

# Diagnostic Tools

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## INTRODUCTION

This module describes two companion tools for assessing a country's quality infrastructure (QI): the Rapid Diagnostic Tool (section 9.1) and the Comprehensive Diagnostic Tool (section 9.2). The evaluation questions and complete methodology are not included in this publication because of their volume. Practitioners or other users of the toolkit can find them in the online annex to this publication: <http://www.worldbank.org/qi> and <https://www.ptb.de/qitoolkit>.

The Rapid Diagnostic Tool allows for a much quicker but less detailed assessment of the QI of a country. It can be used for a quick assessment that would help enable better decision making regarding the need for a more detailed assessment, which would be much more resource-intensive.

The Comprehensive Diagnostic Tool enables a comprehensive assessment of a country's QI. Using this tool will require the involvement of knowledgeable experts, the full support of the country to be assessed, and quite a long time frame. The outcome of such an evaluation will be a detailed report on the status and efficacy of the QI of a country.

## 9.1 RAPID DIAGNOSTIC TOOL

### 9.1.1 Aims of the Rapid Diagnostic Tool

The Rapid Diagnostic Tool is designed to provide its users with rapid feedback on the state of a country's QI regarding its (a) legal and institutional framework, (b) administration and infrastructure, (c) service delivery and technical competency, and (d) external relations and recognition. The Rapid Diagnostic Tool is based on the Comprehensive Diagnostic Tool and evaluates the same four pillars of the QI (as further described below), but it is nowhere near as comprehensive.

The Rapid Diagnostic Tool consists of a series of questions resulting in quantitative answers. The answer to each question is given a value, a series of which

are compounded. The values can then be shown as a radar diagram that may help in deciding whether it is worthwhile to conduct a comprehensive assessment of the QI of a specific country. The Rapid Diagnostic Tool is designed to provide a high-level snapshot of the state of a country's QI and to indicate a need for further development.

### 9.1.2 Structure of questions in the Rapid Diagnostic Tool

The questions deal with a number of major elements for each QI service. For each of the elements, a series of questions needs to be answered. A few of these will be for information only, but most of them will be scored depending on how well they meet the stated benchmark. The scoring is based on a 0- to 4-point system, and the evaluation of the aggregated scores can be broadly considered as follows:

- *Score 0–1.0:* Little or nothing is in place, and the country has to develop the relevant element from scratch.
- *Score 1.1–2.0:* A rudimentary system, needing much fundamental development, is in place.
- *Score 2.1–3.0:* A reasonable system is in place but needs further development.
- *Score 3.1–4.0:* A good system is in place with no need for fundamental development, but maintenance is important.

Aggregate scores should be calculated to at least one decimal place to allow for a meaningful depiction in the radar diagram. But the quantitative analysis is a coarse one, and the aggregate scores should not be taken as absolutes. They provide a quick reference as to the current state and future development of the QI. This tool does not replace a proper assessment of processes such as would be undertaken to determine compliance with, for example, ISO 9001 (“Quality Management Systems—Requirements”); ISO/IEC 17025 (“General Requirements for the Competence of Testing and Calibration Laboratories”); or other in-depth management system assessment techniques. It is designed to be used in the QI toolkit workflow as described in module 1: Executive Summary, section 1.2.2.

### 9.1.3 Using the results of the Rapid Diagnostic Tool

The output of the Rapid Diagnostic Tool is a set of numbers. These can be used quite readily to develop the graphical depiction of the state of the QI or of its relevant elements in the “building block” approach or with radar diagrams, as detailed below, as well as in module 1: Executive Summary, section 1.3. These depictions can then be used to decide whether a comprehensive diagnostic should be conducted. They can also be used by a country's institutions to benchmark their QI performance against international good practice.

When considering the outcome of such a rapid diagnostic, care should also be exercised when comparing it with the level of QI development, as discussed in detail in module 2: The Importance of QI Reform and Demand Assessment, section 2.2.2. The outcome of the rapid diagnostic will be a good indication of whether a “basic” QI is in place and will even provide some information regarding an “advanced” QI. To gain a full understanding of the “advanced” or “mature” QI stages in a specific country, a comprehensive diagnostic will have to be conducted, as described in section 9.2 below.

