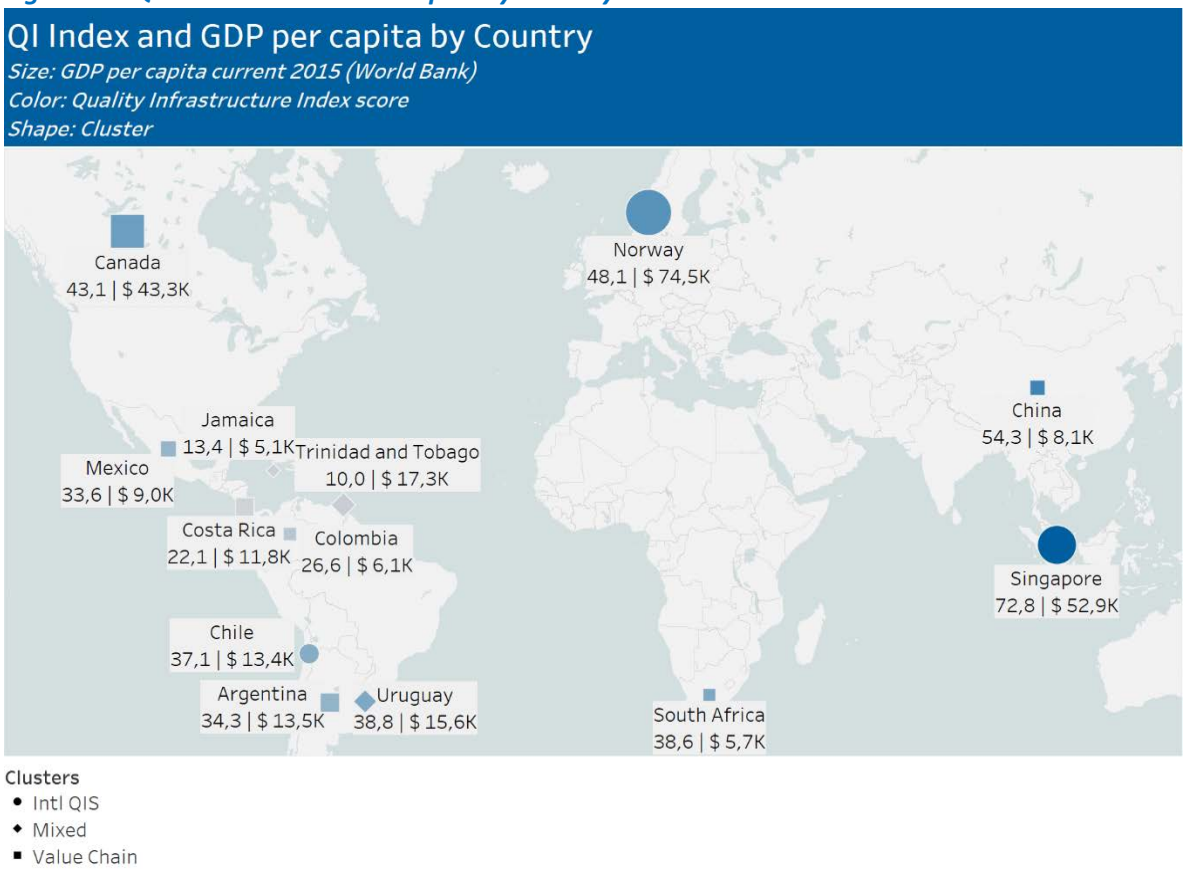
- $Index\ (K\&SComp.,\ Tech.\ Comm.,\ Membership) = \left(\frac{K\&SComp_i}{max.value}+\frac{TechComm_i}{max.value}+\frac{Members\ hip_i}{max.value}\right)x\frac{100}{3}$

Source: HARMES-LIEDTKE/ OTEIZA 2011

Based on the six components of the QI Index, beyond the obvious considerations, about the positions in the ranking, the thirteen (13) countries in the list can be grouped into three clusters. One group with the highest scores on average for CMCs, ISOs, and TABs includes Singapore, Norway and Chile. Therefore, in considering the connection between NQI and the National Value Chain, these systems reveal the strongest relationship within the ranking. Another set of countries

that are attracted to each other by their strong linkages with the international QI system (number of international memberships, Key and Supplementary count, and total Participation in Technical Committees), show on average the highest values for the second component of the QI Index. These countries are China, Mexico, Canada, South Africa, Argentina, and Colombia. The rest of the countries in the list (Uruguay, Costa Rica, Jamaica, and Trinidad and Tobago) show mixed results for all components, but also correspond to smallest populations.

Figure 16: QI Index and GDP Per Capita by Country



Source: Authors' own elaboration

Performance of QI vs Global Competitiveness and Economic Complexity

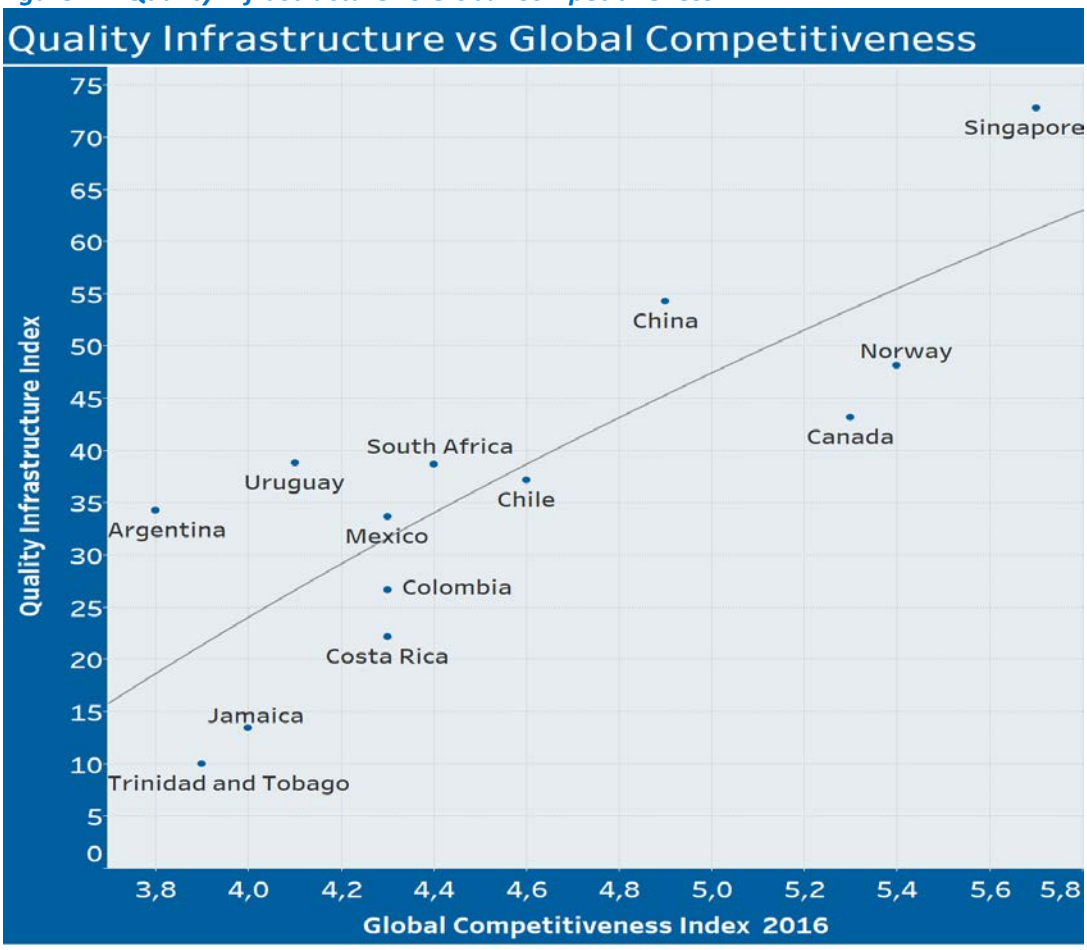
The Global Competitiveness Index (GCI), published by the World Economic Forum, ranks 140 countries/economies. Developed based on 12 pillars and 110 variables, this composite indicator is perhaps the most recognized in its field.

