SECTION 37
QUALITY IN DEVELOPING COUNTRIES

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A HETEROGENEOUS GROUP OF COUNTRIES

Countries are often classified as "developing" or "developed." This terminology is misleading, as countries that are classified as developing could in many respects be more advanced than some so-called developed countries; for example, when such facets of human life as morale, culture, social relations, democratic rights, and equal opportunities are taken into consideration. A clearer grouping would be into "industrialized" versus "less industrialized" countries or, alternatively, into

"economically developed" versus "less economically developed" countries. This is, in fact, what is meant by the developed versus developing classification.

Neither developing nor developed countries can be regarded as forming a homogeneous group; they show differences in terms of industrial development, natural resources, size, economic strength, access to markets, national policy, human resources, and other criteria.

The heterogeneity of developing countries is also reflected in other classification systems. The term "least developed countries" is used to denote some 50 countries in the context of United Nations discussions. These countries are the weakest partners in the international community, with the most formidable structural problems. The term "newly industrialized countries," commonly abbreviated NIC, implies countries which have recently advanced from a developing status to a developed status. This group includes some countries in Southeast Asia referred to as the "Asian tigers." As a consequence of the collapse of the Soviet Union there are "countries in transition to a market economy." This group previously had a centrally planned economy. Now they are converting to a market economy.

TRADE GLOBALIZATION AND LIBERALIZATION

The Uruguay Round of Multilateral Trade Negotiations was held under the General Agreement on Tariffs and Trade (GATT) from 1986 to 1993. The final act of these negotiations was signed at a meeting in Marrakesh, Morocco in April 1994. The "Marrakesh Declaration" affirmed that the results of the Uruguay Round would "strengthen the world economy and lead to more trade, investment, employment and income growth throughout the world." Although tariff reductions had continuously been undertaken under the GATT framework earlier, liberalization of trade had been threatened by the increased use of protectionist measures such as export restraints and import quotas. The Uruguay Round of negotiations achieved substantial results toward the reversal of protectionist measures.

The developing countries took a very active and influential part in the Uruguay Round of negotiations. These countries will be affected to a higher degree by the new agreement than by earlier agreements which involved industrialized countries only.

The new trade situation includes reductions of subsidies and tariff and nontariff barriers, more open and fair trade without protection, and rules for trade in goods, services, and "intellectual properties." This will entail greater access to new markets, as well as increased competition from imports on the domestic market. In the new competitive situation, quality will become more important to developing countries than ever before.

The contribution made by developing countries to global output is increasing rapidly. According to the World Bank (*Global Economic Prospects and the Developing Countries*, 1995, p. 65), these countries will account for 38 percent of the growth in global output in 1995–2010, compared to 22 percent in the 1980s. Their share of global output will rise from 21 percent in 1994 to 27 percent in 2010. The report states that "the increasing integration of developing countries into the global economy represents a major—perhaps the most important—opportunity for raising the welfare of both developing and industrial countries in the long term."

TECHNOLOGY IN DEVELOPING COUNTRIES

In many developing countries the manufacturing sector may be divided into a modern component, a modernizing component, and a nonmodern component, which utilize different technology.

Modern component: This component consists of the largest industrial enterprises, which are located mainly in urban areas where infrastructure and an adequate work force, including skilled workers, are available, and which use modern technology. This group of enterprises also includes

subsidiaries of multinational companies. The modern component is mainly found in the most industrialized developing countries.

Modernizing component: This component includes mainly small to medium-sized industrial enterprises, located mostly in urban but also in some rural areas, in which various intermediate levels of technology are used. Enterprises in this component might be suppliers to larger enterprises.

Nonmodern component: This consists of small industrial enterprises and artisan workshops, located largely in rural but also in urban areas, which use traditional and upgraded traditional technologies.

Discussions of the technological basis for industrial development in developing countries are often focused on the choice of appropriate technologies and their development, transfer, and implementation.

The term "appropriate technology" for developing countries is often taken to mean simple and labor-intensive technology. The concept is based on the observations that industrial technologies are designed in the developed countries and that conditions in these countries are quite different from those in the developing countries. Technologies that are more suitable to conditions in developing countries are needed.

The concept of appropriate technology includes factors other than economic efficiency and growth; for example, employment, working conditions, and provision of basic needs. This means that appropriate technologies will differ from country to country depending on the significance of these various factors.

FACTORS IMPEDING QUALITY IMPROVEMENT

Developing countries face several problems with regard to quality. The nature of these problems differs depending on the phase of development the country is in. Consequently, the solutions to the problems also differ.

An increasing number of developing countries are liberalizing their economies and adopting export-oriented policies. These changes lead to an increased awareness of the importance of quality.

Discussions that the author has had with many representatives of developing countries show that there are several factors impeding improvement of quality in developing countries, of which the major ones seem to be.

Low Purchasing Power. The vast majority of people are poor. Their purchase decisions are based on price consideration only. The manufacturers consequently aim at low prices, using cheap and low-quality materials.

Shortage of Goods and Absence of Competition. The shortage of goods provides some guarantee to the manufacturers that everything produced will be sold; as a result, they show very little interest in quality. Restrictions on the importation of goods, along with high custom barriers, protect locally produced goods against competition from goods produced in more industrialized countries.

Foreign Exchange Constraints. Most developing countries have a shortage of foreign exchange, and the industrial sector of the economy has to compete with other sectors for the insufficient amount available. This leads to obsolete technology, inadequate machinery and poor material, all of which have an adverse effect on quality.

Incomplete Infrastructure. The infrastructure is not satisfactory. In most developing countries there are shortcomings in areas such as power supply, transport, communication, and education. In addition, specific services in areas important to quality development, e.g., standardization, testing, training, and consulting, are not adequate for the needs of the enterprises.

Inadequate Leadership. There is a short-term view on the business, which leads to a quantity-oriented management culture. Business leaders rely on a few key members of personnel. The need for an overall coordination of activities is overlooked. Quality is regarded as a technical issue only, managed by technicians. There is no proper awareness of the strategic importance of quality to the enterprise among owners and top managers.

Inadequate Knowledge. The managerial as well as technical knowledge of personnel in industry is generally limited. In some developing countries the problem of limited knowledge is compounded by the transient nature of the work force. (It is not uncommon to find that 20 to 50 percent of work force is replaced within 3 to 6 months). Under these circumstances, it is difficult to achieve a skilled work force. The high illiteracy rate in many developing countries adds to the problem.

INDUSTRIAL DEVELOPMENT AND QUALITY

Industrial development usually progresses in identifiable phases, from a primitive, agricultural subsistence economy to a sophisticated economy producing manufactured goods for export. Five phases of development can be defined (Juran 1975), as described below.

Phase I. Subsistence Economy. Economic activity consists mainly of the production of subsistence goods for local consumption (agriculture, fishing, etc.). Quality is low—there is a lack of quality standards, technology, test facilities, etc. Quality control takes place mainly by consumer inspection of products in the village marketplace.

Phase II. Export of Natural Materials. In this phase the economy undertakes export of natural materials such as fruits, fibers, and minerals. Selling these goods in the international market requires adherence to international quality standards, which are usually higher than domestic standards. Quality therefore has to be improved. The contracts for export normally include the quality specifications to be met, the tests to be used, and the sampling procedures to be followed, which requires test laboratories, instruments, and appropriate knowledge. In order to provide for the necessary services, a national standards body is set up.

Phase III. Export of Processed Materials. Local processing of materials is started, and the economy shifts to export of processed rather than raw materials, e.g., metals instead of ore, plywood instead of logs, canned instead of fresh fruit. The economy must now include the acquisition, operating, and maintenance of technological processes. International quality standards for processed products have to be met, and process controls have to be introduced. Supplier relationships concerning quality have to be developed, since packaging materials, raw materials, etc., are supplied from external sources within the country. The traditional work of the standards body is expanded. In addition, new needs arise as tools from the quality management profession (statistical methodology, quality planning, supplier quality activities, organization for quality, etc.) are introduced. This requires training and consulting services.

Phase IV. Integrated Manufacture for Domestic Use. In this phase the economy undertakes integrated manufacture of modern industrial and consumer products for domestic use. The industries now have to manage quality in all stages of industrial production, from determining the market need through product development, design, manufacture, and marketing. This requires not only training and consulting services but also professional development through research work, conferences and seminars, publications, quality society activities, exchange of views with colleagues, etc.

Phase V. Export of Manufactured Products. Finally, the manufactured products are sold on the international market, where they have to compete with products from other countries that have fully developed industrial economies. Foreign buyers are increasingly requesting suppliers to conform to the international series of standards on quality management systems (ISO 9000). The industries now have to develop, document, and introduce such systems. They must also, in many cases, ensure that these systems are certified by an accredited institution. This means that there is a need for training in ISO 9000 standards and auditing of quality management systems. Certification bodies have to obtain accreditation, which implies registration of certified auditors.

QUALITY ACTIVITIES

The different phases of industrial development require various activities to attain, improve, and control quality. In a subsistence economy these consist primarily of inspection by consumers.

In the early stages of industrialization there is an increasing need for standardization activities, such as the preparation of standards covering specifications, testing methods, sampling methods, etc. It is also necessary to develop applied and legal metrology, as well as a national testing capability. A certification scheme for selected products is sometimes introduced. All these tasks are usually referred to the national standards body.

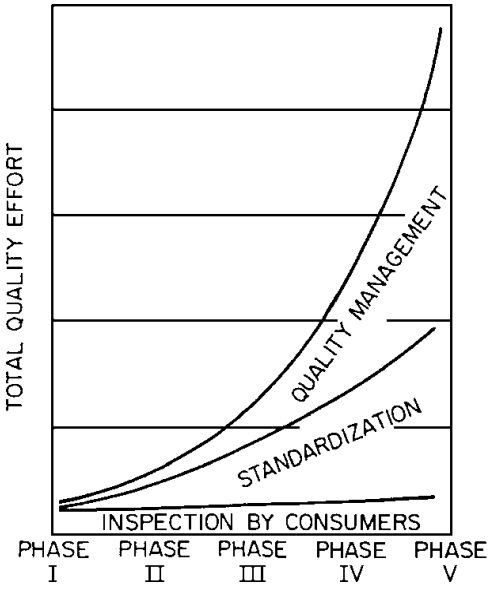

FIGURE 37.1 The growth of total quality effort in industrial development. (*Based on Juran 1975.*)

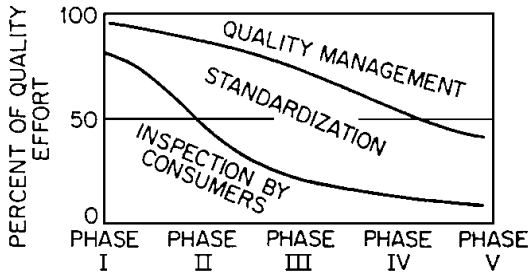

FIGURE 37.2 The relative importance of the quality activities. (*Based on Juran 1975.*)

As industrialization continues, new needs arise, which cannot be satisfied entirely by traditional standardization activities on a national level. These new needs have to be fulfilled primarily by in-house quality activities, e.g., quality planning, design reviews, new-product testing, supplier surveys and controls, process capability analyses, inspection planning, quality audits, quality evaluation, quality data feedback, poor quality cost analyses, benchmarking, quality improvement programs, quality policies and objectives, quality systems and organizational development. Knowledge about these activities and the appropriate tools (under the designation of quality management) is required, and this creates a need for education and training, development of quality specialists and managers, consulting assistance, etc. These needs are accommodated with measures that may include training courses, conferences and seminars, research committees, publications, and/or quality societies.

