Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
National Metrology Institute

WORLD BANK GROUP

Ensuring Quality to Access Global Markets: A Reform Toolkit

Executive Summary

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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Introduction

This publication entails a draft executive summary of the Quality Infrastructure Diagnostics and Reform Toolkit jointly developed by the World Bank Group and the National Metrology Institute of Germany which is scheduled to be published in Winter 2018. The views expressed herein are those of the author and do not necessarily reflect the views of the World Bank Group or the National Metrology Institute of Germany.

The author of the toolkit is Martin Kellermann, who has provided Quality Infrastructure and technical regulation related consultancy services under contract from the World Bank, PTB, ISO, ITC, UNIDO, UNDP, and others for many years. He has worked in many parts of the developing world, including Central Asia, the Middle East, East Africa, Southern Africa, West Africa, Ethiopia and the Far East, providing advice to governments, government departments and QI institutions on policy, strategy and re-engineering of business activities, as well as facilitating the drafting of quality policies and Quality Infrastructure legislation.

World Bank Group
The World Bank Group (WBG) is a family of five international organizations that make leveraged loans to developing countries. The WBG works in every major area of development and provides a wide array of financial products and technical assistance that help countries share and apply innovative knowledge and solutions to the challenges they face. The WBG has set two goals for the world to achieve by 2030: End extreme poverty by decreasing the percentage of people living on less than $1.90 a day to no more than 3 % and promote shared prosperity by fostering the income growth of the bottom 40 % for every country.

Physikalisch-Technische Bundesanstalt – National Metrology Institute of Germany
For longer than 50 years, the National Metrology Institute of Germany, abbreviated PTB, has shared its core competence in international development cooperation by supporting developing and emerging economies in the comprehensive field of Quality Infrastructure.

On behalf of the Federal Ministry for Economic Cooperation and Development, PTB supports developing and emerging countries in the task of developing and applying an internationally recognized Quality Infrastructure that has been tailored to suit the countries' needs. A functional Quality Infrastructure is essential for our daily lives: for free, fair and safe trade, for reliable and safe health care, for environmental protection and for the expansion of renewable energies. The International Cooperation department at PTB advises governments and ministries, advances the Quality Infrastructure institutions and provides assistance to small and medium-sized enterprises (SMEs).

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1. Rationale

For the World Bank Group (WBG) to achieve its twin goals of ending extreme poverty and boosting shared prosperity, the benefits of trade must be extended to all countries, but many countries lack the necessary infrastructure to meet the quality standards necessary to enter global markets, because participation in world trade increasingly requires that suppliers comply with standards, technical regulations, and sanitary and phytosanitary measures. To overcome these technical barriers to trade in the most efficient and cost-effective way and to reap the benefits of trade, a functioning Quality Infrastructure (QI) ecosystem is crucial.

Making use of their vast experience in upgrading and reforming QI ecosystems, the WBG and the National Metrology Institute of Germany have partnered to develop the first comprehensive QI diagnostic and reform toolkit, which is designed to help development partners and country governments analyze the QI ecosystem and develop a coherent offering to support QI reforms and capacity development.

This toolkit is also a valuable knowledge base for other interested parties to learn more about QI and reform their QI systems or parts thereof.

The focus of such reforms could be any one or a combination, to:

- improve the legal and institutional framework for efficient and effective QI
- enhance trade opportunities by removing unnecessary non-tariff barriers and technical barriers to trade through harmonization of technical regulations and mutual recognition of conformity assessments
- integrate into global value chains
- enhance overall quality of products and services
- encourage innovative products to be entered into high value-added markets
- increase productivity and efficient use of scarce resources
- provide for greater consumer protection.

2. Overview

In a modern world with rapidly growing international trade, countries compete less based on the availability of natural resources, geographical advantages, and lower-cost of labor and more on factors related to the ability of firms to penetrate and compete in new markets. One of these factors is the ability to demonstrate quality and safety of goods and services and to comply with international standards in target markets. Consumers are the ultimate judges of the quality of goods and services, so products need to comply with specifications that buyers set and they need to prove not to be harmful to human health and the environment. To demonstrate such compliance, a sound QI ecosystem is essential.

The QI ecosystem[1] can be understood as comprising the organizations (public and private), policies, and relevant legal and regulatory frameworks and practices needed to support and enhance the quality, safety, and environmental soundness of goods, services, and processes.

The QI ecosystem is required for the effective operation of domestic markets, and its international recognition is important to enable access to foreign markets. It is a critical element in promoting and sustaining economic development, as well as environmental and social well-being, and relies on metrology, standardization, accreditation, and conformity assessment (which comprises testing, inspection, and system or product certification). Exporters wishing to participate in global trade face many challenges in terms of compliance with standards and technical regulations, including sanitary and phytosanitary measures. In the World Trade Organization Technical Barriers to Trade Agreement, compliance with standards is seen as voluntary, whereas compliance with technical regulations is mandatory, has legal standing, and is therefore considered more onerous. For most of the world, between 60 percent and 80 percent of global trade is subject to technical regulations (ITC 2016). For Africa, the effect is lower (40–60 %), because much of Africa's trade is in mining materials that are not subject to technical regulations. The influence of technical regulations on trade can be seen in Figure 1.1.

1 The organizations of the QI ecosystem provide such things as national standards, calibration, test reports, certification reports, and accreditation certificates. The term "QI services" is used as a collective term to denote these outputs of QI organizations.