### 9.1.4 Rapid Diagnostic Tool evaluation questions

As noted earlier, the Rapid Diagnostic Tool's evaluation questions are not included in this publication because of their volume. Practitioners or other users of the toolkit can find them in the online annex to this publication on the World Bank website: <http://www.worldbank.org/qi>, and on the PTB website: <https://www.ptb.de/qitoolkit>.

## 9.2 COMPREHENSIVE DIAGNOSTIC TOOL

### 9.2.1 Introduction

The Comprehensive Diagnostic Tool provides information on the evaluation of the QI in a number of important elements:

- National policies and legal environment
- The fundamentals
  - Standards
  - Metrology
  - Accreditation
- Conformity assessment
  - Inspection
  - Testing
  - Product certification
  - Management system certification
- Technical regulation framework
  - Technical regulation
  - Legal metrology

The Comprehensive Diagnostic Tool questionnaire is provided as an online tool for practitioners. The questionnaire and details of its use can be found in the online annex to this publication on the World Bank website: <http://www.worldbank.org/qi>, and on the PTB website: <https://www.ptb.de/qitoolkit>.

### 9.2.2 Approach of the Comprehensive Diagnostic Tool

The Comprehensive Diagnostic Tool follows a specific logic, starting from the policy and legal environment, before it deals with each of the QI elements. The outcome of the evaluation provides qualitative results that an expert can turn into quantitative results. Over and above in-depth reports, the results can therefore also be made visible in “dashboard”-type images for a more rapid understanding of situations when discussing them with counterparts.

#### ***Coordinating the QI: The policy and legal environment***

The various elements of the QI are interrelated, and coordination of their responsibilities and services is an important parameter. Hence, while dealing with the various elements of the QI individually, their overall coordination should not be neglected.

Such coordination is usually provided for in government policy, such as a country's quality policy, that clarifies the interdependence between the

fundamentals, QI services, technical regulations, and the market. It should also be related to broader trade and export development policies. Furthermore, the coordination between (a) the fundamentals and QI services, and (b) technical regulation (as the mandatory manifestation of the QI) is provided for in what is generally known as the technical regulation framework. Therefore, evaluation of the quality policy and the technical regulation framework are included in the Comprehensive Diagnostic Tool.

### ***The “pillar and building block” approach***

In constructing a diagnostic tool for each of the identified elements of the QI, it is useful to consider the “effectiveness” of each of the QI elements in relation to four pillars:

- *Pillar 1: Legal and institutional framework*, in which the broader environment within which the entity is legally established and operating is considered
- *Pillar 2: Administration and infrastructure*, in which the organizational structure and the necessary infrastructure of the entity to fulfill its responsibilities are considered
- *Pillar 3: Service delivery and technical competency*, in which the output and services of the entity are considered, with special emphasis on their demonstrable quality
- *Pillar 4: External relations and recognition*, in which the important liaisons of the entity with relevant regional and international organizations are considered in view of the need to be acknowledged for its output and services

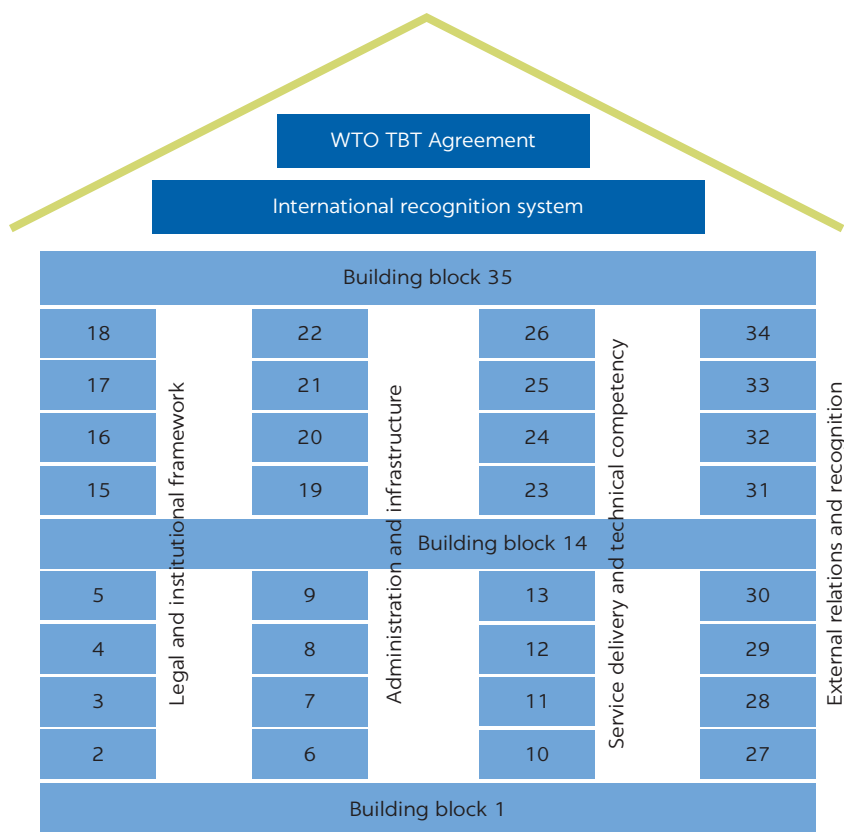
Each of these pillars consists of building blocks that have to be in place for the QI element to function optimally and to comply with international good practices and requirements. Some of the building blocks for each of the QI elements would be similar, but there will also be quite a few differences. Such an approach can be illustrated as being a “building” (figure 9.1).

