

INTERNATIONAL DEVELOPMENT IN PRACTICE

# South Africa

## QI Toolkit Case Studies

Martin Kellermann

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## About the Author

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# Abbreviations

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ANC	African National Congress
BIPM	International Bureau of Weights and Measures
CSIR	Council for Scientific and Industrial Research
DTI	Department of Trade and Industry
EU	European Union
IAF	International Accreditation Forum
ILAC	International Laboratory Accreditation Cooperation
MoA	memorandum of agreement
NEDLAC	National Economic Development and Labour Council
NMISA	National Metrology Institute of South Africa
NML	National Metrology Laboratory
NRCS	National Regulator for Compulsory Specifications
NRF	National Research Foundation
NTRF	National Technical Regulation Framework
QI	quality infrastructure
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SANAS	South African National Accreditation Service
SDO	standards development organizations
TBT	Technical Barriers to Trade
WTO	World Trade Organization



# South Africa

## QI Toolkit Case Studies

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*Abstract: South Africa reengineered its quality infrastructure (QI) after 1994 when the country moved from the previous apartheid dispensation to become a full-fledged democracy. During this transition, the business environment changed from an internally focused one—largely driven by the economic sanctions South Africa had endured during the apartheid era—to an open-market one. The business environment had to compete with foreign companies that flooded South Africa. The QI had to change accordingly, from a mostly inward-focused one to one that had to connect with the international QI community and gain recognition. The reengineering of South Africa’s QI was overseen by the Department of Trade and Industry (the ministry responsible for the QI) and was implemented by the QI organizations themselves without support from foreign organizations.*

### COUNTRY CONTEXT

#### Geography and peoples of South Africa

South Africa is the southernmost state in Africa. It is bounded on the south by 2,800 kilometers of coastline stretching along the South Atlantic and Indian Oceans; on the north by the neighboring countries of Botswana, Namibia, and Zimbabwe; on the east by Mozambique and Swaziland; and within by the kingdom of Lesotho (which its land area surrounds). South Africa is the 25th-largest country in the world by land area and, with close to 53 million people, the world’s 24th-most populous nation.

South Africa is also home to a multiethnic society encompassing a wide variety of cultures, languages, and religions. Its pluralistic makeup is reflected in the Constitution’s recognition of 11 official languages, which is among the highest number of any country in the world. Two of these languages are of European, and the others of African, origin.

## History of South Africa

South Africa became a republic in 1961, when the British monarch was abolished as head of the state. In the same year, South Africa left the Commonwealth of Nations and was readmitted only in 1994. The system of legally institutionalized racial segregation and discrimination known as “apartheid” (from Afrikaans, “being apart”)—characterized as such by the National Party, which came to power in whites-only elections in 1948—put South Africa at odds with the international community, which progressively subjected the country to political and financial sanctions. The African National Congress (ANC), established in 1909, became the major resistance movement, demanding a nonracial society and an end to discrimination. In the 1970s and 1980s, the ANC resorted to violence when dialogue proved to be ineffective. The ANC was banned in 1960, and its leaders were incarcerated, the most notable being Nelson Mandela.

At the beginning of the 1990s, the government took decisive steps to end the system of apartheid. It freed Nelson Mandela, unbanned the ANC, and started negotiations for a nonracial political system. The first free elections took place in 1994, and the ANC won by a landslide. All of a sudden, South Africa was no longer the pariah of the international community, but was welcomed everywhere with open arms. The whole world sought to trade with South Africa as its borders were opened.

## BACKGROUND OF QI ISSUES

The changes brought about by the new political dispensation in the 1990s had a profound impact on business and society—developments that also left their mark on the quality infrastructure (QI). Before 1994, as a result of the many sanctions it had endured since the 1960s, South Africa followed, of necessity, a self-sufficiency or replacement policy regarding imported products. Hence, many businesses were totally inward-focused, and the QI provided services that supported them in this endeavor. Once a fully democratic government came to power in 1994, the QI had to adapt fairly rapidly to a completely new situation, one of open borders and intense international competition, rather than an inward-looking self-sufficiency paradigm.

### Standards

The national QI of South Africa has a long history (Pelsler 1995). Standardization was required in the furiously developing gold industry, and as far back as 1912 the South African Engineering Standards Committee was recognized by the British Standards Engineering Committee, both of which changed their structures to that of associations in 1918. The South African Engineering Standards Association morphed into the South African Standards Institution (SASI) in the 1930s.

After World War II, some eminent industrialists in South Africa asked the government to establish a national standards body with legal standing, because the country was starting to industrialize. The South African Bureau of Standards (SABS) was established by an act of Parliament in 1945. Although SABS was initially established as an independent organization, the cabinet decided to

merge SABS with the Council for Scientific and Industrial Research (CSIR) in 1956. However, the merger was not a happy one. The two organizations were separated again in 1960 after acrimonious clashes in the senior management ranks.

## **Metrology**

The National Metrology Laboratory (NML) was established in 1945, just after World War II, as part of the CSIR. South Africa signed the Metre Convention in 1964,<sup>1</sup> even though it had utilized the International System of Units (SI) for scientific purposes for many years. On the other hand, the country also used the weights and measures of the British Imperial System (such as the mile, foot, pounds, gallons, and others) in normal life.

South Africa started metricating in an intense campaign during the 1960s and early 1970s. By July 1974, an act of Parliament designated the SI system as the country's only legal measurement system, and metrication was considered to be completed by 1978. The NML was now a small division within the CSIR, reporting to the CSIR management and board and subject to CSIR business strategies. At the technological level, the NML was well placed, with good research capabilities and world-class physical measuring equipment under its control.