As expected, the most competitive economies tend to be the best developed in terms of QI and, the lower the QI, the worse the performance observed. The relationship between QI and Competitiveness tends to be moderate and positive.

Another interesting correlation has been tested for this set of countries. Reference is made to HAUSMANN *et al*., 2011 regarding Economic Complexity. The document firstly states that countries whose residents and organizations possess more knowledge have what it takes to

produce a more diverse set of products. In other words, the amount of embedded knowledge that a country has is expressed in its productive diversity, or the number of distinct products that it produces. Secondly, HAUSMANN *et al*., 2011 states that products that demand large volumes of knowledge are feasible only in the few places where all the requisite knowledge is available. Ubiquity is defined as the number of countries that make a product. Combining diversity and ubiquity, the author measures Economic Complexity (ECI) and ranks countries according to their capacity to hold and use a larger amount of productive knowledge.

Figure 17: Quality Infrastructure vs Global Competitiveness

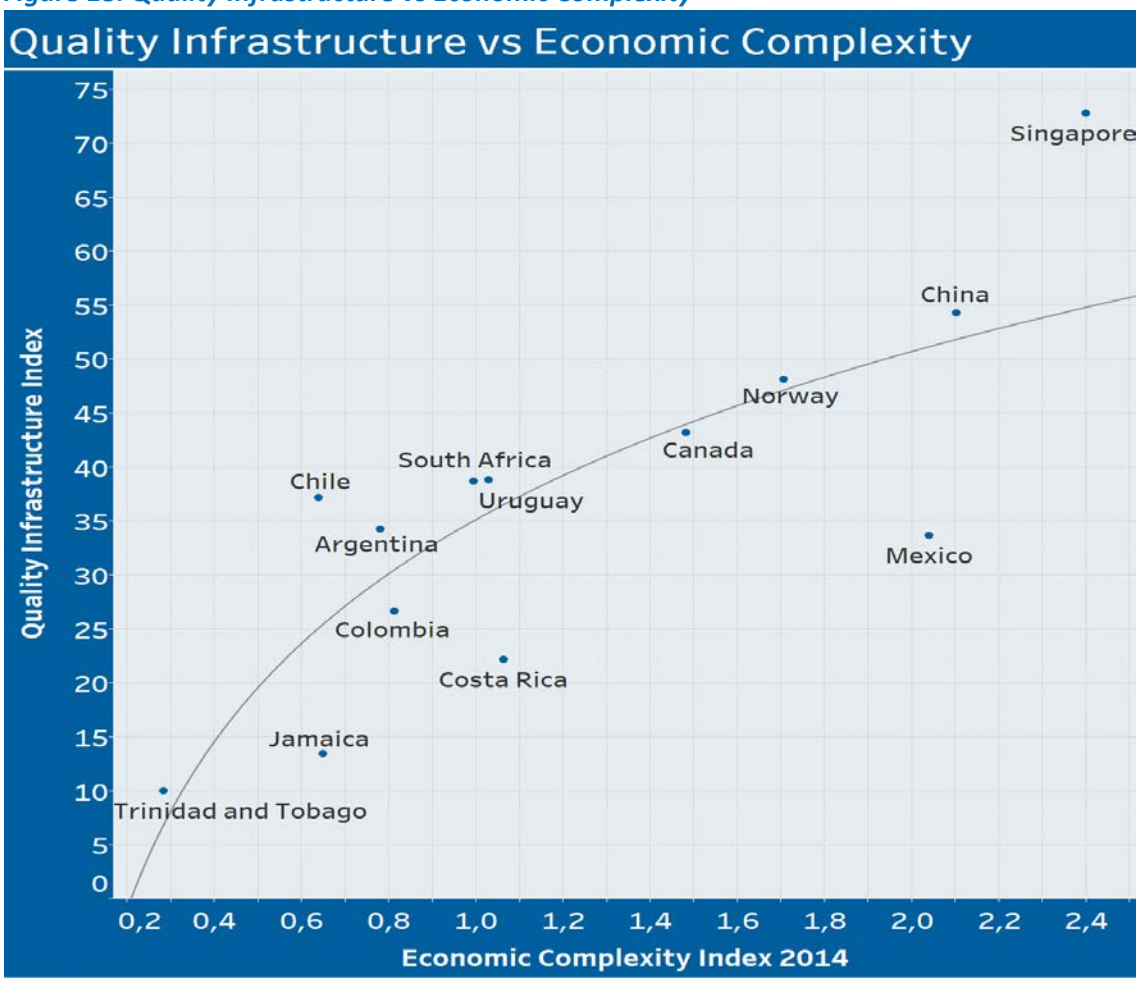


Trend Line Model
A logarithmic trend model is computed for Quality Infrastructure Index given Global Competitiveness Index 2016. The model may be significant at p <= 0,05. R-Squared = 65,8%. p-value (significance) = 0,001.

Source: Authors' own elaboration

The QI Index reveals a positive and strong correlation with ECI, supporting the idea that a well-developed NQI goes together with increased economic complexity expressed in the composition of these countries' productive outputs. In other words, the more diverse the product space of a country, the more developed is the NQI.

Figure 18: Quality Infrastructure vs Economic Complexity



Trend Line Model

A logarithmic trend model is computed for Quality Infrastructure Index given Economic Complexity Index 2014. The model may be significant at p <= 0,05. R-Squared = 64,4%. p-value (significance) = 0,001.

Source: Authors' own elaboration

Conclusions for Trinidad and Tobago NQI

Based on the NQI included in the analysis, Trinidad and Tobago in relative terms, has the lowest number of recognized calibration and measurement capabilities, accredited bodies, key and supplementary comparisons, and membership to international QS. For these five sub indicators, Trinidad and Tobago occupies the lowest position in the ranking.

The best performance is observed in the number of Trinidad and Tobago's ISOs issued, and in the participation in technical committees in the same organization. Those two sub-indicators places Trinidad and Tobago in the tenth position.

Trinidad and Tobago's position in the ranking is perfectly aligned to the need for a National Quality Policy that can guide the country through its intention to achieve a better reputation regarding trade in products and services and consumption. Based on the benchmark countries' performance, it can be stated that most of the Trinidad and Tobago's NQI potential has not yet been revealed, neither in size nor in quality. The resultant profile the National Quality System is a matter for current policymakers.

The country is expected to observe significant improvements in competitiveness and economic complexity while the Trinidad and Tobago NQI evolves into a system with deeper linkages with the National Value Chain and the International QI, regardless of the paradigm that follows.

An effort designed to bring to light calibration and measurement capabilities already present in Trinidad and Tobago, could represent a very positive sign for the International QI for a relatively low cost. Some consideration can be made regarding Trinidad and Tobago's membership status in the International QI organizations.

In comparison with other benchmark countries, the development of Trinidad and Tobago's NQI is relatively low, and aligned with its positioning in global competitiveness. The strong correlation between country competitiveness and the development of NQI indicates that a major investment in QI services is needed to accompany the upgrading strategies of companies and the economy of Trinidad and Tobago.