Consequently, there are a wide range of quality activities, the importance of which depends on the stage of industrial development. Basically, the activities can be grouped as follows:

Inspection by consumers: Inspection of products in the marketplace.

Standardization: National standards on terminology, sampling methods, testing methods, specifications, codes of practice, and quality management systems; applied and legal metrology; national testing facilities; certification; legislation.

Quality management: Application of managerial tools to plan for quality, attain and control quality, follow up and improve quality, as well as to organize for quality and develop competence in the field.

Figure 37.1 shows the development of total quality measures in the industrial development. Figure 37.2 shows the importance of the activities on a relative basis. It is clear that the dominance is shifting from inspection by consumers to standardization, and from standardization to quality management.

QUALITY MANAGEMENT

Phases of Development. There is an increasing interest in quality worldwide. Over the past 10 years, more and more companies in industrialized countries have become involved in quality activities of various kinds. Management journals include quite a lot about quality. National and international conferences highlighting quality are held frequently.

This development is also influencing developing countries. In the more industrially advanced of these countries, the interest in quality is equal to that in industrialized countries. In other countries, interest is emerging.

Five phases can be identified in the development of quality in manufacturing enterprises as well as in service organizations (Sandholm 1996).

Dormant phase: Companies do not feel any threat in the marketplace. They earn an acceptable income. Executives are satisfied with the business results. They experience no need to give any special consideration to quality.

Awakening phase: The situation is dramatically changed. Market shares are lost. Income drops. Profit turns into loss. Executives awake and feel that they are facing a crisis.

Groping phase: Upon awakening, executives realize that they have to do something in the field of quality. But what? Trendy tools and methods are there as a possibility, highlighted very much in business literature and at management seminars and conferences. Lacking any sound knowledge in how to manage for quality, executives just select whatever presents itself. The groping phase is a period of trial and error.

Action phase: Some companies discover that the trendy tools and methods do not lead to excellent results. They then start to carry out an effective program for changing the situation. Such a program includes a change of the internal culture, as well as improvements of products and processes.

Maturity phase: A real sign of maturity is when quality is no longer talked about in the enterprise. Full customer satisfaction is achieved through perfect processes in all areas of the organization. The concept of quality applies not only to products, i.e., the goods and services produced and supplied, but also to all supporting activities. A total quality approach is applied, which includes all processes and functions, as well as the involvement of everyone in the organization. Quality is just a natural aspect of the work, permeating the entire organization. Executives regard quality in the same natural way as they regard finances. The maturity phase has been reached by successful Japanese companies. In the West, the list of winners of the Malcolm Baldrige National Quality Award in the United States and the European Quality Award in Europe contains companies that can be fairly considered to have reached the maturity phase.

In Western industrialized countries, the dormant phase continued up to the end of the 1970s, when the awakening came as a result of Japanese competition. The awakening phase in Japan had taken place 30 years earlier. The groping phase in the West is going on right now. The maturity phase is still to come in most Western companies.

The dormant phase has prevailed in most developing countries due to governmental policies of protecting local manufacturers from competition from abroad. However, the governments in many developing countries introduced policies implying liberalization of the economy and opening up the market for foreign competition early in the 1990s. For local enterprises this meant that they entered into the awakening phase, which was rapidly succeeded by the groping phase.

Developments in Western industrialized countries have a strong impact on what is done in the field of quality in developing countries, particularly those countries which are more industrialized. The methods and tools which become trendy in the groping phase in the West will be applied (somewhat later, though) in developing countries as well.

A list of trendy methods and tools includes "Zero Defects," quality circles, statistical process control (SPC), quality function deployment (QFD), seven tools, "TQM," ISO 9000, benchmarking, process re-engineering, etc. There is a phenomenon of methods and tools of this kind emerging, being highlighted for some time and then fading away.

A veritable explosion took place in this field in the 1980s, when it dawned on many Western companies that they were being driven out of business by Japanese companies. Companies in the West found that they had to do something and were willing to try anything.

There is nothing wrong with these methods and tools as such. The fault lies in how they are implemented. They are used as general methods and tools for quality improvement and, used in this manner, will only lead to marginal improvement. They ought to be used only when an analysis indicates that they are the appropriate measures to eliminate specific problems or to better meet the needs of customers. The same is true for all other methods and tools which are part of the quality profession and which have not yet been widely publicized, even though they may have much greater effects on the results achieved.

Areas of Interest. During the 1990s there has been an increasing interest in three areas: total quality management, ISO 9000, and national quality awards. In this respect, the more industrialized developing countries do not very differ significantly from countries with a developed market economy.

Total Quality Management. The concept of quality has formerly been discussed exclusively in relation to products, i.e., the goods and services which an organization produces and supplies. Nowadays, quality is increasingly discussed in a broader context. The concept most commonly referred to is total quality, which includes the quality of all internal processes and functions as well as the involvement of everyone in the organization.

In this context, reference is often made to the term "total quality management." An increasing number of conference papers referring to total quality management in the title are being presented. Many of these papers, however, do not actually deal with total quality management. They propagate certain narrow concepts or tools. Presentations on the experiences of companies in developing countries really practicing total quality management are, in fact, rare.

ISO 9000. The international series of standards for quality systems, ISO 9000, has had an immense impact. A growing number of enterprises in developing countries are taking ideas from these standards as a basis for developing and introducing procedures for their own quality activities, primarily relating to product quality. More and more quality activities are tending to focus on ISO 9000.

For most enterprises, the driving force behind the development, documentation, and implementation of a quality system based on the requirements in the ISO 9000 series of standards is commercial. Enterprises in developing countries find that they are no longer accepted as suppliers by customers in industrialized countries if they do not apply a documented quality system. Or they may find that they are losing market shares to competitors who do have a quality system based on the ISO 9000 standards.

National standards bodies are very active in promoting the use of ISO 9000. Promotion material is distributed frequently. ISO 9000 receives extensive publicity in the media through these bodies. Conferences and seminars are organized to highlight the merits of ISO 9000.

A certain infrastructure on a national level is a prerequisite for using the ISO 9000 approach to quality (see below, under Institutional Infrastructure). The enterprises need services in areas such as

consulting, training, auditing and certification. In addition, the infrastructure shall provide for the accreditation of certification bodies, as well as for the registration of certified auditors for quality systems (see below, under Certification).

The United Nations Industrial Development Organization (see below, under External Assistance) has conducted a survey of developing countries and emerging economies in Latin America and the Caribbean, Africa, Asia, and Eastern Europe on the subject of the ISO 9000 series of standards and the implications of these standards upon the trade of those countries (United Nations Industrial Development Organization 1996). Special attention was paid to the situation of small and medium-sized enterprises. The survey showed that awareness of ISO 9000 was highest in Latin America and lowest in African countries. The highest awareness was among multinational companies and large national enterprises, while small and medium-sized enterprises showed a low awareness. ISO 9000 was perceived to be of most importance for exporters, particularly in Latin America and Asia. This was not the case in Africa. It had hardly any importance for importers and little relevance for producers for the domestic market.

The International Trade Centre UNCTAD/WTO (see below, under External Assistance) has published two books on the implementation of the ISO 9000 standards in small and medium-sized enterprises in developing countries. One is a guide (International Trade Centre UNCTAD/WTO and International Organization for Standardization 1996), published jointly with the International Organization for Standardization (see below, under External Assistance), that provides guidance on methodology for implementing the elements of ISO 9000 quality management systems as well as guidance on preparing enterprises for third-party certification. The second book is a handbook (International Trade Centre UNCTAD/WTO 1996) dealing with basic concepts of quality management. The book explains the structure and content of the ISO 9000 standards and discusses the establishment, implementation, auditing, and third-party certification of quality management systems.

National Quality Awards. In order to promote quality, national quality award schemes are set up in an increasing number of developing countries. These schemes started to emerge early in the 1990s in the more industrialized developing countries. The schemes are based on either the Malcolm Baldrige National Quality Award (in the United States) or the European Quality Award.

The quality awards have become an important ingredient of national programs to promote an awareness of quality among manufacturers and service providers (see below, under National Promotion).

UNIDO Quality Program. The United Nations Industrial Development Organization (UNIDO) has designed a program for quality development in enterprises in developing countries (Maizza-Neto et al. 1994). The program, called the UNIDO Quality Program, is based on a systemwide approach to continuously improving every aspect of an organization's production process to achieve higher levels of quality—while simultaneously holding down costs. The program recognizes that poor product quality and low productivity are major impediments to the viability of many enterprises in developing countries.

The system has two major parts: an inner quality loop and an outer management loop (Figure 37.3). The inner quality loop involves the main activities that are responsible for compliance with specifications and the creation of consumer satisfaction. The outer management loop has to do with the operational performance of the enterprise. Operational indicators are developed. These will show the entrepreneurs that the effect of an important strategic decision can be detected and corrected. The implementation starts with a survey to identify subjects which the entrepreneurs themselves consider to be important. Once the priorities for changes have been identified, the technical assistance of UNIDO, in the form of the expert advice of national and international consultants, is available to support the modernization of interested pilot enterprises. The results are continuously evaluated through the operational indicators. For the evaluation of these indicators, UNIDO has developed two computer softwares: BEST (Business Environment Strategic Toolkit) and FIT (Financial Improvement Toolkit). BEST assists the entrepreneurs in the operation and management of the enterprise, while FIT assists in financial decisions concerning strategy.

