JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

CENTER FOR INDUSTRIAL STANDARDIZATION, MINISTRY OF INDUSTRY
THE REPUBLIC OF INDONESIA

STUDY
ON
MASTER PLAN OF INDUSTRIAL STANDARDIZATION AND PROMOTION OF QUALITY CONTROL
IN
THE REPUBLIC OF INDONESIA

(SUMMARY)

AUGUST 1995

UNICO INTERNATIONAL CORPORATION

JAPANESE STANDARDS ASSOCIATION

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Abbreviation (*)

AARD	Agency for Agricultural Research and Development
	(Bandang Penelitian dan Pengembangan Pertanian Departmen Pertanian)
AAS	Atomic Absorption Spectrometer
ABB	Asea Brown Boveri
ABI	Association of Indonesian Internal Combustion Engine Manufacturers
	(Asosiasi Motor Bakar Indonesia)
AC/DC	Alternating Current/Direct Current
AIPSI	Association of Indonesian Pump Industries
	(Asosiasi Industri Pompa Seluruh Indonesia)
ALSINTANI	Association of Indonesian Agricultural Machinery
	(Asosiasi Perusahaan Alat dan Mesin Pertanian Indonesia)
AMDAL	Environmental Impact Assessment
AOTS	The Association for Overseas Technical Scholarship
API	American Petroleum Institute
APLINDO	Association of Indonesian Metal Foundry
	(Asosiasi Industri Pengecoran Logam Indonesia)
APPI	Association of Electrical Industries of Indonesia
	(Asosiasi Produsen Peraltan Listrik Indonesia)
AS	Australian Standard
ASAKI	Indonesian Ceramic Industries Association
	(Asosiasi Aneka Industri Keramik Indonesia)
ASEAN	Association of South East Asian Nations
ASME	American Society of Mechanical Engineers
ASPEP	Association of Indonesian Metalwork and Machinery
	(Asosiasi Pengerjaan Logam dan Permesinan)
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BAKOSURTANAL	The National Coordinating Agency for Survey and Mapping
	(Badan Koordinasi Survey dan Pemetaan National)
BAPEDAL	Environmental Impact Management Agency
BAPPENAS	National Planning Agency
	(Badan Perencanaan Pembangunan Nasional)
BATAN	Agency for National Atomic Energy
	(Badan Tenage Atom National)

(*) Descriptions in parentheses show the names in Indonesian.

BBIK	Institute for Research and Development of Chemical Industries: IRDCI
	(Balai Basar Penelitian Pengambangan Industri Kimia)
BBLM	Institute for Research and Development of Metal and Machinery Industries: IRDMMI
	(Balai Basar Penelitian dan Pengembangan Industri Logan dan Mesin)
BBK	Institute for Research and Development of Ceramic Industries: IRDCRI
	(Balai Basar Penelitian dan Pengembangan Industri Keramik)
BBP ALSINTAN	Center for Development of Agricultural Engineering
	(Balai Basar Pengenbangan Alat dan Mesin Pertanian)
BKPM	Investment Coordinating Board
	(Badan Koordinasi Penaman Modal)
BPBJ	Materials Research and Testing Institute: MRTI
	(Balai Penelitian Bahan DKI Jakarta)
BPCs	Sampling Organization for Export Inspection of MOT
BPIS	Agency of Strategic Industry Management
BPPI	Agency for Industrial Research and Development
	(Balai Penelitian dan Pengembangan Industri)
BPPT	Agency for Assessment and Application of Technology
	(Badan Pengkajian dan Penerapan)
BPS	Central Bureau of Statistics
	(Biro Pusat Statistik)
BS	British Standards
B4T	Institute for Research & Development of Material & Technical Product Industries: IRDMTP
	(Balai Basar Penelitian dan Pengembangan Industri Bahan dan Barang Teknik)
CAD/CAM	Computer Aided Design/Computer Aided Manufacturing International Inc.
CD	Compact Disk
CE Meter	Carbon Equivalent Meter
CICA	Ceramic Industry Club of ASEAN
CIF	Cost, Insurance and Freight
CKD	Completely Knocked Down
CODEX	Codex Alimentarius Commission
CRT	Cathode Ray Tube
CSA	Canadian Standard Association
CTQC	The Center of Testing and Quality Control
	(Pusat Pengujan Mutu Barang : PPMB)
CWQC	Company Wide Quality Control
DG	Directorate General
DIN	Deutches Institut Fur Normung