Annex 4

Synopsis of Stakeholder Needs

The stakeholders articulated their needs in interviews, workshops and Meetings of the National Quality Policy Project Steering Committee:

Public Sector

The main need identified by the public sector at the stakeholders' consultation was access to adequate resources to perform duties. These include human resources such as sufficient number of persons to fill numerous vacant positions, trained persons, adequate facilities, equipment and a safe working space. It is suggested that the MTI drive the NQP and be supported by the private sector.

Private Sector

The needs of the private sector in Trinidad and Tobago as it relates to QI were outlined during three stakeholder consultations. The main needs identified include a greater number of laboratories at affordable costs and their accreditation. Currently, food-related tests are being conducted primarily at CARIRI which resulted in long wait times. The private sector also identified the need to update and/or modernize legislation. One of the concerns was the Consumer Protection and Safety Act No. 22 of 1998 which require stronger mandates to be adequately enforced so that consumers could get proper redress for complaints. Other needs such as calibration services that would be acceptable for export products and standards to guide a wide range of products and services were also identified. Trinidad and Tobago's laws, standards and regulations need to be updated and amended, with penalties and incentives put in place. The National Quality Policy Law should be developed and implemented throughout all sectors. There is also the need to reduce customer complaints by providing quality goods and services and improve the quality infrastructure ranking with economic growth and impact on gross national product.

Traditional Sectors

The needs of traditional sectors, as identified by stakeholders, include:

- The Tourism sector: all subsectors should comply under tourism standards, with the development of new standards for all areas and a new organization to be put in place to fill the gap left by the Tourism Development Corporation.
- The Energy sector: harmonization of inspection, a national policy for renewable energy and a standard for renewable energy. Also the development of other needs such as equipment measurement metering and improved technical competence of service providers were also identified.
- The Manufacturing sector: improved competency of personnel (manufacturing and construction), good training for skilled craftsmen, regulation inspection in buildings, training in calibration and the capacity of laboratories to calibrate; the need for standards, for example building codes, and the need for competitive tendering that looks at quality not just price.

- The Agro-food sector: subsidized costs for testing and calibration, an accredited testing laboratory to support exports, calibration undertaken by the TTBS to be expanded to include exports, national standards in line with industry/commercial standards for foods, and the same standards being applied to exports also applied to imports. Additionally, the sector requires the compliance of raw material suppliers with food safety requirements and quality standards, an approved list of safe pesticides to use, a GAP certification scheme, an overarching country brand (seal/stamp) that can be used on all products, and, most importantly, a traceability system to be put in place.

Tobago

- The provision of full Quality Infrastructure services in Tobago – public officers have a fully operated sub-office in Tobago, including laboratories
- Improved access to the mainland via sea or air transportation
- Improved education and awareness of consumers on the importance of quality raw materials, goods and services
- The agriculture and tourism industries should collaborate closely - both public and private sector bodies
- Increased domestic production of goods and services
- Diversification of the economy and less reliance on oil and gas
- Increased levels of employment

Annex 5

Recommendations for the Trinidad and Tobago Bureau of Standards

The TTBS is a central organization of the National Quality Infrastructure of Trinidad and Tobago, but the development of an advanced NQS requires strengthening all components of the National Quality System and organizational change within the TTBS. The table below provides a summary of the key issues to be addressed and recommended strategies/actions to be adopted by the TTBS.

Figure 19: Key issues and recommendations for the Trinidad and Tobago Bureau of Standards

AREA/FUNCTION	KEY ISSUE	RECOMMENDED STRATEGY/ACTION
GOVERNANCE OF THE TTBS	Limited participation of stakeholders in the Standards Governance Structure/process Restriction on the development of national voluntary standards for food	Review and amend the Standards Act to address issues and other limitations
	Conflicts of interest between activities of Standards Division and Implementation (Enforcement) Division	Consider short term "firewalling" of the Implementation Division and mid to long term separation of the final decision process for sanctions.
	Conflicts of interest between Certification Division and Implementation (Enforcement) Division	Establish a Certification Body (or Certification Bodies) that: • has the participation and support of all stakeholders in the supply chain of priority sectors (suppliers, producers, regulators, consumers, government procurement, etc.) • meets the principle of impartiality in the final granting of certification • offers a more demand-driven service, with scope that includes sustainability standards • is accredited to offer a management system certification that is internationally recognized; • offers a scope of service that includes the sustainability

AREA/FUNCTION	KEY ISSUE	RECOMMENDED STRATEGY/ACTION
		standards Look for joint ventures to expand certification capacity in terms of types of certifications (voluntary/ sustainability standards) and possibly to serve other countries.
LEGISLATION	The Standards Act focuses mainly on product quality	Amend Act as appropriate, as indicated in NQP: • Move from a "compulsory standards" to a separate voluntary standards/ technical regulations model • Ensure that an authority is empowered to issue voluntary standards for the processed foods sector, based on available international standards • Achieve the independence of ACCREDI-TT • Increase fines for the breach of product regulations to an optimal deterrence level Move forward with GRPs covering all product regulators in Trinidad and Tobago. Ensure compliance of all standard setting bodies in Trinidad and Tobago with the WTO Standards Code of Good Practice.
STANDARDIZATION	Restriction by the Standards Act to develop standards for food	Amendment of the Standards Act and the Food and Drugs Act to unify the consensus approach to standards development, broaden stakeholder participation in the governance process and address the use of mandatory standards.

AREA/FUNCTION	KEY ISSUE	RECOMMENDED STRATEGY/ACTION
	Standards may not always be market relevant	Development and utilization of a policy to ensure market relevance of standards based on the needs identified. The current procedures can be amended to address this.
	Low level of awareness of standards and standards setting process among stakeholders, including the Board Members and Chairs of Technical Committees	Implement programmes to increase awareness of stakeholders, including the Board Members and Chairs of Technical Committees. This entails short training sessions throughout their tenure. Consider a more stable presence in Tobago
	Slow process of approval of standards by current structure and responsibility of the Board	Establish and use the Technical Committee of the Board for Review and Recommendation of the standards. Ensure that the Board only considers and approves the standard as developed by the established consensus process and not technical content.
	Increased use in sustainability standards globally.	Consider how to treat with the international increase in the use of sustainability standards that are not yet formally adopted.
METROLOGY	Laboratory building does not have the technical conditions required to undertake the tests or calibration (Inadequate space for conducting current and future work and unreliable environmental conditions).	The TTBS should as a matter of urgency take steps to improve the laboratory environment by (1) implementing a system of good laboratory practices (2) reorganizing laboratories for a better flow and use of the existing environment (3) improving the air conditioning system where it is technical and economical to do so In the mid to long term, the GORTT should design and build a new state-of the art laboratory complex to function as the National Metrology Centre and as an InQbator for the NQI and related

AREA/FUNCTION	KEY ISSUE	RECOMMENDED STRATEGY/ACTION
		services, to support both innovation and quality policy strategies (See Additional Notes below this table).
	Level of participation of private sector in offering calibration services not known – traceability is a concern	Agree on appropriate policy to encourage private sector participation Facilitate participation through training and nurturing/assistance.
	Trinidad and Tobago, through the TTBS (its NMI), has not yet submitted a Calibration Measurement Capability (CMC) result to the BIPM key comparison database (KCDB).	Continue preparation and submit CMC in shortest possible time, using peer evaluation or accredited calibration laboratory approach.
	Overlapping activities of Legal Metrology and Implementation Inspectors	Examine the relationship and organization of work between Legal Metrology and the Implementation (Enforcement) Division. Where inspections are done in the local market, this could include aspects of Legal Metrology such as pre-package checks and deceptive labelling.
TESTING	Inadequate space to expand testing capabilities, e.g. for food products	The recommendation on the metrology laboratory suggested above also applies to TTBS testing laboratories. In addition, the establishment of a food testing laboratory should be on a purely commercial basis, as done by CARIRI. Seek accreditation of other test methods in high demand (especially by exporters). The CFDD laboratory building should be finished and accredited as a testing laboratory.
	Need for specialized training in all areas	Train personnel as identified in the business plans to be developed on marketing of services.