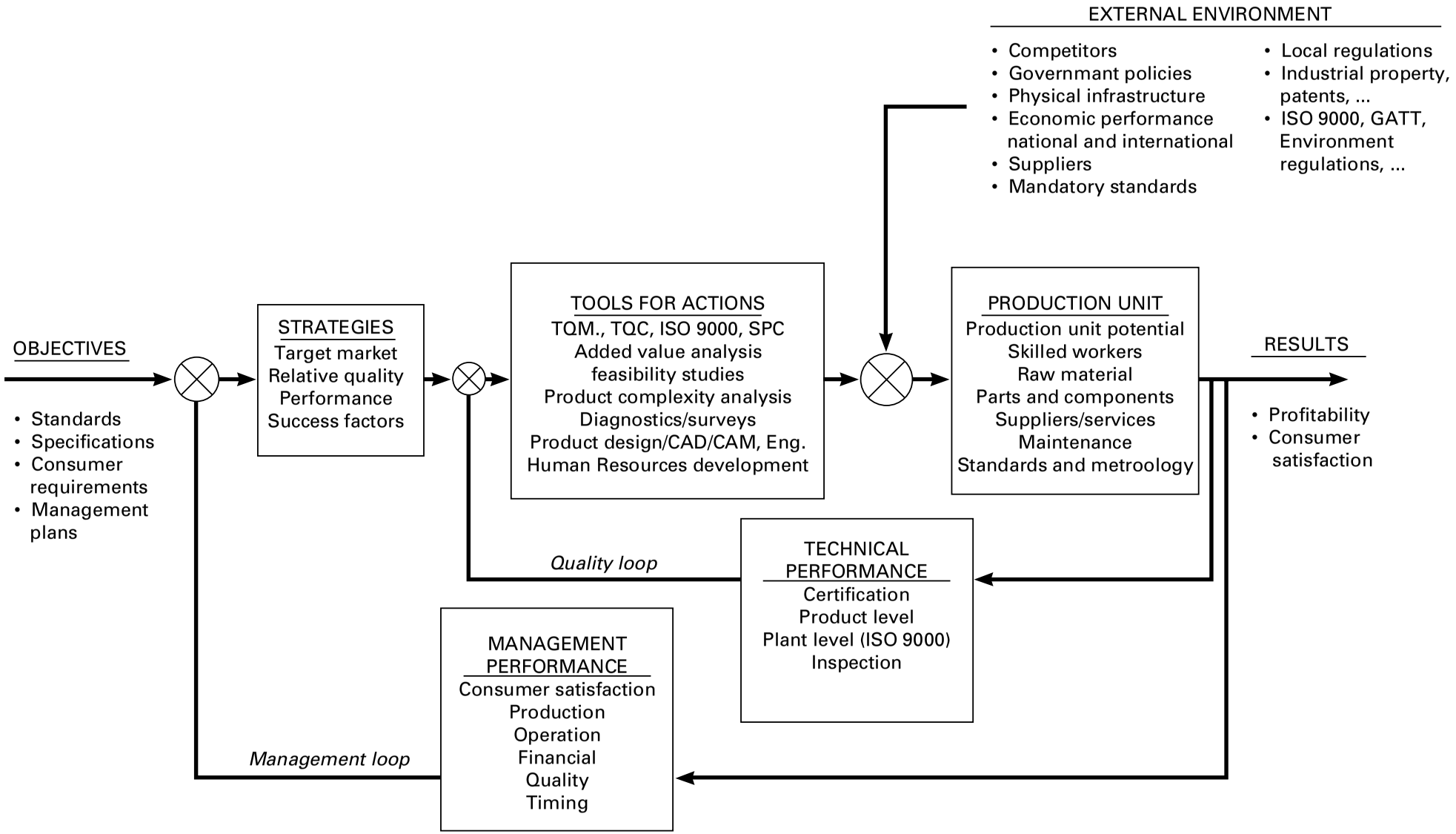

FIGURE 37.3 The inner quality loop and the outer management loop in the UNIDO Quality Program. (*Maizza-Neto et al. 1994.*)

The approach described above has been successfully implemented in 95 companies, in the capital goods sector, in 10 Latin American countries. The same approach is planned for the food processing sector of seven African countries.

NATIONAL EFFORTS FOR QUALITY

The problems related to quality in developing countries are of such a nature that they cannot be solved on a company level only. In fact, efforts on a national level are necessary, and these depend largely on the national policy of the country. In some countries, the government is ahead in developing means for an effective quality program. National efforts include.

Standardization: Preparation of national standards covering terminology, sampling methods, testing methods, specifications, quality management systems, and codes of practice

Certification: To attest that products comply with standards, and that quality-related activities are carried out in accordance with certain standards on quality management systems

Export inspection: Ensuring the quality of certain products for export through preshipment inspection

Legislation: Enforcement of standardization, certification, accreditation, export inspection, and other requirements through acts of parliament and legislature

National promotion: National programs to promote a general awareness of quality

Education and training: Development of the necessary knowledge and skills, as well as exertion of influence on attitudes

External Assistance: Assistance from international organizations, bilateral aid programs, transnational corporations, and other sources to shortcut the development process

Institutional infrastructure: Services offered by institutions in the areas of standardization, certification, accreditation, testing, metrology, quality consulting, and training

Professional societies: To develop the competence of quality professionals and practitioners

The steps to be taken on a national level are determined mainly by the governments of the respective developing countries. The way this is done depends on the policy of the government. In some developing countries there is a centrally planned economy, and in these we will often find a strong reliance on governmental institutions and legislation. In other countries only some basic needs (e.g., standardization, education) are met by the government. There is a growing trend among developing countries toward less government intervention and more deregulation.

STANDARDIZATION

Standardization plays a major role in promoting industrial and economic development of a country. Many developing countries have realized this and as a consequence have set up national institutions to handle the standardization activities.

Standardization refers to the process of formulating and applying standards to a specific activity. There are several types of standards:

Terminology standards: Terms used in technical and legal documents have to be clearly defined. Terminology and symbols are a means of communication.

Basic standards: Standards on units of measure are a prerequisite for trade, engineering, health care, etc. There are also other basic standards in fields like civil engineering, electrical engineering, and mechanical engineering.

Dimensional standards: By making components to certain standardized dimensions, interchangeability will be achieved.

Performance standards: Criteria reflecting the fitness for use of the products are important for consumers. These, as well as safety-related requirements, are given in performance standards.

Testing and inspection standards: Test and inspection data can differ depending on the methods used. Therefore, standards describing the equipment to be used, the procedures to be adopted and the evaluation of the data obtained are important. This also includes the sampling procedures to be used.

Quality systems standards: Industrial buyers are increasingly referring to the international series of standards for quality systems (ISO 9000) in the procurement of equipment and materials. An increasing number of developing countries have as a consequence adopted these standards as national standards.

National Standardization. Standardization activities on a national level are dealt with by a national standards body. This institution, carrying full government recognition (in many developing countries through legislation), is responsible for the development and publication of national standards, as well as for keeping them up to date. In preparing standards, the national standards body calls upon the knowledge and experience of manufacturers, users, government departments, universities, etc. This is normally done by setting up technical committees with this wide representation.

The following procedure is applicable in relation to the national standards bodies activities on preparing national standards (International Organization for Standardization 1994a, pp. 32–42):

1. Identification of standardization subjects
2. Justification of projects and assignment of priorities
3. Approval of projects and their inclusion in the work program of the national standards body
4. Development of the standards
5. Approval of the standards by the national standards body and their publications

As an example of standards preparation, the procedure used by the Standards Association of Zimbabwe (SAZ) is shown in Figure 37.4.

A checklist for identifying subjects and assigning priorities for national standardization is given in Figure 37.5.

National standards can be mandatory or voluntary. Mandatory standards are found in countries with a centrally controlled economy, while countries with a free-enterprise economy normally have voluntary standards. In most countries, however, there is a mixed or selective approach in the enforcement of national standards. This means that standards are voluntary, except those dealing with safety and health. Such standards are mandatory.

This mixed or selective approach would fit the needs of many developing countries where the situation is as follows (International Organization for Standardization 1991, p. 21):

1. Low level of standards consciousness in circles involved in production and distribution of goods and services, combined with a low literacy rate in the country as a whole
2. Coexistence of modern and traditional industries
3. Small or unrecognized industries that, by virtue of their number, contribute to substantial production
4. Wide variation in manufacturing and processing capabilities
5. Uncertainty about the availability of raw materials of assured quality
6. Sporadic or low consumer demand for standard quality
7. Difficulty in ensuring an adequate enforcement mechanism
8. Need for ensuring essential health and safety protection of the consumers

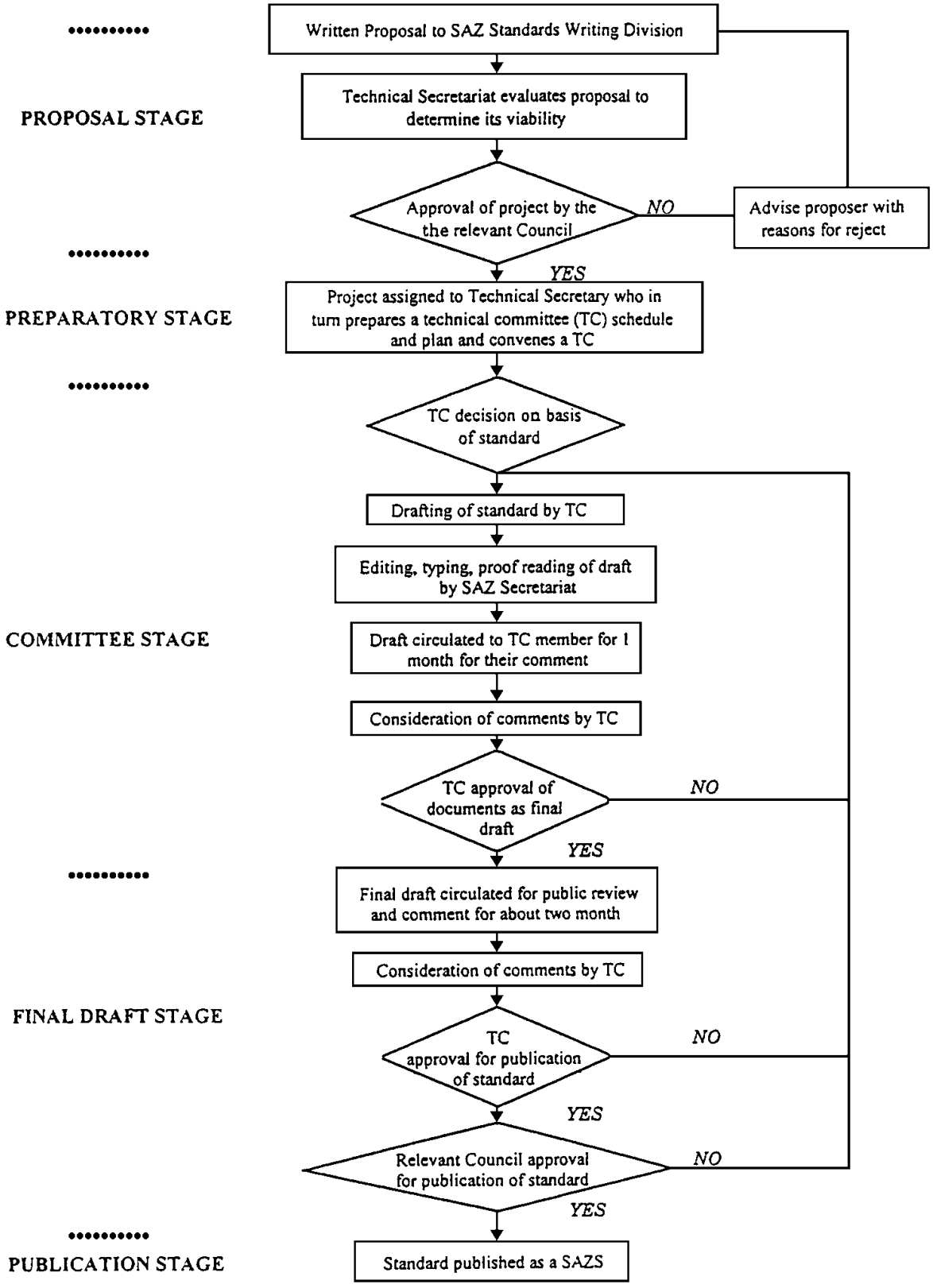

FIGURE 37.4 Standardization procedure used by the Standards Association of Zimbabwe (SAZ). (*Mhlanga 1995, p. 56.*)

1. Which of the following objectives should be included in the standards?

	YES	NO
Mutual understanding	☐	☐
Health, safety, protection of environment	☐	☐
Interface, interchangeability	☐	☐
Fitness for purpose	☐	☐
Variety control	☐	☐
Others (please specify)	☐	☐

2. Which of the following aspects are to be standardized?

a. Terminology symbols/signs	☐	☐
b. Characteristics	☐	☐
• Dimensional	☐	☐
• Mechanical	☐	☐
• Chemical (including microbiological)	☐	☐
• Thermal	☐	☐
• Electrical	☐	☐
c. Marketing, labelling, packaging, transport	☐	☐
d. Sampling	☐	☐
e. Testing	☐	☐
f. Others (please specify)	☐	☐

3. What is (are) the specific aim(s) of the standard? E.g.,

a. Government requirements in support of	☐	☐
• Public sector procurement	☐	☐
• Legislation	☐	☐
b. International/regional harmonization	☐	☐
c. Commercial factors associated with	☐	☐
• Exports	☐	☐
• Imports	☐	☐
• Internal trade	☐	☐
d. Certification	☐	☐

4. What technical expertise is available?

a. Research institutions/universities	☐	☐
b. Manufacturers	☐	☐
c. Users (consumers)	☐	☐
d. Independent personnel	☐	☐
e. Government departments	☐	☐
f. Others (please specify)	☐	☐

5. Is it envisaged that these aspects can be covered

In a single publication?	☐	☐
Or in parts?	☐	☐

6. Are any of the aspects listed in 4 or 5 above covered by existing national legislation in the country? _____

Please specify such legislation. _____

7. Are any of these aspects covered by existing

a. International standards	☐	☐
b. National standards	☐	☐
c. Other specifications of written requirements?	☐	☐

8. Are any of the requirements included in standards considered to be of outstanding importance by your organization? ☐ ☐

9. What is the estimated time needed to complete the project? _____

10. What liaison will be necessary with other technical committees or outside bodies? _____

11. Who will be the ultimate users of the standard (number and/or names)? _____

FIGURE 37.5 Checklist for identifying fields for the establishment of national standards. (*Source: International Organization for Standardization 1994b*, pp. 93, 94.)