### ***Weighted or not weighted***

In allocating a quantitative measure to the various building blocks, the question of whether all of them are of equal weight needs to be clarified. Arguably, some of the building blocks must be in place; otherwise, the QI element has no chance of being considered established or recognized. These could be considered “fundamental.” At a second level are the “major” building blocks: those necessary for the service delivery to be effective and efficient. At the third level are the “minor” building blocks: those in which the custom and practice of the country play a role rather than international practices. The quantitative evaluation will have to take cognizance of such differences.

A supplementary way of looking at the absolute necessity or otherwise of a specific element or service of the QI would be to consider it as part of the basic QI (relevant for a low- or middle-income country approach); an advanced QI (relevant for an economywide approach); or ultimately, as a mature or innovative QI (relevant for a high-income economy or world-class approach). If there is virtually no QI established, a rudimentary state exists, which is a major challenge for the country irrespective of its development status (see also module 2: The Importance of QI Reform and Demand Assessment, section 2.2.2). The country’s development status is not equally relevant for all the QI elements; it is more relevant for those that are of a more technical nature, such as metrology.

**FIGURE 9.1**  
**Building blocks of a QI (conceptual)**



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Note: QI = quality infrastructure; WTO TBT Agreement = World Trade Organization Agreement on Technical Barriers to Trade.

It certainly influences the decision about which level of technical support a country needs. This evaluation is included in all of the elements of the QI because of the differences—it is difficult to provide a structure valid for all.

### **Assessment and infrastructure**

A comprehensive assessment of the QI of a country is a complex undertaking. It is virtually impossible to reduce the outcome of such an assessment to a single figure or a simple pronouncement. There are just too many possibilities and nuances that have to be considered, too many externalities that have an influence.

Therefore, the Comprehensive Diagnostic Tool endeavors to provide for a qualitative and quantitative approach for each of the QI elements, which can be made visible in a “building” showing the state of implementation through different-colored “bricks” (figure 9.2), a radar-type diagram (figure 9.3) for the individual elements, or a dashboard illustration for the QI collectively (figure 9.4), supported by an extensive narrative.

For each of the building blocks, the comprehensive diagnostic

- Provides details about the best practices with which the building block should be compared, under the heading “*What is meant*”;

**FIGURE 9.2**  
**Implementation of a QI entity, by building block status (conceptual)**



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Note: QI = quality infrastructure; WTO TBT Agreement = World Trade Organization Agreement on Technical Barriers to Trade. Figure shows a “dashboard”-type illustration that tells the viewer at a glance what the implementation status is without having to read through lengthy reports. Once all building blocks are green, then implementation is complete.