AREA/FUNCTION	KEY ISSUE	RECOMMENDED STRATEGY/ACTION
	Marketing of Services	Develop business plans and operate testing and calibration laboratories in competition with private sectors based on these models.
CERTIFICATION	Low uptake for both management system and product certification	Consider joint ventures to explore private certification market The section on governance proposes the establishment of a Certification Body
	Conflict of interest with other parts of the organization	The section on governance proposes the establishment of a Certification Body
INSPECTION (STANDARDS ENFORCEMENT)	Conflict of interest with standardization and certification activities	The section on legislation proposes the adoption of higher penalties to a level that ensures deterrence
ACCREDITATION	Conflict between TTLABS as accreditation body and TTBS laboratories Lack of autonomy of accreditation (TTLABS) to obtain international recognition	Expedite the process to establish an Independent Accreditation Body, first by way of a Note to the Government and then the development of overarching legislation
FINANCE	Lack of financial sustainability for the operation of some areas: Testing, Certification and Standardization	Develop and implement a “Funding Mix” Policy to identify those areas to be funded by government and those by fees from services and project funds. Develop business plans and operate testing and calibration laboratories in competition with private sectors, based on these models.

Source: Authors' own elaboration

Rationale for InQbator Recommendation

The current metrology laboratories will not be able to obtain and maintain international accreditation and hence will not be able to support industry, exports and laboratories requiring traceability. The benchmarking results indicate that the development of Trinidad and Tobago’s NQI is relatively low, and is not in line with its positioning in global competitiveness. The strong correlation between country competitiveness and the development of NQI indicates that a major

investment in QI services is needed to accompany the upgrading strategies of Trinidad and Tobago's companies and economy. The following recommendation is therefore a formidable and far-reaching but necessary and inevitable step that the GORTT should take:

The GORTT should design and build a new state-of-the-art laboratory to function as the National Metrology Centre and as an InQbator for the NQI and related services to support both innovation and quality policy strategies. This laboratory will:

- provide the space and suitable environment required for national metrology standards and measurement dissemination/traceability work, including chemical metrology to support emerging industries;
- provide for additional space and environment for testing laboratories, including those to be operated by other players (Government or private sector)
- be housed in a building that is not necessarily owned/operated by the TTBS, but jointly by the investors;
- be located close to other research/testing laboratories and /or innovation supporting facilities (e.g. CARIRI); and
- serve as the national (or regional as appropriate) reference laboratory for metrology and testing in selected areas.

The presence of this laboratory in Trinidad and Tobago will not only serve to address the immediate NQI needs, but will be a significant boost to the quality of scientific institutions and close the NQI gaps (to support the strategies for innovation and sustainability), thereby increasing its competitiveness profile at regional and international levels.

Annex 6

Sectors/Subsectors Driving NQI Services

A sustainable and effective NQI should be demand- and user-driven. With this assumption, through review of documents and engagement with stakeholders, the consultants have identified the eight (8) key sectors/sub-sectors targeted for development to diversify Trinidad and Tobago's economy and which are likely to require significant focus for NQI support. This does not preclude the already existing demand in other sectors not mentioned. These sectors are:

- Agriculture and agro-processing
- Maritime Services
- Fish and fish processing
- The Creative Industries
- Aviation Services
- Financial Services
- Manufacturing (Alcoholic and non-alcoholic beverages)
- Construction

Although Software Design and Applications is a targeted sector for development, it is not likely to be a significant driver of NQI services. Figure 20 lists the sectors/subsectors with competitive advantage/niche market, quality requirements, NQI services required, and the gaps that may hinder effective support and realization of quality goals in the sectors.

Figure 20: Sectors/Subsectors driving NQI Services

Competitive Advantage/Niche	Main Quality Requirements/Standards	NQI Services Needed	Gaps
SECTOR 1	**Agriculture and Agro-processing**		
Large local demand for agriculture produce from crops and livestock. Suppliers are not able to take advantage of demands in US, Canada and UK markets (Ref) Agro-processing provides an alternative market for some fruit and vegetables such as hot peppers and pigeon peas. Focus for development is on: roots and tubers, cereals and grain legumes, hot peppers,	Food safety and animal health regulations, (e.g. Canadian Safe Food Act, FSMA) Good Agricultural Practices, Good Manufacturing Practices and Quality and Sustainability standards.	Standards, Inspection, Testing, Certification and Metrology and Accreditation	Outdated Food Safety Law (Food and Drugs Act). Low adoption and use of food safety and quality standards. Testing laboratories not sufficient nor accredited. No certification service for agricultural products.

Competitive Advantage/Niche	Main Quality Requirements/Standards	NQI Services Needed	Gaps
fruits and vegetables, small ruminants, climate change resilience for agricultural development and natural resource management			
SECTOR 2	**Maritime Services – Shipbuilding, ship repair, dry-docking and yachting services**		
Leveraging of TT's connectivity to regional and global markets, healthy export base, highly educated workforce, vibrant energy sector and, low fuel rates as competitive advantage Generate shipbuilding, ship repair, dry-docking and yachting services	Occupational health and safety standards, Materials Specification, personnel certification, ABJC Standards (Yacht), ISM, ISO and ISPS Standards, as well as International regulation (SOLAS, MARPOL, STCW, ILO compliance.	Standards, Inspection, Testing, Certification and Metrology and Accreditation.	Testing of materials
SECTOR 3	**Fish and Fishing Industries**		
Most of the fish are marketed fresh and sold directly by fishermen on the beach to private buyers/middlemen or to consumers. Species of fish include snapper, flying fish, kingfish, croakers and shrimp. Government facilitating the expansion of hatcheries, improving the supply of fingerlings and establishing national processing and cold storage facilities.	Food safety and animal Health Regulations, (e.g. Canadian Safe Food Act, FSMA) Good Agricultural Practices, Good Manufacturing Practices and Quality and Sustainability standards.	Standards, Inspection, Testing, Certification and Metrology and Accreditation	Outdated Food Safety Law (Food and Drugs Act). Low adoption and use of food safety and quality standards. Testing laboratories neither sufficient nor accredited. No certification service for agricultural products.
SECTOR 4	**Aviation Services – aircraft maintenance and repair**		