## **Accreditation**

Accreditation had a much more convoluted path than the other QI fundamentals (standards and metrology) before it stabilized in the 1990s (McDowell 2000). Both SABS and the CSIR were mandated through their enabling legislation to accredit laboratories. SABS started accrediting civil engineering laboratories in the 1980s and inspection bodies in the early 1990s. The NML established the National Calibration Service (NCS) in the middle 1970s and started accrediting calibration laboratories. It was broken off as a private company in 1991. Various ministries, such as Health, Labour, and others, accredited private companies to perform conformity assessment duties regarding various safety and health regulations. At the insistence of the Department of Trade and Industry (DTI),<sup>2</sup> all accreditation activities of the NCS, SABS, and the CSIR were merged into the newly established South African National Accreditation Service (SANAS) by 1995, which gradually took over accreditation activities from other ministries as well.

## **Overall QI status, 1994–99**

On the surface, the QI looked in good shape when the ANC government came to power in 1994. It was respected in international organizations and had kept pace with technological developments, even in the last decades of apartheid. But the ANC government wanted to be sure that it could meet the challenges of the new South Africa, which faced serious socioeconomic issues and that had to reintegrate quickly into the world trading system after decades of sanctions. At the same time, industry that had developed as a result of the need to become self-sufficient now had to be supported to become competitive in the light of fierce competition from abroad.

**TABLE 1 Snapshot of quality infrastructure (QI) reform in South Africa**

BEFORE REFORM	AFTER REFORM
Only the South African Bureau of Standards (SABS) developed and published national standards, each identified by “SABS” preceding the standard number.	SABS was empowered to recognize other standards development organizations (SDOs) to develop national standards, even though SABS retained the right to publish them. The abbreviation identifying the standards was changed to “SANS,” for South African National Standard.
SABS was fully responsible for the administration of compulsory specifications—national standards that were declared mandatory by the Minister of Trade and Industry.	The responsibility for administering compulsory specifications was moved from SABS to a newly established National Regulator for Compulsory Specifications (NRCS) under the Department of Trade and Industry.
Trade metrology was the responsibility of SABS.	Trade metrology was moved to the NRCS.
The National Metrology Laboratory (NML) was a division of the Council for Scientific and Industrial Research (CSIR).	The NML was established as an independent organization of public law, and its name was changed to the National Metrology Institute of South Africa (NMISA).
Accreditation services were provided by SABS, the NML, and specific ministries.	The South African National Accreditation System (SANAS) was established first as a not-for-profit private organization and later as an independent organization of public law. All accreditation activities of other organizations were taken over by SANAS, which became the only national accreditation organization by law.

For these reasons, the Department of Arts, Culture, Science and Technology commissioned an in-depth review of the whole science system by an international team in 1996.<sup>3</sup> This review indicated clearly that SABS, the CSIR, and other science councils were world-class, considering the size of South Africa and its economy. The outcome of this review did not result in a major shake-up of the QI.

A second major review—this time, of the “South African Standards, Quality Assurance, Accreditation, and Metrology (SQAM) Infrastructure”—was commissioned by the DTI in 1999. Conducted by a consortium of South African and Australian teams, this review (NEDLAC 2001) had a profound impact on the QI landscape in South Africa (table 1) and was at the time arguably one of the most thorough reviews of a QI anywhere in the world.

## THE QI REVIEW

The DTI established the Standards and Environment Directorate in 1996. This directorate provided decisive leadership in terms of policy and implementation in the formative years of the new government regarding the development of the South African QI. It was instrumental in merging the accreditation activities of various organizations into SANAS, for example. During the many discussions with all the actors in the QI—each vehemently defending the status quo—it became abundantly clear that an independent, in-depth evaluation of the QI was indicated. The DTI therefore commissioned such a QI review through an international tender with sufficient funding to pay for it.

A South African–Australian consortium was awarded the tender in 1999, with the South African side (Bentley West Management Consultants Pty Ltd) providing the business and analysis expertise and the Australian side (a consortium of Standards Australia, Commonwealth Scientific and Industrial Research Organisation [CSIRO], and National Association of Testing Authorities [NATA]) providing the QI expertise. The DTI set up a Counterpart

Group to act as sounding board for the review team. The Counterpart Group was representative of the major QI organizations, organized industry, and the DTI. It met several times with the review team and contributed significantly to the effective outcome of the review. The DTI also established a website to communicate the intermediate and final results of the review to a much wider audience.

### Objectives of the review

The main overall objective of the QI review was to improve and enhance the competitiveness of South Africa's industry, to ensure the health and safety of consumers, and to improve the overall socioeconomic conditions of South Africa by ensuring that the QI operates at optimum efficiency. The study related only to products and services. Other areas—such as environmental safety, eco-labeling, general health issues, and non-product-related legislation—were not covered. The technical objectives of the review were therefore to

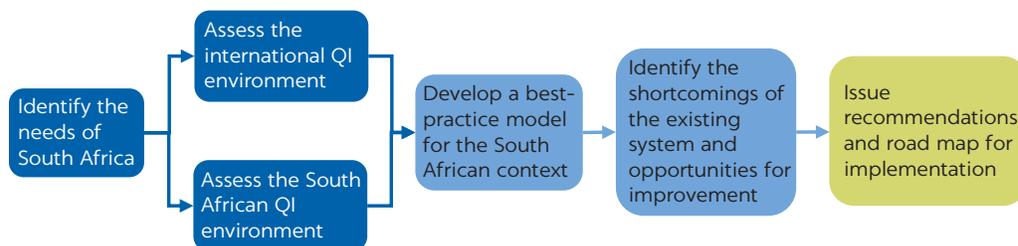
- Evaluate the South African QI to identify shortcomings and recommend improvements to meet the needs of South African commerce, industry, and government;
- Determine which financial, effectiveness, and efficiency constraints, if any, hamper QI development; and
- Level the playing field by removing obstacles to competition, where appropriate.

