

gas chromatography, high speed liquid chromatography, X-ray equipment, radioactive testing equipment, ultrasonic testing equipment, and calorimeter. Thus, no equipment requires urgent upgrading or replacement at present.

5.4 Present Status of Major Institutes for Metrology

5.4.1 Research and development centre for calibration, instrumentation & metrology

(1) Services and activities

KIM-LIPI was designated as a national standards institute under Presidential Decree No.7 in 1989, being responsible for technical management of national physical standards. It now belongs to Science and Technology Council.

KIM-LIPI consists of 6 divisions, Instrumentation R&D, Applied Instrumentation R&D, Instrumentation Development Technology, Metrology & Calibration R&D, Service & Information, and Administration. Its activities are divided into research and development related to instrumentation technology and in the fields of metrology and calibration. It has approximately 400 employees.

Metrology and Calibration R&D Division is divided into the following 6 laboratories.

1) Force & mass metrology laboratory

The laboratory has 11 staff and conducts metrology and calibration R&D and services related to force, pressure, mass, density, viscosity, and volumenometer.

2) Electrical metrology laboratory

10 engineers and technicians conduct metrology and calibration R&D and services related to voltage, radiation, power, capacity, inductance resistance, frequency, and time.

3) Temperature metrology laboratory

The laboratory is staffed with 10 persons and conducts metrology and calibration R&D, and services related to temperature, humidity, and moisture meter.

4) Acoustical metrology laboratory

4 research staff is engaged in metrology and calibration R&D, and services related to microphone, noise meter, and vibrometer.

5) Optical metrology laboratory

The laboratory has 6 research staff and conducts metrology and calibration R&D, and services related to standard lamp and illuminometer.

6) Dimensional metrology laboratory

9 research staff is engaged in metrology and calibration R&D and services related to

length, linearity, flatness, surface roughness, and roundness.

Breakdown of research staff by area and level of specialization at each laboratory indicates the shortage of engineers and technicians, i.e., the number of research staff in a field is four at most and only one in some fields.

KIM-LIPI is a member of JNK and acts as its central figure. It provides calibration service for equipment of the JNK member organizations, government research institutes, and private enterprises in the areas of photometry, length, mass, time, electricity (current), temperature, density, and assembly quantity.

Calibration activities of the six laboratories remained at a level of 800 cases per year between 1980 and 1985. By category of calibration, electricity, temperature, force and mass, and dimension show more or less the same number, while the number of photometry and acoustic calibration is one fifth that of the above four fields. During the ensuing four year period between 1986 and 1989, the number of calibration services increased from 1,000 to 1,500. Service related to force and mass accounted for the largest share, followed by dimension. In fact, these fields showed strong growth. Between 1990 and 1993, the number of services grew to a record level each year. Using the 1989 as the baseline figure, the number of calibration services in 1990 increased by 10%, followed by 70% in 1991, 2.6 times in 1992, and 5 times in 1993, clearly indicating a rapid growth after 1991. While growth has occurred in all the six fields, two fields - dimension and force/mass - have recorded marked growth. The number of services handled by each person in these fields doubled in 1993, totaling to 323 and 207, respectively, which is close to the handling capacity. Given the future industrial development and an anticipated increase in calibration demand, KIM-LIPI clearly needs to reinforce its calibration equipment and staff.

(2) Equipment

KIM-LIPI's facilities are located in Bandung and Serpong, and have total floor areas of 1,800m² and 21,000m², respectively. Its headquarters are situated in Serpong. The facilities in both locations have ample working space and are equipped with good ventilation and air-conditioning systems as well as lightings to provide excellent testing environment.

All the calibration and testing equipment for national standards owned by each of the six laboratories were purchased within the past 10 years and do not require urgent upgrading. In fact, each laboratory has sufficient equipment that provide necessary calibration service in its designated fields. Also, KIM-LIPI has a vehicle equipped with

equipment to provide field calibration service. On the other hand, testing equipment is partly insufficient in quantity and needs to be increased to meet current and future needs.

5.4.2 Calibration organizations under the Ministry of Industry

Two research institutes under BPPI, B4T and BBLM, participate in JNK and provide calibration services in their relevant fields.

(1) B4T

B4T renders calibration service for equipment of private enterprises and local laboratories in the fields of force, pressure, temperature, mass, and volume. The number of calibration services totaled 585 in 1991, 648 in 1992, and 650 in 1993.

(2) BBLM

The institute provides calibration service for private enterprises and local laboratories in the categories of length, force, pressure, hardness, shape, and torque. BBLM conducted 65 calibration services in 1991, 150 in 1992, and 439 in 1993.

(3) BBIK

Under the technical guidance of BBLM, BBIK performs calibration service for private enterprises in the fields of length and pressure. In 1993, BBIK conducted 16 calibration services.

B4T, BBLM, and BBIK have mostly new calibration equipment that do not require urgent upgrading, although some of them are in short supply.

5.4.3 Calibration organization under the Ministry of Mining and Energy

PLN-LMK which is under the Ministry of Mining and Energy s have for its major responsibilities being research and development, dissemination, consulting, training in the fields of thermal power generation, hydro-electric power generation, and general electricity. PLN-LMK consists of 5 departments (Planning & Research, Scientific Service, Standardization, Operation Service, and Administration), 3 laboratories (Electricity, Hydro-Electric Power Generation, and Thermal Power Generation), and 2 service units (Power System Research and Investigation Service). PLN-LMK has 441 employees.

PLN-LMK provides testing and calibration service as a member of JNK. Standards and Instrumentation Division of Electrical Laboratory is responsible for testing and calibration of electrical instruments, while Instrumentation and Materials Division of Thermal Power Generation Laboratory performs testing and calibration of instruments

measuring non-electrical characteristics.

Fields of calibration include energy, capacitance, resistance, temperature, watt, electric current, and voltage.

Calibration equipment is sufficient in capability and variety, although some of them are in short supply.

5.4.4 Private organization

PT. Sucofindo joins JNK as a private enterprise and provides calibration service in the areas of pressure and moisture. It maintains traceability of its own calibration equipment under contract with KIM-LIPI. Calibration equipment is new and sufficient in capability, albeit insufficient in terms of quantity.

5.5 Current State of Testing, Inspection, and Calibration by Subsector, and Major Issues

5.5.1 Automobile and automotive parts subsector

5.5.1.1 Testing and inspection

Most of leading and medium-sized enterprises that have been supporting the industry to date have testing and inspection equipment required for in-house quality control. On the other hand, testing equipment owned by the public organizations hardly meet requirements and are relatively old. As a result, the industry rarely avails the testing service rendered by the public organizations. While testing equipment owned by private companies may face difficulty in terms of meeting future demand, it can still be used as the basis of testing service for the coming years depending on the industrial growth.

A major issue related to testing service lies in its ability to keep up with future technological advancement. To maintain measurement, inspection, and calibration techniques and meet the latest requirements, it is important to disseminate universal and basic testing technologies throughout the industry.

5.5.1.2 Calibration

Calibration equipment owned by the industry appears to meet present requirements. Companies have a minimum set of required calibration equipment to maintain accuracy of their own equipment, except for large and special testing equipment that needs to be attended through calibration service visits.

Many companies own their master instruments based on which calibration is done. However, these instruments are imported and cannot be calibrated within the country.

Under these circumstances, it is not realistic for public organizations to satisfy calibration requirements. Developing the entire system with the participation of private companies and their calibration resources is important.

5.5.2 Agricultural machinery subsector

5.5.2.1 Testing and inspection

Joint ventures, local enterprises having foreign partners, and large enterprises which own the necessary equipment conduct in-process quality check and product performance tests (and own necessary equipment). On the other hand, small-and-medium enterprises perform dimensional and visual check in process, but many of them do not have a minimum set of equipment required.

Acceptance tests on purchased materials and parts are conducted by most companies, but only covering dimensions and external appearance.

Outside testing organizations are resorted to only when test reports are required for government procurement and other purposes. In fact, a very small number of requests has been made. BBP ALSINTAN under the Ministry of Agriculture is a public testing organization conducting performance tests.

Under the Act Related to Plant Cultivation Systems (UU 12/92), machinery and tools used for cultivation must be tested before selling to the market. In practice however, these tests are requested on special purposes as mentioned above.

5.5.2.2 Calibration

Joint ventures and local enterprises having foreign partners are mainly conducting calibration through equipment manufacturers in various countries, or at their service centers in Singapore. In particular, calibration is done on a periodical basis or using in-house standards. In the latter case, the equipment calibrated by in-house standards is marked accordingly.

Local large enterprises having no foreign partners use calibration organizations in JNK. However, calibration service using outside organizations usually requires high cost and longer time.

5.5.3 Electronic equipment and components subsector

5.5.3.1 Testing and inspection

Joint ventures and local enterprises with foreign partners basically adopt inspection systems of parent companies or foreign partners, and they have resources in conducting minimum-required test and in-house inspection. On the other hand, local companies

manufacturing foreign products under license, with no equity participation by foreign companies, do not always have testing equipment desired by their licensees. This largely depend upon the policy of the management.

There is no public testing organization that provides testing service in the field of electronic equipment, except for type inspection on telephone by PT TELEKOM⁸⁾. Thus, there is no demand for public testing service on the industry side.

However, with the localization of components and parts in the future, an increasing number of local enterprises is expected to enter the market creating the need for public testing inspection service. Also, technical assistance accompanying testing and inspection service provides a good opportunity for the local parts industry to grow. Such need is strongly felt by support industries including metalworking.

5.5.3.2 Calibration

Calibration is usually done annually by KIM-LIPI. For special equipment, some companies have calibration equipment for group companies, and still some send it to parent companies in foreign countries, or calibration service of equipment manufacturers in Singapore. To improve the situation, some Korean manufacturers calibration equipment in Indonesia in an attempt to provide service for their affiliates.

There is a strong need for the improvement of calibration service for measuring instruments, among a variety of companies including joint ventures and local enterprises with foreign partners. However, such service is not necessarily provided by public organizations only. Consideration should be given to the possible participation of private companies and their resources.

5.5.4 Electrical equipment subsector

5.5.4.1 Testing and inspection

Among the electrical equipment industry, joint ventures and local enterprises having foreign partners own the necessary testing equipment. The home appliance manufacturers specifically use outside testing service only for certification by a third party organization.

Industrial electrical equipment manufacturers are expected to conduct PLN tests since their major customer, LMK, requires PLN's certification.

Public testing organizations in the electrical equipment field are B4T under the Ministry of Industry and PLN under LMK. The Ministry of Mining and Energy plans to transfer part of PLN's testing facilities and equipment to enable it to establish its own research institute. B4T's equipment is inferior to those owned by manufacturers and thus

⁸⁾ Some have equipment for research purposes, but they do not provide testing service for companies.

is rarely used. PLN has testing equipment for cables and wires, but are generally old. Public organizations are not capable of conducting tests on home appliances. Despite this, few requests are made.

Thus, testing resources for product certification are insufficient. As a result, data submitted by manufacturers or test reports made by reliable testing organizations are used as substitute.

Many companies are not satisfied with testing service of public organizations in terms of time and cost required.

5.5.4.2 Calibration

Industrial electrical equipment manufacturers ask KIM for calibration service. Home appliance manufacturers also rely on KIM, but equipment which KIM is unable to calibrate is done in-house (in the case of a large company having sub-standards for its group companies) or at Singapore service centers of manufacturing instrument manufacturers or foreign partners.

Like testing and inspection service, there are many complaints about the long time it takes and the high cost involved in soliciting calibration service from public organizations. At present, calibration service by private companies has not been accredited, except for JNK's facilities. If private companies and their equipment and facilities are accredited, the effective use of capital investment, reduction of calibration costs, and reduction of time for calibration can be expected.

5.5.5 Metalworking subsector

5.5.5.1 Testing and inspection

Joint ventures and local companies having foreign partners or customers have sufficient testing resources including equipment and manpower. In contrast, small companies in the foundry industry have few measuring instruments and human resources.

Outside testing organizations are mainly used for material testing purposes, including in chemical analysis and strength testing. MIDC and B4T in Bundong, and BI Surabaya (a regional testing laboratory under BPPI) are mainly used. The former two facilities are not convenient for companies located in the suburbs of Jakarta. Results of testing service rendered by these organizations require two weeks to obtain and requires expensive fees. As a result, few small enterprises avail of their service. These organizations nearly have a complete set of equipment, all of which are very old. Also, BI Surabaya's testing capacity is too small for metallic materials.

5.5.5.2 Calibration

Joint ventures, and local enterprises having foreign partners or customers rely on equipment manufacturers, either in their own countries or at service centers in Singapore, for calibration. It is done on a periodical basis or on the basis of in-house standards for internal certification.

While JNK member organizations are utilized, their service requires high cost and takes a long period of time.

5.5.6 Ceramic construction material subsector

5.5.6.1 Testing and Inspection

The need for testing ceramic construction materials arises from the following areas:

- 1) To determine a mixture of raw materials;
- 2) To conduct quality control in the intermediate process; or
- 3) To perform final product inspection.

Large enterprises have equipment necessary to conduct a minimum set of required tests internally. However, chemical analysis (composition analysis) of raw materials is generally done by outside testing organizations. Medium-sized enterprises are busy in production and lack quality awareness. Thus, only a small percentage of these enterprises own these types of equipment. Small enterprises have little interest in testing and inspection, and only a few own equipment, nor ask outside testing organizations for service.

Final inspection of products is generally done visually, regardless of company size.

Looking at percentage distribution of testing service by outside organizations, mechanical tests, such as bending strength and height measurement account for approximately 40% of total, chemical analysis (chemical composition, acid resistance, etc.) 40%, and physical analysis (water absorption and dimensions) 15%. Public testing organizations account for 60%, and the private organization (PT. Sucofindo) 40%. Among public organizations Ceramic Research Institute (BBK) in Bandung account for major portions, followed by Chemical Research Institute (BBIK) in Jakarta.

Testing equipment owned by Ceramic Research Institute is older than those of private companies, which nonetheless do not rely much on the institute's service. Also, its testing service takes a relatively long period of time.

5.5.6.2 Calibration

Calibration service of outside organization is availed by large companies. The

principal calibration organization is DOM, and calibration of weighing machines accounts for approximately 80% of total.

5.5.7 Demand for testing and inspection service

According to the questionnaire survey conducted as part of the present study, demand for outside testing service is not very high. (Charts 5.5.2 – 5.5.5, Appendix 4) By field, the highest percentage among responding companies is seen in the machinery area (32%), followed by the chemical field (29%), and electrical and physical fields, 14% each.

By subsector, the ceramic construction material industry (in the chemical field) accounts for 68% of the total, mainly due to unstable quality of raw materials. Then, the agricultural machinery and metalworking subsectors (in the mechanical field) follow with 47% and 43% shares from total responding companies.

Service areas used by more than 20% of the responding companies are electrical/electronics, automobile/automotive parts, and ceramic construction materials (mechanical field), electrical/electronic in the electrical field, automobile/automotive parts in the chemical field, and ceramic construction materials in the physical field.

5.5.8 Major issues related to the calibration system

There is sizable demand for calibration. According to the questionnaire survey, 40% of the respondents use calibration organizations of various types. The percentage varies greatly among the subsectors, ranging from 39% for the automobile/automotive parts industry to 64% for the ceramic construction material industry (Chart 5.5.1, Appendix 4).

Actual calibration practice of the manufacturing sector indicates that the calibration system does work as intended. Large companies and foreign-affiliated companies requiring high levels of accuracy use calibration service of KIM and JNK member organizations for general measuring instruments. For measuring instruments that cannot be calibrated by KIM, working standards are owned to ensure proprietary calibration service. However, many working standards are not calibrated properly. Foreign-affiliated companies use foreign calibration organizations or calibration service furnished by original equipment suppliers.

Given the anticipated industrial development of the country, calibration demand is expected to grow in response to diversification of calibration fields, and increase in calibration requirements. Also, geographical expansion is expected. To meet these requirements, the following improvements are called for:

(1) Expansion of calibration fields

At present, primary standards in the seven basic fields are kept by various organizations to enable proper calibration service. However, there is a lack of standards for derived quantities⁹⁾ which calibration demand is expected to grow.

(2) Clarification of accreditation standards

With the anticipated increase in calibration service demand, certification and calibration organizations with sufficient equipment and ability, need to be augmented to the network. Present accreditation standards are reportedly based on ISO 25/38/40, but not clearly defined. As seen in the example of the foreign-affiliated company, there are many organizations capable of providing adequate calibration service in the country, including foreign organizations. To encourage capable organizations in boosting the certification network, clear definition of accreditation standards is required.

⁹⁾ In Japan, derivative quantities for which calibration service is possible are placed at around 80, compared to 50 in the NIEs.