Competitive Advantage/Niche	Main Quality Requirements/Standards	NQI Services Needed	Gaps
Well-established industry, significant experience in airport administration, air traffic management, aviation inspection, advanced training and air navigation services. To become the regional aviation hub for maintenance and repair.	The International Air Transport Association (IATA) standards. National Civil Aviation Standards. Occupational health and safety standards, personnel certification.	Standards, Inspection, Certification, and Metrology.	To be Assessed by CALIDENA method.
SECTOR 5	**The Creative Industries**		
Film, music, entertainment, fashion and design	Occupational health and safety standards Sustainability standards: Environment, labour, social responsibility	Inspection, Testing, Standards, Metrology (e.g. noise levels) and Accreditation	Industry in early stage of development Limited use of standards and conformity assessment systems.
SECTOR 6	**Financial Services and Gambling**		
Making Trinidad and Tobago a regional financial centre: Banking, Insurance, Building Societies, Credit Unions, Non-deposit taking Institutions, Others	Customer Service Standards, Building Services Standards, Personnel certification, Inspection, Accreditation, and Metrology	Standards/Inspection, Testing, Certification, Metrology (e.g. noise levels) and Accreditation Calibration and testing of gambling equipment	To be assessed by CALIDENA method.
SECTOR 7	**Software Design and Applications**		
Making Trinidad and Tobago a technology and innovation centre.	International Standards	Consideration stages	To be assessed by CALIDENA method
SECTOR 8	**Alcoholic and non-alcoholic beverages**		
The Food, Beverage and Tobacco subsector is the largest manufacturing sub-sector in Trinidad and Tobago.	Packaging and Labelling, Safety, Quality and Environmental Regulations and/or standards. Social standards becoming important.	Inspection, Testing, Standards, Metrology	To be assessed by CALIDENA method.
SECTOR 9	**Construction (Local)**		

Competitive Advantage/Niche	Main Quality Requirements/Standards	NQI Services Needed	Gaps
Architectural, Engineering, Management, construction, fabrication, installation services.e.g cement, blocks, steel, aggregates, lumber, etc.	Industry Performance Standards, Professional Competence, Certification of Skills, Occupational Health and Safety Standards, Environmental Standards	Inspection, Testing, Certification, Standards, Metrology and Accreditation	Absence of a National Building Code.
SECTOR 10	**Tourism**		
Accommodation, restaurants, event planning, theme parks, transportation, cruise line, health and culinary tourism	Certification of Management Systems, sustainability standards, food safety	Inspection, Testing, Certification, Standards, Accreditation	To be assessed by CALIDENA method.

Source: Authors' own elaboration

Within the NQI itself, there are factors that are expected to open new doors of opportunity. The establishment of the ACCREDIT-TT as a distinct body from TTBS is anticipated to change the landscape for what will be a significant driver of the QI going forward. They should seek to garner clients from the Caribbean region and the government would need to provide the human and financial resources to maintain high quality services.

In the same manner, CABs in Trinidad and Tobago are expected to create a "pull" on NQI services. The launch and inaugural Meeting of the Caribbean Network of Conformity Assessment Bodies (CANCAB) Committee that was hosted by TTBS in 2015 was a great boost to recognizing the work of CABs. The event was supported by the 10th EDF TBT project managed by CROSQ, PTB and INDOCAL. The support of these agencies underscores the importance of conformity assessment bodies and should give the CABs in Trinidad and Tobago the encouragement to drive the NQI and the NQP.

Annex 7

Contribution of Quality Infrastructure to the Sustainable Development Goals

The National Development Strategy identifies from its assessment: the need to transform the existing economic growth model into one that is environmentally friendly while addressing climate change, including reducing greenhouse gas emissions and building resilience to its adverse impacts (ref). Based on this need, and as a signatory to the UN 2030 Agenda for Sustainable Development, Trinidad and Tobago seeks to align its national policies with the SDGs.

These goals are built upon the three pillars of sustainable development, namely, the economic, social and environmental spheres. Among the five thematic areas for focus, the GORTT has identified Theme V as Placing the Environment at the Centre of Social and Economic Development. Given this commitment by the GORTT, it makes sense that the National Quality Policy sets its mid-term horizon also in the year 2030 and maps the elements of the NQI towards the support of these goals.

The National Development Plan also provides a roadmap for the implementation of the SDGs. Figure 21 provides a list of the key interventions areas in the economic areas in the roadmap.

Figure 21: Roadmap - Key Intervention Areas

Inclusive Economic Growth (labour market reform, decent work, macroeconomic stability, employment)
• Energy Security and Efficiency • Food Safety and Security • Tourism Development • Science, Technology and Innovation Development • Creative Industries
Social development
• Health – Non-communicable diseases, communicable diseases (emerging and re-emerging), HIV, sexual and reproductive health, nutrition, universal health coverage, injuries, health financing, quality assurance • Human Capital Development (education and training, etc. – early childhood level, youth empowerment training in emerging occupations and lifelong learning, manpower planning, standards and quality across educational levels) • National Security and Reform of Justice System • Social Protection and Poverty
Environmental development
• Environmental Sustainability (biodiversity conservation, ecosystems management, waste management etc.) • Climate Change Adaptation and Disaster Risk Management) • Sustainable Urban and Rural Development

Crosscutting issues
• Data Quality and Management and Monitoring and Evaluation • Gender Equality and Women's Empowerment

Source: National Development Plan

It is important to note that development in all these areas requires the support from services of the National Quality Infrastructure. Consequently, we can map the services of NQI to all 17 goals of SDGs (Table 6.4) to the demonstrated contribution and anticipated demand for NQI services.

Figure 22: SDG Goals

Goals	Link to Quality Infrastructure
Goal 1 No poverty	A recognized and effective quality infrastructure creates the framework conditions for private-sector activity. QI allows manufacturing processes and product quality to be improved in a way that conserves resources, thereby reducing costs and increasing competitiveness. In this way, access is improved to both the domestic market and to regional and international trade. This creates the jobs and income opportunities that are the prerequisites for large-scale growth and poverty reduction.
Goal 2 Zero hunger	Enhanced quality assurance in the production, processing and distribution of food improves its quality and accessibility. Locally available analysis laboratories ensure that food is free of contaminants that are detrimental to human health, and that post-harvest losses are reduced. In addition, access to reliable laboratory analysis results promotes sustainable agriculture, as fertilizers and pesticides are used properly and sustainably, value creation is increased and local producers are empowered.
Goal 3 Good health and well-being	A functional quality infrastructure supports medical laboratories in providing reliable services and ensures that medical devices measure accurately. Only in this way can patients be diagnosed correctly and treated effectively. In addition, the quality of medicines is ensured, thus providing the population with effective protection against inadequate or even harmful medicines. By collaborating with pharmaceutical inspection laboratories, national regulatory authorities and industrial firms, NQI improves the approval, inspection and market surveillance of locally produced medicines. This allows products that are affordable yet safe and of high quality to be available locally.
Goal 4 Quality Education	An important component of NQP is basic and advanced training in the field of quality infrastructure: QI stakeholders intensify their knowledge and skills both at a high scientific level within the scope of scientific and technical cooperation or higher education and within the scope of vocational advanced

	training.
Goal 5 Gender Equity	A functional quality infrastructure enables economic growth as well as the creation of income and employment for all members of society. In addition, quality infrastructure also contributes to making basic services, such as access to clean drinking water and availability of non-toxic food as well as reliable healthcare services, available to one and all – both men and women equally.
Goal 6 Clean Water and sanitation	Quality infrastructure contributes to useable, clean drinking water, as well as to enhanced wastewater management. On the one hand, local access to reliable analysis ensures drinking water quality. On the other hand, enhanced measurement capacities increase the accuracy and reliability of consumption measurements, as well as the effectiveness of existing supply systems.
Goal 7 Affordable and clean energy	Not until a suitable quality infrastructure is in place can renewable energies be used effectively in the long term and energy efficiency increased. Correct measurement and testing services are necessary to both correctly install and increase the efficiency and lifespan of solar and wind power facilities. Furthermore, precise transmission and energy-measurement technologies, the development of new standards and the harmonization of various technologies are needed to incorporate electricity from renewable energy sources into existing networks with minimal losses.
Goal 8 Decent work and economic growth	A recognized and effective quality infrastructure creates the framework conditions for fruitful private-sector activity. When companies draw on reliable QI services, they should fulfil the requirements placed on their products and participate in global competition. In this way, local income and employment opportunities are generated and economic growth is facilitated. In addition, by enforcing international labour standards and worker safety provisions, safe working conditions and decent work are ensured.
Goal 9 Industry, innovation and infrastructure	In addition to improvements to the energy and water supply, quality infrastructure also contributes to improvements in the quality of processes and products in value chains. For example, the competitiveness of local businesses is improved, a sustainable process of industrialization is supported and innovations are initiated.