Regional Standardization. Developing countries in the same region have similarities in climate, culture, governmental policies, consumption, industrial production, etc. Therefore, there might be a need for common standards. In order to deal with these regional issues in the field of standardization, regional standards organizations have been formed.

Such regional standards organizations exist in Africa (African Regional Organization for Standardization, ARSO), in Arab Countries (Arab Organization for Standardization and Metrology, ASMO), in the Caribbean (Caribbean Common Market Standards Council, CARICOM), and in Latin America (Comisión Panamericana de Normas Técnicas, COPANT).

International Standardization. International standards are an important means of communication in international business and trade. With the globalizing of trade, the need for international standardization increases.

There are three international standardization bodies which are most important to developing countries:

The International Organization for Standardization (*ISO*): This a worldwide federation of the national standards bodies of some 110 countries, many of them developing countries. The mission of ISO is "to promote the development of standardization and related activities in the world, with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological, and economic activity." This work results in international agreements which are published as international standards.

The International Electrotechnical Commission (*IEC*): This is a body preparing international standards in the electrotechnical field. IEC and ISO have a close cooperation.

The Codex Alimentarius Commission (*CAC*): This is a body jointly set up by the Food and Agricultural Organization of the United Nations (FAO) and the World Health Organization (WHO) in order to prepare international standards in the food sector.

Developing countries can gain by adopting or adapting international standards as national standards, as the process of standards development is time-consuming and costly. Many developing countries do not have the professional resources necessary to prepare standards in certain areas.

Adopting and adapting international standards as national standards has several advantages (International Organization for Standardization 1986, p. 5):

1. It supports export promotion
2. It creates flexibility in imports and ensures the quality of imported products, services, etc.
3. It facilitates the transfer of technology
4. It supplements the production of national standards
5. It gives national authority to the use of international standards

As international standards are providing the key to international markets, it is important to developing countries to be able to see such standards internationally established for products that are vital to their national economies. In addition, they are concerned for the safety and the health of their citizens.

A developing country may find a need for an international standard to serve one or more of the following purposes (International Organization for Standardization 1994b, p. 3):

1. For an important export commodity: to ensure equitable prices that correspond to the delivered quantity and quality and to avoid rejects due to nonconformance to different conditions of export markets.
2. For an imported product that may affect the health and safety of users or have environmental implications: to have a technically sound and universally accepted basis for government regulations to protect the consumer and the ecology.

3. For a service that is being offered in the country to local and foreign customers: to maintain an acceptable level that would ensure safety (such as in building construction and health services) and/or competitiveness with other countries that offer similar services (such as tourist services).
4. For products and components traded with other countries: to ensure ability to interact and interchangeability.
5. For information, commercial, cultural, and other types of exchange: to facilitate communication between nations.

It may be difficult for developing countries to launch and to get acceptance for proposals on international standards in fields of interest to them. In order to help developing countries to prepare their proposals in a way that will have a good chance of acceptance by other countries, ISO has published some guidelines on how to launch a standards initiative (International Organization for Standardization 1994b).

CERTIFICATION

Certification means to verify conformance with certain requirements. This can take many forms, ranging from a simple statement by the manufacturer that the product conforms to the specification to a third party certification in which an independent body verifies that the manufacturer operates in accordance with a recognized standard on quality management systems.

Certification on a national level is very often combined with standardization. This means that national standards bodies, in addition to dealing with standardization on a national level, may also perform third-party certification on a national level.

Product Certification. This involves checking and certifying that products comply with the standards. The purpose of a product certification program is to give the buyer confidence that the product is of a certain quality or that it meets quality requirements. Such certification goes beyond the seller's assurances that the product conforms to the requirements and beyond the buyer's own verification—instead, systems operated by impartial bodies are used (third-party certification). The impartial certification body can be a governmental or nongovernmental organization. In developing countries the national standards body normally assumes this responsibility.

In developing countries there are various reasons for having a third-party certification program. One is to upgrade quality in the domestic market. Because of the shortage of goods and the absence of competition which very often prevail in developing economies, product quality is likely to be poor, and a mandatory certification system can provide a minimum quality level. A second reason is to promote exports. A certification system can be an important factor in enabling developing countries to secure access to foreign markets. A third reason is to prevent importation of products of inferior quality. Some developing countries have had the misfortune to be used as dumping grounds for unscrupulous foreign manufacturers.

A third-party certification can take various forms:

Type testing: A sample of the product is tested according to a test specification in order to verify conformance with certain specified quality requirements. The testing is carried out by the certification body or by a recognized testing institute or laboratory.

Audit testing: In order to provide for a subsequent assurance, the type testing can be followed by an audit test of samples purchased in the market place or selected from the manufacturer's production before shipment.

Batch testing: Manufactured batches are tested. This could be done on a sampling basis or 100 percent.

Assessment: Specialists from the certification body visit the manufacturer's factory in order to find out how the quality control activities are performed.

These forms can be combined into certification systems (Figure 37.6). Products that come under a certification program and have been found to comply with the standards are marked with a certification mark upon the granting of a license issued by the certification body (in most cases the national standards body). The manufacturer has to support the application with the following documents:

1. Articles of incorporation
2. Organizational chart
3. Quality control staff complement, their designations, qualifications, training courses attended, and number of hours thereof

System No. 1—Type testing

Type testing is a method under which a sample of the product is tested according to a prescribed test method in order to verify the compliance of a model with a specification. It is the simplest and most limited form of independent certification of a product both from the point of view of the manufacturer and the approval authority.

System No.2—Type testing followed by subsequent surveillance through audit testing of samples purchased on the open market

A system based on type testing (see System No. 1) but with some follow-up action to check that subsequent production is in conformity. Open market audit testing means a random audit testing of the type tested model from distributors' or retailers' stock.

System No.3—Type testing followed by subsequent surveillance through audit testing of factory samples

A system based on type testing (System No. 1) but with some follow-up action to check that subsequent production conforms. Audit testing of factory samples involves a regular check of samples of the type-tested models selected from the manufacturer's production before dispatch.

System No.4—Type testing followed by subsequent surveillance through audit testing of samples from both the open market and the factory

A system based on type testing (System No. 1) but with follow-up action to check that subsequent production conforms. Audit testing both of factory samples and open market samples.

System No.5—Type testing and assessment of factory quality control and its acceptance followed by surveillance that takes into account the audit of factory quality control and the testing of samples from the factory and the open market

A system based on type testing (System No. 1), with assessment and approval of the manufacturer's quality control arrangement followed by regular surveillance through inspection of factory quality control and audit testing of samples from both the open market and the factory.

System No.6—Factory quality control assessment and its acceptance only

Sometimes known as the approved firm or approved manufacturing method of certification. A system under which the manufacturer's capability to produce a product in accordance with the required specification, including the manufacturing methods, quality control organizations, and type and routine testing facilities are assessed and approved, in respect of a discrete technology. This system can be applied particularly where the specification covers a type of manufacture, possibly a material, but where the end product may take a variety of forms for which there are no particular specifications.

System No.7—Batch testing

Batch testing is a system under which a batch of a product is sample tested and from which a verdict on the conformity with the specification is issued.

System No.8—100% testing

100% testing is a system under which each and every item certified is tested to the requirements of the technical specification.

FIGURE 37.6 Description of third-party certification systems. (*Source: International Organization for Standardization and International Electrotechnical Commission 1992, pp. 156–171.*)

4. List of training courses regularly conducted by the company or other outside training courses attended by company personnel
5. Flow process diagram indicating the inspection points, frequency of inspection and key quality characteristics to be inspected at each control point
6. Brief description of manufacturing process
7. Copy or summary of management policies
8. Copy or description of test plan and specifications used by the company
9. Copy of sampling plans
10. Copy or a sample of work instructions or other related documents
11. Sample copies of frequency tables, histograms and/or statistical control charts and records of inspection/test results
12. Brief description of action taken on defectives
13. Brief description of the system for the preservation, segregation, and handling of all items
14. List of measuring and testing equipment with nominal capacities at each inspection point and final product testing together with their evidence of ownership
15. Brief description of calibration program (including frequency of calibration)
16. Brief description of equipment maintenance program

System Certification. There is a trend to move from product certification to system certification. This means that the supplier's credibility is demonstrated by the assessment and registration of his quality system.

The assessment of the supplier's quality system is carried out by an independent certification body against an applicable quality system standard in order to establish whether the system conforms to the standard. Standards usually referred to are the international standards on quality management systems ISO 9001 and ISO 9002 (or the equivalent national standards). If the assessment shows that the supplier's quality system conforms to the relevant quality system standard, the supplier is entered into a register of certified companies. The idea is that this will indicate to the user of the register that the supplier is capable of producing a certain product or range of products. The registration is maintained by surveillance through periodic audits of the supplier's quality system, performed by the certification body. This will ensure continued conformity of the quality system with the standard in question.

In some developing countries, the national standards body has been assigned the quality system certification task. As soon as the auditing capability of the staff is developed and the necessary management structure is set up, quality system certification will be one of the major tasks of the national standard bodies in developing countries. As there is a great demand for quality system certification, many foreign (mainly European) certification agencies are operating in developing countries on a commercial basis. The certification has also become a business opportunity for local consultants. The less scrupulous ones form two organizations: one to set up the quality systems and to write the quality manuals for their clients, and one to certify that these quality systems and manuals conform to the quality system standards ISO 9001 or ISO 9002. The certification agency itself might have achieved accreditation by a body in Europe on a rather loose ground, making any of the certificates it issues of doubtful validity.

There are doubts about the validity of quality system certification, as this mainly relies on documentation in the form of quality manuals, work procedures, instructions, and records generated during the operation of the quality system. Product quality, and the customers' perception of quality, are not considered. Such doubts are more valid in developing countries compared to industrialized countries (Lal 1996a). In developing countries top management more often pays only lip-service to quality. They see the ISO 9000 certification as "some kind of magic key" which will open doors to export markets for their products. For them it is most important to obtain the formal certificate. There will be no basic change in the quality culture of the enterprise, nor will any real product quality improvements take place. The limited experience in quality management among assessors and auditors in developing countries will also create doubts about the validity of the certification.