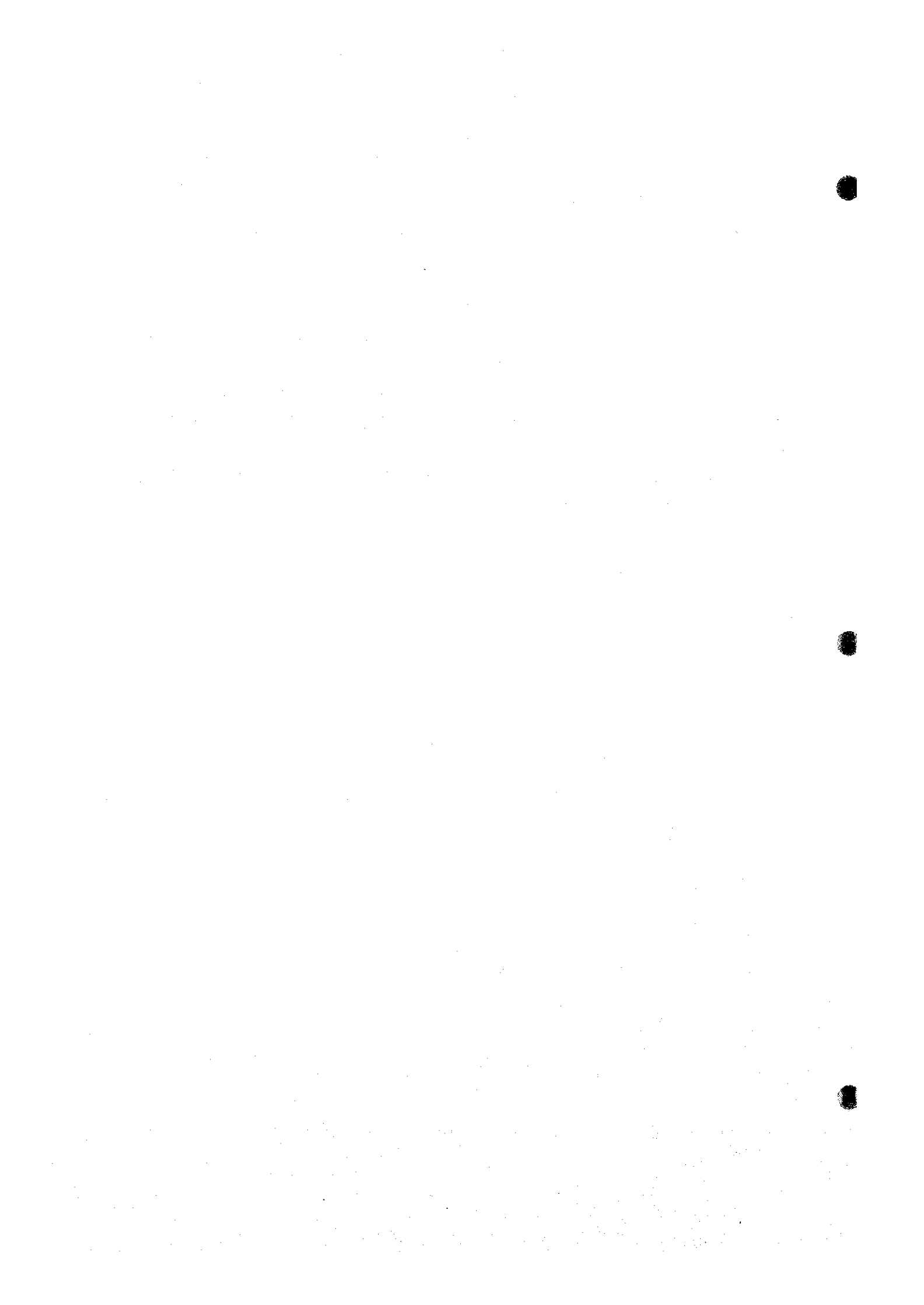
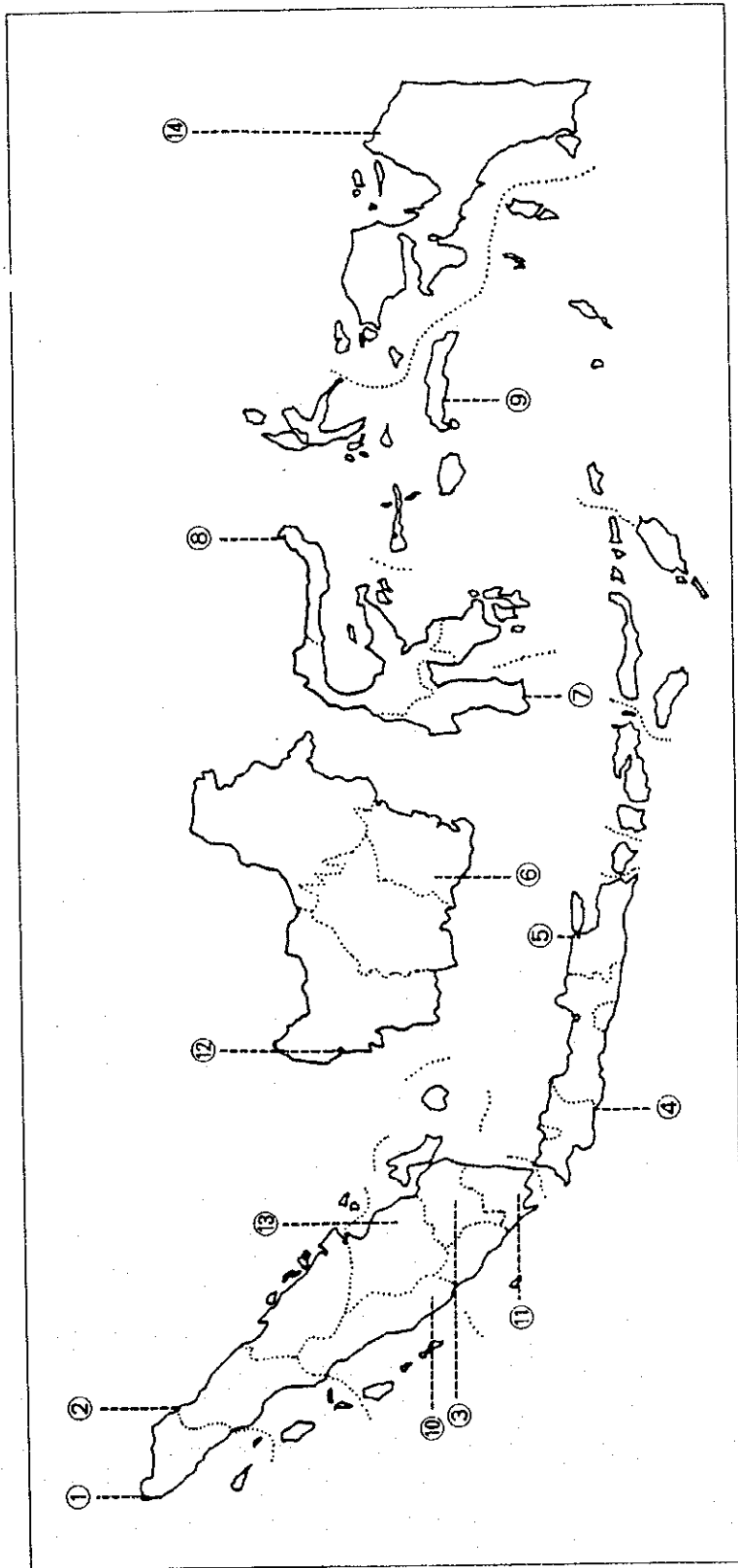


Chart 5-1 Regional Institutes



- | | | | | |
|-----------------|------------------|---------------------|------------------|------------------|
| 1. RI Aceh | 4. RI Semarang | 7. RI Ujung Pandang | 10. RI Padang | 13. RI Riau |
| 2. RI Medan | 5. RI Surabaya | 8. RI Manado | 11. RI Lampung | 14. RI Jaya Pura |
| 3. RI Palembang | 6. RI Banjarbaru | 9. RI Ambon | 12. RI Pontianak | |

RI : Regional Institutes

**Chart 5-2 Members of National Calibration Network
and Their Capabilities**

Members of National Calibration Network	Basic Quantities	Light Intensity	Length	Mass	Time	Electric Current	Temperature	No. of Mol.	Derivatif Units
1	BBPILM (MIDC) – Ministry of Industry Bandung		x						x
2	Directorate of Metrology – Ministry of Trade Bandung		x	x					x
3	PSPKR – National Atomic Power Agency (BATAN) Jakarta							x	
4	PPMK / LMK – National Electric Power (PLN) Jakarta					x	x		x
5	R&D of Telecommunication – (PERUMTEL) Bandung				x	x			x
6	P.T. PINDAD (Persero) Bandung		x						x
7	P.T. Boma Bisma Indra – Unit Bisma Surabaya		x						x
8	Bandung Institute of Technology Bandung		x			x			
9	PUSLITBANG KIM – LIPI Serpong	x	x	x	x	x	x		x
10	BBPPIBBT – Ministry of Industry Bandung								x
11	P.T. PAL Indonesia (Persero) Surabaya		x			x	x		x
12	P.T. IPTN Bandung		x			x			x
13	LUK – BPPT Serpong		x			x			x
14	PPMB – Ministry of Trade Jakarta		x	x			x		x
15	P.T. Mektan Babakan Tujuh Utama Jakarta								x
16	P.T. Radio Frequency Communication Jakarta				x	x			x
17	BPSMB – Ministry of Trade Ujung Pandang						x		x
18	P.T. GARUDA Jakarta		x						x
19	P.T. SUCOFINDO Jakarta								x

6 Current State of Quality Control Promotion and Major Issues

6.1 Organizational Structure for Quality Control Promotion

Generally, organizations engaged in promotion of quality control are divided into, 1) those managing events and incentive programs for quality control promotion at national and local levels, and 2) those specializing in dissemination and education of quality control techniques. In addition, many countries have organizations that consist of professionals in quality control instruction aimed at improving the status and income of their members, as well as in providing advanced training. These organizations are also classified as either government-led or non-profit organizations and profit-oriented organizations.

Indonesia has various organizations serving the above functions, as described in the following sections. Yet, they are not very active partly due to the insufficient recognition among companies of the need for quality control. There is no organization that undertakes overall quality control promotion in the country, so that the existing organizations conduct their activities without mutual coordination.

6.1.1 Organizations and programs for quality control promotion at national level

There is no organization that engages in satisfactorily promoting quality control at the national level.

In Indonesia, a nationwide event on quality control is conducted annually by DSN. Every November, a national meeting held to promote quality control with the cooperation of related ministries and agencies. The national meeting in 1994 was held for three days between November 1 and 3, the main theme being "Activities for Quality Month and National Productivities". It had planned to attract around 800 participants including representatives from related ministries and agencies, as well as those from the industries which accounted for 60% of the total. The meeting consisted of various sessions focusing on major topics related to certification and accreditation, including SNI, ISO 9000 series, metrology and calibration.

It should be noted, however, that DSN does not have an exclusive organization for the promotion of quality control. Rather, it sponsors the quality month as part of its standardization program.

In fact, the central figure in the event is PMMI rather than DSN. PMMI is an

organization which is comprised of many leading companies in Indonesia. With its major mission of promoting QC circle activity, it holds annual national conference, and also serves as the secretariat for the quality month. However, it lacks resources to support secretariat activities, and aside from sponsoring conferences and several seminars, it is unable to conduct quality promotion activities on a continuous basis.

In addition, as regards to the certification and accreditation system under ISO 9000 series as part of the standardization and certification projects, an implementation body is being formed.

The certification and accreditation scheme is structured by KAN (National Accreditation Committee) being the supreme organization of accreditation and supervision and the advisory organ of DSN Chairman, under which KAIT (Technical Accreditation Committee) has been established in each of SSN-related ministries and agencies. KAN is responsible in providing actual accreditation service. As of October 1994, only the Ministry of Industry had KAIT.

Under accreditation of KAN and KAIT, 3 organizations under BPPI of the Ministry of Industry, namely B4T-QSC, SRQA (Sucofindo) and ABIQA (BBIHP), have been accredited to certify quality control systems, as of November 1994. At the same time, accreditation of 2 organizations (KEMA-Indonesia, Textile Institute - TIQA) are still under examination. The Ministry of Industry requires that 20 certification organizations be accredited by the end of REPELITA VI.

Since the certification system under ISO 9000 is still at an infant stage, Indonesian companies having ISO 9000 certification mostly obtained it from foreign certification organizations (35 out of 40 companies).

6.1.2 Organizations responsible for dissemination and education of quality control techniques

Organizations that carry out dissemination and education of quality control techniques in Indonesia can be categorized into those specializing in such service, and those which offer it as part of technical education and training courses.

In the former group, there is only one organization specializing in dissemination and training of quality control techniques, ITQC (LPMT), apart from consulting firms and individual consultants. ITQC is a private organization that provides TQC-related educational service for companies, currently cooperating with government staff in testing and research institutes. In the future, it plans to expand to cover ISO 9000 series. It is characterized as being near to a consulting firm.

Many consulting firms and individual consultants engaged in quality control systems offer dissemination and education services for companies wishing to obtain the ISO 9000 certification, although an accurate number of these companies is not available through data. Among them, the most active indigenous company is Sucofindo. It is a semi-government enterprise which entered into mutual approval of ISO 9000 certification with TUV of Germany.

As a group of organized individuals engaged in quality control, IQMA has established 15 branches throughout the country.

There are many organizations that provide quality control education as part of technical and other educational services, including government organizations, such as B4T and BBK (testing and research laboratory/educational institution) under BPPI of MOI, PPEI under the Ministry of Commerce (educational institute in the field of foreign trade), and CEVEST under the Ministry of Labor (vocational training institute). All of them teach the general concept of quality control but do not include quality control techniques.

6.2 Current State of Quality Control Promotion in Subsectors under the Present Study and Major Issues

6.2.1 General

Companies are motivated to be engaged in quality control activity primarily because of two reasons. First, quality control is performed in response to the customer's request for a third party certification on quality control, or to customer's attitude of purchasing (import) products from companies who practice proper quality control. A typical example is seen in certification of quality control systems under ISO 9000 series. There are some product certification schemes which require continuous quality control, such as JIS Mark Certification Schemes, etc. Product certification under SNI also includes certification of quality control systems, but is not widely used.

As for the certification of quality control systems under ISO 9000 series, a total of five companies obtained it from foreign certification organizations. As of November 1994, four companies were certified on the basis of ISO 9001 and one ISO 9002. The certification of 30 companies is still under examination or some waiting for it. In addition, 35 companies were registered through foreign certification organizations.

Another motivation comes from the intrinsic nature of quality control to improve operating efficiency. Japanese and other foreign-affiliated companies have been carrying out quality control for this reason. Most of them have introduced their quality control

systems through their parent companies. In Indonesia, there is virtually no organization that is engaged in dissemination and education of company-wide quality control to enterprises for productivity improvement.

One of major problems hindering the promotion of quality control in Indonesia is the insufficient quality awareness in both consumer and producer markets, the former being highly price-oriented. This is reflected in the strong preference of manufacturers for low-cost production over one which adopts quality control as it is believed to require a large cost.

Another problem is in the misperception of quality control and its concept. Even companies who perform a certain level of quality control consider it as final product inspection, and simply believe that quality control is just a means of preventing defects before actual shipment to customers.

In the following sections, the current status of quality control in each subsector is analyzed in quantitative terms, based on the results of the questionnaire survey.

6.2.2 Current state of quality control and its implementation based on the questionnaire survey

As viewed from the results of the questionnaire survey of the target subsectors, conducted as part of the present study, the major characteristics of quality control practice in each are summarized as follows: (Table numbers in the following sections denote those in Annex 4).

(1) Level of quality control performed

More than 90% of enterprises in each subsector perform quality control in the form of inspection. The high percentage covers product inspection as well as in-process inspection (Tables 5.1.1 and 5.1.2). The percentage is very high compared to other aspects of quality control, indicating that most companies equate it with inspection. In addition, most inspections are done visually.

In contrast, less than 60% of companies process inspection results by using SQC techniques (Table 5.1.3), as other companies only remove defects found in the inspection process from a lot. Nevertheless, approximately 20% plan to introduce SQC in the future reflecting a certain level of recognition for the need of quality control. Looking at individual subsectors, relatively high percentages of companies performing SQC are found in electric/electronics, automobile and automotive parts, and agricultural machinery, each exceeding 60%. These companies are directly or indirectly related to foreign-affiliated

companies. This may be compared to 46% in the metalworking industry which is dominated by local enterprises. In the ceramic construction material industry also dominated by local enterprises, 64% of companies responded that they are performing SQC¹⁾.

The similar situation is observed in terms of the establishment of QC departments and documentation of QC practice.

The development of in-house standards is done by slightly less than 50% of enterprises (Table 5.1.8). The percentage is particularly high in the automobile and automotive parts industry (58%) suggesting the influence of Japanese and other foreign-affiliated companies. Moreover, 76% of companies in the ceramic construction materials subsector maintain internal standards. It should be noted, however, that the industry can be clearly distinguished from others in terms of type of the standards maintained in-house. Only 54% of ceramic construction material manufacturers develop in-house standards on the basis of international standards, foreign standards or customer standards, compared to 80% in the automobile and automotive parts, and metalworking subsectors, while 40% use standards developed on the basis of their own experience (Table 3.4).

The employee suggestion program is adopted by more than 70% of companies. The percentage exceeds 80% in the automobile/automotive part and agricultural machinery industries.

On the other hand, other important QC tools such as QC circle activity, 7 tools, and 5S are adopted by less than 50% of the total.

QC circle activity is conducted by slightly less than 50% of the total. In particular, the automobile and automotive parts industry shows a high percentage of 70%. A large percentage of companies is interested in QC circle activity, reaching slightly less than 80% when combined with companies currently conducting it. Implementation rates of 7 tools and 5S are 42% and 48% respectively, for all the industries. Again, the automobile and automotive parts industry show higher percentages of 61% and 70%, respectively. This seems to be the result of technical assistance both direct and indirect, from Japanese-affiliated companies.

As for the quality control system under ISO 9000 series, less than 10% of the responding companies are currently implementing it, and approximately 50% plan to do so (Table 5.1.6). The percentage of companies implementing the ISO-based quality system is similar in most of the subsectors, except for the ceramic construction materials subsector

¹⁾ Note that, in both the metalworking and ceramic construction material industries, companies responding to the survey are skewed toward larger enterprises compared to an actual distribution of enterprise size, thus the current state of quality control is presumably better than the industry average.

where no company conducts it at all. The percentage share of companies planning to introduce the QC system is relatively high, particularly for the electric/electronics, automobile/automotive parts, and ceramic construction materials industries, each exceeding 50%, while a low 41% and 27% for the metalworking and agricultural machinery industries are noted respectively. Companies which are not aware of ISO 9000 series exceed 40% of the total in the agricultural machinery and ceramic construction materials industries, followed by the metalworking industry (30%), and the electrical/electronics and automobile/automotive parts industries (20% or less). These figures clearly reflect high interest in ISO 9000 among the electrical/electronic and automobile/automotive parts industries. In contrast, the low figures for the agricultural machinery and metalworking subsectors reflect the fact that these industries are divided into two tiers; those having commercial relationship with foreign companies which maintains high interest in ISO 9000, while those mainly serving the local market have little interest. The similarly situation seems to prevail in the ceramic construction materials industry where there is a large gap between large and medium-sized enterprises interested in future export opportunity, and small enterprises which focus on the local market. Note that only two companies in the ceramic building materials subsector have introduced the ISO 9000 series quality system due to favorable situation in the domestic market caused by supply shortage.

Finally, more than 20% of companies use QC consultants, and additional 20% plan to use them in future. This seems to be closely related to actual or planned implementation of the ISO 9000 series quality system, as evidenced by a low percentage exhibited by the agricultural machinery subsector showing low interest for ISO 9000. On the other hand, the lower percentage for the ceramic construction materials industry, despite high interest in ISO 9000, seems to reflect a low rate of implementation of the ISO-based quality system.

(2) Issues related to implementation of quality control

As for the obstacles in the implementation of quality control systems, more than 45% of the responding companies cite the lack of knowledge on quality control methods (the percentage is a sum of companies who cite it as the first or second reason). The second largest factor is the lack of manpower required to introduce QC systems (40% of total). Other reasons are the lack of interest of employees (24%), time constraint (11%), the lack of interest of customers (12%), ignorance of the management (5%), cost increase (4%), and job hopping (2%). Since the respondents have been skewed toward larger enterprises, a very small number of them cite cost increase as a significant factor. On the other hand,

job hopping, which is a major obstacle to quality control practice in neighboring Southeast Asian countries, poses as a minor problem in Indonesia where labor supply is abundant.

Looking at individual subsectors, different patterns are somewhat revealed from the above-mentioned overall trend. The automobile and automotive parts industry is most distinct with 54% citing the lack of knowledge on quality control methods, 30% for the lack of manpower, and only 12% for the lack of interest among employees. In this industry, technology transfer has been proceeded from Japanese-affiliated companies and engineers and technicians, explaining why awareness of quality control are on the rise. Yet, education and training for quality control methods are yet to be improved, and the lack for the former seems to manifest itself from lack of knowledge. The growing number of engineers having quality control awareness is also reflected in a relatively high percentage of respondents (9%) citing the ignorance of the management.