The results would be used to advise business, labor, and government on the formulation of a holistic national QI policy and the relevant roles of these three stakeholder groups in implementing such a policy. In the process, the effects of such policies elsewhere in the world were taken into consideration. Eight sub-systems of the QI were evaluated to a greater or lesser extent: government and international liaison, standardization, accreditation, conformity assessment, metrology, legal metrology, funding, legal system, and promotion of quality.

### Scope of the QI review

The approach of the QI review was based on building an understanding of the issues at hand, gathering the required information, conducting in-depth analysis, and formulating recommendations as appropriate (figure 1).

**FIGURE 1**  
Process of QI review in South Africa, 2000



Source: NEDLAC 2001.

Note: QI = quality infrastructure.

### ***Identifying the needs of South Africa***

The needs of South Africa that the QI must fulfill were the underlying factors that had to be considered in the assessment of the domestic and international QI landscape to develop proposals for an optimum QI. The country's needs were determined from four perspectives:

- *International trends and developments* that would have an impact on the QI as well as the environment in which it operates. An assessment of key drivers at the international level was therefore conducted as part of the review.
- *National imperatives* were established by an assessment of the overall economic and social environment of South Africa.
- *Needs of stakeholder groups*—including the government, industry (with specific attention to small and medium enterprises, SMEs), labor, consumers, the QI institutions, and other organizations active in the QI arena—were established through a variety of mechanisms: public hearings, formal submissions, a questionnaire-based industry survey, discussions with primary institutions, roundtable discussions with industry representatives, and an assessment of prior research in this area. Nearly 120 individual stakeholders, representative of all stakeholder groups, provided input through one or more of these mechanisms.
- *The current status of QI development and performance* was considered. The identification of this “baseline” situation was imperative to identify strengths and weaknesses and to develop appropriate recommendations. Various practicalities and realities that affect the viability of recommendations were also identified.

### ***Assessing the international and domestic QI environment***

An extensive survey of the international and domestic QI was conducted from a broad perspective that included fundamental issues relating to strategy, governance, functions, funding, and performance.

The international survey consisted of visits to a group of targeted countries as well as a questionnaire-based survey of other selected countries. The visited countries included Australia, Brazil, Malaysia, and the United Kingdom. The countries targeted by questionnaire included Colombia, Germany, Iceland, the Netherlands, New Zealand, Singapore, Sweden, and the United States. The international visits proved to be successful, with the study team able to visit most of the primary institutions within the targeted countries. Many institutions in these countries that were not visited participated by completing the questionnaire, thereby providing valuable additional insight into their environments and operations.

The domestic assessment included an analysis of the formal submissions received from primary QI institutions and other role players in the QI environment, as well as follow-up discussion sessions with the relevant organizations.

### ***Developing a best-practice model for the South African context***

The best-practice model developed represented the “best practices” that could be considered for adoption within the South African context. It was acknowledged that some needs were unique to South Africa as a middle-income nation and that some practices found in high-income countries might not be suitable for South Africa.

Best practices were derived from the analysis of international and domestic practices, with the needs of South Africa taken as the common denominator for deciding which practices should be considered in the South African context and which ones were inappropriate. A comparison of the South African situation at that time with the derived best-practice model indicated specific areas of strength as well as areas for improvement.

#### ***Identifying QI system shortcomings and opportunities for improvement***

Shortcomings were identified in several areas. Some of the higher-level ones included:

- The lack of a cohesive policy by the government, and specifically the DTI, regarding the QI and its responsibilities;
- The lack of an adequate management process in the government for funding the QI where relevant;
- Conflict of interest within SABS between its development of national standards and its management of the compulsory specifications;
- The low profile of the NML within the greater CSIR;
- The lack of recognition of SANAS by the whole government; and
- Fragmentation of South Africa’s technical regulation regime.

Other shortcomings concerned operational areas where the South African QI did not function in accordance with international good practices.

#### ***Issuing recommendations, and a road map for implementation***

Recommendations were formulated with a view to closing existing gaps within the South African QI and to exploiting opportunities. The viability of implementing such recommendations was considered, as well as the risks associated with implementation. The requirements for successfully implementing recommendations were therefore also broadly identified.

It was recognized that many recommendations would have to be implemented over a period of time. The conclusion to the review provided a high-level “road map” that outlined how the South African QI was expected to evolve over time. The ongoing relevance of and reaction to emerging influences were specific themes for the long term.

## **RECOMMENDATIONS OF THE QI REVIEW**

The QI review, published in April 2001, listed 55 recommendations regarding a wide variety of QI and technical regulation issues (NEDLAC 2001). The main recommendations for the QI and technical regulation are summarized below under a few important headings.

### **Standards and compulsory specifications**

SABS should be confirmed as the pinnacle national standards organization, with its prime responsibility being the development and publication of national standards. It should be given the mandate to “recognize” other standards development organizations (SDOs) once they meet specified requirements. These SDOs can then develop national standards, but SABS

retains the legal monopoly on their publication. Such a system will broaden the standards development capabilities of South Africa without losing the process compliance required by annex 3 of the World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT Agreement), for example. It would also pave the way for ministries to more readily use standards as the basis for their regulations because, as recognized SDOs, they retain a measure of control over the content of the standard.