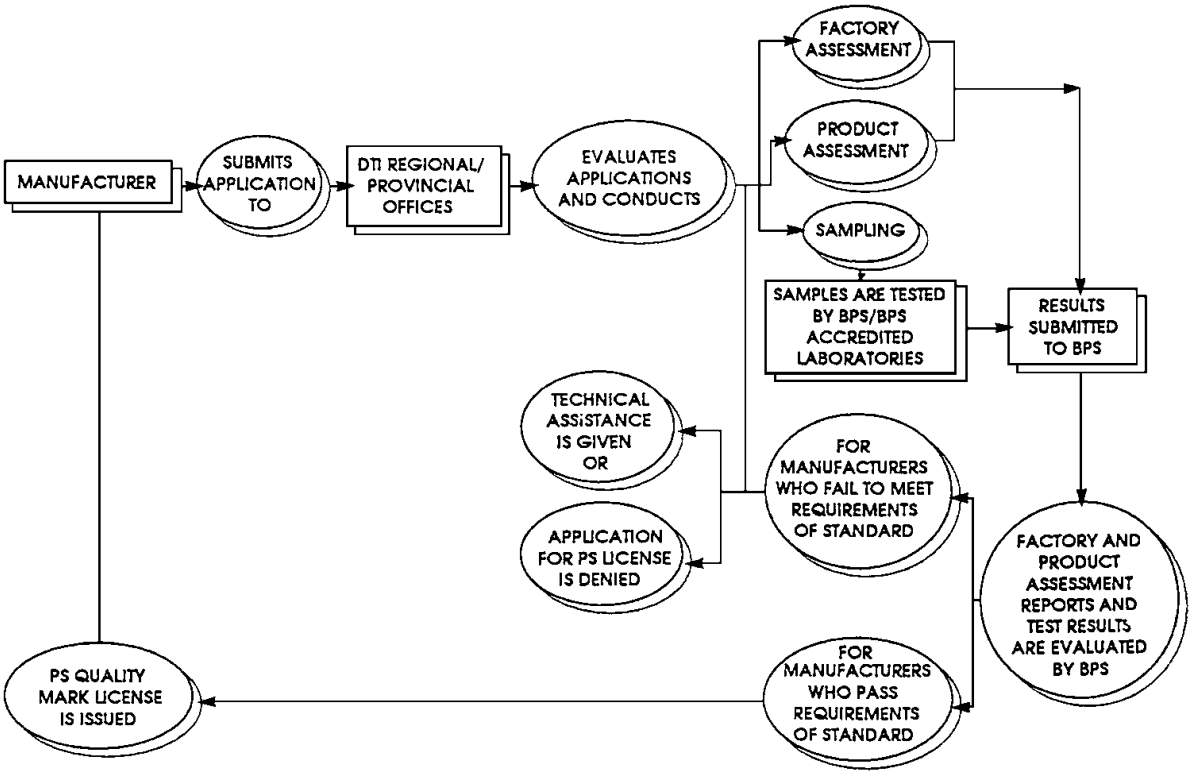

FIGURE 37.7 Product certification procedure used in the Philippines. (*Courtesy Bureau of Product Standards, Philippines.*)

Worldwide Recognition of Certificates. In order to encourage good practice in conformity assessment activities worldwide among the organizations that perform them, the International Organization for Standardization and the International Electrotechnical Commission in 1985 set up the Committee on Conformity Assessment (CASCO). CASCO has three basic objectives: (1) to study the means of assessing the conformity of products, processes, services, and quality systems to appropriate standards or other technical specifications; (2) to prepare international guides relating to the testing, inspection, and certification of products, processes, and services, and to the assessment of quality systems, testing laboratories, inspection bodies, and certification bodies and their operation and acceptance; (3) to promote mutual recognition and acceptance of national and regional conformity assessment systems and the appropriate use of international standards for testing, inspection, certification, assessment, and related purposes (Donaldson 1996). The guides are available from the International Organization for Standardization (see below, under External Assistance).

The worldwide growth in the certification of enterprises to ISO 9000 has led to a desire to establish a global system of mutual recognition of certificates. Therefore, on the basis of a proposal from CASCO, ISO and IEC initiated a voluntary worldwide system called Quality System Assessment Recognition (QSAR). The objective of QSAR is to ensure that ISO 9000 certificates issued to any enterprise, anywhere in the world, by any quality system certification body recognized under the QSAR program, are accepted everywhere. When QSAR has established itself, developing countries could benefit from such a worldwide recognition system in their efforts to export goods and services.

EXPORT INSPECTION

In assuring foreign buyers goods of an acceptable quality, plans for preshipment testing and inspection of products for export are used. Some developing countries have legislation dealing with export inspection. The legislation generally applies to specific commodities that are of key importance for

the national economy (coconut, coffee, cocoa, fruit, jute, rice, rubber, etc.).

As a consequence of the deregulation of the markets, the trend is to get away from compulsory systems for export inspection enforced by law. Instead the export inspection is a matter for the market forces, which means that the trading partners (the exporters and the importers) set up and agree on how to ensure the quality of the deliveries. Third-party certification is then increasingly applied.

An example of an export inspection program which has been successful in promoting export is the fish inspection program in Thailand (Suwanrangsi 1995). The Fish Inspection and Quality Control Division (FIQD), established in 1992 within the Department of Fisheries, has gained recognition in major importing countries such as Australia, Japan, Canada, and the European Union for its active role in controlling the performance of the seafood export industry.

The Thai fish inspection program involves plant inspection and preshipment inspection. The plant inspection, carried out two to four times a year, covers the condition and maintenance of construction, equipment, processing operations, plant hygiene, and personnel. The preshipment inspection includes sampling of batches to be delivered. Sensory and microbiological assessment, as well as testing for contamination, toxicology, etc., are performed according to the requirements of the importing country. FIQD also provides consultancy service and training to the seafood industry in matters related to quality.

LEGISLATION

National standards bodies in developing countries have been established by acts of parliament or legislature. Such acts, normally called "standards acts," stipulate the role of the national standards institute in promoting standardization throughout the country. Provisions related to the enforcement of standards are sometimes incorporated into some of these laws; for example, foods acts or certification mark acts.

The standards act may also deal with weights and measures. In some countries such standards are covered by a separate weights and measures act, which also deals with the testing of weighing and measuring equipment to ensure that it is fit for use in trade.

There may also be legislation on export inspection, which is the case for certain items in some developing countries.

NATIONAL PROMOTION

In an increasing number of developing countries, national programs for promoting a general awareness of quality have been launched with the involvement of government agencies and trade and consumer organizations. The national programs usually have the following components:

High-level recognition: Support from ministries and important national organizations is granted. Even the head of state may be involved.

Publicity: Public media such as newspapers, magazines, radio, and television are used.

Conferences, seminars, and other meetings: Speeches are given by political leaders, industrialists, quality professionals, etc.

Slogans: Slogans such as "Quality first" are disseminated through posters, pamphlets, stickers, badges, etc.

Logotype: The campaign has a common emblem, displayed on posters, flags, pamphlets, etc.

Awards: Deserving companies and individuals are recognized through awards, which are presented with great publicity.

Quality month: The promotional activities may be concentrated in a particular month.

National Quality Awards. Promoting quality among enterprises by means of a national quality award program has in recent years become an important factor to improve the competitiveness of

the industrial sector in many industrialized countries. Experience shows that these programs stimulate improvements of quality and productivity to an extent that goes beyond the effects of ISO 9000. The awards criteria have become a yardstick for enterprises that allows them to assess their own situation and to guide their improvement efforts.

National quality awards have also been launched in some developing countries, e.g., Argentina, Brazil, Colombia, India, Republic of Korea, Malaysia, and Philippines (Stephens 1995). In most cases, either the Malcolm Baldrige National Quality Award or the European Quality Award has served as a model in the development of the setup and the awards criteria.

In some developing countries, the responsibility for the national quality award is assumed by a governmental organization, in others by a foundation financially supported by the private sector. The latter is the case in Argentina and Brazil. The National Quality Award in Argentina was established by a legislation passed by the Argentinean parliament. The administration of the award is delegated to a private foundation (FUNDAPRE, the National Quality Award Foundation), funded by member companies and by the government (Bertin 1996).

In India, the Rajiv Gandhi National Quality Award, named for the late prime minister of India, was launched in 1991. The award is promoted by the Indian Government and administered by the Bureau of Indian Standards. The presentations are made by the prime minister. A list of the award criteria and the point allocations is shown in Table 37.1.

There are four awards, consisting of one for large-scale manufacturing units, one for small-scale manufacturing units, one for service sector organizations, and one for best overall. In addition, there are six commendation certificates each for large-scale and small-scale manufacturing units: metallurgical, electrical and electronic, chemical, food and drug, textile, and engineering industry and others. The objectives of the award are stated as follows:

- Encouraging Indian companies to make significant improvements in quality for maximizing consumer satisfaction and for successfully facing competition in the global market as well.
- Recognizing the achievements of those companies which have improved the quality of their products and services and thereby set an example for others.
- Establishing guidelines and criteria that can be used by industry in evaluating their own quality improvement efforts.
- Providing specific guidance to other organizations which wish to learn how to achieve excellence in quality, by making available detailed information on the "Quality Management Approach" adopted by award winning organizations to change their cultures and achieve eminence.

TABLE 37.1 Criteria of the Rajiv Gandhi National Quality Award in India

Criteria	Marks
Leadership	100
Policies and strategies	100
Human resource management	50
Resources	100
Processes	150
Customer satisfaction	200
Employees satisfaction	50
Impact on society	100
Business results	150
Total	1000

Source: Rajiv Gandhi National Quality Award. Procedure and Application Form, Bureau of Indian Standards.

EDUCATION AND TRAINING

A key to quality upgrading is education and training, which involves developing necessary knowledge and skills, as well as influencing attitudes. In developing countries, it is necessary to direct activities of this kind not only toward manufacturers and service providers but also toward consumers; consequently, the activities are very far-reaching. The difficulties are aggravated by the normally high illiteracy rate in these countries.

National Level. Education and training in the quality field can be dealt with in different ways within a developing country:

Educational Institutions. Quality management topics are to an increasing extent included in the curricula of engineering universities and institutes, particularly in the more industrialized developing countries. The courses offered deal mainly with the more trendy tools, such as statistical process control, quality function deployment, benchmarking, and ISO 9000. Topics related to top management are rare. The courses are taught by professors who have limited experience in industrial work and management. There is a limited supply of locally developed textbooks.

Under a project of the European Union and with the involvement of three European universities, an undergraduate course on total quality management has been developed at the Indian Institute of Technology in New Delhi (van der Wiele 1996). The course has a modular basis with a content according to Figure 37.8. Each module includes case studies from Indian industry. The course was designed to meet the following objectives:

- Present an overall view of quality fundamentals for engineering graduates of all disciplines
- To present the international developments in the field of total quality management

Module I. Fundamentals (6 lectures)

General introduction (definitions, evolution etc.). Contributions from quality gurus. Major conclusions and a general framework for understanding TQM. Examples of companies. Tools and techniques. Costs of quality.

Module II. Human Resource Management (8 lectures)

General framework. Attitude, value system, and behavioral pattern. Motivation models. Team concept. Human resouce development. Quality circle. Quality education and training. Employee empowerment.

Module III. Tools and Techniques (12 lectures)

Significance. Seven QC tools. Pareto analysis. Process control chart. Seven management tools. Just-in-time. Quality function deployment. Statistical process control. Process capability. Tolerances and interference. Quality and maintenance.

Module IV. Systems and Procedures (8 lectures)

Quality system structure. Quality-related standards. Certification, testing, registration, and accreditation. Quality manual. Quality information systems. Quality audit. ISO 9000.