The lack of interest among employees is cited by majority in the electrical/electronics and ceramic construction material subsectors. This is partly because of the labor intensive in nature of these industries and that their QC circle activity has been lesser propagated than the automobile and automotive parts industry. In the metalworking industry, dominant reasons raised are the lack of knowledge on QC methods (54%) and the lack of manpower (52%).

Clearly, many companies are unable to perform quality control for a variety of reasons, e.g., they are not aware of quality control methods, or that they do not have manpower to support QC activity. This seemingly contradicts the high implementation rate of QC training, 63% on the overall average, and 70% for the electrical/electronics and automobile/automotive parts industries. The main reason that entails the lack of knowledge or manpower, therefore, translates to the lack of an organization that can systematically conduct dissemination and education of quality control methods suitable for local conditions, and the absence of a place for education of required manpower.

It should be noted that 62% of the responding companies have assets exceeding Rp. 5 billion, indicating a high skewness toward large enterprises relative to the overall distribution of enterprises in the entire country. For practical purposes however, it is reasonable to assure that these companies will lead the promotion of quality control practice contemplated in this study, as most of small-and-medium-sized enterprises and micro enterprises are not in a position to do so. They conduct only visual inspection prior to shipment, perform few product design, and do not have measuring instruments and other equipment required for quality control. Moreover, most of them face problems related to production specific technology, and hence, are not capable of utilizing control

technology for the ultimate quality improvement effect. Thus, the results of the questionnaire survey will serve as the adequate basis of QC promotion efforts that will be advocated under the project.

6.2.3 Automobile and automotive parts subsector

In the case of auto makers, they utilize quality control systems established by and transferred from their parent companies. They have sufficient in-house standards, as well as technical and operation standards, with quality control methods being at the TQC level. To maintain these systems, they are required to conduct continuous education and training for a large number of employees, imposing substantial burdens such as translation for the preparation of educational materials.

As for automotive parts suppliers which directly deliver their parts to auto makers, they may be requested by the makers to establish quality control systems so as to assure stable product quality, while simultaneously complying with product specifications of customers. These requests are made through quality and inspection agreements between the auto makers and suppliers as a part of their supply contract. The auto makers check if quality control systems are properly maintained based on agreed quality control methods, and in terms of both data and system through periodical and/or on-the-spot inspection of suppliers' factories. Auto makers require that the quality level of all the components and parts be maintained in order to support their brands.

Quality control practice of parts suppliers may be differentiated from foreign affiliated companies, mainly Japanese, and local suppliers.

Japanese-affiliated parts suppliers adopt quality control systems established by their parent companies, with modification according to local conditions peculiar to Indonesia. They obtain technical assistance from parent companies, rather than auto makers, and attain a TQC level. In-house education includes overseas training at parent companies.

On the other hand, the operational types of local suppliers vary greatly from top-class component manufacturers to subcontractors, and accordingly, by the level of their quality control systems, which in turn, depend on their scale of operation and importance of parts from final products. Nevertheless, most suppliers share a certain level of awareness of the importance of quality control.

Local parts suppliers (including component manufacturers) supplying their parts directly to auto makers, have chances of receiving technical assistance from customers in various forms, including staff training at parent companies of auto makers (particularly, when new products are introduced). In-house training is very common among these parts suppliers. In short, conscious quality improvement efforts are continuously undertaken to

prevent customer claim. Minimum-required quality control methods are adopted to keep them at a level with Japanese-affiliated suppliers. However, many companies do not fully understand the relationship between the quality control data, and the problems in the actual process.

In the case of subcontractors for the local parts suppliers, they have very few chances of receiving technical guidance unless when a problem arises.

No company has obtained certification of quality control systems under ISO 9000 series. In fact, even parent companies of Japanese-affiliated makers have not obtained such. Exports operate within the framework of each group company, besides, customers do not require the certification.

Some of leading Japanese-affiliated parts suppliers have the ISO 9000 certification. The auto makers however, use their own quality control standards and do not require parts suppliers to obtain the ISO 9000 certification.

One of major issues related to promotion of quality control in the automobile and automotive parts industry is the difficulty in disseminating quality control to the existing and potential subcontractors dominated by small-and-medium-sized enterprises.

One of the ways to overcome the situation is to disseminate quality systems, even as ISO 9000 series certification may be too much of a burden for them. If the quality control practices required by automakers to parts suppliers can be made open to others, through a compilation of a standard, this may be used as a basis of certification replacing ISO 9000 series certification. Then, these quality control practices may be applied to parts suppliers which have no chance of receiving technical assistance directly from the automakers.

At the same time, it is important to further promote the quality control concept. Many small enterprises fail to distinguish quality control from inspection. While the former is designed to manufacture good products on a stable and continuous basis, the latter is mainly concerned with separation of acceptable products from defects. Attention must be focused in understanding the importance of trouble identification in the process through inspection, followed by an immediate feedback from the process.

Most important is the establishment of a system of dissemination and provision for training in areas of the quality control concept, systems and methodology, at the soonest time possible.

6.2.4 Agricultural machinery subsector

There is a large difference in the level of quality control practice between joint

ventures and local enterprises having foreign partners on one hand, and small-and-medium-sized industries on the other.

In the former group, the management generally has a higher level of recognition of the importance of quality control. Many companies adopt Japanese-style quality control systems including TQC, QC circle activity, and employee suggestion program, and have QC departments or sections. They are also active in preparing standards and other documentation. Training includes in-house programs and special training by foreign partners. Nevertheless, few are using SQC techniques including control charts and have reached a quality control level of incorporating "kaizen" (improvement) as their primary target. Also, not many text books and reference materials on quality control and standardization have been translated to Indonesian, constituting an obstacle to training. Thus, there are various problems related to the structure for promotion and training of quality control concept and techniques.

On the other hand, in the case of small-and-medium-sized enterprises, which simply produce imitations of foreign products, they do not have quality control organization and equipment. Moreover, they even lack production specific technology which is considered prerequisite to the introduction of control technology.

More than 10 companies, which are mostly the export-oriented, are reportedly considering to obtain the ISO 9000 certification, although none of them are taking any action yet.

6.2.5 Electronic and electrical equipment production subsector

Joint ventures and local companies having foreign partners are receiving technical assistance in quality control from partners. In particular, large companies which produce most components and parts internally, enforce strict quality control throughout.

Many local enterprises not having foreign partners often receive technical assistance from customers (large joint ventures operating in Indonesia or foreign customers), but their level of quality control is limited in scope and extent, meeting only the quality requirements for the ordered product. As a result, their quality levels often deteriorate unless they receive support or assistance from customers. For example, the rise in percentage of defects may be seen in a company where engineers sent by the foreign partner have already left.

This is because companies have incorrect motivation for quality control. A very small number of companies mainly the large ones, understand that the success of quality control translates directly to production cost.

A very few companies conduct sufficient QC training, although QC managers are appointed at many companies. Also, the lack of experience both in quality control and production specific technologies prevents them from developing an ability to improve quality on a continuous basis. Only joint ventures, especially large companies undertake process management using control charts that incorporate proper control items, control methods, quality characteristics, inspection and working methods that are identified for each process.

To effectively promote quality control and standardization, preparatory steps need to be taken, including quality control campaigns with easy-to-understand mottoes, like 5S, and data collection and the development of operational rules for standardization. In practice, however, these activities are rarely conducted, not to mention that inspection has been also regarded as quality control.

6.2.6 Metalworking subsector

Joint ventures and local companies having foreign partners, and those supplying products to them often adopt Japanese-style quality control systems and are active in manpower development as mentioned earlier. At the same time, however, many medium-sized enterprises cannot secure experienced staff nor obtain text books and standards used for quality control and training, despite the willingness of the management. Also, very few of them have reached the advanced level of quality control incorporating "kaizen" (improvement) as a primary goal.

On the other hand, small enterprises and micro enterprises seen in the foundry industry mainly manufacture products on the basis of drawings, specifications, and samples furnished by customers upon order, and they do not have quality control organization and equipment. For these enterprises, the development of a production specific technology is still more important rather than quality control per se.

6.2.7 Ceramic building material subsector

For the industry, the most important issues related to quality control are the manufacture of products with stable quality, and reduction of defects. At present, unstable mixture of raw materials makes proper process control difficult. As a result, product quality cannot be stabilized, resulting to high rate of defects.

Approximately 60% of companies are performing quality control, and 20% plan to introduce quality control systems according to a manufacturer survey. However, there is a growing misconception about the similarity of quality control and inspection. Most of the

companies including those who have responded that they will adopt quality control systems have this in mind. They perceive that quality control simply means not to ship defective products to customers. As a result, the cause for defects occurring in the process is rarely analyzed, explaining why few activities are geared towards the reduction of rate of defects. Furthermore, because final products are inspected only visually, many defects are found after shipment or upon completion of construction work.

At present, where supply shortage prevails in the market, it becomes difficult to correct the misconception that quality control activity will mean cost increase. Nevertheless, effective promotion of quality control is essential in ensuring the improvement and stabilization of product quality in the future, and in strengthening cost competitiveness. Critical points in promotion of quality control are as follows:

- 1) To disseminate the true concept of quality control as the means to materialize rationalization of the production process and of reducing cost. And to correct the wrong perception that "quality control equals inspection to prevent the shipment of defective goods;"
- 2) To understand the need for testing methods standards, and testing standards (be it internal or industry standards) that shall serve as basis for quality control, and to understand that efforts to develop such standards contribute to accumulation of technology; and
- 3) To institutionalize the official support for such efforts by individual companies.

As for ISO 9000 series, more than 10 companies belonging mainly to the export industry are reportedly considering certification, but only two of them are taking actions.

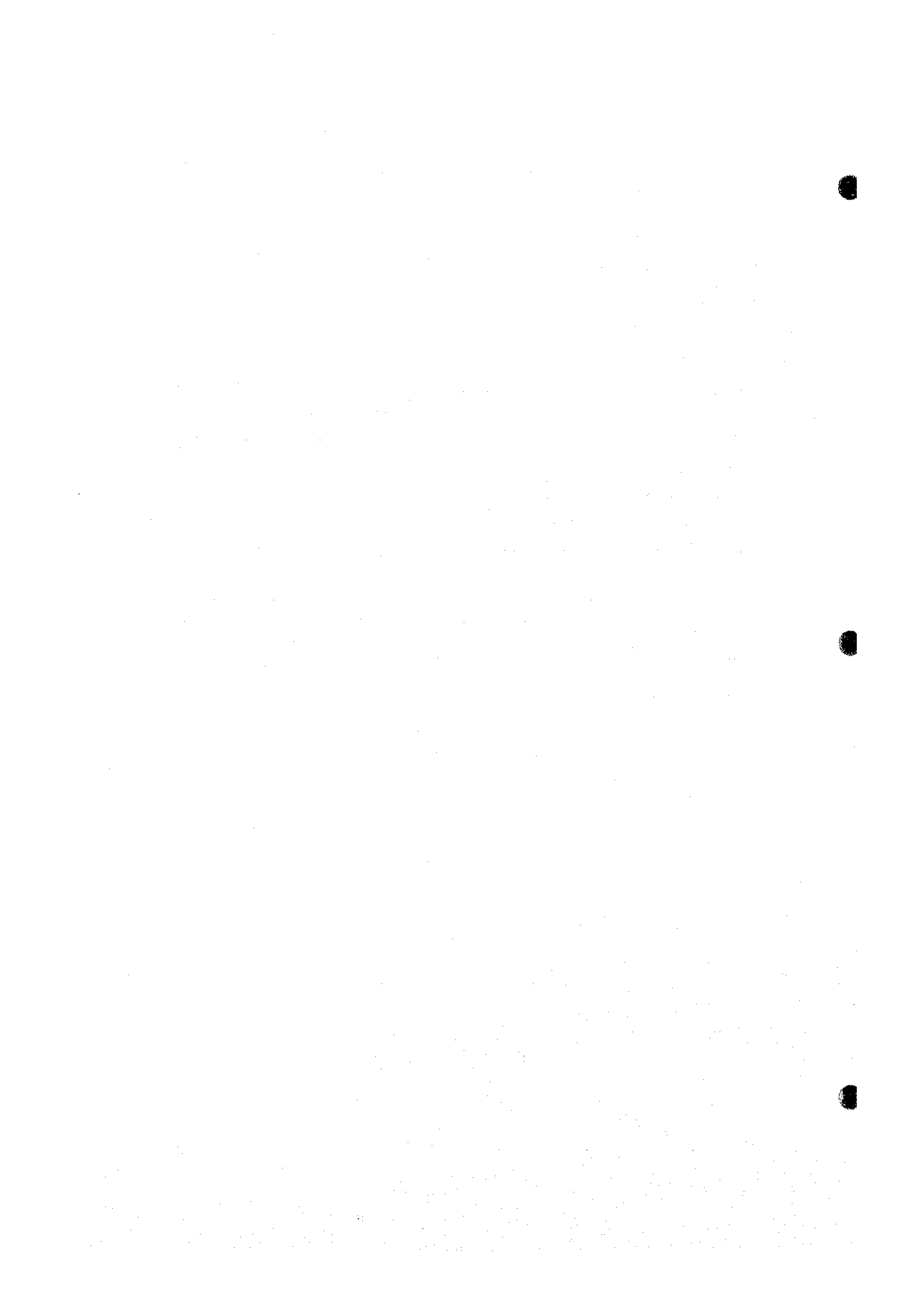
6.3 Required Promotion Activities for Quality Control

As for the organizations engaged in promotion of quality control, as discussed in the above, their number and performance are still limited compared to other countries. Their basis of organization is weak and training activities are fragmentary. The following will be essential in enhancing the promotion of quality control in this country:

- 1) Establishment of center organization, which undertakes research on quality control technology suitable for this country, and disseminate it on the basis of well organized long-term dissemination plan. The actual training activities may be undertaken by various organizations, which have training courses as presented in the above. However, this proposed organization will provide these organizations with an adequate

curriculum and training materials with instructor training on the basis of their research works.

- 2) To make use of resources available in this country, qualified persons as quality control instructor should be registered at appropriate organizations which can be private companies, government agencies, research institutes, or academe. A follow-up system in providing updates on QC information for these personnel will also be useful to maximize resources.
- 3) It is difficult for a local company to obtain documents and materials for the improvement of quality control, as these are not widely available or have not been translated to Indonesian language. Under these circumstances, it is important to establish or improve general access to such information, by making available libraries in major cities in addition to the central facility.
- 4) The quality system based on ISO 9000 series imposes extreme burden among small enterprises, which are still facing difficulty in learning the basic technology. It is also true, however, that the development of industries with workable linkage and structure will require the refocusing of quality control concerns of small-and-medium-sized enterprises. For this purpose, the development and dissemination of quality control systems that are viable for small enterprises to implement is timely.



7 Strategy for Industrial Standardization and Quality Control Promotion

7.1 Role of Standardization and Quality Control in Industrial Development

7.1.1 Role of industrial standardization and quality control, and major considerations to their promotion

To effectively promote industrial standardization and quality control, correct understanding of the roles of standardization and quality control as well as their mutual relations is essential.

Quality control is mainly implemented in production fields by individual companies¹⁾. Evolution of standardization beyond individual companies into industry-wide, national, and international levels, contributes to the improvement of efficiency of distribution and economy. In particular, individual companies through their production activities benefit from standardization as standardized products and methods are adopted, allowing them to perform effective quality control practices. In other words, standardization is not an end in itself, but is considered rather an initiative to translate results into production and distribution systems in the form of promotion of quality control²⁾. Thus, standardization and quality control have an inseparable relationship.

(1) Quality control

The limited understanding on the basic concept of quality control serves as a bottleneck to its dissemination among Indonesian industries.

Many still misconstrue that quality control is costly that it and leads to lower productivity. This misconception often arises from the fact that many people regard inspection are quality control as one and the same. Inspection-oriented quality control

¹⁾ The concept of quality control is no longer limited to factory floor. It has expanded to marketing and administrative areas. By the same token, quality control is not confined to an individual company who also requires its suppliers to pursue and achieve the same level of quality. In reality, however, different companies are not likely to adopt exactly the same method for quality control. Here, standardization comes into play. The same level of quality control is accomplished when different companies follow the standardized concept and approach of quality control.

²⁾ National standards provide the value to the industry only when they are used as the basis of manufacturing products having a sufficient level of quality. The development of national standards must be accompanied with dissemination of quality control that motivates industries to manufacture products meeting prescribed quality standards. Otherwise, standards will turn into mere slogans. In Japan, one of the impetuses that has brought its current economic success lies in industrial standardization and quality control that have been moving forward side by side. In particular, the JIS mark certification system has set visible targets for manufacturers; to produce JIS-conformed products; to improve production technology, and promote statistical quality control.

requires added costs for equipment and manpower. Also, the rise in design quality level sometimes leads to a higher cost. Quality control if effectively incorporated into the production process can reduce defects, and minimize the need for reworking and adjustment. The result is higher productivity and lower cost. In addition, if the intended quality level meets consumer demand, sales will increase resulting to a scale of economy in production and further cost reduction.

Dissemination of quality control not only helps rationalize production activity of individual companies, but contribute greatly to structural development of the industry by fostering suppliers of reliable raw materials and parts. Structural development of the industry takes place as the entire production system creates or boosts availability of raw materials and parts from local suppliers, which previously had to be imported or manufactured in-house. Internal production, serving only captive consumption of limited size, is not an effective way of establishing production technology, nor does it offer competitiveness in cost or price compared to specialized manufacturers having expertise and manpower. Quality control helps in nurturing such specialized manufacturers who can be relied on for the production of raw materials and parts, thus ensuring better allocation of production resources among industries.

Quality control is closely associated with standardization in the following two areas: 1) the improvement of technical standards and methods, and 2) the improvement of quality control techniques.

Quality control utilizes the application of standardized technical standards and methods to improve and stabilize the quality of products, raise product yield, and increase productivity in shop floors and distribution channels. At the same time, strict enforcement of quality control visualizes the need for further standardization. This means that quality control starts from efforts to comply with established standards, national or international, and then further going beyond it. It must aim at meeting present and future consumer needs and quality requirements. Such market-driven goal prompts the development of new standards at the industry's level, which are then reflected in national and international standards.

The evolutionary notion also applies to quality control methods. At present, quality control methods are increasingly adhering to international standards. Nevertheless, the success of quality control is heavily affected by human, social and cultural factors. The transplanting of international standards does not warrant that they take root in any country. Instead, they have to be used as the basis for developing new methods suitable under local conditions, which can then be standardized to flourish as the country's industrial foundation.

(2) Standardization

Standardization is a major driver for rationalization and streamlining of production activities as well as in the simplification of commercial trade. It is the process enabled by producers, distributors, users, consumers, and other persons in a neutral position. It has inherent international perspective, and provides a technological base that promotes economic exchanges on a global scale.

From the producer's perspective, standardization is a powerful engine that drives broad based reduction of production costs, and improvement of corporate performance in a variety of ways, including the improvement of production yield, the decrease in the number of customer claims, savings in raw materials and other inputs, reduction of per-unit energy consumption, rise in operating rate, and improvement of labor productivity.