Share of Trade Subject to Technical Regulations

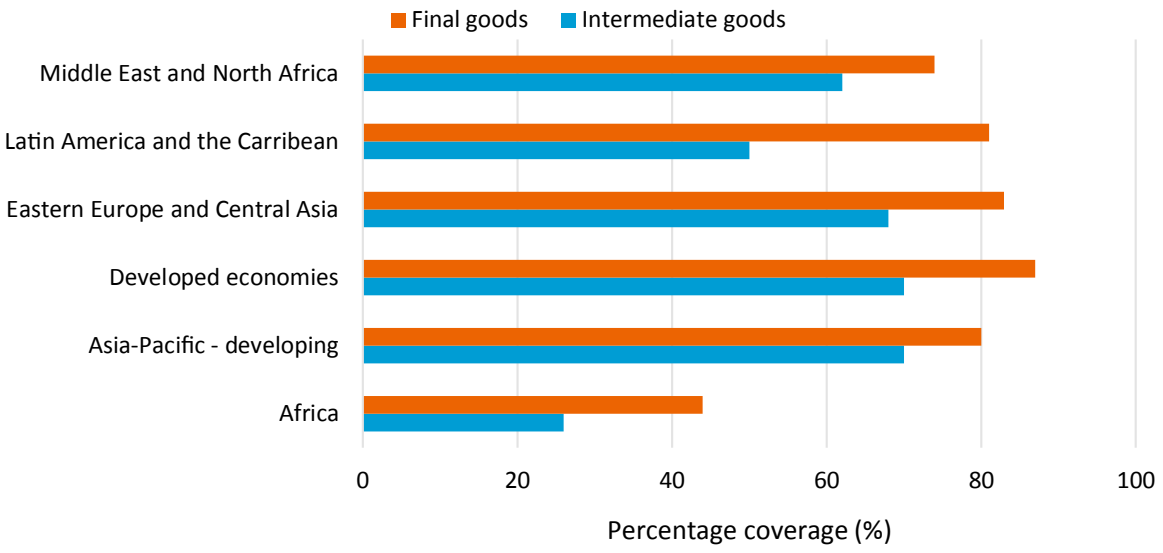

Fig. 1.1: Share of Trade Subject to Technical Regulations. Source: ITC 2016.

Non-tariff barriers (Figure 1.2), consisting of technical and nontechnical barriers to trade, are equally problematic, and compliance with standards and technical regulations in the most efficient and cost-effective way will help manufacturers, suppliers, and exporters gain access to local and foreign markets.

A modern QI ecosystem serves the needs of governments, businesses, and consumers. **For governments**, a QI ecosystem serves as a mechanism to support relevant trade and industrial policies and ensures enforcement of mandatory technical regulations. A recent study from the United Kingdom (Cebr 2015) found that more than £6.0 billion of additional UK exports per year could be attributed to standards. **At the firm level**, a modern, efficient QI ecosystem helps limit the cost of production, increasing productivity and enabling firms to be more competitive in domestic and foreign markets. Use of standards helps firms adopt new technologies and innovation in their production processes. A survey of British companies found that more than 60 percent of product and process innovators used standards as a source of information for innovation (WBG 2007), and 37.4 percent of productivity growth can be attributed to use of standards (BSI 2016). **For consumers**, a QI ecosystem ensures public health and safety and environmental and consumer protection. Technical regulations play an important role in this regard, together with effective enforcement mechanisms such as market surveillance. These mechanisms ensure that fraudulent and counterfeit products are not traded in the marketplace.

2.1. Objective of the Toolkit

The objective of the toolkit is to help development partners and governments analyze countries' QI ecosystems. Based on the results, the toolkit provides recommendations to bridge gaps in the QI ecosystem, support reforms, and build capacity of institutions. The toolkit is modular, consisting of nine modules to provide a valuable knowledge resource because it is a holistic reference for QI diagnostics, reform interventions and approaches, and monitoring and evaluation, and is supported by practical case studies and examples.

Barriers to Trade

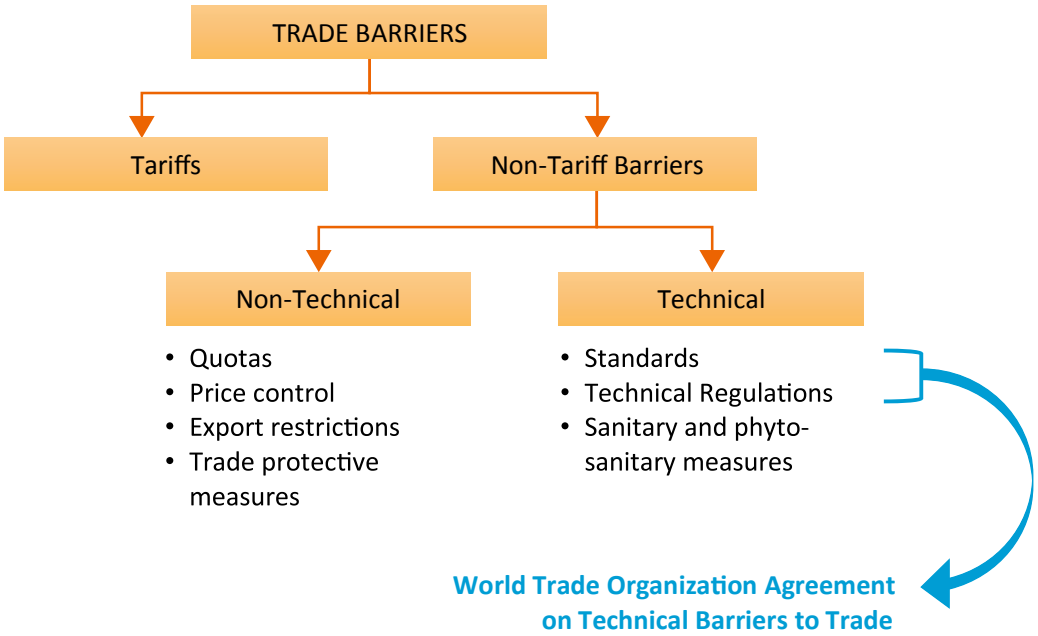

Fig. 1.2: Barriers to Trade. Source: Authors' elaboration.