The national standards published by SABS were identified by a numbering system starting with “SABS” (for example, SABS 1234). This practice was seen as a barrier to the use of South African standards by other conformity assessment service providers. Furthermore, having the country in the designation of the national standard sends a clear message to users that the standards are “national standards,” with all that that implies. It also reinforces the national role of the standards body and its agreement with the government. Hence, it was strongly recommended that, in the future, the SABS standards should be renamed “South African National Standards” (for example, SANS 1234).

SABS had a good track record in administering (that is, developing and implementing) the compulsory specifications (national standards that were declared mandatory by the Minister of Trade and Industry),<sup>4</sup> but there was some confusion in the minds of stakeholders between SABS’s role as standards developer and its role in implementing regulatory requirements. There was also the potential overlap between its regulatory activities and those of other ministries, which could eventually lead to resentment and altercations, to the detriment of socioeconomic development. By clearly separating SABS’s role as standards developer from the regulatory implementation of the same, this conflict of interest would be set aside. This would also pave the way for increasing the ministries’ use of standards as the basis for technical regulation, as required by the WTO TBT Agreement, because there would no longer be a “competitive issue” between SABS and ministries regarding technical regulation.

Therefore, it was strongly recommended that the administration of compulsory specifications be separated from SABS and placed in an independent regulatory agency under the DTI. At the same time, the de facto monopoly that SABS enjoyed in conducting the inspection, testing, and certification of products falling within the scope of compulsory specifications should be set aside; that is, SABS should compete on a level playing field with other organizations, appropriately accredited and designated, in providing such services in the regulatory domain.

### **Technical regulations**

There were significant problems with the South African system for management and control over technical regulations, which included compulsory specifications. The need for better coordination of formulation and review of technical regulations was identified as a common need. In South Africa, the problem was one of a system that was fragmented (multiple sources that generate regulations), a lack of knowledge of the existence of regulations, and technical regulations that were drafted without ensuring that all the elements of good regulatory practice are present.

The QI review recommended that the Office of Regulatory Reform be established to:

- Review existing approaches for the formulation of technical regulations contained in legislation and legislative instruments, and develop a best-practice approach for technical regulation formulation;
- Conduct a comprehensive review of existing technical regulations contained in legislation, including legislation relevant to trade and legal metrology;
- Require that regulatory impact assessments be compulsory for all future formulations of technical regulations;
- Establish the principles for any regulatory marks used in South Africa; and
- Monitor any potential abuses of such regulatory marks and conformity assessment marks in both the voluntary and mandatory sectors.

## **Metrology**

The NML was one of nine business units within the CSIR's Division for Manufacturing and Materials Technology (M&MTEK). The director of M&MTEK represented the NML on the CSIR senior management team. A memorandum of understanding (MoU) existed between the CSIR and DTI for the funding of the NML national activities, but stakeholders expressed concern that the CSIR's strategic drive to become less dependent on government funding and more commercialized was negatively affecting the NML's work for the public good. The NML was also largely hidden within the much larger CSIR, even though the CSIR was well known in industry. At the international and regional levels, the NML was well respected. The NML was not considered a threat to independent laboratories; in fact, it supported their development and technical competency.

To give the NML its unique identity, the review recommended that the NML become a fully independent entity (with its own governance, advisory board, and a separate budget) but still within the CSIR. That is, it stopped short of recommending that the NML be totally separated from the CSIR, citing its relatively small size as the major constraint. Attaching the NML to another QI organization was not considered a viable option in the South African context. It would, as is the case all over the world, continue to have to be funded largely by the government.

## **Accreditation**

The establishment of the South African National Accreditation Service (SANAS) was the outcome of a cabinet memorandum. Its forerunner was the National Calibration Service (NCS), augmented by SABS's laboratory accreditation activities. SANAS was established as a "not-for-profit" private company under South African commercial legislation (the Companies Act). After its establishment, the DTI and SANAS signed a memorandum of agreement (MoA) that provided for the recognition of SANAS as the DTI's accreditation body and for some of its funding to come from the DTI. The review concluded that the private company status of SANAS gave it certain advantages regarding its business practices and that the market penetration it achieved in a fairly short time would not have been possible if it had been a statutory body.

Accreditation was increasingly being used by regulatory authorities to determine the technical competency of conformity assessment service providers for the implementation of technical and other regulations. SANAS's private company status was discussed extensively—that is, whether a private accreditation

organization could be used in the regulatory context by the regulatory authorities, or even whether it could act as a regulator itself. Furthermore, would the whole of government (ministries other than the DTI) be committed by the DTI-SANAS MoA to use SANAS as the sole national accreditation body?

There are two significant issues concerning regulators' use of accreditation bodies: (a) accreditors' ability to report the outcomes of their accreditation assessments to regulators, given their usual confidentiality arrangements with accredited clients; and (b) accreditors' ability to be indemnified in some way by the government to allow them to operate without fear of recrimination from accredited clients when acting on behalf of regulators. Both issues could be resolved if the accreditation contract between SANAS and its accredited entity dealt with them decisively, as agreed to beforehand.

The QI review recommended, in line with international good practices, that SANAS should not become a regulator in its own right, but that it should provide the independent evidence of technical competence on which the regulatory authorities could base their "approval" or "designation" of conformity assessment service providers.