Goal 10 Reduced inequalities	A recognized quality infrastructure creates the prerequisites for private-sector activity and facilitates participation in global trade. In this way, local employment and income opportunities are generated and inequalities within and between countries are reduced.
Goal 11 Sustainability cities and communities	Quality infrastructure allows safe buildings to be built by ensuring the quality of building material (to name one example). Reliable measurements such as air quality are also necessary to ascertain environmental conditions in cities and settlements and to comply with corresponding regulations and directives.
Goal 12 Responsible production and consumption	A functional quality infrastructure provides an institutional framework to develop environmental and social standards (or to incorporate them into national regulations) and to monitor their observance. Furthermore, competent, locally available laboratory analysis can demonstrate environmental contamination in the water, air and soil. In this way, causes are identified at an early stage and can be prevented in future. Early detection of contaminants in food and textiles also contributes to more sustainable consumption and production patterns.
Goal 13 Climate action	A functional quality infrastructure supports the implementation of climate and environmental protection, as it can be used to identify, regulate and monitor risks. Substances are checked for contamination and soil, water and air quality is measured and analysed. In this way, compliance with environmental directives is checked and processes and conduct guidelines that are relevant to the climate and to the environment can be implemented. In addition, using quality management systems as well as calibrated and verified measuring and testing equipment promotes the economical use and management of energy and raw materials.
Goal 14 Life below water	
Goal 15 Life on land	
Goal 16 Peace and justice	QI measures contribute to legislation reform and support reform processes such as those in the fields of regionalization, privatization and participation. A functional quality infrastructure entails that the state protects its citizens by having goods and services that are traded fulfil respective safety requirements. Legal framework conditions (and the support and surveillance systems that are associated with these conditions) make government action transparent and predictable. This ensures the establishment of national administration structures for the implementation of internationally mandated surveillance mechanisms.

Goal 17 Partnership for the goals	International development cooperation projects support its partners during establishment and development of their scientific, technological and innovative knowledge and skills in the field of quality infrastructure. Knowledge is also exchanged within the scope of south-south and trilateral cooperation projects. Quality infrastructure fulfils the prerequisites for the integration of partner countries into the global system of trade, thereby strengthening their trade capacities and increasing their exports. Preconditions for taking part in global trade include proving that products are in conformity with required standards or regulations. Furthermore, assurance is provided that technical regulations, standards, tests and certification procedures do not create unnecessary barriers to trade. In the same way, sanitary and phytosanitary measures can be adhered to, to control risks for humans, animals and plants.

Source: Authors' own elaboration based on PTB, 2017, Technical Cooperation, Global Goals for Sustainable Development, The contribution of quality infrastructure to the implementation of Agenda 2030.

Annex 8

Principles of Good Regulatory Practices

Considering that in today's world there are several regulators in different countries issuing several regulations on a myriad of sectors, different multilateral, regional and local entities have decided to work in principles and methodologies to ensure said regulations could perform better for society and impose the least trade restrictions to products originated elsewhere.

These initiatives have been worked and published by WTO TBT Committee,[61] the OECD,[62] the UNECE,[63] ASEAN,[64] APEC[65] and several other countries[66]. These initiatives are called Good Regulatory Practices (GRPs).[67]

GRP Principles

Taking into consideration current practices by national and regional bodies and multilateral obligations on GRP, there is a convergence of views on common principles for GRP, whereby good regulation should:[68]

- Serve clearly identified policy objectives, and be effective in achieving those objectives;
- Have a sound legal and empirical basis;
- Produce benefits that justify costs, considering the distribution of effects across society and taking economic, environmental and social effects into account;
- Minimise costs and market distortions;
- Be clear, simple, and practical for users;
- Be consistent with other regulations and policies;
- Be transparent to both regulators and those affected by regulation;
- Be based on international or national standards that are harmonized to international standards, except where legitimate reasons for deviations exist;
- Reference only those parts of a standard that represent minimum requirements to fulfil the desired objectives;
- Be least trade restrictive to achieve the desired objectives;
- Be performance- based rather than prescriptive;

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[61] See https://www.wto.org/english/tratop_e/tbt_e/wrkshop_march08_e.htm Visited 9/27/2017.
[62] See http://www.oecd.org/regreform/regulatory-policy/44294427.pdf Visited 9/27/2017.
[63] http://www.unece.org/trade/wp6/welcome.html.
[64] See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.
[65] See http://www.asean.org Visited 9/27/2017.
[66] See WTO G/TBT/W/341. 13 September 2011.
[67] See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.
[68] See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

- Accord equal treatment to products of national origin and like products imported from Member States; and
- Be subject to review to maintain flexibility and adaptability to changes.

GRP principles applied to the process for preparation, compliance to and review of technical regulations

Notwithstanding the fact that GRP principles can be applied to all types of regulations, when dealing with a technical regulation, the regulator needs to consider how the regulation is prepared, adopted and reviewed so that it will be effective over time.[69] Trinidad and Tobago, as a WTO Member State, should align its practices to the WTO TBT obligations when preparing, revising, or applying technical regulations and associated conformance requirements.[70] In addition, Trinidad and Tobago shall also apply recommendations on Regulatory Quality and Performance (See OECD http://www.oecd.org/regreform/sectors/37318586.pdf Visited 9/27/2017). The following list covers WTO TBT obligations regarding technical regulations:[71]

1. Preparation of technical regulations[72]

1.1 In the preparation of technical regulations, the principles as listed in Article 2.1 of the WTO TBT Agreement should be considered.

1.2 The benefits of the use of specific tools for enabling GRP has been recognized by WTO members. This includes the use of the Regulatory Impact Assessment (RIA).[73] The RIA requirements have been introduced as the means to ensure that the proposed regulation is assessed for its need and net impact on society before it is put forward to regulators. RIA requires a series of steps to be followed, such as: defining the problem; setting objectives; assessing all feasible options; and analysing the impacts arising from these options; and consulting with stakeholders. (See OECD http://www.oecd.org/regreform/sectors/37318586.pdf Visited 9/27/2017).

1.3 RIA imposes a common system of quality assurance on a wide range of regulatory proposals, with the aim of better achieving effective and efficient regulatory arrangements.

1.4 RIA also promotes widespread consultation with groups likely to be affected and leads to published documentation of why regulators have chosen regulatory options and how different groups will be affected.

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69 See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

70 See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

71 Elaborated by Mesopartner based on http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

72 Elaborated by Mesopartner based upon http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

73 See http://www.oecd.org/regreform/regulatory-policy/44294427.pdf Visited 9/27/2017.

1.5 The results of this analysis are detailed in the Regulatory Impact Statement (RIS). RIS is based on a set of steps that structure the preparation of regulatory proposals and has the following key elements, which set out:[74]the problem which gives rise to the need for action; in defining the problem, some basic questions are required to be addressed.[75]

1.6 Regulatory measures should contain compliance strategies which ensure the greatest degree of compliance at the most appropriate level of regulator intervention and at the lowest possible cost to all parties, and hence provide economic benefits and stability.