DOM	Directorate of Metrology
	(Direktorat Metrologi)
DRN	National Research Council
DSN	Standardization Council of Indonesia
	(Dewan Standardisasi Nasional)
DTA/TGA	Differential Thermal Analyzer/Thermogravimetry Apparatus
EC	European Community
EIJA	Standards of Electronic Industries Association of Japan
EN	European Standards
EPTE	Export Oriented Production Entrepots
ESCAP	Economic and Social Commission for Asia and Pacific
FDD	Floppy Disk Drive
FOB	Free on Board
FY	Fiscal Year
GAIKINDO	Automobile Industry Association
GAMMA	Federation of Indonesian Metal Work & Machinery Industries
	(Gabungan Asosiasi Perusahaan Pengerjaan Logam Dan Mesin Indonesia)
GDP	Gross Domestic Product
GE	General Electric Co.
GIAMM	Indonesian Automotive Parts and Components Industries Association
	(Gabungan Industri Alat-Alat Mobil dan Motor)
GNP	Gross National Product
HDD	Hard Disk Drive
IATO	Automobile Technology Association
IEC	International Electrotechnical Commission
IECQ	The IEC Quality Assessment for Electric Components
IETC	Indonesian Export Training Center
	(Pusat Pelatihan Ekspor Indonesia)
IFEAT	International Federation of Essential Oils and Aroma Trades
ILAC	International Laboratory Accreditation Committee
IPO	International Procurement Office
IR	Infra-red
IRA	International Rubber Association
IRDCI	Institute for Research and Development of Chemical Industries
	(Balai Basar Penelitian Pengambangan Industri Kimia : BBIK)
IRDCRI	Institute for Research and Development of Ceramic Industries
	(Balai Basar Penelitian dan Pengembangan Industri Keramik : BBK)

IRDMMI	Institute for Research and Development of Metal and Machinery Industries
	(Balai Basar Penelitian dan Pengembangan Industri Logan dan Mesin : BBLM)
IRDMTP	Institute for Research and Development of Material and Technical Product Industries
	(Balai Basar Penelitian dan Pengembangan Industri Bahan dan Barang Teknik : B4T)
ISA	Instrument Society at America
ISO	International Organization for Standardization
ITQC	Institute for Total Quality Control
	(Lambaga Pengendalian Mutu Terpadu)
JASO	Japanese Automobile Standards Organization
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
JNK	National Calibration Network
	(Jaringan Nasional Kalibrasi)
JODC	Japan Overseas Development Corporation
JSA	Japanese Standards Association
KAIT	Technical Accreditation Committee
KAN	National accreditation Committee
KEMA	N.V. tot Keuring van Electrotechnische Matcialen, NETHERLANDS
KIM-LIPI	Pusalitbang Kalibrasi, Instrumentasi & Metrologi
KVA	Kilo-Voltage Ampere
LAPAN	The National Aero Space Institute
	(Lembaga Penerbangan dan Antariksa National)
LHA	Laporan Hasil Analisa
LIPI	Indonesian Institute of Science
	(Lembaga Ilmu Pengetahuan Indonesia)
LKP	Laporan Kebenaran Pemeriksaan
LMK	Electrical Power Research Institute
	(Pusat Penylidikan Masalah Kcelistrikan)
LNG	Liquid Natural Gas
LPMs	Local Laboratories of MOT
LSI	Large Scale Integration
MCB	Miniture Circuit Braker
MIDC	Metal Industrial Development Center
MIG	Metal inert gas welding
MITI	Ministry of International Trade and Industry, Japan