The issue of enshrining SANAS's position as the sole national accreditation body was a bit more complicated. Three possibilities were considered:

1. Establishment of SANAS as a statutory body through an accreditation act
2. Continued operation as a private, not-for-gain company, enabled through an accreditation act
3. Continued operation as a private, not-for-gain company but with an extended MoA with the government as a whole.

Based on international trends, the South African legal system, and the independence issue, the second option—that is, for SANAS to continue operating as a private, not-for-gain company under the Companies Act and with its activities bolstered by an accreditation act—was considered the most appropriate. This would give SANAS the legal backing it required to act on behalf of all of government and indemnify it for regulatory work, while at the same time being less prone to government interference and able to react much faster to changing market requirements.

### **Conformity assessment**

The conclusion of the QI review was that there would be considerable benefits and greater compliance with international requirements such as the WTO TBT Agreement if the system for demonstrating compliance with technical regulations, including compulsory specifications, were opened up to all competent providers, both in South Africa and abroad, based on their demonstrated competence to comply with South Africa's specific technical requirements. Such demonstration of technical competence should be through an objective and transparent process, as provided by SANAS accreditation or accreditation by its international multilateral recognition agreement partners.

It is, however, recognized that demonstration of technical competence is not the only criterion for acceptance of a service provider. Issues such as legal liability should also be considered. It is therefore essential that final acceptance of such service providers vest with the regulatory authority and not with SANAS, which should not have regulatory powers.

## IMPLEMENTATION OF QI REVIEW RECOMMENDATIONS

The recommendations of the QI review were wide-ranging, and their impact would be profound. The DTI accepted the report, which was also considered and endorsed by the National Economic Development and Labour Council (NEDLAC).<sup>5</sup> The DTI and the QI organizations started the long road of implementation in 2001. All the QI organizations were directed to implement the recommendations, either on their own or in cooperation with each other, and the DTI maintained an oversight role.

### Technical regulation

Following the QI review, the DTI established an interministerial technical regulation coordination committee to discuss and agree on a coordinated approach to technical regulation. This resulted in the publication of the “Government Strategy towards an Efficient National Technical Regulation Framework (NTRF) for South Africa” (DTI 2006).

#### ***NTRF strategy***

The purpose of the NTRF strategy was to establish and improve a common approach in terms of technical regulation responsibilities. It provided guidance to all departments responsible for the development, maintenance, and review of technical regulations. Although the strategy initially invited the “voluntary” implementation of the NTRF, it was envisaged that the NTRF would eventually be given legal certainty through the South African Technical Regulatory Act.

The strategy for formulation of the NTRF established the following broad guidelines, based on five internationally accepted elements of technical regulatory infrastructure:

- *The legislator.* The government as legislator faces the challenge of keeping regulatory intervention to a minimum, while still achieving the objective of protecting the health and safety of society and the environment. The proposed interventions are designed to promote innovation and competition among businesses rather than stifle them. Hence, a regulatory impact assessment (RIA) will be conducted that includes options and alternatives. For each RIA, a cost-benefit analysis, risks, and distributional impacts would be considered before a final decision is made. The various ministries at both the national and provincial levels would retain their mandates in this regard.
- *The regulator.* Various regulatory agencies oversee the implementation and administration of technical regulations at the national, provincial, and local levels. In high-risk cases, the regulatory agency may be required to approve commodities before marketing. This approval should be based on compliance evidence provided by a technically competent (that is, accredited) third-party conformity assessment service provider, the cost of which would be borne by the supplier. For all products, market surveillance will be conducted to identify products that do not meet technical regulation requirements, in order to initiate sanctions. Inspection bodies responsible for market surveillance should be accredited by SANAS.
- *Technical requirements.* The technical regulations—based on international or national standards where available and appropriate—will focus on performance requirements rather than prescription.<sup>6</sup> Moreover, only those

elements of the standards that are relevant for achieving the objective of the technical regulation should be used. Hence, regulatory agencies need to be involved in the technical committees developing the national standards in this regard.

- *Conformity assessment.* Because South Africa did not have strong product liability legislation, conformity assessment requirements in technical regulations frequently called for various forms of “premarket” product testing or certification. A balance must be identified between the costs and the risks associated with these various forms of assessment and their effect on trade. The NTRF strategy did not provide a clear-cut definition of preferred modalities (such as the eight Modules of the European Union Global Approach for conformity assessment).<sup>7</sup>
- *Sanctions for noncompliance.* Technical regulations should contain appropriate but flexible sanctions or remedies to enforce compliance and penalize noncompliance. These could include fines, injunctions, corrective advertising, withdrawal of products, product recalls, negotiated settlements, and preventive actions by suppliers. Mechanisms must be established to ensure a consistent and balanced approach to the imposition of sanctions.

The NTRF strategy envisaged the establishment of the Technical Regulatory Office at the DTI with the main purpose of coordinating technical regulation across all ministries and regulatory agencies, as well as coordination of these with the QI organizations—such as SABS, SANAS, and NMISA—to facilitate the use of standards, accreditation, and metrology in technical regulation.

#### ***NTRF implementation***

Many government departments and related agencies slowly implemented the NTRF. Accreditation became the common denominator for the designation of inspection bodies, testing laboratories, and certification bodies as the government withdrew from service delivery activities. Standards were increasingly used as the basis for technical regulation, even though there were still pockets of resistance among the regulatory agencies. The envisaged NTRF legislation did not come about, and neither did the envisaged Technical Regulation Office. Obtaining the necessary support from all affected ministries for such cross-cutting legislation and powers of control proved to be difficult, and other priorities became more important in the DTI over time.