1.7 Conformity assessment is the comprehensive term used for measures taken or required by manufacturers, their customers, regulators and independent third parties to assess conformity to standards or technical regulations. Conformity assessment procedures include procedures for sampling, testing and inspection; evaluation, verification and assurance of conformity; registration, accreditation and approval, as well as their combinations.

1.8 When deciding on requirements for the conformity assessment, Trinidad and Tobago should ensure that: requirements and conformity assessment procedures are not prepared, adopted or applied with the effect of creating unnecessary technical barriers to trade; the same are to be complied with by suppliers of products of national origin and those of like products imported from other WTO Member States; in order to avoid delay of market entry, the implementation of registration, licensing or approval of regulated products prior to placing the goods onto market, where possible, should be limited to high -risk products.

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[74] Accurate regulatory proposal definition reduces the risk of choosing inappropriate options for regulator action or ignoring more effective solutions, and reduces the likelihood of over regulation, which will result in increased production costs, reduced competition, reduced innovation, or reduced customer choice. See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

[75] Including whether: the unregulated market could be expected to reduce the problem within a reasonable timeframe; why such regulatory action is necessary; and how a regulatory scheme will improve the situation; the desired objectives: this element is a clear statement of the objectives that the regulator is pursuing with the proposed regulation; the options (regulatory and non-regulatory) that may constitute viable means for achieving the desired objectives: This element sets out a range of viable options for addressing the proposed regulation. It is here that non-regulatory solutions (such as information and education campaigns, the use of codes of practice and voluntary standards) must be described, as well as possible regulatory options; an assessment of the impact (costs and benefits) on consumers, business, government and the community of each option, including the impact on small business paperwork and compliance costs: This element is an assessment of the impact of a range of viable options (both regulatory and non-regulatory) on all groups affected. Each option should be considered carefully in terms of costs and benefits. The option preferred should be the option which either provides the maximum net benefit or the least net cost to society; a consultation statement (the process and results of consultation): This element sets out what consultation is undertaken and summarises the views of the main affected groups. This is an important aspect of the transparency of the regulation-making process and provides those most affected with adequate lead-in-time before the regulations take effect; a recommended option: This element is a statement of the recommended option; and a strategy to implement (including consideration of appropriate enforcement mechanisms) and review the preferred option. See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

1.9 Trinidad and Tobago should maintain appropriate post market surveillance systems in place to complement the implementation technical regulations to ensure that products comply, or continue to comply, with the relevant regulatory requirements.

2. Review of technical regulations[76]: To ensure that technical regulations continue to meet their intended objectives efficiently and effectively, it is important that provisions exist for the review of current regulation and the vetting of new regulatory proposals. RIA is applicable not only to new regulatory proposals, but also when reviewing the existing regulations. Monitoring is essential to assess whether the circumstances or objectives giving rise to their adoption have changed. It is also essential to assess whether the regulation is achieving the desired objectives in a proportionate way.

3. Consultation of regulations[77]: Openness, transparency, proportionality and accountability in the preparation and application of regulations are fundamental to ensuring public confidence in the approach taken to address a problem that has been identified.

3.1 The regulation-making process should be transparent to both regulators and those affected by regulation. The process should ensure the issuance of notice of a proposed regulation with a sufficient consultation period to allow: all stakeholders, including consumers and business to have access to the draft proposals and to submit comments; adequate consideration and analysis of those comments; and responses to significant points and explanations of the rationale for revisions when adopting the final regulation.

3.2 Consultation with all parties affected by the technical regulation is an essential element in the preparation and implementation of technical regulations. A well-designed and implemented consultation: increases the transparency of the process; insures that all perspectives on the issues have been considered; and highlights alternative approaches to achieve objectives; can be a useful means of evaluating the accuracy of regulators' assessment of the costs and benefits; and enhances awareness and therefore encourages compliance.

3.3 Trinidad and Tobago may adopt a technical regulation as it finds necessary. However, before the technical regulation is amended or introduced, Trinidad and Tobago shall notify other WTO Member States of its intention to legislate through the registered TBT or SPS contact points before the WTO TBT Committee.

3.4 Upon request, provide to other WTO Member States the draft of the technical regulation and other information regarding the deviations from the relevant international standards and the applicable pre-market conformity assessment procedure.

3.5 Trinidad and Tobago shall allow at least a six-month period between the publication of technical regulations and their entry into force, to provide sufficient time for producers in exporting Member States to adapt their products or methods of production to the

[76] See http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017.

77 Elaborated by Mesopartner based upon http://asean.org/wp-content/uploads/images/2012/Economic/sectoral_aem/standards_conformance/ASEAN%20Good%20Regulatory%20Practice%20(GRP)%20Guide.pdf Visited 9/27/2017

requirements of importing Member States. In cases where urgent problems of health, safety, security or environment exist, Member States shall notify other WTO Member States through TBT / SPS as applicable.

3.6 It is suggested that regulatory cooperation between regulators from different WTO and CARICOM Member States could also be viewed as an element of GRP. This voluntary and "informal" activity, where regulators from different Member States exchange information on regulations and conformity assessment procedures, could help to achieve a better understanding of different regulatory systems and avoid unnecessary regulatory differences (through means such as achieving harmonized, equivalent or compatible solutions).

Annex 9

Selected Country Case Studies

Uruguay

National Quality Infrastructure[78]

The National Quality Infrastructure of Uruguay (SUNAMEC) has been established to consolidate National QI to have a more competitive and internationally recognized country. The SUNAMEC is composed of: The National Quality Institute, a coordinating and guiding body for the system. The National NSB (UNIT), the National NMI (LATU), and the National Accreditation Body (OUA) are also part of the system. The head of the system (CONNAM), is a body that establishes the public policies for SUNAMEC.

The National Quality Institute of Uruguay (INACAL) pursues the following goals: orients and coordinates the actions of a National Quality Infrastructure; promotes the improvement of the competitiveness of companies to increase exports; provides training and training of human resources in the quality of business management; promotes the improvement of the management of the public and private organizations (of the National and Departmental Governments); technically supports the consumer in terms of quality as the basis of their choice; manages the National Quality Award; has a wide portfolio of options for continuous improvement models to adapt to the environment of different users; plans activities oriented to the education in quality to all the actors of the society; provides a broader spectrum of recognition to quality improvement efforts that encourage more companies and institutions to undertake them and; generates strategic alliances to avoid duplication of efforts and to maximize the results of its activities, with public and private institutions, national or foreign and with international organizations.

NMI Technological Park[79]

The LATU Technology Park promotes the sustainable development of the country and its international insertion through innovation and the transfer of value solutions in analytical, metrological, technological and management services, and conformity assessment in accordance with applicable regulations.

The Technological Laboratory of Uruguay (LATU) was created in 1965 as a joint effort of the government and the private sector. Initially it was called Analysis and Testing Laboratory, although in 1975 began to use its current name.

It is a public non-governmental entity, and is administered by a board composed of: a representative of the Executive branch of the government (Ministry of Industry, Energy and Mining), who holds the presidency, and two representatives of the Chamber of Industries of Uruguay and the Banco República, as directors.

LATU occupies 11 hectares, with 23,500 m² built, and is in Montevideo. Facilities include the main building, 11 modules with laboratories and pilot plants, the business incubator Ingenious, the

[78] See http://www.inacal.org.uy/institucional Visited 9/21/2017.

[79] See www.latu.org.uy/index.php/latu-english Visited 9/21/2017.

Exhibition Park and the Science Museum. Since January 2007, it also hosts the Knowledge Development Centre, dedicated to training human resources for the information technology sector.

It offers a wide range of services to add value to technologies and management processes used by public and private companies, seeking to promote the development of the whole community in Uruguay.