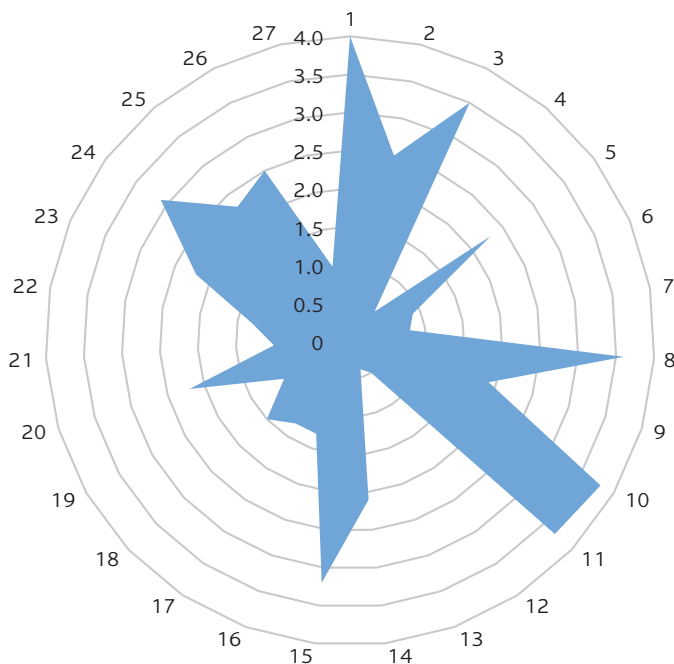
- Shows how the building block can be demonstrated (that is, describing the elements that indicate that the practice exists), under the heading “*How can it be demonstrated*”; and
- Shows where the assessor could find information to support the existence of such practices, under the heading “*Existing information/reporting/monitoring*”

For each building block, an indication as to whether it is “fundamental,” “major,” or “minor” is also provided. This will help the assessor to determine the extent and significance of the gap between the current situation and international good practices, which in turn will be an indication of the “effectiveness” or otherwise of the QI elements in the country, leading ultimately to a judgment call on how much support the country would need to develop its QI to the point where it meets the needs of its stakeholders.

The evaluation is therefore a complex array of levels of (a) *implementation* (implemented, mostly implemented, partially implemented, or not implemented); and (b) *classification* (fundamental, major, or minor). A judgment call will have to be made to determine how far a project wishes to take the capacity-building exercise. A reasonable approach would be that the “fundamentals” must be dealt with, and the “major” issues likewise. The “minor” issues are, to some extent, “nice-to-haves” or “nonmandatory,” and would be included, resources permitting.

FIGURE 9.3

### Radar diagram of QI entity's implementation status (conceptual)



Note: QI = quality infrastructure. Each number around the outside corresponds to a building block, whereas the values 0–4 are either a direct result of the rapid diagnostic or the representation of the percentile-based results of the comprehensive diagnostic (4 being 100 percent and 2 being 50 percent).

To depict the “building” (figure 9.2) or construct a radar diagram (figure 9.3), the implementation status of each of the building blocks has to be given a numerical value (that is, the percentage implemented). In this Comprehensive Diagnostic Tool, the expert assessing the QI will have to provide a quantitative and qualitative result based on his or her experience and the narrative in the various sections of this diagnostic tool, and it has to be an evaluation based on a matrix-type approach. The question-and-answer methodology in the Rapid Diagnostic Tool (discussed earlier in section 9.1) can provide some guidance in this respect.