For the government, standardization should not be viewed as mere regulatory measures. Rather it should be promoted as a vehicle for industrial development and economic growth. While the government is expected to take the initiative in the initial stage of promoting the standardization project, government-led standardization efforts alone do not produce desired result, and will not outrightly lead to an increased awareness of standardization. The national standardization project needs to be aligned with promotional projects at different levels including (1) international standards, (2) national standards, (3) association (industry) standards, and (4) corporate standards³⁾. In essence, standardization should involve concerted efforts through the participation of industries and companies in the national standardization project, and in the promotion of standardization within each company.

At the same time, international standards can spearhead standardization. Their effective use aids in transferring technology subject of international standards, and in saving costs in developing national standards.

(3) Limitation of industrial standardization and quality control and, change in their roles reflects the demands of times

1) Existence of technology specific to the industry as a prerequisite

As pointed out earlier, promotion of industrial standardization and quality control indirectly supports industrial development. Generally, industrial technology is divided into: 1) technologies specific to a particular industry, as design, processing, and

³⁾ For instance, the industrialization standardization move in Japan is largely driven by the establishment of JIS and the certification of JIS marks. At the same time, it has spurred the development of standards of various associations and companies, including JASO, which in turn support JIS and its value.

measurement, embracing product planning, R&D, manufacturing and inspection, and 2) control technologies that are linked to the specific technologies and heavily influence product quality, efficiency, and cost, e.g., quality control and production management. Needless to say, control technology such as quality control owes its very existence to a specific applied technology. While many industrial standards are closely associated with basic technology, such as product standards and testing methods, standardization and quality control per se (i.e., activities that promote standardization and quality control) functions as control technology. They can contribute greatly in rationalizing production and distribution systems, but they need basic technology for them to work. In other words, standardization and quality control can work increasing the value of basic technology to the industry and society.

Take the automotive parts industry in Indonesia, for instance. At present, many primarily shaped materials are imported into the country. To promote localization of these products, local companies must have the ability to produce them in accordance with quality standards required by the auto industry. In fact, there are many foundries which are expected to have capacity to produce primarily shaped materials in the future. For second-tier companies who have modern foundry technology (specific technology) at a certain level with the introduction of advanced equipment, availability of standards specifying strength of a product and its testing method would be an effective technical yardstick for quality control, unless they have particular quality control standards, such as those specified by their customers. Such standards can be used as the targeted level of technology by a company in improving its technology level by utilizing specific technology and improving their control methods. Eventually, it may be able to achieve or exceed the target level. On the other hand, the situation is different for small enterprises as well as micro enterprises which constitute a majority of the foundry industry. First of all, they do not have measuring equipment and technology that can identify conformity of products with standards. Or if it is possible to identify, they do not have technological resources to improve their products to a level required by applicable standards.

Having said that promotion of standardization and quality control is highly effective in improving the efficiency of the industries and the economy, the above argument leaves one caution: neither standardization nor quality control has any effect without the development of technology specific to the industry. This bears an important implication on Indonesia. In particular, the focus of promotional efforts for standardization and quality control in the country should be placed on various industry sectors or companies that have their specific technologies, to maximize the effect of promotion.

2) Need for target setting aligned with strategic focus of industrial development

The target (issue) of industrial standardization and quality control varies greatly over time and among countries. The chief factor determining the target in a particular setting is the strategic focus (areas) of industrial development, which in turn varies from one industry to another.

The point can be illustrated by taking post-war Japan as an example. During the industrial reconstruction period (1949 - 1955), priority was given to the establishment of JIS in the fields of equipment and raw materials required for restoration of the war-torn industries. This was done by revising and updating standards established before or during the war. Another concern was the quality improvement of export goods. At that time, Japanese products were perceived as "cheap but low-grade goods" making quality assurance particularly important for export promotion. In 1948, the Export Goods Control Act was enacted, and intensive efforts were made to establish in the areas of export inspection standards and methods for light industrial products such as watches, cameras, and general merchandise.

After 1955, the liberalization of foreign trade prompted the development of standards for export promotion as well as those related to transformation of the existing industries, the fostering of small-and-medium-sized enterprises, basic and common items and areas, the security of safety and health of people, and protection of consumers.

Then during the era of high economic growth between 1956 and 1973, the target was in the development of industrial infrastructure and export promotion, particularly 1) standards conducive to rationalization and simplification of production and use, 2) basic and common standards, and 3) standards required for regulatory measures, such as safety standards for factories and mines.

In the moderate growth period after 1974, when the need for international cooperation was raised, efforts to develop industrial standards became consistent with three target areas, namely the development of industrial infrastructure, resource and energy savings, and the rise in standards of living in terms of quality of life. In addition, special themes were set forth in each of the long-term industrial standardization plans: pollution control including measuring instruments in the fourth plan (established in 1974); internationalization in the fifth plan (1981); and the information age, new technology, and international harmonization in the sixth plan (1986).

7.1.2 Basic framework for industrial development in Indonesia

(1) Coexistence of different types of industries and companies

At present, the basic framework for Indonesia's industrial policy is directed with emphasis to market mechanism, the liberalization of imports, and the privatization of state enterprises. This is a sharp contrast from the previous policies that vigorously pursued localization in a repeated attempt to free the country from dependence on imported industrial goods. The changes in industrial policy over time and its magnitude have prompted the development of different industries. In fact, the country is today accommodating three types of industries that are distinguished by management style, technology level, and target market, all being historically related in terms of their development.

1) During the periods when the government vigorously promoted localization and import substitution, policy priority was placed on protection of the local industries against foreign competition. Naturally, the industries which have grown under such protection policy often are weak in gaining international competitiveness. In fact, most Indonesian industries have emerged from serving the domestic market that has huge growth potential, and thus lack international perspective, this constituting its weak point. In particular, manufacturers of raw materials, capital goods, and consumer durables have these characteristics. Among industry subsectors covered by the present study, a majority is classified into these categories, including portions of the electronics and electrical equipment industry which cover home appliances, the industrial electric machinery and equipment industry, the auto and automotive parts industry, the agricultural machinery industry, and the ceramic building materials industry including wall and floor tiles.

2) The industries which were born during the period capitalized on industrial growth under the market mechanism, and consist of labor-intensive industries and some resource-intensive industries. They have been growing with some exposure to competition in the international market and with imported goods. Nevertheless, many of them have enjoyed benefits given a certain level of protection, except for subsectors of the electronics industry that target the export market only, and are less competitive compared to counterparts in neighboring countries. Among the subsectors subject of the present study, the electronic equipment and parts industry has been classified into this category.

3) Finally, there are the industries which have grown in response to an expansion of the domestic market. They primarily serve the domestic market and local consumers

preferences. Their products are far below those required in the international market in terms of cost and quality. Among the subsectors covered by the present study, the category corresponds to the unglazed roof tile subsector of the ceramic building material industry, and the metalworking subsector consisting of local small-and-medium-sized enterprises as well as micro enterprises.

The industries in categories 1) and 2) above contain diverse types in terms of ownership: a) foreign-affiliated companies and joint ventures, regardless of their principal markets, domestic or export; b) local enterprises (large and medium-sized enterprises) having close technology-based relations with foreign companies, including the use of brands; c) local enterprises (large and medium-sized enterprises) receiving a certain level of technical assistance from foreign companies and supplying raw materials and parts to joint ventures and foreign affiliated companies and local companies⁴⁾ mentioned before; and d) local small-and-medium-sized companies without relationship with foreign partners, which supply raw materials and parts to local companies (large and medium-sized enterprises)⁵⁾.

(2) Expectation of the roles of the industrial sector in economic development and major considerations for industrial development

Under the ongoing economic development policy of the Indonesian government, the shift to an open market economy is a primary objective, with the industrial sector holding the key to the success via an increase in industrial exports, and further promotion of import substitution. In addition to these rather traditional objectives, the industrial sector in the country is expected to establish itself as an independent and reliable sector with the ability to drive the economy in its take-off, as discussed in Chapter 3. To this end, the sector needs to be improved and reinforced in many respects.

At the same time, the country's industrial development strategy envisages the attraction of foreign companies in the use of their technology, capital and market power. In this connection, it is important to understand how Indonesia is positioned within the framework of international deployment of various industries, e.g., the establishment of overseas production bases by industrialized nations and the NIEs. In view of the tightened labor supply in Malaysia, Thailand, and Asian NIEs as a result of a rapid pace of industrialization in these countries, accompanied by an increase in salaries and wages, foreign companies see Indonesia as a new production base with high growth potential having 1) a certain level of technology, 2) a large domestic market with massive

⁴⁾ Including direct supply of consumer goods to the domestic market.

⁵⁾ Including direct supply of consumer goods to the domestic market.

potential purchasing power, and 3) abundant labor supply. Thus, future industrial development needs to be re-directed to allow the country to explore its advantages to the fullest extent.

To ensure the successful and sustainable implementation of the promotional strategy, a bottom-up approach of innovation of the industrial sector is called for. Innovation desired from the technological viewpoint is summarized as follows:

- 1) To improve productivity of the existing industries suffering from inefficient and high cost of operations, and to raise their product quality and performance to an internationally competitive level;
- 2) To strengthen inter- and intra-industry linkage by improving the quality and technology of local industries; and
- 3) To expand product exports including components and parts by boosting the reputation of Indonesian products in the export market.

Promotion of standardization and quality control if properly managed, can lead to their significant contribution in achieving the above objectives.

7.2 Strategies for Industrial Standardization and Quality Control Promotion

Successful promotion of industrial standardization and quality control can be measured by the following results:

- 1) Quality control that brings about productive results to the production and distribution system is accepted on an industry-wide basis.
- 2) The industries spontaneously participate in development of standards to accelerate the development and updating of effective standards that meet required levels by the industries, and used as the basis of quality control⁶⁾.
- 3) Quality control methods and certification systems used in Indonesia become internationally recognized.

These objectives can be achieved through the following approaches, 1) dissemination of standardization and quality control to related industries, and 2) the establishment and development of an organization and system that would promote standardization and quality control.

⁶⁾ As pointed out earlier, national standards are not only standards used for quality control, and in-home standards as well as industry standards are also focused in this context.

In Indonesia, the need to promote standardization and quality control was widely recognized with some efforts having been taken so far. Yet, such efforts have not been so successful. Reasons cited vary across industry subsectors, and types of companies in each subsector. The following section reviews the perceived need for promotion of standardization and quality control by type of enterprise in each subsector covered by the study, the major impeding factors, and possible solutions.

(1) Foreign-affiliated companies and joint ventures

These companies are particularly dominant in the auto and automotive parts industry, the electrical and electronics industry, and the metalworking industry which are all covered by the present study⁷⁾, and are urged to increase their international competitiveness. In particular they are expected to 1) achieve scale of economies in production by exporting products that are produced for a market of limited size, and 2) reduce costs by increasing local procurement of raw materials and parts that are currently imported.

These companies are already implementing relatively high levels of standardization and quality control. Their primary concern lies in responding to the need of securing the quality and performance of local products in order to accelerate local procurement. They aim to improve productivity of suppliers through elaborate quality control and to boost the availability of locally produced components and parts with competitive quality and price. At present, this can be accomplished by procuring mostly important parts and primarily shaped materials from foreign-affiliated suppliers including joint ventures operating in Indonesia or through imports. On the other hand, the quality of products purchased from local companies is assured to be inspected 100%, mainly through visual check, on the supplier side. But some items are not covered by visual check, so it is desirable to assure product quality by means of in-process control by suppliers, replacing the acceptance inspection by customers.

The second biggest concern of foreign-affiliated companies related to quality control is proliferation of quality awareness to their employees. Generally, foreign-affiliated companies and joint ventures have their own established brands promoting them to secure product quality and performance so as to meet standards set by each brand. For this purpose, most companies have transplanted quality control systems of their parent companies and control product quality by applying in-house standards. At present, this arrangement produces mostly satisfactory results, for which the staff sent by parent companies play a critical role. Most companies still have to establish independent

⁷⁾ In another subsector covered by the study, the ceramic construction material industry, no foreign-affiliated companies nor joint ventures are operating.

quality control systems that are operated by local employees. While quality check in each process is performed by, and inspection methods up to data recording have been transferred to local staff, the use of the inspection result, i.e., in finding a cause for defect and to devise corrective measures, requires advice and guidance of staff sent by parent companies. Many companies have been training quality control personnel through their own programs, as well as training at their parent companies. However, with an accelerated rate in demand growth, it will exert pressure on companies' resources because 1) of the anticipated increase in production activity demand more than the quality control personnel, and 2) quality control training requires time and cost as it starts from quality awareness and knowledge of statistical data processing that constitute the fundamentals of quality control techniques. To overcome the situation, public organizational support is desirable to provide basic education and training.

As for standardization, these companies do not feel the need for participating in efforts of developing standards, because they basically rely on foreign standards, i.e. those of parent companies, and have rarely used Indonesian standards. However, they will increasingly be aware of the need to actively involve in the development of Indonesian standards so as to ensure that they are applied to the current production and distribution systems without confusion. In addition, they will be increasingly demanded to 1) develop products meeting local needs, and 2) develop and use Indonesian standards for local procurement purposes. Further, with the interest of promoting standardization efforts, these companies are expected to take the lead as well as in updating Indonesian standards for it to become widely acceptable in actual industrial operation.

(2) Local large and medium-sized enterprises directly dealing or having alliance with foreign-affiliated companies and joint ventures

The major challenges for these companies which are particularly from the auto and automotive parts industry, the electrical and electronics industry⁸⁾, are 1) to reinforce competitiveness by raising production yield, and 2) to promote cost reduction through an increase in scale of production by exports.

Quality control activities of these companies are based upon instruction of their customers or partners (foreign-affiliated companies and joint ventures) and take the form of education and training at foreign partners' facilities or technical assistance. They only have minimum required equipment for quality control. Likewise, as seen in the previous section, their quality control ability of the local staff is fairly limited. This is evidenced by the fact that none of these companies apply quality control data collected at

⁸⁾ There is no ceramic building material manufacturer classified into this category.

field to "kaizen" (improvement) efforts. Since these companies conduct quality control in each process, quality control has become effective in preventing shipments of defective products. However, efficiency in production remains unimproved mainly because of the limited knowledge and experience of quality control personnel, and partly due to the lack of incentive in a fairly protected market environment where products are mostly purchased by customers.

These companies use foreign standards specified by their customers, but few modify them and accumulate into internal standards as the basis of subsequent technological development. Thus, standards will not likely contribute to the improvement of technical capability. This fact is closely related to the lack of "kaizen" efforts in the quality control activity as discussed above. As a result, they keep on using standards and manuals that are provided by outside sources, i.e., internal standards provided by customers or foreign standards. The quality control concept has to be understood by the management and quality control personnel.

As seen in foreign-affiliated companies and joint ventures, it is desirable to make certification and inspection in Indonesia acceptable to the export market by meeting requirements for certification of product quality, and of the system demanded by importing countries in preparation for the anticipated increase in exports of products (parts).

(3) Large and medium-sized enterprises serving the domestic market

Among the subsectors covered by the present study, companies of this type are seen in the metalworking industry, the electronics and electrical industry - particularly, the industrial electrical equipment and home appliance subsectors - and the ceramic building material industry, mainly ceramic tiles (floor and wall) and glazed roof tiles. These industries expect to face increasing competition from imported goods as a result of market opening. In response, they should focus on 1) the strengthening of competitiveness through the improvement of operational efficiency, and 2) the improvement of target quality and performance levels.

All the companies introduced foreign technology with production equipment at the initial stage of operation. Thus, they also received technical assistance in quality control from foreign companies. While quality requirements are relatively high, price competition has not been intensive in these markets. As a result, quality control activity has been focused on the prevention of shipping defective goods than in the improvement of production efficiency. Also, quality and performance levels required by customers are below international levels.

Quality control equipment is not fully owned nor effectively used.

These companies will face increasing competition with low-cost imported goods, including the inferior ones. Unless they show quality competitiveness over imports, they may face a survival risk. Also, they have to make quality control as a company-wide effort, and consequently procure adequate equipment for quality assurance.

For this purpose, providing incentives aimed at improving of quality and performance, particularly the use of the certification system, is believed to be effective.

(4) Small-and-medium enterprises and micro enterprises serving the domestic market

Among the subsectors covered by the present study, these companies are found in the automotive parts industry (serving the after market, and not those dependent upon auto makers), the foundry and machining (metalworking) industries, and the unglazed roof tile industry.

These companies conduct few quality control activities, mostly limited to visual inspection at the final stage of production. Production technology is mostly copied from manufactured products in the past, and know how for it is limited to managers and some staff. Accumulation of technology through the development of internal standards (or manuals) is not seen.

In essence, these companies serve the markets that are more sensitive to price than quality, and accept the use of low-cost raw materials and parts having uncertain quality. Thus, there is no clear need for quality control among these companies, and market incentive seems to be the best way of promoting the value of quality control.

For these companies, incentives for quality control should be provided by the use of the certification system. While education and training need in order to be promoted to secure quality control personnel as the need arises.