3. Quick Start Guide

The toolkit has nine modules.

- Module 1: Executive Summary
- Module 2: Importance of Quality Infrastructure Reforms and Demand Assessment
- Module 3: Description of Good Quality Infrastructure Practices
- Module 4: Rapid Diagnostic Tool
- Module 5: Comprehensive Diagnostic Tool
- Module 6: How to Reform: Interventions and Approaches
- Module 7: Challenges of Quality Infrastructure Reform
- Module 8: Monitoring and Evaluation of Performance and Effect of Quality Infrastructure Reforms
- Module 9: Country Case Studies

3.1. Importance of QI

QI services are necessary to:

- Enhance market access, facilitate product diversification, and increase investment opportunities.
- Enhance productivity through
  - Reducing costs of trade by reducing duplication in testing and inspection, streamlining operations, and eliminating restrictive regulations
  - Benefiting from economies of scale through improved and standardized working methods and interoperability between manufacturers along the value chain
  - Enhancing innovation and technology diffusion.
- Promote public policy objectives through effective enforcement of technical regulations regarding public health and safety and consumer, environmental, and social protection.

To learn more about the importance of QI, go to:
Module 2: Importance of Quality Infrastructure Reforms and Demand Assessment

To learn more about the QI ecosystem and its good practices, go to:
Module 3: Description of Good Quality Infrastructure Practices

3.2. QI Toolkit Workflow

This QI toolkit has been developed with a logical workflow (Figure 1.3). It starts by comparing demand for QI services with supply, which leads to the identification of gaps between what is needed and what is being offered in the QI ecosystem and is addressed through the development of a roadmap for QI reforms.

Because the QI ecosystem is complex, the current supply of QI services is analyzed in a two-stage process to make the decision-making process more efficient (Figure 1.4). After initiation, the project starts with a rapid diagnostic of demand for and supply of QI services, resulting in a concept note, which helps determine whether a development project is worthwhile. If it is deemed to be so, a much more comprehensive evaluation of the QI ecosystem demand and supply situation in the client country is conducted. A development project can then be designed to address some or all of the identified gaps, depending on development project objectives, client capacity, and available resources. Guidance on implementation and monitoring modalities are also covered.

Designing the Future Quality Infrastructure (QI)

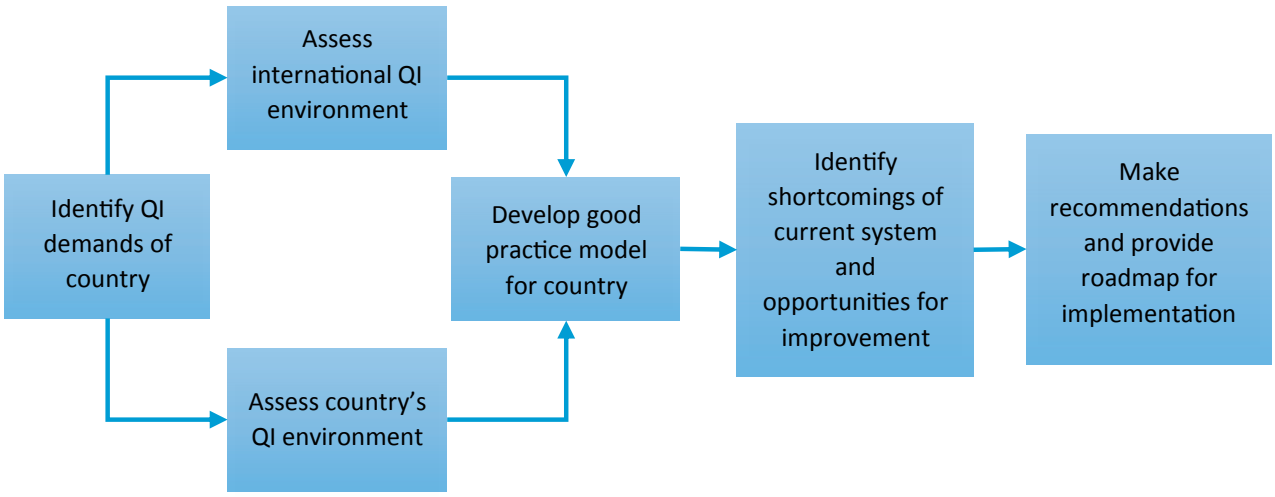

Fig. 1.3: Designing the Future Quality Infrastructure (QI). Source: Authors' elaboration.