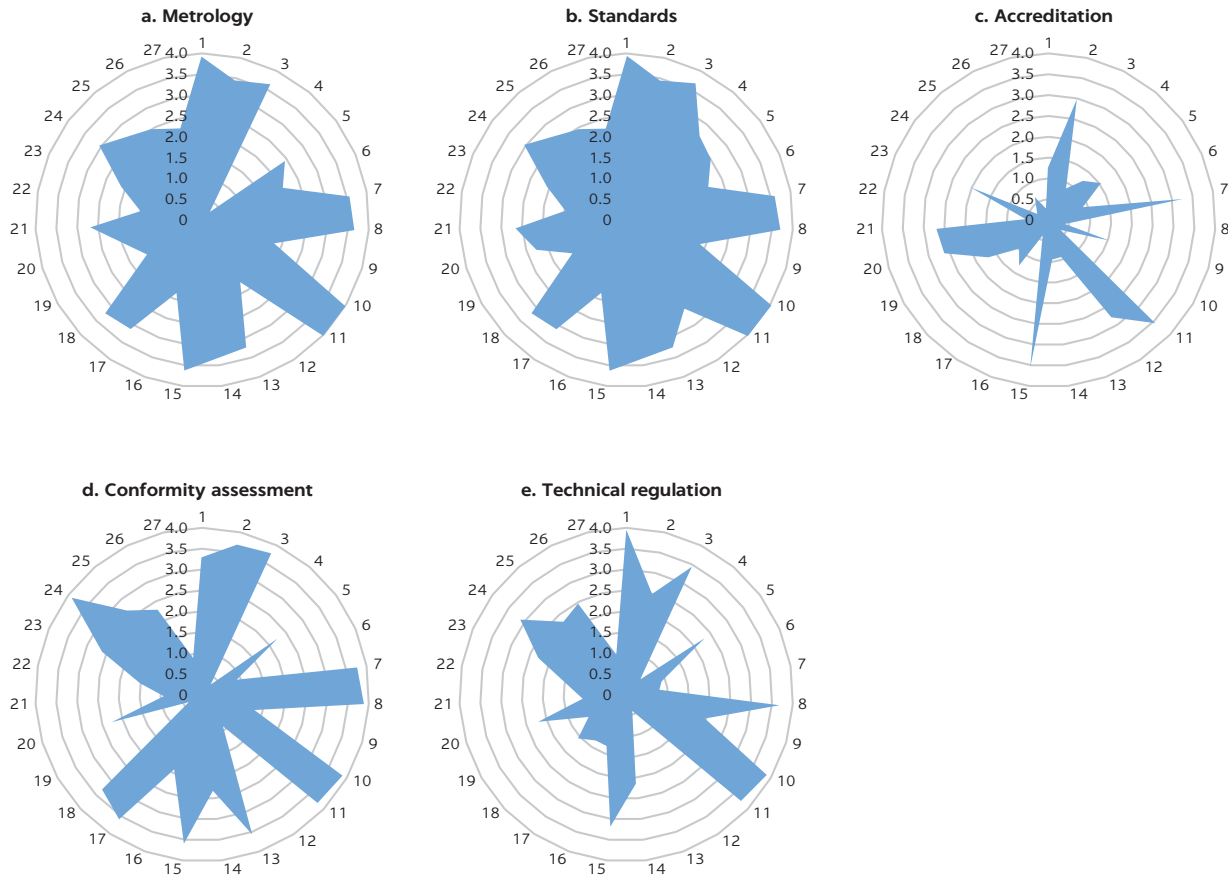
Once the percentages are determined, it is fairly easy to construct a radar diagram (figure 9.3). To depict the “building” will take an additional step. The percentages can be grouped into four categories, such as the following:

- Above 75.1 percent: Implemented
- Between 50.1 percent and 75 percent: Mostly implemented
- Between 25.1 percent and 50 percent: Partially implemented
- Between 0 and 25 percent: Not implemented

The four groups (or more, if the four are considered too coarse a grading) can then be given different colors in the “building” (as in figure 9.2). It helps if the colors are chosen to coincide with a color scheme psychologically understood by potential readers.

FIGURE 9.4

## Dashboard illustration of QI implementation status, by QI element (conceptual)



Note: QI = quality infrastructure. In each radar diagram, the numbers around the outside correspond to building block numbers, whereas the values 0–4 are either a direct result of the rapid diagnostic or the representation of the percentile-based results of the comprehensive diagnostic (4 being 100 percent and 2 being 50 percent).

## STANDARDS REFERENCED IN MODULE 9

ISO (International Organization for Standardization). 2015. “ISO 9001: Quality Management Systems—Requirements.” 5th ed. Ref. no. ISO 9001:2015(E), ISO, Geneva.

ISO and IEC (International Organization for Standardization and International Electrotechnical Commission). 2017. “ISO/IEC 17025: General Requirements for the Competence of Testing and Calibration Laboratories.” 3rd ed. Ref. no. ISO/IEC 17025:2017(E), ISO, Geneva.

## REFERENCE

PTB (National Metrology Institute of Germany [Physikalisch-Technische Bundesanstalt]). 2007. “The Roadmap to an Accreditation System: 30 Milestones for Developing Countries.” Booklet, PTB, Braunschweig, Germany. [https://www.ptb.de/cms/fileadmin/internet/fachabteilungen/abteilung\\_9/9.3\\_internationale\\_zusammenarbeit/publikationen/007\\_Accreditation/PTB\\_Q5\\_Accreditation\\_EN.pdf](https://www.ptb.de/cms/fileadmin/internet/fachabteilungen/abteilung_9/9.3_internationale_zusammenarbeit/publikationen/007_Accreditation/PTB_Q5_Accreditation_EN.pdf).