Module V. Implementation (7 lectures)

Quality strategy as a competitive tool. Customer-supplier chain. Quality policy deployment. System strategies and tactics. Leadership. Motivational elements. Breakthrough improvement. Continuous quality improvement. Quality awards and self-assessment. Benchmarking. Employee empowerment. Implementation barriers. Impact on society.

FIGURE 37.8 Content of undergraduate course on total quality management given at the Indian Institute of Technology. (*Courtesy of Indian Institute of Technology, New Delhi, India.*)

- To create an awareness of the major factors in evolution on the quality front
- To expose the students to the important tools and techniques of quality management
- To emphasize the role of standards in maintaining and improving quality
- To appreciate the role played by human factors like motivation, leadership, and teamwork in sustaining quality
- To imbibe the principles of quality and apply them to achieve personal improvement

Courses and Seminars Offered by Associations, Institutes, and Other Organizations. In countries that have reached a higher level of industrialization, courses and seminars are offered by national institutions for standardization, productivity, etc. and by professional associations (e.g., manufacturers' associations, national quality societies), as well as by consultants. Some countries are active in inviting foreign lecturers. As a consequence of the great interest in ISO 9000 certification, the majority of courses offered are in this field (e.g., implementation of ISO 9000, preparation for ISO 9000 certification, quality system auditing). International consulting and registration firms (mainly European-based) offer lead assessor training that can lead to registration by the International Register of Certified Assessors (IRCA).

Meetings and Conferences. An important activity of a national quality organization is to hold meetings and conferences at which practitioners can exchange ideas and experiences. Countries with a more developed industrial sector generally have a quality association that is active in this way. Such organizations are the Chilean Association for Quality (ASCAL), the China Quality Control Association, and the Philippine Society for Quality Control.

Self-Instruction. Independent study of books and journals can provide considerable knowledge in the quality management field, particularly for managers and engineers. In many developing countries there is, however, a shortage of such literature, owing to the lack of foreign exchange, a national language with limited readership, etc. Some national quality organizations publish a journal or newsletter as a means of promoting the professional development of their members.

In-House Training Programs. Successful enterprises in industrialized countries have adopted a strategy that includes a massive in-house training program with the objectives of changing everyone's attitudes and giving new skills and knowledge. In these enterprises training in quality is provided for everyone regardless of function and level. Such training starts with top management and then works its way down the organization, level by level. This kind of massive training is rare in developing countries. In some larger enterprises, training in various narrow concepts and tools is provided.

On-the-Job Training. On-the-job training is the principal method of training workers and inspectors, even in developing countries. Instructions are given by the supervisor or a more experienced inspector. The result depends on both the technical ability and the ability of the instructor to instruct and motivate the participants. In general, these abilities vary more in countries that have a limited industrial tradition.

International Level. Developing countries also have opportunities for training on the international level by sending trainees to more industrialized countries. International organizations such as the United Nations Industrial Development Organization (UNIDO), the International Organization for Standardization (ISO), and the Asian Productivity Organization (APO) organize quality training programs for developing countries. (For information on these programs consult the International Trade Centre and the International Organization for Standardization at the addresses given under References.)

The United Nations Development Organization, in cooperation with the Government of Japan (Ministry of International Trade and Industry, MITI) and the Japanese Association for

Overseas Technical Scholarships (AOTS), organizes a 5-week training program on Quality Improvement of Industrial Products every 2 years. The structure of the program is given in Figure 37.9. The program, intended for quality managers and production managers, focuses on problem-solving.

Since 1973, the government of Sweden has been sponsoring training programs in the field of quality for developing countries. A 7-week course entitled "Total Quality Management" is held in Sweden twice annually, and a 3-week top management seminar entitled "Quality Leadership" is held once annually. The training programs include lectures, case studies and study visits. The content of the theoretical training sessions of the "Total Quality Management" course is listed in Figure 37.10. The training programs in Sweden have been attended by quality professionals and managers from some 80 countries in Africa, Asia, Europe, Latin America, and the Caribbean. (Address information for the Swedish International Development Agency is given under References.)

EXTERNAL ASSISTANCE

External assistance plays a significant part in the industrial and economic growth of developing countries by making it possible to shorten the process of development. There are various forms of assistance.

Assistance from International Organizations. There are international organizations providing assistance to developing countries in the field of quality. Some of them work worldwide (mainly within the United Nations system), others work on a regional basis. Significant organizations of this kind are:

European Union (EU). EU offers financial support to development projects in developing countries. Address:

Rue de la Loi 200
B-1049 Brussels
Belgium

Telephone: +32 2 2991111
Telefax: +32 2 2950138
Internet: http://europa.eu.Int

Food and Agriculture Organization of the United Nations (FAO). FAO has a mandate to raise levels of nutrition and standards of living, to improve agricultural productivity and the conditions for rural populations. The organization is involved in land and water development, plant and animal production, forestry, fisheries, economic and social policy, investment, nutrition, food standards and commodities and trade. Address:

Viele delle Terme di Caracalla
00100 Rome
Italy

Telephone: +39 6 52251
Telefax: +39 6 52253152
E-mail: webmaster@fao.org

International Organization for Standardization (ISO). ISO is a worldwide federation of national standards bodies in more than 100 countries, with the objective to promote standardization and related activities worldwide. Within ISO there is a committee on developing country matters (DEVCO) with the aim of assisting developing countries and being a forum for the discussion of all aspects of standardization in this group of countries. In the program for developing countries (ISO 1995), ISO/DEVCO has identified six elements: identification and accommodation of standardization needs in developing countries, preparation and publication of development manuals, training, participation in ISO standards committee meetings, development of international standards needed by developing

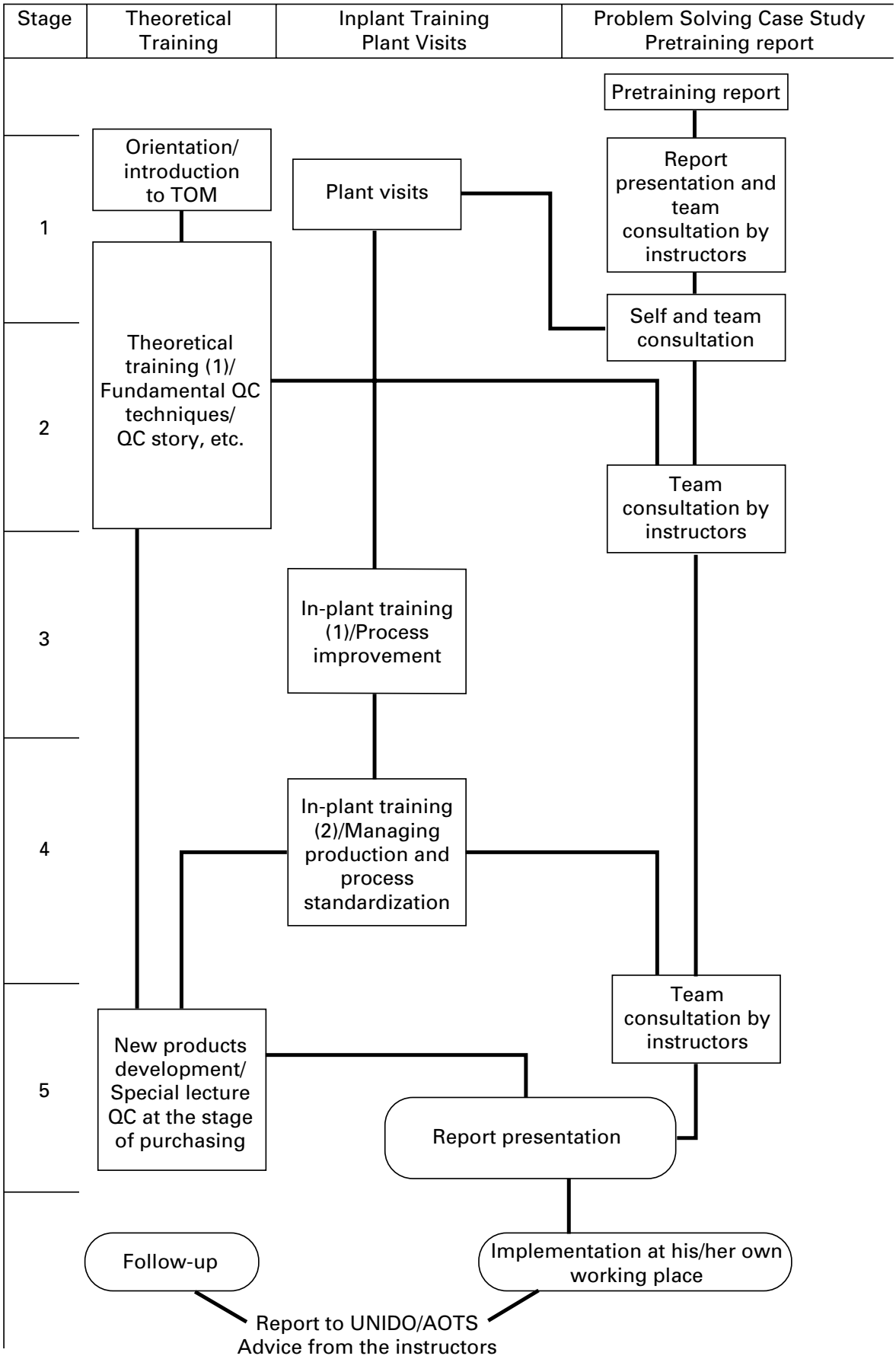

FIGURE 37.9 Structure of training program on Quality Improvement of Industrial Products held in Japan. (Courtesy UNIDO, MITI, and AOTS.)

Introduction: Quality; the quality function; quality management; role of upper management; quality planning; the concept of total quality; developments in the quality profession; profitability and quality; quality strategies; terminology

Statistical tools: Basic concepts, the statistical tool kit; methods of summarizing data; probability distributions; process capability; tools for process studies; control charts; acceptance sampling; point and internal estimates; tests of hypotheses; transformations of data; regression and correlation analysis; design of experiments

Metrology: Measurement technology; error of measurement; calibration control

Inspection: The nature of inspection; statistical tools in inspection; automated inspection; inspection accuracy; inspection workplace; inspection feedback; inspection by operator; inspection planning; planning of incoming inspection; planning of process inspection; planning of final inspection

Reliability and dependability: Dependability concepts; reliability requirements; failures and failure mechanisms; reliability prediction; fault tree analysis (FTA) and safety analysis; failure mode and effects analysis (FMEA); reliability determination by testing; reliability growth and screening; reliability verification; maintainability requirements, prediction and testing; availability requirements and testing; maintenance support conditions; environmental testing in general

New-product quality: Product phases and development programs; forms of early warnings, design reviews; the concept and definition phase; the preliminary design and development phase, the final design phase; the pilot production phase; series production, marketing and installation; use and maintenance phase; project management for new product quality; new-product planning

Quality specifications: Purpose and content; setting requirements; revisions; standards

Supplier relations: Supplier relations; purchase documents; supplier selection; joint quality planning; activities in the supplier's plant; incoming inspection; supplier surveillance; supplier certification; complaints; supplier quality improvement; single-source suppliers

Manufacture of quality: Manufacturing planning; nature of process; providing capable process; providing capable instruments; process control; self-inspection; inspection feedback to production; process improvement; traceability; quality responsibilities on the factory floor; automated manufacturing

Customer relations: Customer; field intelligence; complaints; marketing; product safety and liability; consumerism; government regulation of quality

Quality assessment: Why assessment?; standing in the marketplace; customer-focused quality analysis; quality culture; assessment of quality activities; using quality awards criteria; quality auditing; costs of poor quality; quality data, benchmarking

Quality audit: Quality audit concept; product quality audit; process quality audit; systems quality audit; total quality audit (quality surveys)

Economics of quality: Quality and economics; quality and income; quality costs; user's costs; life cycle costing

Quality data: Basic concepts; in-plant quality data; usage data; quality cost data; reports on quality

Improving quality: Control versus breakthrough; need for quality improvement; quality improvement sequence; obtaining information; project identification; diagnosis; remedies; follow-up and feedback; organizing for improvement; resistance to change; training in quality improvement; seven tools

Human factors in quality control: Controllability; theories of motivation; human resource management practices; role of management; role of work force; role of teams; quality motivation for managers; training; inspection accuracy

Quality leadership: Recognized champions versus potential champions; strategic quality management; quality strategies; role of upper management; quality policy; quality objectives (goals); implementing total quality

Quality system: Quality systems terminology; the systems concept; systems requirements and standards (ISO 9000); the quality manual; importance of ISO 9000

Organization for quality: Basic concept; quality work elements; evolution of the quality organization; organization for acceptance; organization for prevention; organization for improvement; organization for coordination; organization for assurance; role of the quality department

Quality consulting: Efficiency of the quality function; studies of the efficiency of the quality function; evaluation; report; who carries out the evaluation?