Quality Infrastructure Toolkit

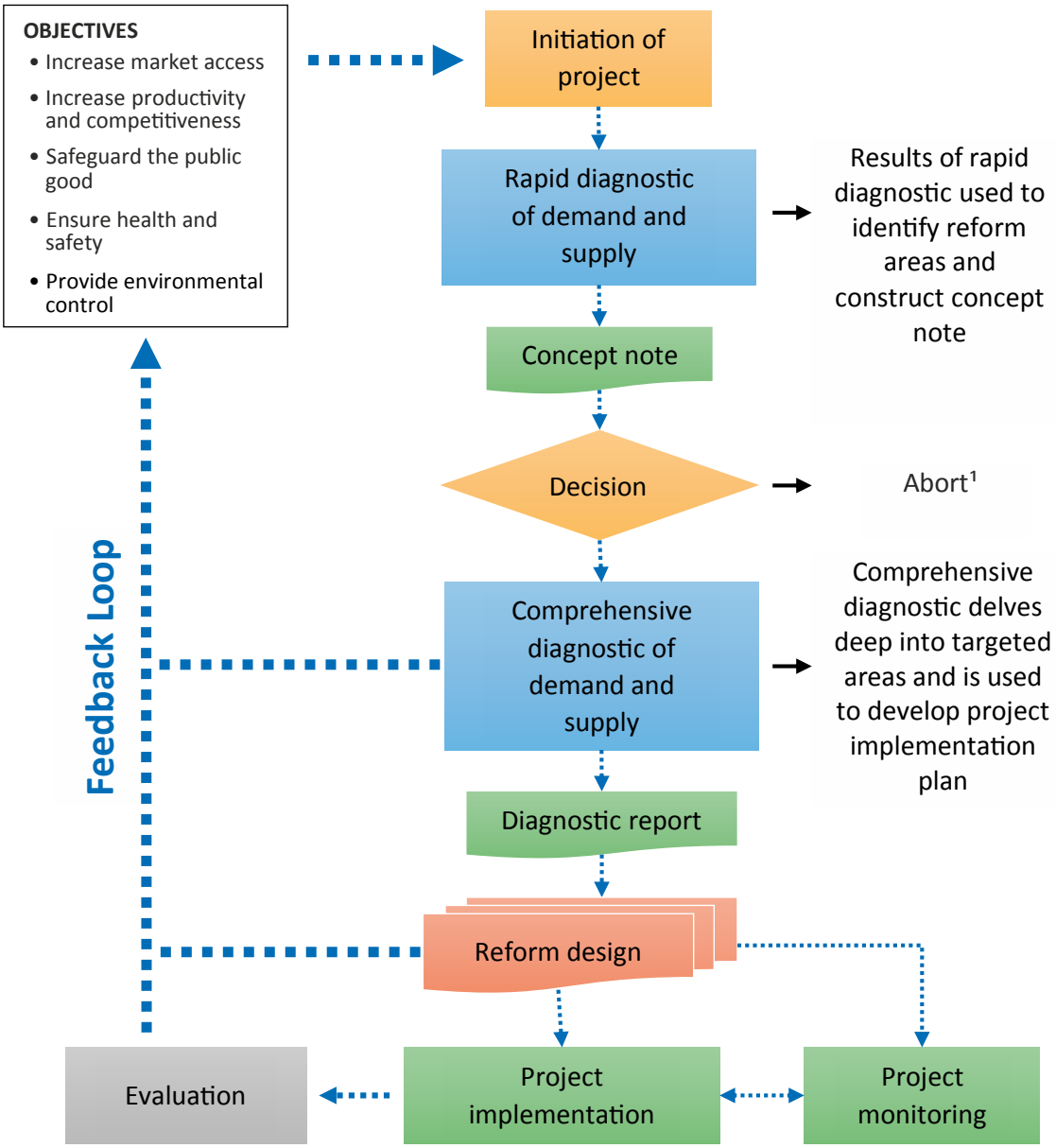

Fig. 1.4: Quality Infrastructure Toolkit. Source: Authors' elaboration.

1 The decision to abort a project is made on a case by case basis, although projects should be implemented only if they have full support from the client country and there is reasonable expectation that project objectives will be achieved.

3.3. Rapid Diagnostic

An initial decision to assess a country's QI ecosystem having been made, a **rapid diagnostic** is done of the QI ecosystem to develop a **concept note** (Figure 1.5).