Given the overall consideration to the existing environment for the promotion of standardization and quality control, the following are recommended as optimum strategies (Chart 7-1):

(1) For successful dissemination of standardization and quality control among industries

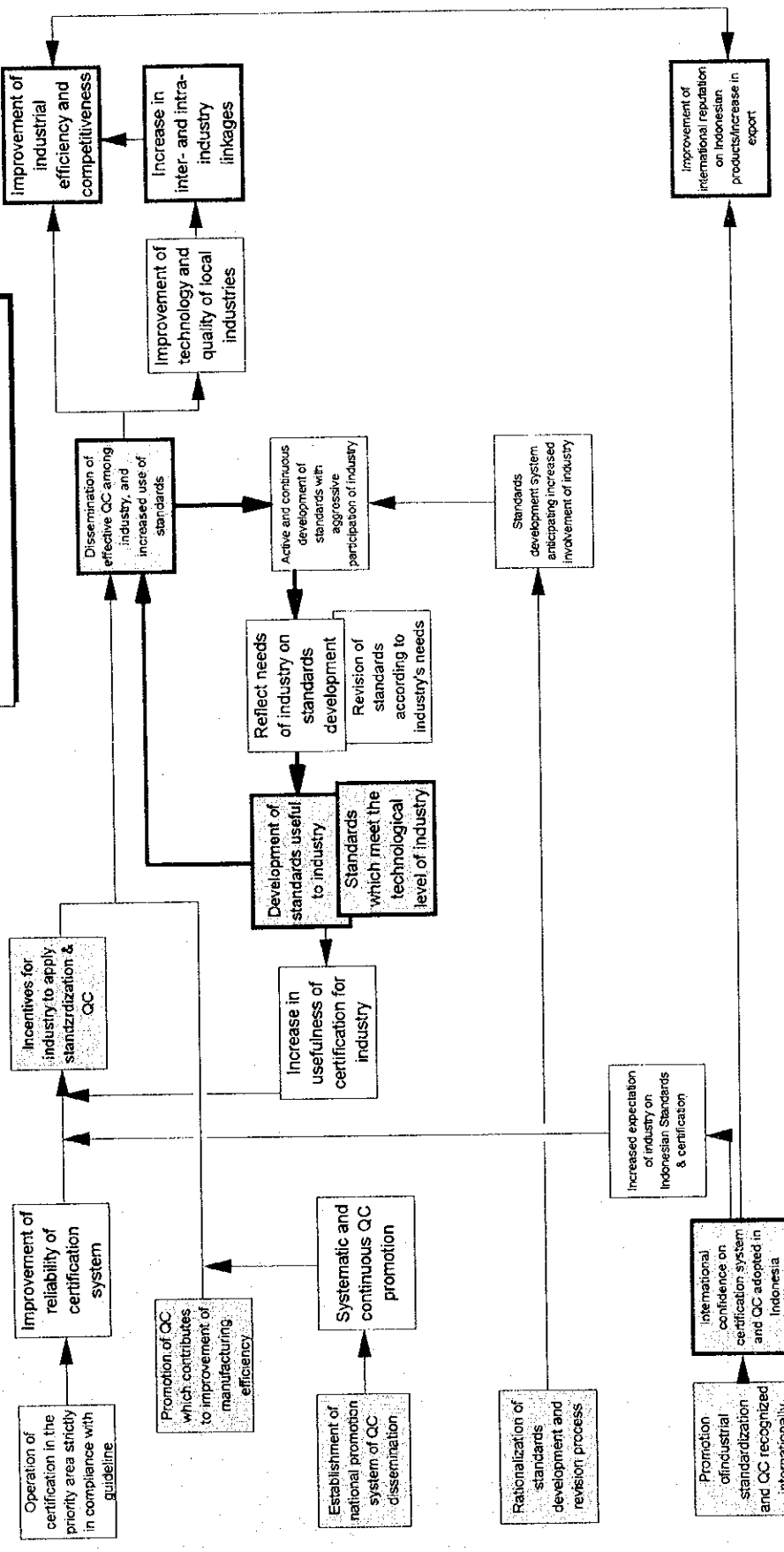
1) Except for foreign-affiliated companies and joint ventures, there is either a lack or very weak motivation for local companies to work with standardization and quality control. The first step therefore, should involve the initiation of motivation. The development of a certification system is expected to play a critical role here, as it becomes useful system for industries to rely on. This way, the industries are encouraged to raise its quality awareness while obtaining certification in the process. The following results are expected to be realized:

- a) They will be able to recognize the importance and effectiveness of industrial standards in production and distribution areas.
 - b) They will have the motivation to develop required standards (in the form of internal standards or industry standards) by themselves.
 - c) They will be motivated to participate spontaneously in the development of national standards relevant to their industries.
 - d) Revision of the existing standards according to industry's needs, and the encouragement to develop new standards, thereby increasing the value of such standards.
 - e) On the other hand, the establishment and operation of an effective and reliable certification system will help raise quality awareness among consumers and create an environment that urges industries to give priority to quality.
- 2) The concept and methodology of quality control conducive to the improvement of operating efficiency need to be disseminated to the industries, particularly among foreign-affiliated companies, joint ventures, and local large and medium-sized companies. This will produce the following results:
- a) The industries will be able to rationalize their operation; and
 - b) The industries will recognize the value of standards as the basis of quality control and will be encouraged to reflect on to their needs, as to the development of standards.
- (2) At the same time, the following strategies are recommended to enhance the system of promoting standardization and quality control:
- 1) To create an organization that will facilitate the development of standards according to industry needs. Such organization should be empowered to rationalize the standards development, update process, and provide easy access to industries for participation. The following results are expected.
 - a) The move to establish and update standards will be unleashed, while the use of standards will be encouraged to raise public awareness on their usefulness.
 - b) As a result, the industries can and will reflect on to their needs for future development of standards on a continuous basis.
 - 2) To establish an organization and structure that will take the lead in quality control drives at the national level, enabling the promotion of quality control in a systematic, organized, and sustainable manner.
 - 3) To make standardization and quality control system of Indonesia internationally

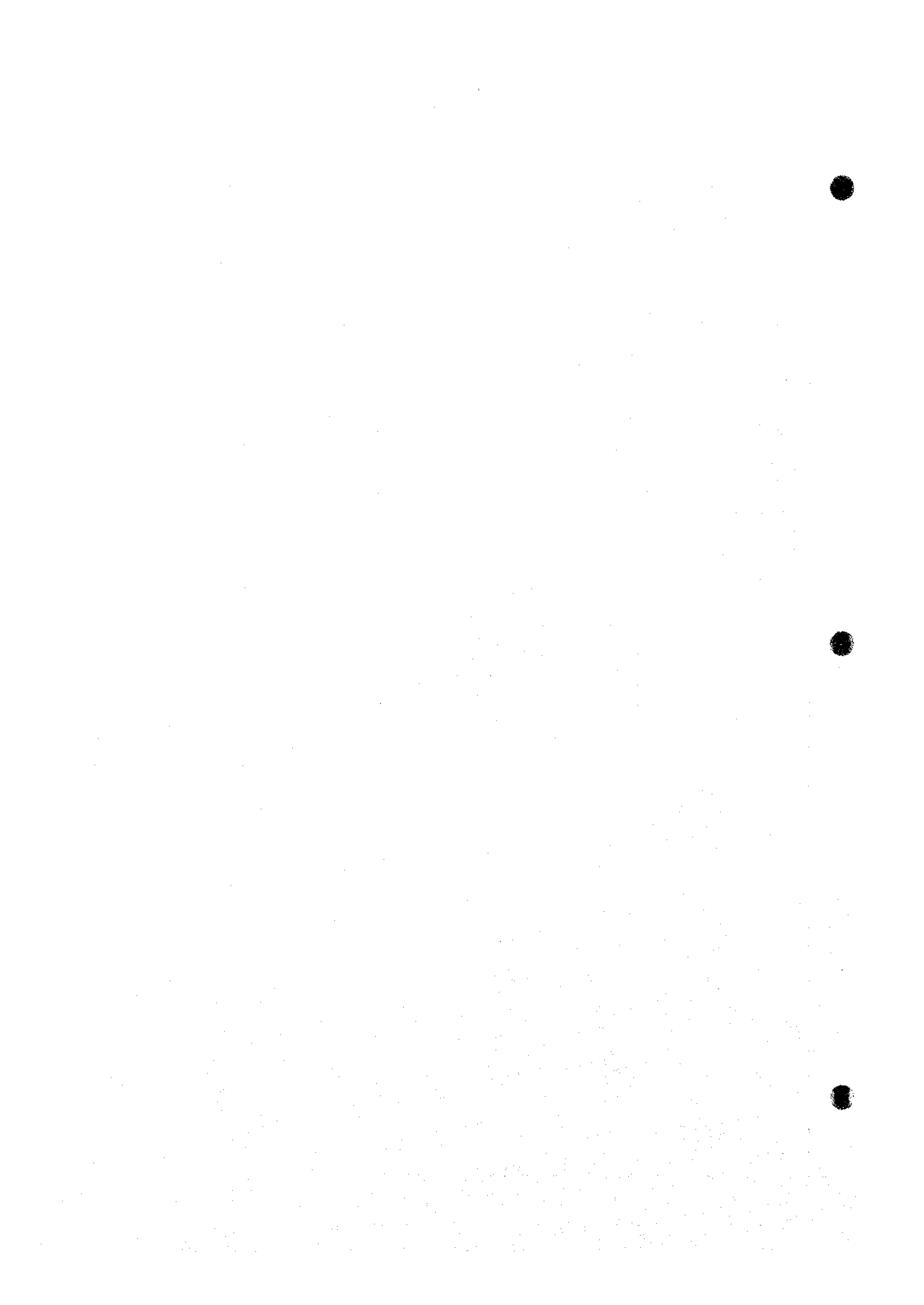
recognized. The following results are then expected:

- a) Expectation for growth in the number of industries adhering to Indonesian standards and certification system, as participation in the standardization process is encouraged.
- b) The frequent use of standards by industries will help in aligning standardization process with industry needs.

Chart 7-1: Basic Strategy for Industrial Standardization and QC Promotion



- Industrial development target
- Target of industrial standardization and QC promotion
- Strategic points for industrial standardization and QC promotion



8 Program Recommendation for Industrial Standardization and Quality Control Promotion

Introduction: Framework of Programs

The general framework of recommendation is summarized below. The recommendation consist of two strategic thrusts designed to increasingly disseminate standardization and quality control to industries, and intended to enhance a system that promotes standardization and quality control.

In addition to the programs that set forth actions for the promotion of industrial standardization and quality control, the following are recommendations that indicate the basic direction and methodology of ongoing standardization efforts.

The recommended action programs by related organization is discussed in Chapter 9.

For Successful Dissemination of Industrial Standardization and Quality Control to the Industries

Thrust 1: Improvement of Quality of Life and Quality Consciousness through the Implementation of Certification System

Program 1: Introduction of certification program for automotive replacement safety parts

Program 2: Introduction of safety mark certification program for home electrical appliances

Thrust 2: Improvement of Operating Efficiency of Manufacturing Industry and Promotion of Industrial Deepening through Increased Dissemination of Standardization and Quality Control

Program 3: Development and dissemination of quality system certification scheme specifically designed for small-and-medium-sized enterprises

Program 4: Establishment of registration scheme of quality system consultant

Program 5: Establishment of certification scheme for quality control officer in factory

For Enhancement of System for Promotion of Industrial Standardization and Quality Control

Thrust 3: Improvement of System for Standards Development and Dissemination to Meet the Demand of Industry

Program 6: Preparation for rationalization of standards development process

Program 7: Establishment of a system for enhancing standardization and quality control promotion

Program 8: Diversification of standard drafting process for increased involvement of industry

Program 9: Increase in public confidence on product certification system

Thrust 4: Establishment of an Internationally Recognizable Accreditation and Certification System

Program 10: Promotion of international mutual recognition of certification system

(1) FOR SUCCESSFUL DISSEMINATION OF INDUSTRIAL STANDARDIZATION AND QUALITY CONTROL TO THE INDUSTRIES

Thrust 1: Improvement of Quality of Life and Quality Consciousness through the Implementation of Certification System

Product quality most recognized by consumers is related to safety of daily use. By implementing a reliable product certification system that will cover safety aspects, quality awareness of consumers can be raised, which in turn will work as a leverage to urge manufacturers to take quality control initiatives. In the process, the effect of the certification and marking system will be realized. Positioning of programs under Thrust 1 within the overall plan is shown in Chart 8-1.

Program 1: Introduction of certification program for automotive replacement parts related to safety

Program description

Automotive spare parts in general, are directly purchased and fitted either by consumers or repair shops. While spare parts supplied by auto makers are manufactured according to safety standards established by each manufacturer, spare parts which are mere copies of genuine products are also distributed in the market. The latter when installed on cars, create a risk of accident that endangers not only drivers but other vehicles and pedestrians. The risk involved becomes very serious if the initiated component relates to safety of vehicle driving. Thus, it is worthwhile to introduce a product certification

program for parts that are widely distributed in the after market.

The program is expected to entail the following actions.

(1) Development of standards for automotive parts related to safety

The conduct of a survey is necessary to determine distribution of automotive spare parts (including those distributed via retail outlets and repair shops) and to identify spare parts, both imported and locally produced, sold in volume, except for genuine parts sold under brands of auto makers. Then, those parts that have close bearing to driving safety and pollution control will be selected as candidates. Based on hearings conducted involving auto industry, the automotive parts industry, the automobile repair industry, parts retailers, and general consumers, spare parts requiring certification will be selected and priorities will be established. For products that are perceived high priorities, standards will be established. For the time being, foreign standards such as JIS and JASO, and international standards, may be used where applicable.

(2) Increased involvement of the relevant industrial associations in standards development and dissemination

Participation of representatives from the auto industry, the automotive parts industry, the automobile repair industry, parts retailers, and general consumers in development of standards will be encouraged. In particular, active participation of IATO is important.

(3) Upgrading R&D capability for development of automotive parts standards related to safety

While most standards related to automobile safety can be made to internationally applicable standards, some need to be fine tuned to local conditions in each country. For this purpose, it is recommended to establish a project team within a research institute (for instance, B4T) in conducting research and study on selected spare parts according to the level of urgency and priority, thereby collecting data required for a study of related standards. Such research activity will also be useful in nurturing the ability to develop new products for the industry in future.

(4) Establishment of standards for automotive parts

Based on the results of the research project, the standards will be established for parts including that of testing method. At the same time, foreign and international standards used as provisional standards will be revised as actual data are obtained.

- (5) Introduction of certification system for automotive replacement parts related to safety

Spare parts for which standards have been established and related tests can be conducted will be designated as products eligible for certification. The certification will be implemented by applying the mandatory SNI certification system under SSN. When this system is implemented, it must be in line with related regulation wherever they exist.

- (6) Development of testing and inspection system required for the certification of automotive parts

To maintain public confidence in the certification system, there should be sufficient resources to carry out tests for all the spare parts requiring certification, including imported products. In practice, however, testing requirements far exceed capabilities of public testing organizations, which need reinforcement by infusing major investment. Nevertheless, the auto makers and large suppliers have a variety of testing and inspection equipment that are considered vital resources. In view of this, the accreditation system for testing organizations should be revised (Program 9).

Key Success Factors

- 1) Mandatory certification can be enforced in two ways. First, standards or certification can be made compulsory within the framework of SSN. Second, is to regulate the safety of automotive parts by enactment of a law to establish requirements. The latter is desired from the viewpoint of an ideal standardization process for the country, as will be discussed later. This field of work, however, may be handled by Ministry of Transport as indicated in Chart 4-4. In this case, safety regulations are established for parts standards.
- 2) Spare parts subject of certification will be selected in consideration of the availability of testing resources. Once the certification system starts, it should be strictly enforced to include marking requirements for all the certified products. Efforts to exclude unmarked products from the market in order to maintain public confidence would likewise be necessary.
- 3) Substandard spare parts presumably include many imported products, which should also be subject to certification. In this connection, the certification system should include certification requirements for importers of products subject to mandatory certification.
- 4) Enforcement of the certification system requires cooperation of the auto and automotive parts industries. A public campaign to promote the link between quality and the marked products should be fully supported by the government in order to

obtain the understanding by the industries of the benefits under the program, and to prevent undue cost increase on the part of participating manufacturers.

Suggestion for Implementation

(1) Organizational setup

- 1) Leading agency: DG, MOI
- 2) Other supporting and implementation bodies
 - a) Study on distribution of spare parts, and selection of candidate products: DG, MOI
 - b) Development of draft standards for automotive safety parts, and encouragement of trade organizations to participate in the development and dissemination of standards: PUSTAN, MOI
 - c) Testing and inspection required to develop safety standards for automotive parts: B4T
 - d) Introduction of the certification system for automotive safety parts : DG, MOI
 - e) Mobilization of testing resources for certification tests for automotive parts: PUSTAN, MOI

(2) Implementation steps

In some countries, the certification system is operated under the voluntary management of trade organizations. However, in Indonesia where there is a general lack of quality awareness among the industries, voluntary management may result in arbitrary enforcement of the system. Instead, mandatory certification is considered as a good starting point, then shifting to voluntary management when the system is widely adopted by the industries.

Implementation steps are described as follows.

Year :	1st	2nd	3rd	4th	5th
Program 1: Introduction of certification program for automotive replacement safety parts					
1) Study on market of automotive replacement parts	██████████				
2) Selection of parts for the certification		██████████			
3) Development of standards for the parts		██████████	██████████		
4) Legislative preparation for the regulation (*)	██████████				
5) R&D required for development of standards		██████████	██████████		
6) Revision of testing labo accreditation scheme	██████████	△			
7) Development of testing/inspection system for the scheme			██████████	██████████	
8) Start of operation of the certification scheme				▲	

Note: The above steps include the initial step for preparation only.

(*) Including the preparation for application of the program to the imported products.

- (3) Prerequisite actions for program implementation
 - a) Application of mandatory certification to imported goods¹⁾
 - b) Reassessment and revision of the accreditation system for testing organizations (Program 9)

Program 2: Introduction of safety mark certification program for home electrical appliances

General consumers tend to choose home appliances based on price rather than quality. However, some products in the market do not meet minimum safety standards, and have a risk of endangering the life and property such as due to electrical leak and overheating. To exclude products from not complying with safety standards in general distribution, a product certification program is recommended to be introduced for widely sold home appliances that require safety precautions which can easily be copied.

The program will entail the following actions:

- (1) Development of standards for home appliances related to safety

Among home appliances on distribution, those having serious implications on consumer safety (e.g., a risk of electrical leak or fire damaging personal life and property) will be selected as candidates for mandatory certification. Based on opinions obtained from the electrical equipment industry, the retail industry, and general consumers, products subject to mandatory certification will be selected in order of priority. Then, standards will be established for products with high priority. As interim measures, foreign standards including JIS as well as international standards will be used as provisional standards.
- (2) Increased involvement of the relevant industrial associations in the development and dissemination of standards

Representatives of the electrical equipment industry, the retail industry, and general consumers will be invited to participate in the standards development process.
- (3) Upgrading R&D capability for the development of standards for home appliances related to safety

While most standards related to safety of home appliances are internationally

¹⁾ If the procedure for applying mandatory certification to imported goods takes time, the alternative way may be for Indonesia to make request to exporting countries for the application of certification system of these countries to their exporting products

applicable, some need to be customized to local requirements and conditions in each country. Such standards have to be developed through field research including various tests and experiments. For this purpose, it is recommended to establish a project team within a research institute (for instance, B4T) which will conduct research and study on selected products according to the order of priority, thereby collecting data required for development of safety standards. The research project will also be useful in nurturing the ability to develop necessary components and parts for the industry in future.

(4) Establishment of standards for home appliances related to safety

Based on the result of the research project, new safety standards will be established. At the same time, foreign and international standards used as provisional standards will be revised to reflect actual data obtained.

(5) Introduction of certification system for home appliances

Products for which standards have been established and related tests can be conducted will be designated as products applicable to the certification. As the legal basis of the certification system, a law ensuring the safety of home appliances will be enacted by the Ministry of Industry to require the use of the designated products that conform with the standards.

(6) Establishment of testing and inspection facility for certification tests for home appliances

To maintain public confidence in the certification system, it is important to have the ability to test all the products designated for certification, including imported ones. In practice, however, there are few testing organizations in the country that conduct required tests for home appliances. PLN and a testing laboratory planned by the Ministry of Mining and Energy are limited to testing related with industrial electrical equipment particularly cables and wires. B4T is reportedly capable of conducting some tests that are limited in scope. Under these circumstances, it is recommended to establish a testing organization in or around Jakarta²⁾. An example of list of testing equipment required for the testing organization is shown in Chart 8-2. In this list, the equipment is assumed to be procured step by step starting from that of basic needs. The list, however, includes the equipment available at the existing testing laboratories.