#### **South African Bureau of Standards (SABS)**

Of the three main QI organizations, SABS was to undergo the most dramatic reengineering. Because of the major changes that were to take place, they were made in a number of definitive steps. The organizational structure was changed in three stages, the Standards Act was extensively revised, the new Compulsory Specifications Act was developed, and the administration of compulsory specifications and legal metrology were separated and placed in a newly established regulatory agency, the National Regulator for Compulsory Specifications (NRCS), under the DTI.

SABS, which hitherto had been placed under the Department of Arts, Culture, Science and Technology—together with other science councils, such as the CSIR, Human Sciences Research Council (HSRC), National Research Foundation (NRF), and others—was now placed under the DTI, together

with NMISA and SANAS, to foster coordination among the pinnacle public QI organizations and to align their activities with the government's industrial development and trade policies.

### ***Status quo before QI review publication***

Ever since its inception in 1946, the SABS structure had been organized in technology sectors. It had four engineering departments (civil, electrical, electronic, and mechanical) and three chemical departments (biological sciences, chemical, and fiber technology). Each of these departments provided the whole range of standardization services (standards development, inspection, testing, and product certification) as well as the administration of compulsory specifications. Some of the departments had also started to provide quality management system certification. Therefore, each of the departments was a standards organization in its own right within its specific technology sector.

The technology-based structure had quite a few advantages: good communication between the standards development and implementation sides, enhanced multiskilling, and an industry sector with a single point of entry. But the structure resulted in a bloated administration, the technology departments developed divergent practices over time, and there was heavy and mostly uncharted financial cross-subsidization between the “good for country” activities and commercial services.

SABS enjoyed a number of marketing advantages—some would argue, monopolistic in nature—that were either enshrined in the Standards Act or had developed over years:

- The national standards were prefixed with “SABS” instead of “SANS.”
- Only permit holders (licensed manufacturers) were legally entitled to market their products as complying with SABS standards. Other certification organizations could not certify products to SABS standards. The annual permit fees constituted a large part of SABS's budget.
- The compulsory specifications were cooperatively developed between SABS and industry, largely without government interference, even though their final promulgation was in the hands of the Minister of Trade and Industry.
- The market surveillance of locally manufactured as well as imported products falling within the scope of compulsory specifications was conducted by SABS, for which it received an annual levy from suppliers, based on production volumes. This levy was negotiated annually between SABS and suppliers and was promulgated by the Minister of Trade and Industry in the *Government Gazette*.
- Although the SABS Mark (the product certification mark of SABS) was not a prerequisite for compliance with compulsory specifications, suppliers whose products were subject to a compulsory specification for which they could also obtain the SABS Mark did not pay the full levies.
- Testing of products for the SABS Mark and compulsory specifications was almost exclusively conducted in the more than 70 laboratories of SABS.

### ***Organizational reengineering***

A major restructuring exercise got under way from 1996 to 1998, driven by the SABS senior management, mostly recently appointed young technologists who had come up through the ranks. The technology “silos” of SABS were deconstructed within each department and rearranged into standards development, testing, and

certification units. Once these were established, the SABS structure as a whole was aligned accordingly, all the standards development was merged into the new Standards Department, and the testing and certification units were merged.

This reengineering provided the possibility to ring-fence the noncommercial from the commercial activities—a step demanded by the government, which had decided it would no longer subsidize commercial activities such as testing and certification; in other words, SABS would have to compete in the marketplace just like any other service provider. On the other hand, the government made the commitment that it would fund SABS’s activities for the public good—that is, standards development and information. The regulatory work of SABS, such as administration of compulsory standards and legal metrology, was separated and placed in the noncommercial part for the time being.

The reengineering brought about new business challenges:

- Management expertise to lead the new functions had to be found.
- State funding for the commercial functions dried up, and some laboratories that were no longer financially sustainable had to be closed.
- Staff were reduced from approximately 1,400 to 1,000 through early retirements and resignations, with the loss of much expertise.

To manage the changes, external change facilitators were brought in from time to time. The clients of SABS were also not altogether happy with the changes, and negative perceptions had to be managed. But after the reengineering, it was possible to identify the actual costs of the “good for country” regulatory work for the first time, and the commercial entities had to become much more customer-focused. The road for future growth was clearer.

The final chapter in the reengineering of the SABS organizational structure was the commercialization of the testing and certification activities in 2002. They were established as wholly owned subsidiaries of SABS under South African company law; that is, they became tax-paying proprietary limited firms. This removed one of the major complaints of the private sector conformity assessment service providers, namely that SABS did not have to pay taxes; in other words, conformity assessment services became a level playing field. Once the legislation to establish the new National Regulator for Compulsory Specifications (NRCS) was promulgated in September 2008,<sup>8</sup> the regulatory activities of the SABS were separated and placed in the NRCS. The reengineering of the SABS organizational structure was now complete.

### ***Revision of the Standards Act***

The Standards Act was revised extensively, as follows:<sup>9</sup>

- The mandate of SABS to accredit organizations was removed to clear the way for SANAS to become the sole national accreditation organization.
- SABS was given the sole mandate to publish national standards, but SABS was also empowered to register other SDOs.
- The reference to national standards was liberalized, opening the way for any organization to declare compliance of its products or services with such standards if materially true, and it also allowed other certification organizations to use them rather than foreign standards.
- The administration of compulsory specifications was removed to clear the way for the separation of these functions from SABS.
- SABS was allowed to establish subsidiaries and operate in countries outside the borders of South Africa—that is, to become much more commercially oriented.