Rapid Diagnostic and Development of Concept Note

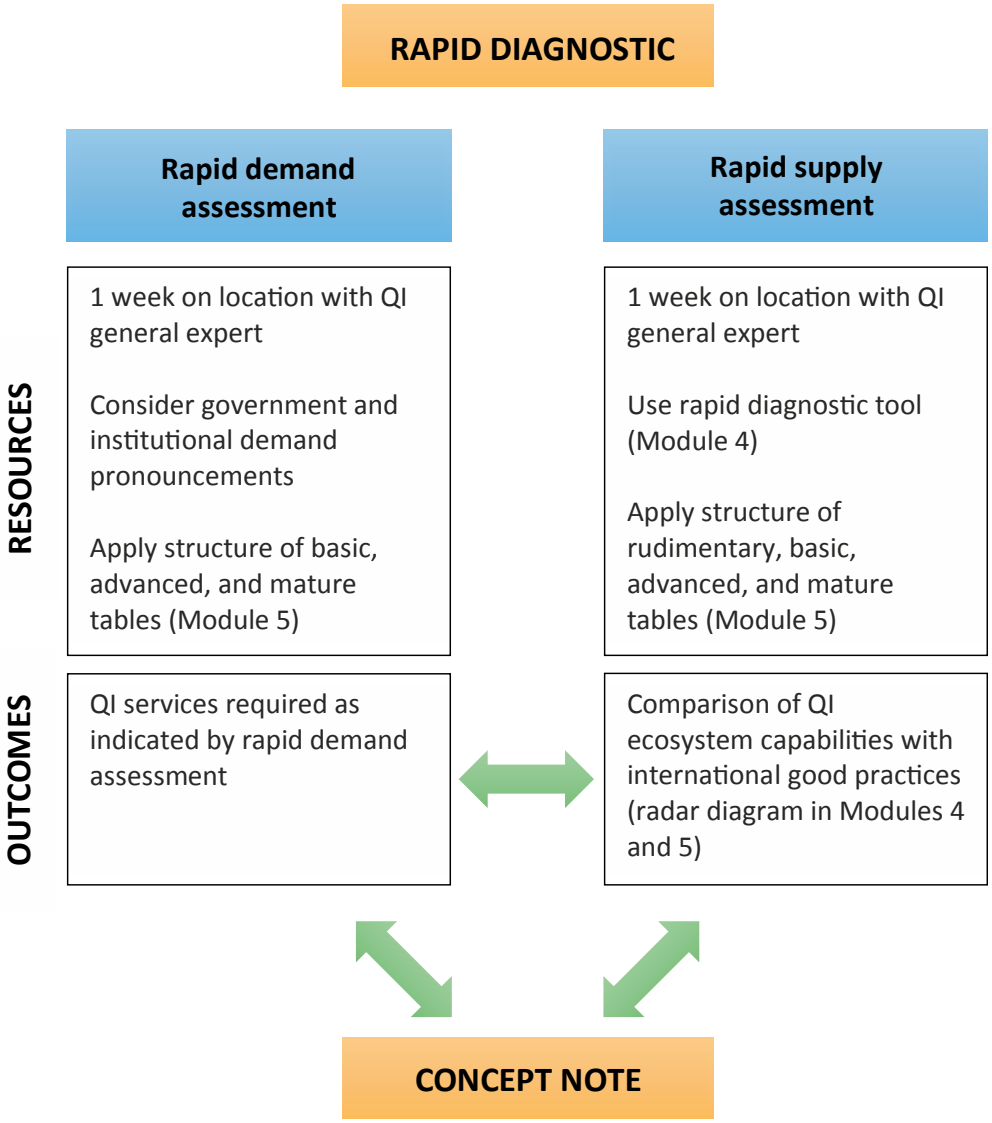

Fig. 1.5: Rapid Diagnostic and Development of Concept Note. Source: Authors' elaboration.

3.4. Comprehensive Diagnostic

Based on the concept note, a decision can be made as to whether to run a QI development project. Design of the development project and its implementation program should be started with a **comprehensive diagnostic**, the outcome of which will be a **diagnostic report** (Figure 1.6).

To learn more about the QI and good practices and to use the comprehensive diagnostic tool to its full advantage, see **Module 3: Description of Good Quality Infrastructure Practices** in detail. The detailed demand assessment is discussed in **Module 2: Importance of Quality Infrastructure Reforms and Demand Assessment.**

Consider also experiences of previous projects in **Module 9: Country Case Studies.**

Comprehensive Diagnostic and Diagnostic Report

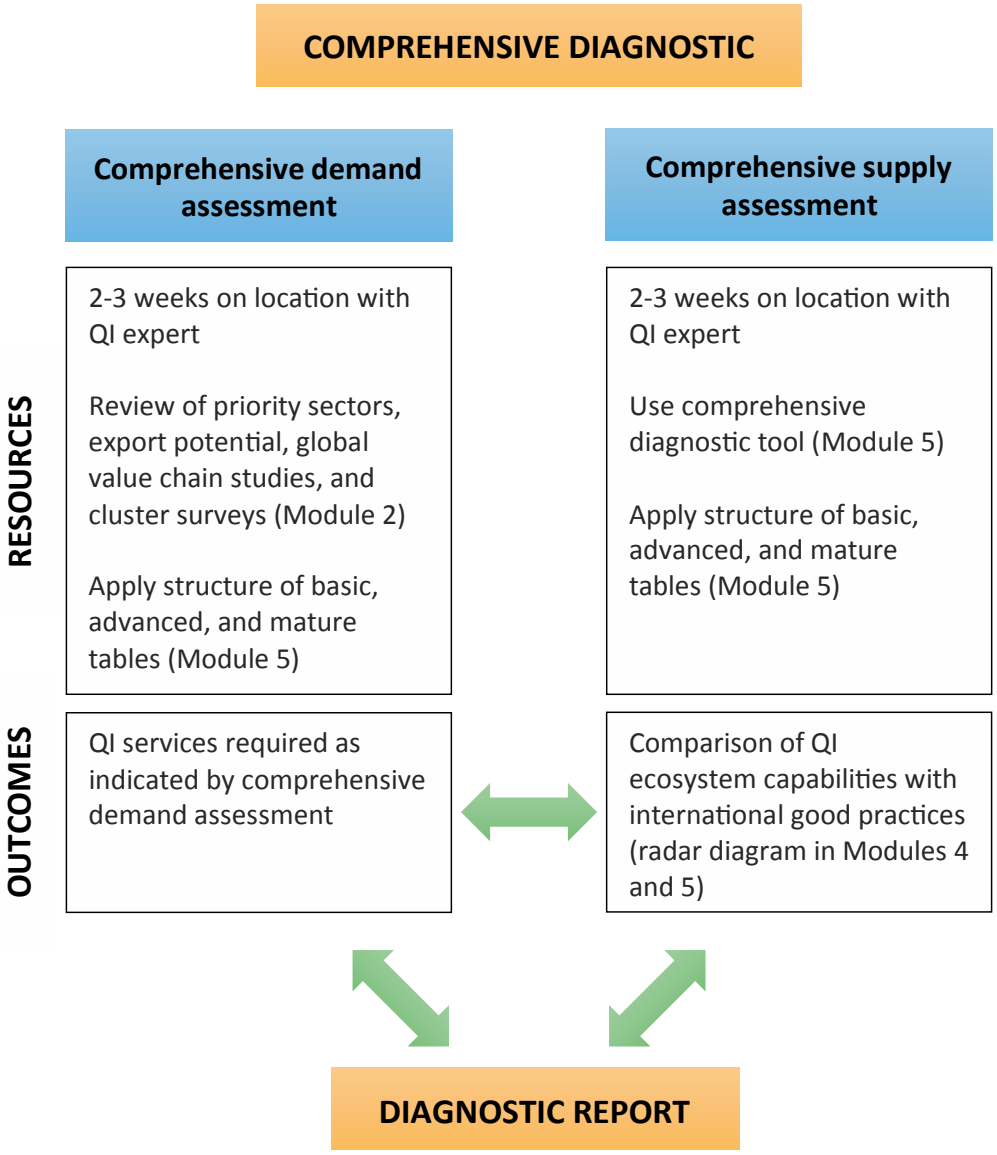

Fig. 1.6: Comprehensive Diagnostic and Diagnostic Report. Source: Authors' elaboration.

3.5. Project Cycle

Figure 1.7 illustrates the support provided to governments in developing modern, efficient quality systems that help producers improve the quality of their products and services to compete domestically and globally. After identifying key gaps in their QI ecosystem through a market assessment, which analyzes the existing supply and potential demand for quality assurance services, reform recommendations based on good international practices to meet such demand are suggested. The WBG and National Metrology Institute of Germany also provide implementation support for these reforms, tailoring them to specific country conditions.