Nevertheless, conducting all the required tests at public testing organizations will

²⁾ The testing organization in Bandung should focus mainly on research, and human resources development, while an organization specializing testing service should preferably be established in and around Jakarta where there is large demand.

require large investment which will likely become a bottleneck for future expansion of the certification system. Alternatively testing equipment owned by electrical equipment manufacturers can be used. For this purpose, the accreditation system for testing organizations should be reviewed (Program 9).

- (7) Establishment of guidelines for implementation of quality system adequately focusing on the home appliance industry

In enforcing the certification system, technical support must be extended to existing companies which are not able to comply with certification standards, particularly small-and-medium-sized enterprises. The current product certification system reviews the quality system in addition to product quality and performance. However, the quality system is generally based on ISO 9000 and cannot be immediately complied with by local small enterprises. As discussed later, enforcement of the certification system should accompany support for small-and-medium-sized enterprises by developing and disseminating the quality system specifically designed for them (Program 3).

Key Success Factors

- 1) Mandatory certification can be enforced either by establishing compulsory standards or certification, or enacting a law ensuring product safety in establishing requirements including certification. The latter is desired from the viewpoint of establishing an ideal standardization process for the country, as will be discussed later. In this case, safety standards are established separately from the law which will cite such standards to show legal authority.
- 2) Products subject to mandatory certification will be selected in consideration of availability of testing resources. It should be noted that the safety problem is not likely to occur in products that are selected by consumers on the basis of brands. Thus, the certification system should focus primarily on products for which brands are not established, and are less-preferred by consumers by appearance. Also, once the certification system starts, it should be strictly enforced, to include marking requirements for all the certified products. Efforts to exclude unmarked products from the market, in order to maintain public confidence should also be necessary.
- 3) Products with no assurance of quality presumably include many imported products, which should also be subject to certification. In this connection, the certification system should cover certification requirements for importers of products subject to mandatory certification.
- 4) Enforcement of the certification system requires cooperation of the related industries. A public campaign to promote the link between the quality and the marked products

should be fully supported by the government in order to obtain the understanding by the industries of the benefits under the program, and to prevent undue cost impacts on participating companies.

Suggestion for Implementation

- (1) Organizational setup
 - 1) Leading agency: DG, MOI
 - 2) Other supporting and implementation bodies
 - a) Study on distribution and consumption of home appliances, and selection of candidate products: DG, MOI
 - b) Development of draft standards, and the encouragement of industry to participate in development and dissemination of standards: PUSTAN, MOI
 - c) Testing and inspection required to develop safety standards: B4T
 - d) Establishment of safety standards: PUSTAN, MOI
 - e) Introduction of the certification system: DG, MOI
 - f) Mobilization of testing resources for certification tests: BPPI, MOI

(2) Implementation steps

In some countries, the certification system is operated under voluntary management of trade organizations. However, in Indonesia where there is a general lack of quality awareness among the industries, voluntary management may result in arbitrary enforcement of the system. Instead, mandatory certification is considered as a good starting point then shifting to voluntary management when the system is widely adopted by the industries.

Implementation steps are described as follows.

Year :	1st	2nd	3rd	4th	5th
Program 2: Introduction of safety mark certification program for home electrical appliances					
1) Selection of home appliances for the certification	[Bar from start of 1st year to end of 1st year]				
2) Development of standards for the appliances	[Bar from start of 1st year to end of 2nd year]				
3) Legislative preparation for the regulation (*)	[Bar from start of 1st year to end of 1st year]				
4) R&D required for development of safety standards	[Bar from start of 1st year to end of 2nd year]				
5) Development of testing/inspection system for the scheme	[Bar from start of 1st year to end of 3rd year]				
6) Start of operation of the certification scheme					
Program 3: Development & dissemination of QC system for SMEs					
Program 5: Establishing certification scheme for QC officer					
Program 7: Establishing organization for standard'n and QC promotion					
Program 9: Revision of testing labo accreditation scheme					

Note: The above steps include the initial step for preparation only.

(*) Including the preparation for application of the program to the imported products.

- (3) Prerequisite actions for program implementation
- a) Enforcement of the mandatory certification system to imported products
 - b) Establishment of an electrical product testing laboratory
 - c) Reassessment and revision of the accreditation system for testing organizations (see Program 9)
 - d) Development of quality system specifically designed for small-and-medium-sized enterprises (Program 3)

Thrust 2: Improvement of Operating Efficiency of Manufacturing Industry and Promotion of Industrial Deepening through Increased Dissemination of Standardization and Quality Control

At present, the primary objective of industrial standardization and quality control promotion in Indonesia is to build the foundation of the industrial sector for sustainable development in the future, by improving its operating efficiency and promoting inter-industry linkage. Among the diverse types of enterprises in the industrial sector, foreign-affiliated companies, joint ventures, and local companies having foreign partners or exporting their products, are fully motivated to work toward industrialization and quality control, as these efforts are essential in surviving in a highly competitive environment. Thus, the standardization and quality control promotion program for these enterprises should be limited in support to areas where they face difficulty in overcoming individually. On the other hand, small-and-medium-sized enterprises operating in the much less competitive environment must be motivated by more focused encouragement measures. This section recommends: 1) the establishment of a program to support quality control efforts of the overall industrial sector, which consists of a) the quality system consultant registration scheme, and b) the quality control personnel fostering program; and 2) the development and dissemination of the quality system certification scheme for small-and-medium-sized enterprises with a view of disseminating quality awareness and quality control practice, in accordance with the conditions of small-and-medium-sized enterprises.

Program 3: Development and dissemination of quality system certification scheme specifically designed for small-and-medium-sized enterprises

Program Description

At present, there is a marked difference in technology and quality between two distinguished groups of companies, local small-and-medium-sized enterprises on one hand, and joint ventures, local companies having foreign partners, and local large

enterprises on the other. The difference is reflected by the fact that the latter imports raw materials and parts which are also available from the former. Clearly, the improvement in the quality of products supplied by small-and-medium-sized enterprises holds the key to the balanced development of the industries as a whole. Yet, implementation of the quality control system by smaller enterprises is difficult in many respects, particularly educating managers and employees to understand the need for quality control and its effect, dissemination of quality control methods, and fostering of quality control personnel. The program is in recognition that full-scale implementation of quality control under ISO 9000 series is very difficult for small-and-medium-sized enterprises. Instead, it promotes adoption of the quality system which targets achievement rate of 60 - 70% from those in ISO 9000 series, and is designed to serve as the first step to facilitate upgrading to high levels.

This kind of intermediate system, however, is not suitable for those enterprises who actively export their products, since the application of such system will tend to result adversely as the enterprises become incapable of applying ISO 9000 series quality system. In Indonesia where a domestic market is large and many small enterprises rely on domestic demand, however, the intermediate system is considered to be very effective.

Naturally, the success of the system also depends upon the existence of an organizational setup that will support its promotion (see Programs 4, 5 and 7).

(1) Design of quality system suitable for small-and-medium-sized enterprises

Based on the quality system complying with ISO 9000 series, a similar system envisaged for small enterprises will be established. The quality system will cover items to the extent of 70% of those in ISO 9002³⁾. It is designed to facilitate the understanding of the "kaizen" concept (or continuous improvement) and methodology through practicing the quality control by the system.

(2) An organizational setup for the promotion of above-mentioned quality control system

An organizational framework for the promotion of the above quality control will be established, consisting of the following functions:

- a) Management and promotion of the certification system, and advertisement of certified factories
- b) Technical assistance for small-and-medium-sized enterprises (see the "quality system consultant registration scheme" and "quality control officer certification scheme")

³⁾ "DSN-Module I" may be used for this purpose, though the detail is not reviewed in this study.

c) Partial financial assistance for the cost of implementation of the quality control system

(3) Implementation of the certification system

Technical assistance will be provided for small-and-medium-sized enterprises who plan to introduce the control system. Those who have successfully implemented the system will be registered and receive a registration certificate. The registered companies will be publicized through mass media.

(4) Adequate support

Making known the factories certified under the quality system known to the public will provide other companies looking for local sources of raw materials and parts, with a list of candidate companies. Also, requiring certification for government procurement will encourage manufacturers to introduce the quality system.

(5) Financial assistance to small enterprises in soliciting the services of qualified quality consultant

To reduce financial burdens of small-and-medium-sized enterprises which will introduce the quality system, the cost for hiring a consultant will be partially financed by the government.

Key Success Factors

1) Quality control cannot be accomplished over night. It has to be acquired over a long period of improvement and refinement to fit the company's requirements. At present, there is no strong incentive for small-and-medium-sized enterprises mainly serving the domestic market to initiate quality control efforts. Under these circumstances, the government is expected to play an active role in disseminating quality control from the viewpoint of promoting future inter-industry linkage. A clear evidence that quality control can produce visible business results is essential, in addition to providing information related to the basic quality control concept and method, as well as fostering of quality control personnel. Possible measures include the publication of a list of certified companies providing information that can be used as the basis for selecting suppliers by large companies, and making certification one of requirements for participation in the government procurement process.

2) Further support for small-and-medium-sized enterprises which plan to introduce the quality control system holds the key to the success of the program. In addition to actions proposed in the previous section, support by the local chamber of commerce and other organizations will prove to be useful.

Suggestion for Implementation

- (1) Organizational setup
 - 1) Leading agency: PUSTAN, MOI or the promotion organization for standardization and quality control as will be described later
 - 2) Other supporting and implementation bodies
 - a) Management of the certification system: PUSTAN, MOI or the promotion organization for standardization and quality control described later
 - b) Development and improvement of the quality control system: PUSTAN, MOI or the promotional organization for standardization and quality control as described later
 - c) Technical assistance for small-and-medium-sized enterprises who plan to introduce the quality system: DG, MOI, and the "(certified) quality system consultant" described later
 - d) Financial assistance to cover the cost for implementing the quality control system: DG, MOI

- (2) Implementation steps
As described below.

Year	1st	2nd	3rd	4th	5th
Program 3: Development & dissemination of quality system certification scheme specifically designed for SMEs					
1) Design of QC system suitable for SMEs	■				
2) Organizational setup for promotion of the system		■			
3) Start of operation of the certification scheme			▲		
Program 7: Organization for standard'n and QC promotion	▲				

Program 4: Establishment of registration scheme of quality system consultant

Program Description:

When enterprises intend to establish the quality system based on the ISO 9000 series, they mostly use outside consultants, since they rarely have staff with proper expertise and experience. This program aims to avoid the services as provided by unqualified consultants by registering only those who have adequate experience and expertise. Such qualified services will facilitate the operation of the quality system based on the ISO 9000 series.

This scheme considers the provision of effective incentives in nurturing capable consultants that render services for the activities.

The objectives of this scheme are as follows:

- 1) To maintain the registration of quality system consultants (both firms and individuals) who meet the required registration criteria
- 2) To raise the level of consulting services provided by quality system consultants in Indonesia
- 3) To publish a list of quality system consultants

The program includes the following activities:

- (1) Establishment of registration criteria

The registration criteria must approximate international level to maintain the level of quality system, which is to be certified by an Indonesian certification body.

The following shows an example of registration criteria.

- 1) To have earned the specified academic credentials, or to become a member of a quality assurance association or similar associations
- 2) To have attended a Training Course on ISO 9000 for example, that is approved by the IQA in UK, and to pass the course tests
- 3) To have a 5-year work experience which includes quality assurance work
- 4) To have practiced as a quality system consultant for more than five times, of which three occasions were in Indonesia

Consultants which meet all of the above conditions for qualification can apply for registration. Applicants who do not meet the performance conditions set in item 4) above can apply for a provisional registration.

- (2) Commencement of registration

The operation includes publicity information works, registration, listing of the registered consultants, and presentation/publication of the list.

Key Success Factors

- 1) At the initial stage of operation, number of consultants qualified for registration will be limited. Nevertheless, it is essential to keep the level of registration criteria at an international level, and to operate the scheme completely in compliance with the set criteria, to maintain the confidence for it.
- 2) For the successful operation of this scheme, publicity information activities are indispensable.
- 3) In cases where there are demands from factories wishing to employ consultants, the scheme shall not permit the recommendation of a particular consultant, instead, the

scheme should limit its action to providing information contained in the registration list.

Suggestion for Implementation

(1) Organizational setup

- 1) Leading agency: DSN or PUSTAN, MOI
- 2) Other supporting and implementation organizations
 - a) Establishment of registration criteria: DSN or PUSTAN, MOI
 - b) Operation of the scheme: PUSTAN, MOI, or an organization to be established for dissemination of standardization and quality control

(2) Implementation steps

Implementation steps are described below.

Year :	1st	2nd	3rd	4th	5th
Program 4: Establishment of registration scheme of quality system consultant					
1) Setting required qualification for registration	██████████				
2) Preparation for operation of the scheme	██████████				
3) Start of operation of the scheme		▲			
Program 7: Organization for standard'n and QC promotion	▲				

Program 5: Establishment of certification scheme for quality control officer in factory

Program Description

The current SNI certification scheme assumes a quality system certification as one of its requirements. The certified companies have to maintain the quality system not only in application. Thus, they have to have more than one quality control officers, who possess the expertise, and shall serve as the core staff for quality control promotion.

While there are many companies which are aware of the importance of quality control, they do not implement it because of lack of quality control staff with required expertise and experience.

This program assists the system in nurturing the quality control staff by defining the duties and qualification of quality control officer, taking into account their important role in quality control implementation.

(1) Defining duties of the quality officers

First of all, the role of quality officers in implementing the quality control needs to

be defined. The contents of the program that aims nurture the quality officer will vary depending on the duties anticipated.

An example of the duties to be undertaken by the quality officer:

- a) Drawing up action plans for in-house standardization and quality management, and leading their implementation based on said action plans prepared;
- b) Overall management with regard to the establishment of in-house standards and any revisions thereof;
- c) Assessment of quality of products produced;
- d) Supervision and guidance for the in-line use of in-house standardization and quality management, and necessary coordination between relevant departments;
- e) Supervision and advice in solving problems arising from the process, and devising measures for complaints;
- f) Training of relevant staff and operators for in-house standardization and quality management;
- g) Guidance to relevant staff with regard to quality control of materials and parts procured from outside suppliers

The following are the detailed duties of each stated above.

- 1) Drawing up action plans for in-house standardization and quality management, and promotion of its implementation

The in-house standards must be established and distributed to the relevant departments as the basis for undertaking the in-house standardization and quality management. In recent years, standardization and quality management practices in factories and offices have advanced significantly in many cases, in keeping with rapid innovation of technology. It is important, therefore, to promote in-house standardization and quality management on the basis of an established plan which reflects its progress and in meeting the need for technology advancement.

- 2) Overall management with regard to the establishment of in-house standards and any revisions thereof

It is a common practice that an internal committee is organized for the establishment and revisions of in-house standards. The quality officer should spearhead this committee, particularly in coordinating drafts, directing meetings, providing minutes, following-up the required procedure after decision, and distribution and dissemination of the in-house standards to be established or revised.

3) Assessment of quality of products produced

Assessment of quality of the products produced is essential in judging the level of quality realized as it meets the target set by the in-house standards, and in setting the target for further improvement of quality. In general, this is achieved by monitoring product quality in accordance with the product inspection standards internally established; and analyzing average values and the degree of irregularity in quality. Histograms and control charts are often used for monitoring and analysis of product quality.

4) Supervision and guidance for the in-line use of in-house standardization and quality management, and necessary coordination between relevant departments

The quality officers must monitor the state of in-line use of in-house standardization and quality management and assess in-line processing capacity for each product line, as well as analyze in-line operation and quality inspection records. They must also provide necessary guidance and coordination for the operation of in-line quality control and optimum application of overall quality management.

5) Trouble-shooting arising from the process of in-line use of in-house standardization and quality management

The quality officers must analyze the causes of trouble and irregularities of product quality arising in the production line, and investigate the measures for trouble-shooting, measures for preventing recurrence of those problems and necessary amendment of in-house standards for proper guidance to the production line. Furthermore, when complaints on product quality are made by buyers or consumers, the quality officers must supervise in the analysis of causes of those troubles and also examine the response to be given to clients. Particularly, the supervision must be made so as to give the response promptly.

6) Training of relevant staff and operators in in-house standardization and quality management

In-house standardization and quality management should be based on the establishment of in-house standards. It is crucial to provide relevant staff and operators with appropriate training so as to enable them to undertake in-house standardization and quality management and gain proper understanding of the established in-house standards. The training program should be carried out in phases to meet the capability of those relevant staff and operators.

- 7) Guidance to relevant staff with regard to quality control of materials and parts procured from outside suppliers

The quality control of materials and parts procured from outside suppliers should be done through a careful selection of suppliers, investigation of ordering conditions, inspection of those materials and parts at the receiving point and proper guidance to suppliers on quality control in their production lines.

- (2) Establishment of qualifications of quality officers of firms

The next action required in preparation for the scheme is the establishment of qualifications. The "Qualification Criteria for Quality Systems Auditors" stipulated in the ISO 10011-2 is the reference material for this aim, and it is the criteria for qualifying quality system auditors engaged in quality system auditing of factories. Hence the qualification criteria as well as training items stipulated in these standards are not appropriate for quality officers to be assigned in factories. Further it may be difficult for small enterprises to have quality officers who satisfy the stipulated qualification criteria, since only large-scale or leading medium-scale enterprises would be capable of applying the quality system based on the ISO 9000 series.

Therefore, it would be appropriate to set up qualification criteria specific to quality officers to be assigned in factories, rather than relying on the above criteria.

The fundamental requirements for quality officers are expertise and experience, which can be defined as follows.

a) Expertise

1. Expertise in the manufacturing or processing technology adopted in the factory where the quality officers are assigned; it should have been acquired through basic education and training and job experience.
2. Expertise on standardization and quality management; it should have been acquired through basic education and training and job experience.

b) Experience

1. Experience in operation of the relevant manufacturing or processing.
2. Job experience in standardization and quality management.

The qualification criteria for quality officers should be defined with an appropriate combination of academic qualifications and relevant job experience. Taking into consideration its application to small-and-medium enterprises, it is advisable to make provision for qualified personnel who have considerable job experience, and have passed the qualification examination after taking a special training course, despite the lack of relevant academic background. The following is an example of the qualification criteria

for quality officers.

An example of qualification criteria for quality officers

Quality officers should (1) have adequate expertise in the technology adopted for the manufacturing or processing of the product to be certified, (2) have relevant job experience of more than one year in factory operation, and (3) satisfy one of the following conditions, after having passed qualification examination specifically designed for this aim.

- 1) University graduates who passed courses relating to quality management, and possess a job experience of more than two years, in the area of standardization and quality management.
- 2) Graduates of secondary education who passed courses relating to quality management, and who have job experience of more than four years in the field of standardization and quality management.
- 3) Personnel who have completed the training courses authorized under the scheme, these relating to standardization and quality management, and have job experience of more than two years in the field of standardization and quality management (or, with lower level of training but a more extensive period of job experience).

(3) Implementation of the scheme

The scheme involves the conduct of a training course, and award of certificate for those who passed the examination.