## The National Metrology Laboratory (NML)

In spite of the recommendation of the QI review that the NML should remain in the CSIR, albeit as a separate division, there was a groundswell of opinion that it would be better to establish the NML as an independent organization. Two issues in particular pushed this agenda: First, the DTI wanted to have control over all three of the pinnacle QI organizations, and the CSIR was under the control of the Department of Arts, Culture, Science and Technology, and would remain there because the CSIR was a science council proper. Second, as SABS and SANAS pursued international recognition as fully independent organizations under their own governance structures, this also became an imperative for the NML.

One of the main challenges for the NML to be established as an independent entity—namely, that it was still a small organization—was set aside when the metrology-in-chemistry activities of CSIR laboratories were merged with the NML. This merger nearly doubled the business side of the NML. The relevant legislation had to be developed, and in 2006 it was promulgated as the Measurement Units and Measurement Standards Act.<sup>10</sup> The NML was separated from the CSIR and renamed the National Metrology Institute of South Africa (NMISA), under the DTI. The NMISA vigorously pursued international recognition through the Key Comparison Database of the International Bureau of Weights and Measures (BIPM) and played a major role in the development of the regional Intra-Africa Metrology System (AFRIMETS).

## Accreditation

SANAS had been established just before the QI review. It had reached a useful market penetration as a “not-for-gain” private sector company and was vigorously pursuing recognition throughout the whole of government. SANAS was well positioned in the Southern African Development Community (SADC) as the only internationally recognized accreditation organization (as a signatory in 2000 to the International Accreditation Forum [IAF] Multilateral Recognition Agreement and the International Laboratory Accreditation Cooperation [ILAC] Mutual Recognition Arrangement), and it was well respected in Europe and Australia. Hence, the QI review did not have much to offer regarding the organizational structure of SANAS, nor its business practices, and there were no conflicts of interest of note to discuss. No major reengineering was thus recommended, other than the possible development of an accreditation law to ensure that SANAS would be designated the sole national accreditation organization and that it would be given certain indemnities to operate in the technical regulation domain, even though it would remain a private company.

However, the DTI wanted SANAS to have the same status as the other two pinnacle QI organizations, the SABS and NMISA—namely, to become a statutory body. This would bring about the legal certainty that SANAS was the sole national accreditation body for the whole of government, and it would give the government more influence in the governance of the organization. In 2006, SANAS became a public entity through the promulgation of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act.<sup>11</sup> The chief executive officer (CEO) of SANAS—who had a lot to do with the powerful position it had achieved in South Africa, regionally, and internationally—resigned. The reengineering of accreditation was complete.

## Remaining implementation challenges

The main challenge remaining would be the development and promulgation of a definitive common approach to technical regulation (see the earlier “Technical Regulation” subsection) and the establishment of the Technical Regulation Office. The technical regulation regime of South Africa, although more compliant with the WTO TBT Agreement than in years past, is still fragmented and suboptimal. The notion that ministries should follow the NTRF strategy in a “voluntary” way is not always effective.

The lack of a common approach to technical regulation will come under additional pressure in the run-up to a common market in the SADC because countries need to learn to trust each others’ technical regulation regimes. It may end up as a common regional approach just as in the 1990s, with the EU’s promulgation of its New Approach Directives for technical regulation and the Global Approach for conformity assessment.<sup>12</sup>

## KEY SUCCESS FACTORS AND LESSONS LEARNED

The reengineering of the South African QI took place without outside intervention or donor support. It is therefore a fairly unique story in the developing country context. The drivers and modalities are known, and these could be just as important in cases where countries are supported by donor activity.

### Government commitment and leadership

When South Africa emerged from the apartheid years, the new government wanted to make sure that the QI was totally supportive of the socioeconomic development challenges that South Africa faced after the sanction years. Among the key success factors in the government’s approach to the successful reengineering of the QI was the leadership provided by the government, as follows:

- *The DTI established a directorate with a specific focus to provide the QI with government support and guidance.* This directorate was led by individuals who understood the QI environment not only in South Africa but also internationally, and they had the ear of those at the political level—among others, the Minister of Trade and Industry.
- *The DTI made adequate funds available for the in-depth and independent review of the QI and technical regulation regime—a totally holistic approach.* This review not only encompassed the QI organizations at the national level but also benchmarked them against international practices and successful reengineering processes elsewhere. In addition, the needs of South African authorities and, importantly, of industry were the markers that had a major influence on the final decisions regarding reengineering. It was accepted that some good practices followed in high-income countries might not be useful in South Africa.
- *The QI review was discussed and agreed to not only in governmental circles but also in a much broader context between government, industry, and labor representatives in a high-level national forum, NEDLAC.* This paved the way, for example, for a smoother transition to new organizational structures that had to be negotiated with sometimes rather militant labor unions.