Project Cycle

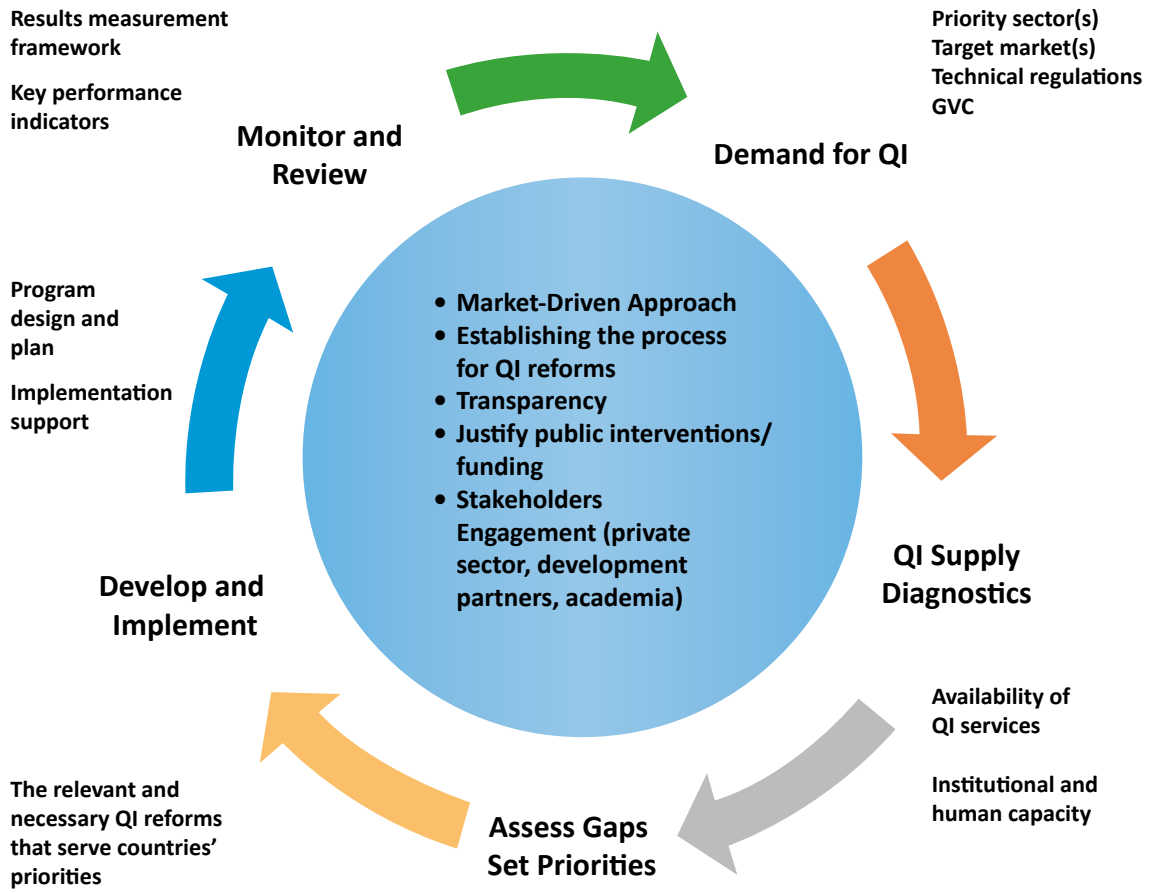

Fig. 1.7: Project Cycle. Source: Authors' elaboration.

3.6. Lessons learned regarding project design and implementation

A development project, along with its implementation program, should close the gap between demand and supply with regard to provision of services by QI institutions. Some key principles that need to be considered in project design include the following.

- Refrain from setting overoptimistic short-term targets, instead embedding short-term assistance in longer-term objectives, including the beneficiary government's long-term policies and planning.
- Agree with partners on a stepwise approach that differentiates reform targets based on the current development stage of a country's QI ecosystem. (The proposed differentiation in the QI toolkit is rudimentary, basic, advanced, mature.)
  - If the current QI ecosystem is at a rudimentary stage, set mainly basic QI targets.
  - If the current QI ecosystem is at a basic stage, consolidate the basic services and set mainly advanced QI targets.
  - If the current QI ecosystem is at an advanced stage, consolidate the basic and advanced services and set mainly mature QI targets.
  - If the current QI ecosystem is at a mature stage, consolidate the basic, advanced, and mature services and broaden the QI intervention scope.
- A balance needs to be found between commitment of technical assistance delivery, the absorption capacity of the recipient country and institutions, and provision of highly technical services by the development partner.
- QI service delivery has to meet a demonstrable demand for quality-related services. Project design should take this into account and, if need be, develop demand and supply in parallel.
- To ensure "ownership," the project needs to be anchored in the right partner institution (one directly responsible for the field covered). Project steering committees and continuous information flows should be used to reinforce this ownership.
- Strengthening business service providers (intermediaries) is often more effective and sustainable than providing direct services through the project.
- Chances of short-term success in providing support to larger enterprises should not be the only goal. The small and medium enterprise sector is more difficult to reach but in the long run may be more important for the country.
- Institutional strengthening may have to be paired with development and promulgation of the appropriate legislative framework, even though the latter is much more demanding in terms of guiding draft or revised legislation through the political process.
- When equipping laboratories or other institutions, development partners should focus as much as possible on a limited number of equipment suppliers to avoid problems with equipment maintenance.
- To enhance sustainability, the move should be made providing from direct staff training to institutionalizing training functions in key institutions.

Detailed information on developing an effective and efficient implementation program is contained in **Module 6: How to Reform: Interventions and Approaches** and **Module 7: Challenges of Quality Infrastructure Reform.** Both need to be carefully considered in the design of an implementation program.