NMI Joint Venture[80]

LSQA is the result of the association of the "Laboratorio Tecnológico del Uruguay" (LATU) and Quality Austria. This strategic alliance allows LATU to access knowledge on training and product certification, processes and management system integration. LSQA possesses international prestige and vast experience in several fields of activity.

From a pragmatic viewpoint, LSQA provides the guidance needed to comply with new requirements and adapt to new trends to be a successful competitor in the global market. LSQA is a limited company owned by LATU and Quality Austria and it is financed by certification and training services fees.

Costa Rica

Overarching Law[81]

Costa Rica´s National System for Quality Bill (Law No 8279/2002) is a successful overarching legislation. It covers all bodies related to the National Quality Infrastructure for the country.

The law covers the reasons why the NQS has been established, the National Coordinating Body (CONAC), the NMI (LACOMET), the NAB (ECA), the National Regulatory Body (ORT) and the NSB (ENN).

National Quality Infrastructure[82]

Costa Rica's National System for Quality (SNC) is a structural framework for the development of activities related to development and demonstration of conformity, in order to improve the competitiveness of domestic enterprises and to provide confidence in the transaction of goods and services. The purpose of the SNC is to provide a stable and integrated framework of trust which, through the promotion of quality in the production and marketing of goods and the provision of services, facilitates the improvement of the competitiveness of productive activities, a degree of general well-being and facilitates the effective fulfilment of the international commercial commitments signed by Costa Rica. The SNC also includes other support, diffusion and coordination activities established in the National Quality Law and its secondary legislation.

Quality Council[83]

The System is coordinated by the National Council for Quality (CONAC). The CONAC is responsible for the coordination of quality promotion and dissemination of activities. It also has the power to

[80] See http://www. lsqa.com Visited 9/21/2017
[81] See http://reventazon.meic.go.cr/informacion/legislacion/metrologia/8279.pdf Visited 21/9/2017.
[82] See http://reventazon.meic.go.cr/informacion/legislacion/metrologia/8279.pdf Visited 21/9/2017
[83] See http://reventazon.meic.go.cr/informacion/legislacion/metrologia/8279.pdf Visited 21/9/2017

make recommendations it deems appropriate to the System. CONAC is composed of public authorities, business associations and the heads of the national standardisation, accreditation and metrology institutions.

Colombia

Overarching Law[84]

Colombian Law 155 of 1959 granted the national Government of Colombia ample legal power to introduce by secondary legislation rules related to the establishment of quality in the country, with some exceptions such as the creation of new agencies, establishing fees etc.

In 2015, the Government of Colombia, issued Decree 1595. This decree covers the interactions among the heads of the Colombian National Quality System (SICAL) i.e. among the Colombian National Standards Body (ICONTEC), the National Accreditation Body (ONAC) and the National Metrology Institute of Colombia (INM).

The Decree provides rules for regulators of products in the country, considers issues of conformity assessment procedure and traceability, development of reference materials and the provision of proficiency testing.

Additionally, the Decree provides rules for regulators in the country to provide a clear regulatory framework and the mandate to use RIA when adopting technical regulations.

Quality Council[85]

The Colombian Quality System (SICAL) provides for an intergovernmental commission to articulate actions among regulators of different sectors. This body is called the Intersectoral Commission for Quality (CIC). Although its mandate is broad, covering private and public matters related to quality in the country, the Commission has focused mostly on the improvement of the quality of regulations to solve issues among the regulators, the national accreditation body, industry and conformity assessment bodies. CIC meets regularly every two months and has 9 permanent members from the public sector and 5 invitees from the private sector.

Permanent GRP Committee[86]

Coming out of the meeting, CIC decided to improve the quality of technical regulations CIC recommended to the Ministry of Commerce of Colombia to establish a permanent Technical Committee on Product Regulations (CTR). The main functions to be granted to CTR are to analyse new technical regulations and to give recommendations to regulators to improve the quality of products secondary legislation.

[84] See Colombia Law No. 155 of 1959 and Colombian Decree No. 1595 of 1995 in http://www.mincit.gov.co/publicaciones/35902/seccion_1_disposiciones_generales Visited 9/15/2017.
[85] See in http://www.asosec.org/documentos/decreto_3257_2008.pdf Visited 9/15/2017.
[86] See draft http://www.mincit.gov.co/loader.php?lServicio=Documentos&lFuncion=verPdf&id=81801&name=PR-_Comite_Regulacion_version_agosto_II.pdf&prefijo=file Visited 9/15/2017.

Quality and Public Procurement[87]

Colombia's Ministry of Commerce has been working with the National Public Procurement Agency to have public entities use product standards for their public tenders. Now, the initiative is directed to have a text for the procurement offices of each agency to indicate the standards the products and services will need to comply with to be accepted in the public tender office.

[87] See minutes from the Inter-Sectoral Quality Commission (CIC). August 2017.

Annex 10

Milestones for the Development of a QI for Trinidad and Tobago

Year	Milestones of QI Development	Major Events
1960	Government Chemist Laboratory already existed. Establishment of the Chemistry Food and Drug Laboratory	Food and Drugs Act No. 8 of 1960
1962	-	Trinidad and Tobago gained its independence from the United Kingdom on 31 August 1962. Trinidad and Tobago and other English-speaking Caribbean states form the Caribbean Free Trade Area
1971	CARIRI Laboratory Established	CARIRI Act No. 19 of 1971
1972	Standards Act No. 38	
1973		Treaty of Chaguaramas – Establishment of Caribbean Common Market Significant Increase in Oil Price
1974	Trinidad and Tobago Bureau Standards started operations/ Salvatori Building in Port of Spain	
1976	TTBS declared its first set of standards	Trinidad and Tobago became a Republic within the Commonwealth
1977	First standard sold	
1983	Relocation to Trincity Industrial Estate, Macoya, Tunapuna	
1989		CSME established
1992		Rio de Janeiro Earth Summit
1995	Commenced services of metrology laboratories	
1993	Creation of new inspection division	
1995	Environmental Management	1st March 1995, Trinidad and

Year	Milestones of QI Development	Major Events
	Authority established Establishment of SIM/CARIMET	Tobago became a member of the WTO; Environmental Management Act No.3 promulgated
1997	New Standards Act No. 18 promulgated	
1998	TTBS Testing Laboratories accredited.	Low Oil Price 16.98 USD/bbl. (Nov. 98)
1999	New training subsidiary started operation under the name: Premier Quality Services Limited, PSQL	
2000	TTBS Metrology Laboratories accredited	Cotonou Agreement signed and start of EPA
2002	-	CARICOM Regional Organisation for Standards and Quality (CROSQ) established
2003	TTLABs established	
2004	Metrology Act promulgated	
2005	TTBS is ISO 9001 certified	First PTB/ Regional Quality Infrastructure Project launched CROSQ signs with the International Committee on Weights and Measures (CIPM) Mutual Recognition Arrangement (MRA)
2007	-	Plans are announced to close the centuries-old sugar industry, mainly because of cuts in European subsidies
2007	-	Revised Food and Drugs Act
2008	-	Peak of oil price @ 156 USD/bbl. for crude oil) June 2008.
2012	-	InvesTT formed as a response to already falling oil prices

Year	Milestones of QI Development	Major Events
2015	-	CALIDENA Project in Poultry Industry (PTB/CROSQ Funded)
2016	-	Oil price @ 29 USD/bbl., January 2016
2017	Accreditation of TTBS Inspection Body with ISO/IEC 17020 by the Jamaica National Agency for Accreditation (JANAAC). Development of a National Quality Policy (NQP) for Trinidad and Tobago	