MOI	Ministry of Industry
	(Departemen Perindustrian)
MOT	Ministry of Trade
	(Departemen Perdagangan)
MRTI	Materials Research and Testing Institute
	(Balai Penelitian Bahan DKI Jakarta: BPBJ)
NAFTA	North Atlantic Free Trade Area
NATA	National Association of Testing Authorities
NBN	Institut Belge de Normalisation
	(Norm Belge)
NIEs	Newly Industrialized Economies
NIST	National Institute of Standard and Technology
OEM	Original Equipment Manufacturer/Manufacturing
OIML	Organization Internationale de Metrologie Lêgale
OJT	On the Job Training
PARPOSTEL	Ministry of Tourism, Post & Telecommunications
PEB	Pemberitahuan Exsport Barang
PH-DSN	Executive Council of DSN
PH-KAN	Executive Council of KAN
PJP	Long Term (25 years) Development Plan
PJU	Ministry of Public Works
	(Pekerjaan Umum)
PLN	State Electricity Corporation
	(Perusahaan Umum Listrik Negara)
PMA	Penanamah Modal Asing
PMMI	Indonesian Quality Management Association
	(Perhimpunan Manajeman Mutu Indonesia)
PPEI	Indonesian Export Training Centre
	(Pusat Pelatihan Ekspor Indonesia)
PPMB	The Center of Testing and Quality Control : CTQC
	(Pusat Pengujan Mutu Barang)
PROKASIH	Clean River Program
PT	Perseroan Terbatas
PTO	Power Take-out
PUSPIPTEK	Science and Technology Development Center
PUSTAN	Center for Industrial Standardization
	(Pusat Standardisasi Industri)

QC	Quality Control
R & D	Research and Development
RDE	Research Development and Engineering Services
REPELITA	5 Years Development Plan
	(Rencana Pembangunan Lime Tahunan)
RIHS	Research Institute for Human Settlement
	(Pusat Penelitian dan Pengembangan Pemukiman)
RNAM	Regional Network for Agricultural Machinery
SEM	Scanning Electro Microscope
SGS	Societe General de Surveillance
SII	Standards of MOI
SIR	Standards of MOT
SIRIM	Standards and Industrial Research Institute of Malaysia
SISIR	Singapore Institute of Standards & Industrial Research
SITC	Standard International Trade Classification
SKD	Semi-Knocked Down
SLI	Standar Ketenagalistrikan
SM	Sertifikat Mute
SME	Small and Medium Scale Enterprise
SNI	National Standard of Indonesia
	(Standar Nasional Indonesia)
SP	Ministry of Commerce Standards
SPCC	Cold-rolled Steel Product
SPCN	Ministry of Mines and Energy
SPLN	PLN Standard
SPM	Surat Pernyataan Mutu
SQC	Statistical Quality Control
SRQA	Sucofindo Register for Quality Assurance
SS	Singapore Standards
SSN	National Standardization System
S/W	Scope of Work
TC	Technical Committee
TELEKOM	Telekomunikasi Indonesia
TIG	Tungsten Inert Gas Welding
TKSI	Steering Committee
TQC	Total Quality Control
TV	Television

UL	Underwriters' Laboratories
U.K.	United Kingdom
U.S.	United State of America
VCR	Video Cassette Tape Recorder
WG	Working Group
YDNI	Yayasan Dana Narmalisasi Indonesia

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Executive Summary

1 Industrial Development in Indonesia and Target of Industrial Standardization and Quality Control Promotion

Direction of Industrial Development

Under PJP II, the industrial sector is positioned as a central force of economic development, and REPELITA VI, which is the first-five year development plan of PJP II, sets the major goal of industrial development in "the industrial sector restructured and soundly established." In the development plan, it was recognized that a powerful and modern industrial sector can be achieved solely on the foundation of the powerful technical capability and the reliable economic system.

The restructured and sound industrial sector is characterized by the strengthening of linkage among upper, intermediate, and lower streams of the industries, large, medium, and small-sized industries, traditional industries, and the industrial and other sectors of the economy.

To ensure the successful and sustainable implementation of the promotional strategy, bottom-up innovation of the industrial sector is called for. Major innovation needed from the technological viewpoint are as follows:

1) To improve productivity of the existing industries suffering from inefficient and high cost 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 establishing reputation of Indonesian products in the export market.