Consider also experiences of previous projects in **Module 9: Country Case Studies.**

3.7. Monitoring and Evaluating QI Development Projects

Implementation programs need to be monitored continuously to ensure that the designed outputs are achieved within the desired timeframe and within budget. Mid-term and end-of-project program evaluations provide feedback on long-term effects and lessons learned to enhance future project designs. Both need to be provided for in project design and agreed upon with the client country and institutions.

Each project is different and thus will require a different set of performance indicators that will inform the theory of change and the logical framework. Although Module 8 provides examples, indicators should be developed on a case-by-case basis. The most important thing to consider when developing indicators is that they be relevant and measurable. Indicators that cannot be measured are not useful, because they would have to rely on subjective interpretations. Once performance indicators are determined, they should be formally agreed upon with the development partner and the recipient country or organization.

Detailed information on implementation program monitoring and project evaluation is contained in **Module 8: Monitoring and Evaluation of Performance and Effect of Quality Infrastructure Reforms.**

Consider also experiences of previous projects in **Module 9: Country Case Studies.**

4. Modules of the QI Toolkit

The main focus of each of the nine modules is as follows.

Module 1: Executive Summary.

Module 2: Importance of Quality Infrastructure Reforms and Demand Assessment. Module 2 covers the role of the QI ecosystem in improving market access and competitiveness; trade facilitation and integration into global value chains; innovation and technology diffusion; increasing productivity; and the role of the QI ecosystem in customer protection, health and safety, and environmental protection.

A proper demand assessment is critical to identification of effective reform and capacity-building in the QI. Identification of the demand for and needs of important industrial sectors and export markets is discussed broadly. Identification of gaps between supply and demand for QI services is explored, and information is provided on specific activities to be pursued. Techniques for providing appropriate information, such as value chain studies and market surveys, are listed. Outlining the requirements for generic QI ecosystem capacity building is an important part of the holistic approach to demand assessment.

Module 3: Description of Good Quality Infrastructure Practices. The QI ecosystem is a complex array of the interdependent organizations needed to provide QI services. There are not many definitive publications describing the QI ecosystem holistically that can be referenced to construct a detailed assessment, so this module elaborates on each element of the QI ecosystem in detail: (i) standards, (ii) metrology, (iii) accreditation, and (iv) conformity assessment (inspection, testing, and product and system certification); and (v) technical regulations, which are a mandatory part of the QI. The QI ecosystem is presented as a flexible system with a focus on its public-private partnership dimensions.

Radar Diagram and Snapshot of Country Quality Infrastructure Ecosystem – Example

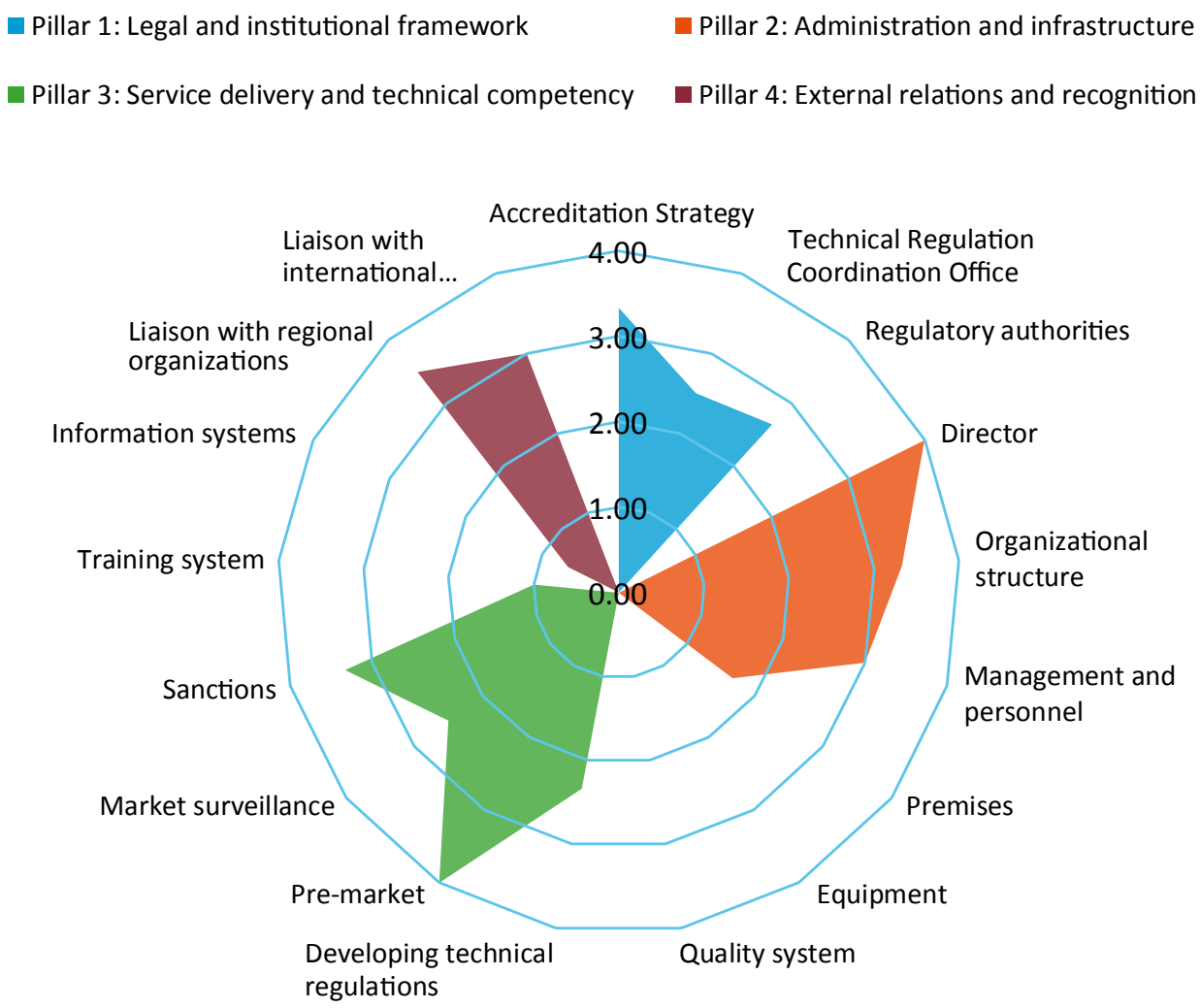

Fig. 1.8: Radar Diagram and Snapshot of Country Quality Infrastructure Ecosystem – Example. Source: Authors' elaboration.