## The QI organizations

The transition from monopolistic status with regulatory powers to service-oriented organizations without regulatory powers was not easy. It was facilitated by a number of factors:

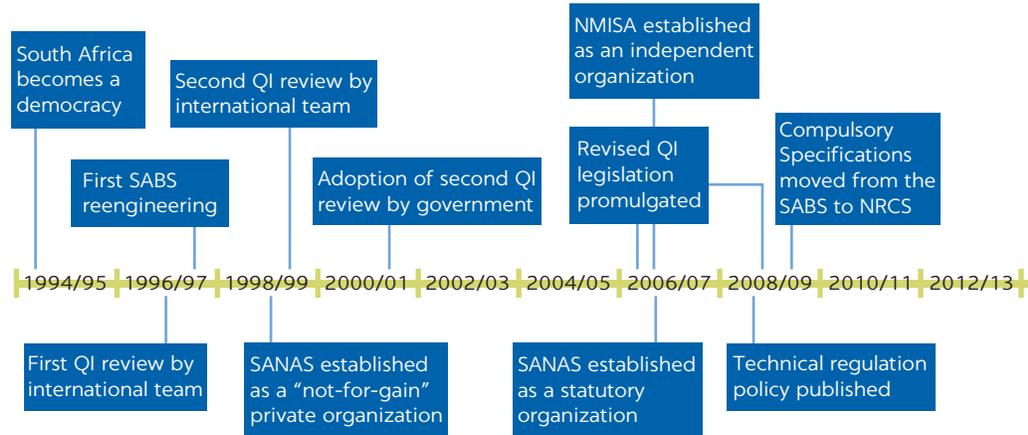
- *Senior management that was relatively young, had been trained in strategic management, and had been exposed to good practices* through continuous interactions with peers in international organizations, such as the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), BIPM, International Organization for Legal Metrology (OIML), ILAC, and IAF. In many cases, the individuals in senior management of the South African QI were actively supported to become members in the governance structures of these organizations. The reengineering of QI organizations was driven internally by these individuals.
- *Facilitation and support of change management by outside change management experts.* They were not involved in determining the technical side of the changes, but they provided the necessary psychological backing and support for what were sometimes difficult changes for many employees.
- *Involvement of the labor unions* right from the start was an important element in keeping peace in the workplace during the difficult transition periods lasting a number of years.
- *Open and continuous communication from management to the workforce* regarding the reengineering needs, requirements, and actual processes at every stage ensured that disruptive rumor mongering was kept to an absolute minimum.
- *Stability and self-sufficiency of QI activity units before moving them to other organizations.* Separating activities from one organization to move them to another without upsetting the whole organization is successful if the part to be separated is established as a unique and self-contained entity within the organization before separation takes place.

## Timeline of QI reengineering

Reengineering a total system takes time—more time than is often considered adequate. Planning the time frame for such changes should take the following into consideration:

- *The development and promulgation of new or revised legislation* takes years in any society, and it is not always easy because the QI is usually not high on the sociopolitical agenda of parliaments. Hence, such revisions and the development of new legislation are frequently not undertaken, and the reengineering process is consequently compromised.
- *Massive organizational changes* require time for planning, obtaining approval from governance structures, realigning budgets, and implementation (figure 2). Separating activities from one organization to establish them within an independent organization cannot be hurried.
- *Changes have to be decisive regarding milestones.* It is not useful to have the changes take place organically, because this allows silent sabotage to creep in.

**FIGURE 2**  
**Main QI reengineering events in South Africa, 1994–2013**



Note: NMISA = National Metrology Institute of South Africa; NRCS = National Regulator for Compulsory Specifications; QI = quality infrastructure; SABS = South African Bureau of Standards; SANAS = South African National Accreditation System.

## CONCLUSION

Reengineering a country's total QI system is possible, given the political will and leadership to do so. Adequate time should be allowed, and all stakeholders should be involved right from the beginning. Change management is very important. It is not necessary for a low- or middle-income country to wait for donor support; a tremendous amount of the reengineering can be done by dedicated and knowledgeable individuals within the country.

## NOTES

1. The Metre Convention is an international treaty signed in 1875 that created the International Bureau of Weights and Measures (BIPM), established the metric system, and addresses the base units of scientific metrology.
2. In South Africa, ministries are designated "departments."
3. The department has since been separated into the Department of Arts and Culture and the Department of Science and Technology.
4. By declaring them mandatory, these compulsory specifications are technical regulations in terms of the WTO TBT Agreement definitions.
5. NEDLAC is the vehicle by which government, labor, business, and community organizations seek to cooperate, through problem solving and negotiation, on economic, labor, and development issues and related challenges facing the country.
6. *Performance-based* technical regulations "specify the desired objective in precise terms but allow the regulated entity to determine their own technique for achieving the outcome," whereas *prescriptive* technical regulations "specify the means for attaining the specified outcome" (DTI 2006, 23–23).
7. For more information about the EU's modules for conformity assessment under its Global Approach Directive, see the summary, "CE Conformity Marking," on the EUR-Lex website: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3A121013>.
8. Act No. 5 of 2008, published July 4, 2008, *Government Gazette* 517 (31216): [https://www.thedti.gov.za/business\\_regulation/acts/national\\_regulator\\_act.pdf](https://www.thedti.gov.za/business_regulation/acts/national_regulator_act.pdf).
9. Act No. 8 of 2008, published July 18, 2008, *Government Gazette* 517 (31253): [https://www.thedti.gov.za/business\\_regulation/acts/standards\\_act.pdf](https://www.thedti.gov.za/business_regulation/acts/standards_act.pdf).

10. Act No. 18 of 2006, published March 28, 2007, *Government Gazette* 501 (29752): <https://www.sahpra.org.za/documents/1ad62e1cMeasurementsUnitsandMeasurementStandardsActmuamsa2006452.pdf>.
11. Act No. 19, 2006, published March 16, 2007, *Government Gazette* 501 (29712): [https://www.thedti.gov.za/business\\_regulation/acts/accreditation\\_act.pdf](https://www.thedti.gov.za/business_regulation/acts/accreditation_act.pdf).
12. Council Directive 83/189/EEC and Council Directive 90/683/EEC, both of which have been revised continuously and extensively over the years.

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