Following is an example of the curriculum of the training course:

An example of training course for applicants for quality officer in factory

- 1) Industrial Standardization
- 2) Fundamental Principles of Quality Management
- 3) Data Collection
- 4) Data Analysis
- 5) Production and Interpretation of Control Charts
- 6) Analysis and Improvement of Production Line
- 7) In-line Control
- 8) Quality Inspections
- 9) Fundamental Principles of In-House Standardization
- 10) Standardization of Products
- 11) Standardization of Materials and Parts
- 12) Standardization of Plant/Equipment Maintenance
- 13) Standardization of Quality Inspections
- 14) Standardization of Complaint Handling
- 15) Application of Quality Management

16) An exam (with overall viva voce examination)

The foregoing training comprises the curriculum for a ten-day course.

Key Success Factors

- 1) This scheme should be operated voluntarily, since some companies might withdraw from application for quality system certification because of lack of quality officer, should a certified quality officer is imposed as one of the requirement for quality system certification. Nevertheless, authorization under this scheme should be referred whenever a quality officer is required in other schemes. Especially where linkage with other certification scheme is essential. It is recommended to require a qualified quality officer for self-declaration of quality system.
- 2) The training course is one of the most focal points of this scheme. Therefore, the course should be held all over the country without a fixed venue, and at a time conveniently set for the prospective attendants, with reduced fees for SME attendants.

Suggestion for Implementation

- (1) Organizational setup
 - 1) Leading agency: DSN or PUSTAN, MOI
 - 2) Other supporting and implementation organizations
 - a) Establishment of qualification criteria: DSN or PUSTAN, MOI
 - b) Operation of the scheme: PUSTAN, MOI, or an organization to be established for dissemination of standardization and quality control

(2) Implementation steps

Implementation steps are described below.

Year :	1st	2nd	3rd	4th	5th
Program 5: Establishment of certification scheme for quality control officer in factory					
1) Setting qualification for the QC officer	█				
2) Establishing detail procedure for operation of the scheme	█				
3) Preparation of training course for the candidates	█				
4) Preparation for the certification examination	█				
5) Start of the scheme operation		▲			
Program 7: Organization for standard'n and QC promotion					

(II) ENHANCEMENT OF SYSTEM FOR PROMOTION OF INDUSTRIAL STANDARDIZATION AND QUALITY CONTROL

Thrust 3: Improvement of System for Standards Development and Dissemination to Meet the Demand of Industry

Under the present system for development of standards, each standard is adopted after approval by related ministries during DSN's general meeting. In essence, the system is designed to establish standards through a very elaborate process. This is not complementary with the current state of national standards in Indonesia, where standards that meet the needs of the industries must be developed and disseminated quickly. To meet such demand, the following program intends to create an adequate structure for development and dissemination of standards, and to allow accelerated participation of user industries, as well as the timely development of standards according to actual needs.

Program 6: Preparation for rationalization of standards development process

Program Description

To ensure that the development of standards by reflecting industry needs proceeds basic policy directions including the concept of the standardization project, its legal authority, organizational refinement, and other fundamentals should be clearly defined. This is a prerequisite action for further improvement of the system, while checking whether the current system is founded on the common groundwork, as follows:

- 1) Standardization contributes to the rationalization of industrial operation, improvement of operating efficiency, and simplification of trade, rather than being used as regulatory measures.
- 2) The national standardization project can only be successfully implemented on the basis of established standardization efforts at the corporate level, and the development of industry standards founded on such efforts.

The program includes following actions to undertake the above arrangements.

- 1) Reappraisal of the basic concept of standardization
 - a) To define standards as opposed to regulatory measures such as laws and regulations; and
 - b) To distinguish standards from regulations, and limit the scope of the standardization project to the former.

- 2) Simplification and streamlining of standards development and operation of organizations and procedures
 - a) Simplification of the standard making process that is assumed to include existing mandatory standards covering voluntary standards only;
 - b) Legislation for transfer of the standardization promotion function;
 - c) Urgent establishment of operational rules and manuals for the standardization project implementation system;
 - d) Acceleration of standards development with strategic focus
- 3) Early implementation of the existing plan to increase representatives of industries in the (standards development) technical committee

(1) Separation of standards from regulations

SNI includes mandatory standards as well as voluntary standards. Mandatory SNI is adopted by government agencies to ensure consumer safety, and protect public health, and the environment. It is equivalent to the technical regulations covering technical requirements within legally binding regulations.

Under the program, standards will be clearly defined from mandatory standards, regulations, and technical regulations according to ISO/IEC Guide 2, including all the standards contained in SNI and those in transition to SNI.

Then, treatment of these standards, mandatory standards, regulations, and technical regulations within the SSN system will be determined. From the context of promoting simplification and streamlining of the standards development process, as will be discussed later, and participation of the private sector, regulations and technical regulations should be treated outside the scope of the SSN system. As for mandatory standards, these should be applied on the basis of relevant technical regulations, rather than establishing a distinct regulation for such.

(2) Simplification of the development and revision process of standards

As defined in ISO/IEC Guide 2⁴⁾, standards should be established under the consensus of related parties. If standards are used as technical regulations, however, they have to be established as government policy with the objective of protecting

⁴⁾ ISO/IEC Guide 2 defines as follows: Standard: Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. Mandatory standard: Standard the application of which is made compulsory by virtue of a general law or exclusive reference in a regulation. Regulation: Document providing binding legislative rules, that is adopted by an authority. Technical regulation: Regulation that provides technical requirements, either directly or by referring to or incorporation the content of a standard, technical specification or code of practice.

consumer safety, public health and the environment. The rulemaking process for this type of standards is not suitable for the private sector to handle. In the case of SNI, it is also established by the government through a strict rulemaking process, since it contains mandatory standards.

However, the establishment of industrial standards is increasingly required: 1) to be done quickly and timely in response to rapid technical advancement and swift changes in technological environment, and 2) to reflect needs and opinions of users. This can be accomplished only by simplifying the SNI making process, i.e., exclusion of SSN elements equivalent to regulations and technical regulations requiring the strict rulemaking process, and the establishment of mandatory standards with reference to technical regulations. This way, SSN will cover solely the establishment of voluntary standards based on general consensus, so that the process can be simplified from the present complex structure containing elements of mandatory standards and regulatory measures, to a structure in terms of organization, committee membership, and rulemaking process.

Under SSN, a draft SNI adopted by each ministry or agency has to be approved by its supervisory organization, DSN. It makes the entire process from the inception of standards development to the establishment fairly complex. This seems to require significant workload, fund, manpower, and time. Thus, simplification of the draft SNI approval process is the first aspect for improvement (the method for simplification of the draft SNI approval process is recommended in Recommendation 1).

(3) Coordination of standardization-related work between DSN and related ministries

Based on the above principle, coordination among DSN and related ministries and agencies will be carried out. SSN is designed to develop projects previously implemented by different ministries into a unified system, and is still ongoing. Bearing the unification process and its direction in mind, coordination will be proceeded with the following focal points.

1) DSN

DSN will primarily function as an organization that sets forth major policies related to national standardization, including overall coordination of related ministries and agencies to establish unified national standards, and medium-and-long-term planning in line with the government's industrial policy. On the other hand, the actual work of standards development and day-to-day coordination will be transferred to other organizations (discussed in detailed proposal presented later) to unload DSN with field work.

2) Standardization work at the ministry level

As previously discussed, redefining the scope of the standardization project will entail separation of regulations controlled by competent ministers and agencies, as standards are to be unified at the national level. This involves distinguishing regulations and technical regulations from the mixtures of standards and regulations, previously called standards. Care should be taken as to how borderline cases such as environmental standards and safety standards should be treated.

By the same token, standards, the use of SNI marks, and regulations should be treated separately. Since the first two categories are used for quality assurance purposes, they should not be treated as regulatory standards.

3) Coordination of standardization-related work between DSN and related ministries

There are three ways to reorganize DSN and the ministries responsible for standardization, as follows:

- a) To reorganize DSN's secretariat to a new organization (operational division) capable of doing day-to-day management work (actual coordination jobs and the approval of standards), based on DSN's policy decision while leaving standardization units of ministries intact.
- b) To integrate part of standardization units of ministries into the above new organization.
- c) To integrate all the standardization units of ministries into the above new organization.

If part or all of the standardization units of ministries is to be integrated into DSN, the establishment of appropriate coordination and communication among departments of ministries responsible for drafting standards and the new organization will become another problem to solve. For this reason, it is desirable to give priority to the standards development work and leave organizational reforms to phased execution in the future. At this stage, it is thought to be more realistic that the first phase will constitute a) or part of b).

(4) Streamlining of standardization development procedures through delegation of authority, and the development of operational manuals, etc.

Based on the result of coordinative work between DSN and related ministries, delegation of authority will be carried out, and operational rules will be developed to ensure smooth operation of the process.

At present, while the development of the overall system and conceptual elements, such as the establishment of SNI and the development certification and accreditation systems are advanced, execution rules and operating manuals planned by ministries lagged behind, except those of PUSTAN under the Ministry of Industry. The situation makes the system difficult, to smoothly operate.

At DSN, the organization and rules are being developed. On the other hand, operational rules and manuals have been left behind.

Further, the establishment of standards which should be done from time to time, is being carried out once a year, or even once every two years due to the absence of detailed rules including the delegation of authority and operational rules (provisional standards are issued in urgent cases). Standards should be established and published at all times. For instance, ISO in recent years makes a final deliberation on international standards at a subcommittee level followed by the vote by member bodies. Similarly, DSN has delegated its decision making power concerning accreditation to KAN. Thereafter, major decisions such as certification of accreditation organizations are made relatively frequently. The streamlining of the decision-making process, including delegation of authority and simplification of the organization, should be considered as early as possible.

(5) Focused and fast-tracked establishment of standards

Standards cover increasingly diverse fields ranging from basic standards such as testing methods, specific products traded daily, information technology-related software and interface, and various systems including quality assurance and environmental management. To ensure the effective use of human resources and meet demand for timely establishment of much-required standards, their establishment must be focused on particular areas or items called for, to reflect government policy and industry needs (important areas for priority in standards development in Indonesia are listed in Recommendation 3).

(6) Early implementation of the plan to increase the ratio of representatives from the industries in technical committees

DSN has already recognized the importance of increasing representatives of the industries in technical committees, and has also established a phased plan. Nevertheless, the plan is not sufficient to speed up the standardization project in response to industrial needs. It is recommended to accelerate implementation of the plan.

Key Success Factors

The above activities are divided into those to be done at the DSN level and those to be carried out at ministerial levels. While the former includes activities requiring coordination and agreement among many organizations, the latter can be partly left to each ministry. Since this program serves as a prerequisite to implementation of remaining programs, the latter should be started as early as possible, separately from the activities requiring coordination and consensus.

Suggestion for Implementation

- (1) Organizational setup
 - 1) Leading agency: DSN
 - 2) Other preparation and implementation organizations: Organizations or units of ministries responsible for standardization
- (2) Implementation steps
Implementation steps are described below.

Year :	1st	2nd	3rd	4th	5th
Program 6: Preparation for rationalization of standards development process					
1) Reaching consensus on scope of standardization project	█				
2) Legislative preparation for simplification of standards development	█				
3) Change in organizational setup w/delegation of authority		▲			
4) Establishment of operational procedure		█			
5) Completion of the preparation for rationalization			▲		

Note: The preparation of rationalization and its operational procedure guideline includes the first step only.

Recommendation 1: Simplification of the Draft SNI Approval Process

Draft SNI approval process of DSN may be simplified as follows, while applying different procedures according to the type of a draft SNI.

- 1) SNI will be approved at the Committee B/F or PH-DSN level, instead of DSN's general meeting.
- 2) Draft SNI standards jointly developed by two or more ministries and/or agencies will be processed in accordance with 1) above. On the other hand, draft SNI standards under the jurisdiction of a single ministry, and those directly translated from international standards should be omitted from DSN's deliberation. In this manner, DSN's secretariat will be able to approve the ministry's decision after checking the scope of application or consistency between SNI, and its applicability to international standard. This will increase motivation of ministries to develop new standards.

- 3) At the ministerial level, if draft SNI standards are deliberated and decided upon by a committee properly represented by producers, users, and persons from the third party in the field covering each standard, deliberation at the subsequent committee will be simplified or omitted.

Recommendation 2: Development of Medium- and Long-term Plans and Annual Operation Plans

1) Need for planning at DSN

At present, SSN is coordinated and managed by DSN, while the development of draft standards and certification are done by responsible ministries or agencies which are operating under a clear "vertical" division of responsibilities from other ministries. On the other hand, the standardization project is coordinated and managed by DSN in an interdisciplinary manner. Under such conditions, setting up long- and medium-term plans of DSN upon agreement with related ministries and its leadership in implementation would be essential for effective operation of the cross-departmental system. These plans should be positioned as a specific plan of REPELITA VI.

2) Establishment of annual operation plan and other relevant plans at the related ministries and agencies

The related ministries and agencies responsible for implementing long- and medium-term plans established by DSN would be essential in setting up well-defined and specific targets.

3) Contents of plans

Long-term national standardization promotion plan

a) Basic policy

1. Preparation for rationalization of national standardization
2. Promotion of internationalization
3. Basic principle related to the establishment, revision, and abolition of SNI
4. Efficient management of the SNI mark system

b) Policy by ministry and by area

1. Dealing with issues related to national standardization in each ministry and areas of responsibility
2. Basic principles related to the promotion of national standardization in each ministry and areas of responsibility
3. Basic principles related to national standardization in each ministry and areas of responsibility

4. Basic principles related to implementation of the SNI mark system in each ministry and areas of responsibility

Annual operational plan for national standardization

a) Basic policy

1. Basic policy of annual plan in view of the long-term plan

b) Priority areas in the annual plan

1. Major areas in establishment and revision of SNI
2. Major areas in the promotion of the SNI mark system
3. International standardization activity
4. Research and study on infrastructure for standardization
5. Target in new areas

c) Implementation plans

1. The number of SNI standards to be established and revised
2. Plan for entrusting research for draft SNI and system related to standards
3. Plan for research covering fundamental and related information required prior to the development of draft SNI standards

d) Detailed plans for establishment, revision, and review of SNI

Establishment/revision of SNI

1. Ministry/agency/unit to serve as secretariat for the draft development
2. Name of standard
3. The scheduled year and month when the establishment, revision or abolition of a draft SNI is referred to technical committee or consensus meeting
4. The scheduled year and month when the minister's approval is obtained
5. Classification as voluntary/mandatory SNI
6. The scheduled year and month of publishing SNI establishment/revision
7. Necessity to harmonize with international standards

Review of standards

8. Ministry/agency/unit responsible for SNI to be reviewed
9. Standard No.
10. Name of standard
11. Classification as voluntary/mandatory SNI
12. Date of establishment
13. Date of latest revision
14. Date of latest verification
15. Identification of scheduled establishment/revision/abolition
16. Necessity to harmonize with international standards, in the case of revision

Annual reporting on national standardization

- a) Number of SNI establishment/revision performed by focused area
- b) Current state of SNI establishment/revision/abolition by ministry/agency/unit
- c) Adoption of international standards to SNI
- d) Progress of entrusted research covering draft SNI and system of SNI standards
- e) Progress of research covering fundamental and related information required prior to the development of draft SNI standards
- f) Performance of operation of the SNI mark system by ministry/agency/unit
 1. Number of applications
 2. Number of review
 3. Number of approval
 4. Number of revocation
 5. Latest number of approval
 6. Number of periodical inspection
- g) Performance of operation of the SNI mark system by geographical area and ministry/agency
 1. Number of applications
 2. Number of review
 3. Number of approval
 4. Number of revocation
 5. Latest number of approval
 6. Number of periodical inspection

4) Method for establishing basic operational policy

In establishing the basic operational policy, in SSN, DSN deliberates the policy proposals submitted from each ministry or agency. In this case, the responsible division of each ministry is expected to understand standardization needs by conducting hearing from research institutes, testing laboratories, trade organizations, and major industries. Based on perceived standardization needs, the operational plan at the ministerial level will be prepared by incorporating details, including selection of required research and study items as well as subjects of standards, and will be submitted to DSN. At the DSN level, it is important to adopt the ministry's principle as it is, if related to a single ministry, whereas, the standardization issue in the field under jurisdiction of two or more ministries will be coordinated to make the process simple.

Recommendation 3: Development of Standards

1) Target number of standards to be established

MOI sets the target number of standards to be established and plans to double the number of SNI to be established/revised in the following year. It intends to establish or revise approximately 2,250 standards by 1998. Setting the target number of establishment and revision is meaningful in that it allows planned establishment and revision. In Indonesia, however, a major issue lies in the fact that national standards are not fully utilized. Regarding the establishment and revision of standards, the focus should be placed on 1) how needs and wants of users of industrial standards, particularly the industries, can be reflected, and 2) how harmonization with international standards should be secured. These points should have priority rather than simply establishing the target number of standards.

2) Establishment of standards that are used by the industries

Basic requirements for standards that are actually used by the industries are:

1. Selection of subjects meeting actual needs
2. Participation of users in the development process
3. Adequate review and revision of existing SNI
4. Development of related standards (basic standards, testing standards, standards related to testing equipment, materials standards, etc.) required for use of product standards

To select the subject meeting actual needs, a systematic study and research should be conducted by focusing on priority areas of the national industrial policy with view to building the technological base for the development of the national economy and industries. In addition, participation of the industries, consumers, and other related parties in the standards development process should be encouraged to identify the subject developed from the perspective of social needs.

Successful systematic study by the government on national standards requires standardization experts in each field, with the collaboration from the industry circle. At the same time, study on standards by system should be organized to obtain accurate understanding on the official standards used by each industry for further development of the systems.

Cooperation of the private sector is essential in involving users of standards in the SNI development process. For this purpose, request should be made to establish a technical committee in each trade organization and entrust the development of the draft SNI standard to said organization by making it as a voluntary project of the organization.

3) Priority areas for standards development

By applying the above-mentioned method, the primary emphasis should be placed upon the establishment of standards for specific products that are in line with priority areas in the government's industrial policy.

a) Basic standards

It is important to develop basic standards commonly used by the industries, which are associated with the development of industrial infrastructure. Standards related to mechanical engineering are a typical example⁹⁾. The area forms the basis of fostering the industries, and international standards should be adopted as far as possible to fill the existing gap.

b) Standards related to technical elements

Priority areas for development of standards related to technical elements are as follows:

1. Basic standards required to implement the quality control system, including sampling methods and testing, and analytical methods
2. Standards in the areas where interchangeability needs to be ensured with a view of harmonization with international standards
3. Standards covering parts sold in the secondary market

c) Standards related to raw materials

Efforts to establish national standards covering raw materials, particularly basic materials used for production, should be pursued with the same level of priority and urgency, or even higher than those for product standards, in order to lay the foundation of the industries in the country. Since many manufacturers produce industrial products in accordance with foreign standards in Indonesia, national standards for final products will not be applicable in the industry in the near future. However, standards for raw materials are closely associated with the quality and performance of final products and so development of these standards should be given priority.

d) Standards related to consumer safety, public health, and environmental protection

Among national standards, the establishment of standards related to consumer safety, public health, and environmental protection should be given the highest priority. In particular, standards in these areas should conform to ISO/IEC Guide 2. Then, by referring to these standards for other standards, awareness of the industries and the

⁹⁾ The number of SII/SNI standards in the area of mechanical engineering is much smaller than JIS.

general public on standardization will be raised.