Module 4: Rapid Diagnostic Tool. The rapid diagnostic tool and the comprehensive diagnostic tool (Module 5) are based on the concept of building blocks arranged in four pillars to describe a specific QI service. The building blocks and pillars are described fully in Module 5.

The results of a diagnostic can be depicted as a radar diagram – an example of which is shown in Figure 1.8. Application of the rapid diagnostic tool provides users with high-level information on the capacity of a country's QI ecosystem, which together with a rapid demand assessment provides guidance as to whether a QI development project would be beneficial to develop and implement.

The rapid diagnostic tool consists of a number of questions, whose answers result in a set of scores ranging from 0 to 4 that are collated to provide an overall score also ranging from 0 to 4. These scores can then be used to construct a QI service radar diagram (Figure 1.8) to

indicate the state of QI services at a glance, as shown in Module 5. The scores are categorized in four levels of implementation.

- **0 to 1.0:** Little or nothing is in place, and the country must develop the relevant elements of a QI ecosystem from scratch.
- **1.1 to 2.0:** Rudimentary systems in need of much fundamental development are in place.
- **2.1 to 3.0:** Reasonable system is in place but needs further development.
- **3.1 to 4.0:** Good system is in place with no need for fundamental development, but maintenance is important.

The rapid diagnostic tool can be applied as a spreadsheet that calculates the scores and draws the radar diagrams automatically. An expert should be able to gather information for the rapid diagnostic tool within a week or two on site, provided that he or she has the full support of knowledgeable local persons. The expert would also be able to use these results to categorize the QI ecosystem as rudimentary, basic, advanced, or mature, which requires a qualitative evaluation of all the results based primarily on his or her experience and knowledge.

Use of the rapid diagnostic tool is not confined to evaluation of the QI ecosystem before any intervention is contemplated; it can be used as a monitoring and evaluation tool to show the continued development or otherwise of the QI. In this way, policy makers and practitioners can be apprised fairly easily of progress, or lack thereof, which can lead to appropriate action at the political level or by the recipient organization.

Module 5: Comprehensive Diagnostic Tool. The comprehensive diagnostic tool contains a detailed approach to evaluation of various elements of the QI. It is based on the four pillars, which address the QI environment, its institution and services, as well as its recognition (a holistic approach).

1. Legal and institutional framework
2. Administration and infrastructure
3. Service delivery and technical competence
4. External relations and recognition

Each of the four pillars is divided into a number of building blocks that must be in place for the elements of the QI ecosystem to function optimally and to comply with international good practices. Some of the building blocks of the QI ecosystem elements would be similar to each other, but there are also some significant differences, and the number for each QI ecosystem element will differ depending on individual requirements. The same information can be used to develop a radar diagram. Assessing each of the QI services is described fully in Module 5. After an in-depth evaluation, which typically takes an expert three weeks on location, a score can be assigned to each of the building blocks and can be presented graphically as four different colors, for example, denoting the level of implementation or compliance. This would give a "dashboard" type of picture that policy makers and higher-level officials who may not have a detailed understanding of the QI ecosystem elements can readily understand.

Module 6: How to Reform: Interventions and Approaches. This module covers three major areas. First, it discusses the policy and legislative domain. The starting point for effective reform of the QI ecosystem is development of a holistic government policy in the form of a National Quality Policy, the characteristics of which are described. Thereafter the reform of the QI ecosystem, related legislation, and the institutional framework are discussed in detail, including information on strategies and relevant training of technical staff.

Second, the QI ecosystem is discussed. Establishing standardization for competitiveness is discussed in detail in subsections on new standards, compliance with public and private standards, global value chains, and areas policy makers could consider. Strengthening the metrology and accreditation systems is addressed in detail, as well as of establishing and strengthening conformity assessment services. Alignment of the technical regulation regime with international good practices and resolving conflicts of interest within the QI ecosystem are discussed.

Third, the external environment is considered. The positive influence that global value chains and foreign direct investment can have on the QI ecosystem is discussed in detail. This section also discusses the influence that the QI ecosystem can have in enabling innovation, which is a recognized driver of industrial development and competitiveness.

Module 7: Challenges of Quality Infrastructure Reform. Project preparation and management are crucial to making a difference in the success of the project. Good practices are discussed in detail. Reforming QI ecosystems poses unique challenges that need to be considered, and these are detailed. Guidance is provided on strategic approaches to supporting development of the QI ecosystem, with a focus on institutions.

Module 8: Monitoring and Evaluation. Projects need to be monitored regularly to determine progress on project objectives. Progress is usually measured against logical frameworks established before the start of the project, an example of which is discussed. It is also important to evaluate projects, which are one-time exercises different from monitoring, to determine their outcomes in a broader context and determine whether development partners have been effective so as to gain knowledge for future projects. Various evaluation modalities are discussed in detail.

Module 9: Country Case Studies. Case studies from a selection of developing and developed countries are presented to showcase the challenges and successes of various QI ecosystem reform initiatives. These provide useful examples for better understanding of the reform approach of the QI ecosystem as described in this QI toolkit.

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