Developing countries and quality: Situation in developing countries; industrial development and quality; national efforts for quality; standardization; certification; export inspection; legislation; national promotion; education and training; external assistance; institutional infrastructure; national quality society

FIGURE 37.10 Content of theoretical training sessions of the total quality management course given in Sweden.

countries, documentation and information systems. ISO also organizes regional courses and seminars related to the ISO 9000 standards. Address:

P.O. Box 56
CH-1211 Geneva 20
Switzerland

Telephone: +41 22 749 01 11
Telefax: +41 22 733 34 30
E-mail: central@isocs.iso.ch

International Trade Centre UNCTAD/WTO (ITC). ITC works with developing countries and economies in transition to set up effective trade promotion programs for expanding their exports and improving their import operations. This includes assistance in the quality management field in order to improve product quality and competitiveness in international markets. Services given are advisory missions, consultancy, development programs, research, publications, etc. ITC operates computer databases, including "Qualidata," which covers information on export quality management, and "Qualicontacts," containing worldwide data on quality-related institutions. Address:

Palais des Nations
CH-1211 Geneva 10
Switzerland

Telephone: +41 22 730 01 11
Telefax: +41 22 733 44 39
E-mail: itcreg@intracen.org
Internet: http://www.unicc.org/itc/

United Nations Development Programme (UNDP). UNDP normally plays the chief coordinating role for operational development activities undertaken by the whole United Nations system. The UNDP activities focus on six priority themes: poverty elimination and grass roots development; environment and natural resources; management development; technical cooperation among developing countries; transfer and adaptation of technology; and women in development. Address:

One United Nations Plaza
New York, NY 10017
USA

Telephone: +1 212 9065000
Telefax: +1 212 9065001

United Nations Industrial Development Organization (UNIDO). UNIDO is the specialized agency of the United Nations aimed at supporting and promoting industrial development in developing countries in order to overcome these countries social and economic difficulties and to achieve a greater stake in the global market. UNIDO's quality, standardization, and metrology program provides multidisciplinary services in areas such as total quality management, just-in-time manufacture, statistical quality control, and business strategies. Address:

Vienna International Centre
P.O. Box 300
A-1400 Vienna
Austria

Telephone: +43 1 211310
Telefax: +43 1 235156
E-mail: omaizza-neto@unido.org
Internet: http://www.unido.org

World Bank. The World Bank Group comprises five organizations. Two of them, the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), provide loans to developing countries for development projects. Address:

1818 H Street, NW
Washington, DC 20433
USA

Telephone: +1 202 4771234
Telefax: +1 202 4776391
Internet: http://www.worldbank.org

World Health Organization (WHO). WHO is the United Nations directing and coordinating authority on international health work. The organization has a wide range of functions including pro-

motion of technical cooperation; improving nutrition and environmental hygiene; improving standards of teaching and training in the health, medical, and selected professions; establishing standards for biological and pharmaceutical products. Address:

20, Avenue Appia
CH-1211 Geneva 27
Switzerland

Telephone: +41 22 7912111
Telefax: +41 22 7910746
E-mail: postmaster@who.ch

Bilateral Assistance. A great deal of the external assistance to developing countries is through bilateral aid from industrialized countries. In this way, quality experts have assisted in various developing and training programs.

An example of this kind of assistance is a 3-year program founded by the U.S. Agency for International Development (USAID) to help enterprises in Egypt with ISO 9000 implementation and certification. A similar program for the countries in Southern Africa is funded by the Norwegian government. The Swedish government funds training programs in quality management organized in developing countries. The Japanese MITI (Ministry of International Trade and Industry) is active in assisting developing countries in Southeast Asia in total quality management development.

Assistance from Transnational Companies. External assistance may also take the form of collaboration with foreign manufacturers to obtain benefits such as technical know-how in joint ventures, import of plants and equipment, or consultant service. This kind of assistance is vital to developing countries.

INSTITUTIONAL INFRASTRUCTURE

Industrial enterprises require access to an infrastructure of institutions able to render a wide range of services for instance, in the areas of standardization, certification, accreditation, testing, metrology, quality consulting, and training. Developing countries that are in the process of industrializing must also provide for development of such an institutional infrastructure.

National Standards Body. In most developing countries, a national standards body is in operation primarily to provide services in standardization, certification, testing, and metrology. Unlike standards bodies in the West, national standards bodies in developing countries are usually governmental agencies established by law and founded by their respective governments. Because of the importance of standardization to both the public and private sector, some developing countries restructure their national standards bodies as joint public/private sector bodies. In the early stages of industrial development some form of government support is needed. A balanced representation of all groups interested in standardization should be considered: industry, trade, consumers, professional associations, the government.

If an integrated approach is used, the list of tasks of national standards bodies includes (International Organization for Standardization 1994a, p. 11):

- The preparation and promulgation of national standards
- The promotion of the adoption and application of national standards at all levels in the country
- The promotion of standardization as a technical activity and an integral yet distinct function of management in the country
- The promotion and, if necessary, provision of third-party guarantee of the conformity of products through a national product certification program
- The promotion of quality in industry and services and, eventually, the provision of third-party

certification of quality management systems implemented by industrial firms and service operators

- The provision of means for collecting and disseminating information on standards and related technical matters both nationally and internationally
- Supporting export promotion programs by providing information on the standards and regulations of export markets, promoting quality by testing products, and certifying their conformity to export specifications
- Protecting the consumer, particularly for safety and against health hazards
- Supporting through standards the efforts undertaken to safeguard the environment from hazards related to products and processes
- Safeguarding the country against the dumping of inferior quality goods as well as unsafe and ecologically hazardous goods
- The promotion of metrology as a necessary adjunct to standardization
- The coordination, for the benefit of the country, of standardization and related activities carried out at various levels: company, national, regional, and international
- The promotion and, if necessary, operation of an accreditation system for testing and calibration laboratories, to promote the precision of their results and enhance confidence in their work
- Undertaking tests for industry
- Offering technological advice to both government and industry
- Organizing training in standardization and related matters
- Conducting investigations to quantify the benefits of standardization with subsequent dissemination of information

The national standards bodies have not traditionally provided any services to industry in the fields of quality consulting and training. In consequence of the great interest for ISO 9000 certification and registration, an increasing number of national standards bodies in developing countries have started offering training in areas related to ISO 9000, such as quality systems implementation and auditing.

The mission of a national standards body is given in Figure 37.11.

In most countries the standards bodies are governed by a council which is responsible for working out policy guidelines, as well as for approving standards. The drafting of standards is supervised by technical committees representing manufacturers, users, university-affiliated institutions, research centers, etc. Usually, there are technical committees in particular fields, such as electrical, mechanical, and civil engineering, chemicals, and textiles.

The staff of a national standards body is headed by a chief executive officer or director, who is usually in charge of departments for standardization, certification (sometimes called quality control or quality assurance), metrology, laboratory services, information, and administration. The organizational structure of a fairly well-developed national standards body is given in Figure 37.12.

National Quality Council. With the increasing awareness of the fact that quality is an important element behind the economic growth of a country, the emerging necessity of having a national institutional infrastructure for the following activities is growing more and more apparent (Lal 1996b, p. 167):

Creating awareness about quality and its economic benefits including administering the national quality award

Promoting new concepts in quality management

Training in quality-related subjects

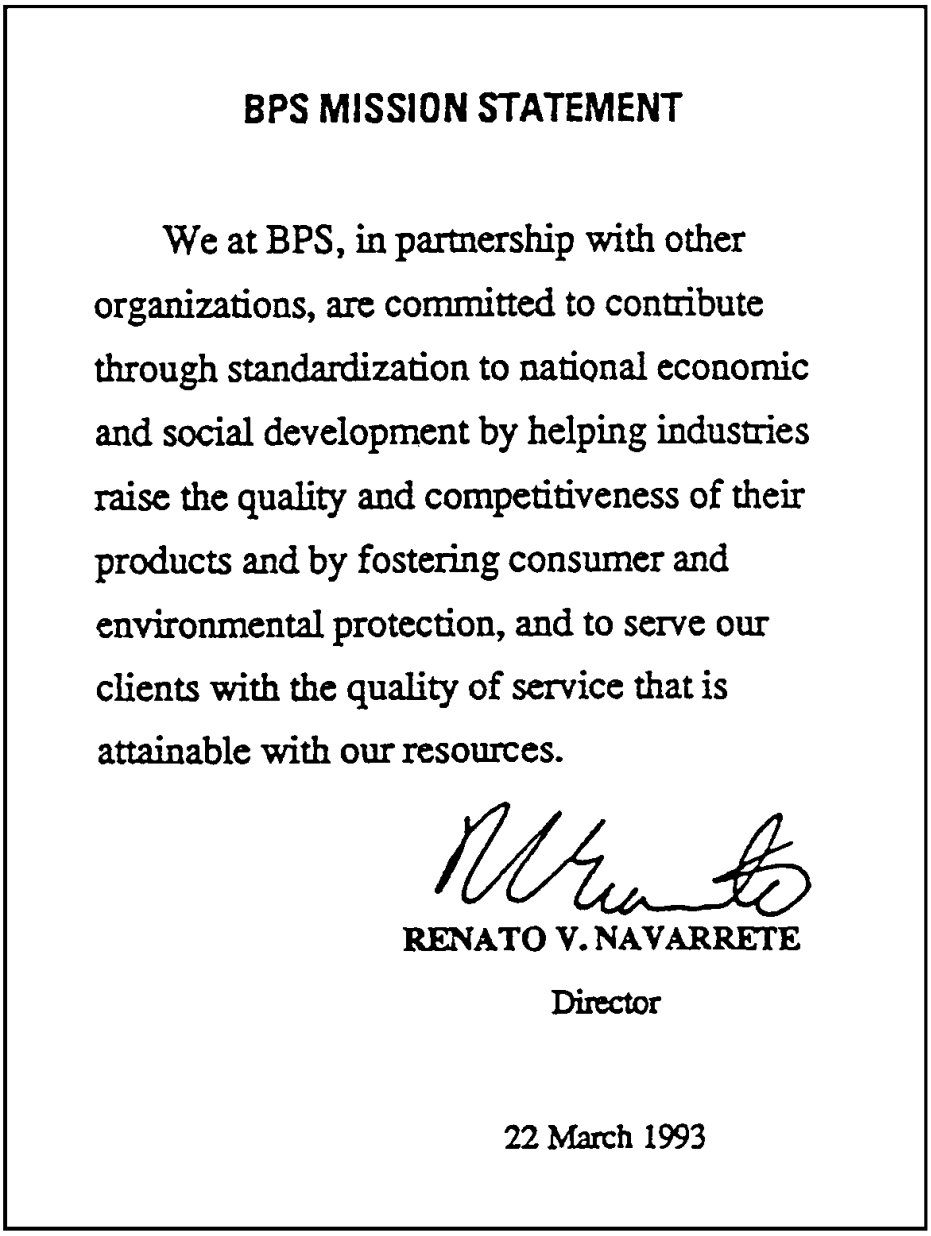

FIGURE 37.11 Mission statement of a national standards body. (*Courtesy Bureau of Product Standards, Philippines.*)

Accreditation of certification bodies

Registration of certified auditors for quality systems

These activities should not be assigned to governmental agencies only, although governments have to take a major initiative in these areas. They should be autonomous, free from bureaucratic control, and set up in close cooperation with the private sector.