4) Adoption of international and foreign standards

- a) As for basic and similar standards, it is recommended to adopt international standards such as ISO/IEC, or widely used foreign standards, whenever possible. Then, they should be revised in the review process to meet local conditions in Indonesia. This is the most efficient way to establish standards as well as most desirable from the viewpoint of international harmonization. If international standards cannot be used at all times (e.g., technical levels in the country are below international levels), they should be adopted as they are without downward adjustment, while national standards are established to cover both national and international levels setting more than one level of standards. This encourages companies at lower technical levels to exert efforts in developing higher standards. The use of international and foreign standards has a major advantage in terms of the shorter time required for evaluation allowing the effective use of resources (manpower and fund).
- b) International standards should be translated to Indonesian language according to frequency of use for dissemination.
- c) Adoption of international standards into national standards, translated to the local language, will benefit the local users in obtaining the contents at the cheaper prices.

5) Control of standards by year of establishment and revision

The years of establishment and revision should be specified on each standard to accurately trace the revision history. SNI's catalog, which is conveniently classified by field does not specify the name of the ministry responsible for each standard, a source of distribution, the name of the person and address to which an inquiry can be made, serial numbers of related international standards, and other important information. A large number of ministries and agencies is responsible for SNI, and providing information in a catalog is important for the promotion of its use, that is likely to be demanded by users.

Program 7: Establishment of a system for enhancing standardization and quality control promotion

Program Description

A system that plays a central role in the promotion of standardization and quality control will be established. In the area of standardization, the system will materialize a

structure that will develop standards reflecting industry needs in a timely manner, as assumed under Program 6. In the quality control front, the system will lead in the preparation and fostering of a nationwide promotional organization in the future.

At present, SNI is not well appreciated among the industries, and its use is limited to a relatively small number of companies. Existence of standards have to be fully recognized and used by industries and the general public. Major driving mechanisms for dissemination of standards to the industries are the public recognition of certification system and quality control. The certification system can serve as the effective means of urging manufacturers to comply with standards. By the same token, quality control is a powerful vehicle for the promotion of SNI. This is because manufacturers often develop in-house standards as a means of promoting quality control practice, so even if the in-house standards are set at higher level than national standards, the latter serves as groundwork for the former. In addition to the promotion of certification system and quality control, there are a variety of activities which are expected to be effective in gaining public acceptance of standards. The system will be responsible for various promotional activities of standards and quality control.

(1) Establishment of the standardization promotion system

At present, printing and distribution of SNI after DSN's approval are carried out by a responsible ministry or agency. Nevertheless, advertisement on SNI, public campaign on its use, and distribution of printed standards are still insufficient. These promotional activities are recommended to be entrusted to an organization which specializes in such function. While standardization organizations under various ministries and agencies are assumed to have a promotional task, only a handful of them such as MOI actually perform such function. Recommendation 4 "Privatization of the Standardization Project" discusses how these existing organizations should be treated, and how the new system will be managed.

A system specialized in the dissemination activities in the private sector may be formed in either of the following ways:

- 1) To privatize printing and distribution function;
- 2) To establish an organization specializing in the promotion of standardization, and transfer the publication and distribution right to it as its basic assets;
- 3) To establish an organization specializing in the promotion of standardization as an initial step of privatization of standards development organization, and transfer the publication and distribution right to it; or
- 4) To assign the standardization promotion function to existing organization(s), and transfer the publication and distribution right to it as basic assets.

For Indonesia, the establishment of a new dissemination system is needed for various reasons: 1) printing and distribution of standards are not considered viable business, and may not serve as a financial source for other projects (including the promotion of standards); 2) there seems to be no existing organization capable of promoting standards; and 3) there is a need for strengthening the activities to promote standardization. It should be noted that the promotional system needs to receive assistance from the private sector in terms of funding and manpower, not only at the time of establishment but during its day-to-day operation as well. For this purpose, the importance of the standardization project should be communicated to the management of related industries prior to the establishment of the system.

In case a promotional organization is established, the following considerations will be important.

- 1) To clearly define the nature of the organization, the following characteristics are what it should preferably possess:
 - a) To establish it as a non-profit business; and
 - b) To be under integrated government supervision.
- 2) Major functions of the organization should be as follows:
 - a) Printing and distribution of SNI;
 - b) Development of draft SNI in basic and common areas;
 - c) Public education and advertisement on standardization;
 - d) Study and research on standardization in basic and common areas;
 - e) Collection and publication of national and foreign standards (establishment of a library);
 - f) Cooperation in international standardization;
 - g) Sponsoring of workshops and seminars on the establishment and revision of SNI; and
 - h) Related publication.
- 3) To secure initial and operating funds from the government and the industries
- 4) Operating funds can be obtained in the following ways:
 - a) Membership fee (members can enjoy special discounts and other privileges); and
 - b) Revenues from sales of publications and other services at market prices (in particular, sales prices of SNI publications should be approved by the supervising organization)

5) To meet manpower requirements from the following sources:

- a) Government staff on temporary assignment (primarily responsible for operation and management, negotiation and communication with related government agencies);
- b) Staff on temporary assignment from related industries (primarily responsible for standardization-related work); and
- c) Sales representatives (to establish SNI's sales network, and sales call to individual companies, etc.)

(2) Strengthening of promotional activity

1) Reinforcement of continuous efforts

At present, the promotion of the standardization project is conducted jointly by the government and private organizations as part of the "Quality Month" campaign. However, this is temporary in nature and is not related to other continuous efforts. In this connection, efforts should be made to increase participants from the private sector (currently around 60% of total) and boost the number of similar events in regions other than Jakarta.

2) Establishment of a commendation system

In Indonesia, there is no commendation system for organizations and individuals who are engaged in the promotion of the standardization project, and there is no plan to establish one. It is recommended to establish a national commendation system for companies and individuals to help motivate company employees in taking and maintaining standardization initiatives⁶⁾.

(3) Dissemination of standards

Stirred by the above mentioned principle, a system should be developed to make standards and handbooks easily available to users and the general public.

At present, SNI is printed by the government and distributed free of charge, so only a limited number of copies are made available to users. Improvement therefore is needed in the following areas:

- 1) Commercial sales of standards including distribution through general bookstores: In many industrialized countries, the standardization project is led by the private sector and standards are sold to users at fair market prices to allow beneficiaries pay the cost.
- 2) Publication and sales of textbooks for various educational and training institutes

⁶⁾ In Japan, there is the government commendation system for individuals and companies as follows, which are widely recognized: 1) commendation by the Minister for International Trade and Industry; 2) commendation by Director General of Agency of Industrial Science and Technology; and 3) director generals of regional bureaus (eight throughout the country).

- 3) Translation of Indonesian standards to English versions for use by foreign companies including joint ventures and exporters
- 4) Translation of international standards (as mentioned earlier, translation of international standards to Indonesian versions should preferably be done as part of efforts to adopt them as national standards)
- 5) Registration of instructors for standardization and dispatching them upon request from organization and companies

(4) Enhancement of promotional activities for quality control concept and methodology

Quality control promotion activities in Indonesia are mainly led by 1) organizations covering individual companies with focus on management aspects, and 2) organizations at the national level. The latter have no permanent secretariat nor much resources. The new organization under the proposed system will be responsible for the following activities:

- 1) Planning and implementation of the comprehensive program for quality control promotion and guidance at the national level, and coordination among related organizations;
- 2) Accumulation of practical experience in quality control through overall planning of quality control training programs and the sponsoring of seminars, and the promotion of practical application and the sponsoring of workshops;
- 3) Publication related to quality control, translation and sales of foreign publications; and
- 4) Registration of quality control experts, and operation of the quality control personnel certification system.

Among them, 1) should be carried out by a separate government organization or entrusted to an organization by the government on an exclusive basis. 2) through 4) are not necessarily done by an organization exclusively, but may be carried out by organizations having similar functions.

Key Success Factors

- 1) The system contemplated under the program will have the primary purpose of promoting standardization and quality control. Such promotional activity is the core of standardization initiatives thus, the establishment of such system is urgently required.
- 2) However, the organization need not to be newly established, and an existing organization (such as PUSTAN under the Ministry of Industry) may assume responsibility for the time being.

3) Even if a non-government system is used, it is difficult to operate it as a self-sustaining body, judging from the low level of use of national standards in the country, and the insufficient quality awareness among the industries. Thus, efforts should be made to secure financial support and other assistance from the government (including contract award) and the industry circle.

Suggestion for Implementation

(1) Organizational setup

- 1) Leading agency: PUSTAN, MOI, or DSN if consensus at the national level can easily be obtained
- 2) Other supporting and implementing bodies: PUSTAN, MOI and standardization organizations in other ministries

(2) Implementation steps

Implementation steps are as follows.

Year :	1st	2nd	3rd	4th	5th
Program 7: Establishment of an organization for enhancing standardization and quality control					
1) Formulation of a prospectus and an operation plan	█				
2) Formalities of the establishment		█			
3) Establishment of the organization			▲		
Program 6: Decision of delegation of authority					
	▲				

Note: The above step does not include the activities for enhancement of the promotion.

Recommendation 4: Privatization of the Standardization Project

In the case of the establishment of standards, it is either managed by a government organization or a non-government organization, depending on the country. However, the development of draft standards and the promotion of established standards are in many cases entrusted to non-government organizations for efficient management.

The rationale for privatization of the standardization project needs to be considered on the basis of various factors, e.g., how standards, mandatory standards, and regulations will be treated, and what effect is produced from educational and promotional activities related to standardization. Also, the need for entire privatization should not be considered at the initial stage. Rather, such need should be discussed in each phase of the standardization project.

1) Increased involvement of the private sector in the relevant organizations

Encouraging the participation of the private sector by means of organizational arrangement is completely different from privatization of the project, as discussed in the

next section, and should be carried out as early as possible. At present, DSN plans to increase private sector representative members in its technical committees (from a present 2% to 30% in 1996 and 50% in 1998). This should be implemented at an accelerated pace, if possible, in order to provide the environment that reflects the needs of users (manufacturers, distributors, consumers, and neutral party) in the development of standards. To this end, collaborative efforts are needed by related government agencies.

2) Privatization of the standardization project

Privatization of the standardization project cannot be advanced without raising interest of users of standards, particularly companies and general citizens, in SNI standards. At present, SNI is distributed free of charge, except for some ministries, such as the Ministry of Public Works, which successfully sells it in relation to corporate activities. Possibility of sales to other organizations and users need to be examined by estimating what price the user are willing to pay for SNI, thereby nurturing in them a sense that of paying the cost of standardization. The increased involvement of the private sector in each area of the standardization project and a timely manner to respond to market needs through standardization activity, will be a prerequisite for the success of sales of standards.

a) Privatization of sales and distribution of standards

In Indonesia, government publications cannot be sold to the public⁷⁾. Nevertheless, efforts should be made to move toward privatization of sales and distribution of standards for expanded availability. In the first, printing and distribution services will be subcontracted. Then, more services will be privatized, including the bonus system for sales efforts of distributors, the editing and publication of handbooks on SNI by subsector, as well as supplemental books on SNI to meet users' needs.

b) Overall privatization

Overall privatization will be studied on the basis of the progress of the above privatization process, dissemination of information, and support from the related industries. However, the following facts need to be taken into account by a standardization project to reflect the country's industrial policy, considering that few countries have fully privatized the project including financial independence as a profit-making organization.

c) Privatization of the certification and accreditation project

The certification operation is increasingly being conducted by private organizations in

⁷⁾ According to the information from PUSTAN, Ministry of Industry. Note that the Ministry of Public Works prints and sells standards through contractors.

the world. In particular, product certification is mostly done under this arrangement. In Indonesia, it is desirable to start privatization whenever possible, provided that the certification system reflects the needs of the industries and consumers, and is significantly utilized by them. Thus, at least preparation measures should be taken for the needed shift to privatization process.

As for the privatization of the accreditation operation, the first step should start from securing manpower to ensure a smooth operation. Once the necessary manpower has been trained, phased privatization should be considered.

Appendix: Promotion of Standardization in Japan

(1) Government's promotional activity

1) Preferential treatment of JIS by government agencies

In Japan, the Industrial Standardization Act (Article 26) sets forth that "the central government and local governments shall give due respect to JIS". Accordingly, government agencies and organizations give preferential treatment to the procurement of products, i.e., they buy products carrying JIS marks over non-JIS products. This is the same strategy set forth in Presidential Decree No.16 Article 24 (2) d. (1994) of Indonesia.

2) Technical workshop for promotion of industrial standardization

The workshop is held for companies to seek for quality improvement, so as to provide technical guidance in standardization and quality control tailored to a particular industry type.

3) Commendation system for industrial standardization

The Ministry of International Trade and Industry give recognition to factories with excellent results in the fields of standardization and quality control, as well as to individuals who have contributed greatly to the standardization project, as commended by the minister and related officials every fall.

4) Industrial standardization promotion months

To raise public spirit of industrial standardization, "Industrial Standardization Promotion Months" are designated in October and November each year, during which a variety of activities including the sponsoring of seminars and the distribution of posters and slogans are conducted.

(2) Promotional activity by Japanese Standards Association

Originally, industrial standardization efforts in Japan were led by the Japanese government. Then, as an organization that will promote and disseminate standards to the general public become increasingly demanded, Japanese Standards Association (JSA) was established in December 1945 upon the approval of the Minister of Commerce and

Industry. JSA emerged as an organization responsible for overall promotion of the standardization project as well as dissemination of standards with cooperation of the government. It is self-funded by revenues from interest on its foundation, membership fees, sales of JIS and related publications, workshops, and inspection and testing services.

1) History of JSA

Major events related to JSA, starting from its foundation to the present, are summarized as follows:

- 1945: Japan Standards Association (JSA) was established in December under the approval of the Minister of Commerce and Industry, as an organization responsible for overall promotion of the standardization project, as well as dissemination of standards under cooperation of the government. The office was located within its Patent and Standards Bureau.
- 1946: Started Monthly magazine "Standards"
- 1948: Started exchange with foreign standard organizations
- 1949: Started publication and distribution of JIS
Opened Nagoya and Kansai branch offices
Established Quality Control Study Committee
- 1951: Started development of draft JIS
- 1952: Opened Foreign Standards Library
- 1953: Opened Tohoku branch office
- 1955: Opened Hiroshima and Fukuoka branch offices
Started English translation and distribution of JIS
Sponsored workshop on standardization technology
- 1957: Opened Shikoku branch office
- 1958: Opened Sapporo branch office
Established JSA Standardization Prize
Held First National Standardization Conference
- 1960: Held First Quality Month (co-sponsored by Japan Federation of Science and Technology)
- 1962: Completed head office building at present location
- 1967: Held First National Q-S Conference
- 1970: Started Monthly magazine "Standardization Journal"
- 1971: Opened JETRO Geneva office jointly with JETRO (for international standardization)
- 1972: Established Control Technology Center
- 1974: Established International Standardization Cooperation Center
- 1981: Became an official inspection organization for JIS-certified factories, as accredited by

the Minister of International Trade and Industry

Held workshop for industrial standardization and quality control promotion manager of JIS-certified factories

1983: Established Information Technology Standardization Research Center

1991: Established secretariat of IEC Activity Promotion Conference

1992: Established ISO 9000 Review Registration Center

2) Major activities of JSA

Japanese Standards Association has a headquarter in Tokyo and branch offices in Sapporo, Nagoya, Osaka Hiroshima, Takamatsu, and Fukuoka, the activities of which coincide with those of the regional bureaus of the Ministry of International Trade and Industry, particularly in the conduct of promotional activity in the area of standardization throughout the country. Its major activities are described as follows.

a) Publication service

JSA publishes a variety of books on standardization and quality control, and two monthly magazines "Standardization Journal" and "Standardization and Quality Control." "Standardization Journal" reports JIS-related research and study, the current state of draft standards development and reviewing, public notification of newly established and revised JIS, and recent publications. It also covers latest information on JIS mark certification and serves as a vehicle for dissemination and promotion of standards and the certification system. On the other hand, "Standardization and Quality Control" covers news on the development of methods related to standardization and quality control, and case studies for corporate application, and provides other information useful for experts such as quality control managers and engineers. It also publishes 50 volumes of JIS Handbook, each of which covers a particular field. They are well accepted by JIS users because of convenience and low cost compared to the price of publication containing a single standard.

b) Training service

JSA holds series of "JIS Dissemination Seminars" including "Standardization and Quality Control Seminars (consisting of short, medium, and long-term courses) and "Enterprise Standardization" workshops. JIS Dissemination Seminars cover a variety of JIS standards, which are used for a wide range of applications and JSA considers necessity of special training, ranging from basic standards including international units of measurement, engineering drawing, and quality systems, to standards covering latest areas of interest, such as safety, public health, pollution control, information technology, and bioengineering. The seminars mainly focus on interpretation of JIS and its application and mostly last between 6 hours and 12 hours (one-day or two day course)

depending on a particular standard.

In addition, JSA holds Workshops for Industrial Standardization and Quality Control Promotion Manager of JIS-certified factories. These workshops officially endorsed by the Ministry of International Trade and Industry and consist of specialization courses, short-term specialization courses, and ordinary courses.

Finally, JSA sends consultants for "Technical Assistance in Standardization and Quality Control" to provide, assistance in application procedures for JIS certification, guidance related to the establishment and management of quality control systems including corporate standardization and quality control, and internal seminars and workshops.

c) Research works

JSA is drafting standards in the basic and common fields among industries, such as standards on units, form of standards, drawing, tolerance, statistical methods, and quality assurance, etc. JSA is also undertaking research works related to standardization.

d) Promotional service

Under the co-sponsorship of JIS-related ministries and agencies and cooperation of organizations developing draft JIS standards, JSA has been holding "National Standardization Conference" during each fall since 1958 as part of the annual standardization promotion events. The conference is a place for quality control experts from all over the country to attend at special lectures, presentations on research projects and case studies, and discussions.

In addition, JSA has been co-sponsoring "Regional Standardization Conference" with MITI's regional bureaus and other organizations since 1974, which are held in JSA's branch offices as part of annual standardization promotion events. Since the First National Standardization Conference in 1958, JSA Standardization Contribution Prize has been awarded with a prize money by JSA President to literature that have made significant contribution to a new discovery in or dissemination of standardization-related principles, the development and promotion of standardization methods, and the promotion of standardization.

e) Information service on foreign standards

JSA furnishes publication data on domestic and foreign standards through on-line service "KIKAKU NET."

Domestic standards: JIS, JAS, and industry standards covering 204 types and 13,000 standards

Foreign standards: ISO, IEC, national and industry standards covering 30 organizations and 200,000 standards