The Quality Council of India is an example of such a council. It is an autonomous body composed of about 10 members from governmental departments and about 20 members from industrial and trade organizations, academic institutions, consumer associations, certification bodies, quality award-winning companies, etc. The chairman is nominated by the prime minister. The structure is shown in Figure 37.13.

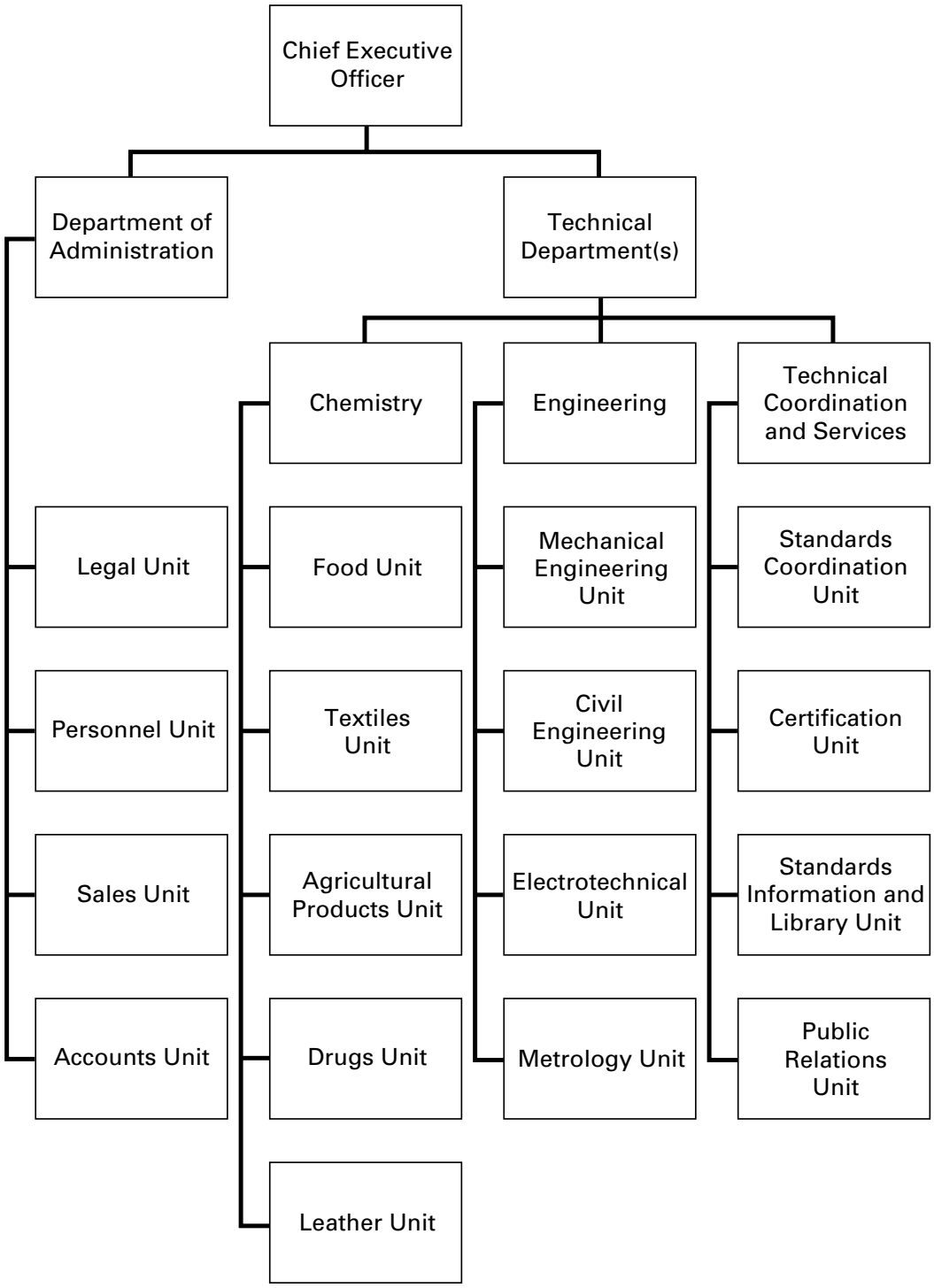

FIGURE 37.12 Organization of a national standards body. (*Source: International Organization for Standardization 1994a , p. 22.*)

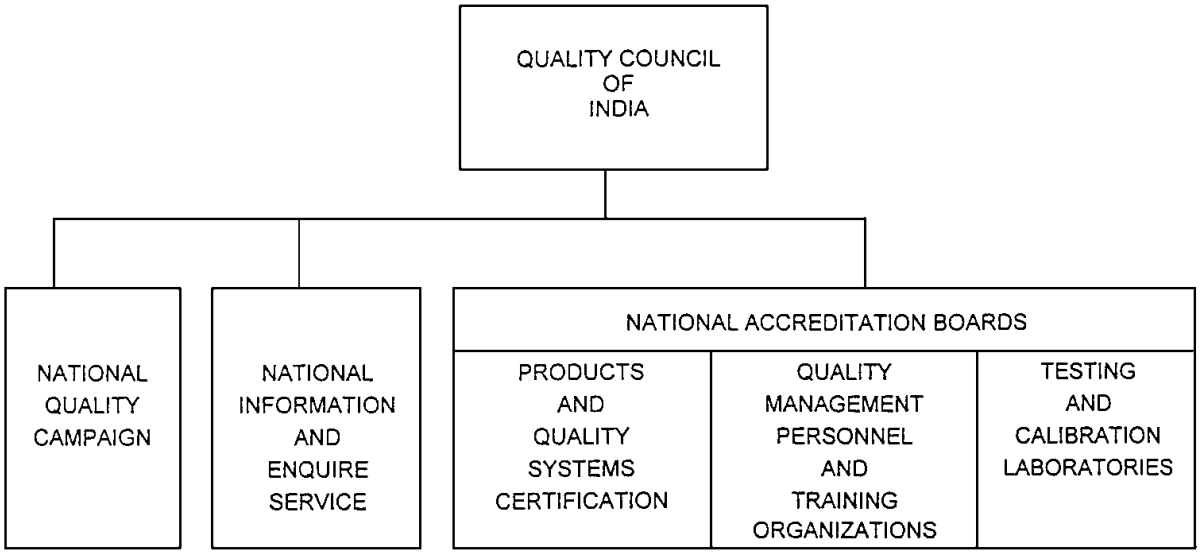

FIGURE 37.13 Quality Council of India. (*Source: Lal 1994, p. 21.*)

PROFESSIONAL SOCIETIES

A national quality society can play an important role in promoting quality nationwide, both in developing and in industrially more developed countries. Quality societies or associations are being formed in an increasing number of countries. Some of the national societies offer individual membership only and some offer institutional membership only, but most offer both.

Some societies are very active, for example, the Argentine Institute of Quality Control (IACC), the Brazilian Association of Quality Control (ABCQ), the Chilean Association for Quality (ASCAL), the China Quality Control Association, the Institute of Quality Control Malaysia, and the Philippine Society for Quality Control (PSQC). These societies organize conferences and seminars, conduct training programs, and distribute information (newsletters, journals, etc.).

A case in point is the Philippine Society for Quality Control, founded in 1969. At the end of 1996 it had 300 institutional members and 100 individual members. The mission of PSQC is phrased as follows: "We are an internationally recognized organization highly committed to promote quality as a culture and a way of life in our industries, government, academe, non-government organizations and communities. We lead and influence the transformation of the Philippines into a world class country by being proactive in the practice of total quality management." The values are phrased: "The organization is continuously striving for excellence. This is to be achieved through: respect and concern for people, continuous improvement, customer orientation and teamwork."

PSQC's objectives are

- To promote quality awareness and practices in both the private and public sectors through seminars, conferences, publications, and awareness campaigns
- To promote the development of members in quality leadership and technology
- To link with international organizations for updates in recent trends and the latest technologies

PSQC's programs and activities are

- To organize luncheon dialogues and symposia, seminars, and training programs
- To organize a National Quality Forum during the National Quality Month in October
- To disseminate quality information and updates about PSQC through quarterly issues of the society's newsletter, "Q…Point"

- To establish links with government agencies in promoting quality practices
- To coordinate "ugnayan" (the Filipino word for "linking") with host member companies for plant tours and sharing of their quality programs and success stories
- To form Youth Quality Chapters in universities to increase youth involvement and participation in making quality a way of life
- To administer the selection of the Philippine Quality Award winner every year

The term of office is 2 years, but an election is held every year for nine and six members alternately, to allow for smooth transitions and prevent a complete change in the composition of the board. The trustees elect officers from among themselves every year. They subsequently form working committees from the rest of the membership to help carry out the programs for the year. The immediate past-president is the 16th member of the board as an advisor.

PSQC is a member of the regional organization Asia-Pacific Quality Control Organization (APQCO). Another regional organization of national quality societies is the Latin American Organization for Quality (OLAC). These regional organizations regularly organize regional conferences.

CONCLUSION

The so-called developing countries are in various phases of economic and industrial development—some have just started with manufacture, whereas others are almost fully industrialized. No matter which phase a country is in, the quality of the goods and services provided is important to its economic growth. Quality management in a broad sense will ensure that goods and services are fit for domestic use, reduce the waste of scarce resources, and facilitate the export of national products.

It is of great importance that developing countries use appropriate methods in quality efforts. Simple basic techniques will in most cases give a better result than currently fashionable methods (to which too much attention is often paid). Before methods are selected, the actual needs have to be determined. This seemingly obvious point, however, is often overlooked. The focus should be shifted from a method-oriented to a more result-oriented approach, with increased emphasis placed on studies of established facts. Such an approach will provide a better basis for successful development.

There is an obvious need for extensive studies on how to deal with quality in developing countries on both a national and a company level and on the relations between the two levels. Models and plans for different levels of industrial development, different industrial structures, different branches of industry, etc. should be worked out. This is an important international undertaking.

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International Trade Centre UNCTAD/WTO
Functional Advisory Services Section, Division of Trade Services
Palais des Nations
CH-1211 Geneva 10
Switzerland
Telefax + 41 22 733 44 39

International Organization for Standardization
Director, Programme for Developing Countries
ISO Central Secretariat
P.O. Box 56
CH-1211 Geneva 20
Switzerland
Telefax: +41 22 733 34 30

The governmental agency responsible is the Swedish International Development Agency (Sida). The program director is the author. Information is available from Swedish embassies and consulates, as well as from:

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e-mail: quality@sandholm.se