Target of Industrial Standardization and Quality Control Promotion

For the successful promotion of industrial standardization and quality control, measures are necessary in pursuing the following situation:

1) Quality control that brings productive results to the production and distribution system is accepted industry-wide
2) The industries spontaneously participate in the development of standards to accelerate the development and updating of effective standards that meet levels

required by the industries, and standards become the basis of quality control[1].

3) Quality control methods and certification systems used in Indonesia become internationally recognized.

2 Present Status and Issues of Industrial Standardization and Quality Control Promotion

2.1 Industrial standardization

Present SSN System

The standardization projects were operated by each government agencies independently in the past. In 1984, with the establishment of DSN (Dewan Standardisasi Nasional; Standardization Council of Indonesia), activities for unified national standardization was launched with SSN (National Standardization System).

Primary components of the SSN project in Indonesia include the establishment of SNI standards and their application. Implementation of SNI is driven by various mechanisms including the SNI marking (certification) system. The SSN system also covers the metrology system. Based on the original schedule, the system should have been inaugurated on April 1, 1994. However, in consideration to the status of preparation by ministries and agencies serving as technical institution, DSN's Plenary Meeting on March 22, 1994 approved the extension of the transition period up to March 31, 1995.

Major Issues on Standardization

The SSN is in the suspension period, during which laws, institutional arrangement, organizational structure, manpower, and facilities and equipment are set up for official implementation. However, it will take considerable time until the envisaged system is totally established, as various activities are undertaken including (1) preparation of guidelines and operation manuals, (2) establishment of required facilities and equipment as well as ensuring availability of manpower, and (3) implementation of institutional setup required for operation of the system, etc.

Further, there is a need to review the basic stances for promotion of standardization and rationalize it to make the process simple, possible for prompt implementation, and with substance, by taking into account the following points:

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[1] Apart from national standards, in-house standards as well as association standards are also used for quality control; the promotion of these standards should be emphasized as well.

Chart 1: Summary of Present Status, Recommended Measures and Programs

	Present Status and Issues	Recommended Measures to be Undertaken	Responded Programs Recommended									
			1	2	3	4	5	6	7	8	9	10
(1) Standardization												
1) Overall aspects for standardization	1) Establishment of standardization system which contributes to improvement of industrial efficiency with separation of regulation from standardization project	1) Define standards as opposed to regulatory measures						X				
		2) Reappraisal of total system for standardization in view of streamlining and simplification of the system and transfer of authority						X	X	X		
		3) Increased involvement of industry in standardization	X	X				X		X		
		4) Rationalization of standards development by adoption of international/foreign standards for draft SNI						X		X		
	2) Delay in preparation of the system for implementing under SSN	– Reappraisal of total system for standardization in view of streamlining and simplification of the system and transfer of authority						X		X		
2) Standard development/revision	1) Insufficient understanding of needs of users of standards, and insufficient reflection of it on standard development	– Standard development reflecting to needs of industry with their increased involvement	X	X				X		X		
	2) Acceleration of standard approval process	1) Define standards as opposed to regulatory measures						X				
		2) Reappraisal of total system for standardization in view of streamlining and simplification of the system and transfer of authority						X	X	X		
3) Dissemination of standards	1) Insufficient utilization of the national standards in industry a) Common use of foreign standards by leading and middle standing companies due to requests from their users and foreign partners b) Insufficient development of standards particularly in the basic and common areas c) Insufficient understanding of needs of users of standards, and insufficient reflection of it on standard development d) Insufficient QC due to lack of "KAIZEN" (or continuous improvement) concept by the middle standing companies e) Insufficient QC practices by SMEs	1) Standards development reflecting the needs of industry 2) Establishment of system for standard dissemination 3) Dissemination of QC with "KAIZEN" concept							X X	X		
	2) Lack of adequate dissemination activities of standards	1) Establishment of system for standard dissemination							X			
		2) Establishment of national commendation system for standardization promotion							X			
4) Certification system	1) Insufficient utilization of the existing system in industry	1) Improvement of the system to reflect the needs of industry	X	X							X	
		2) Implementation of advertising activities on usefulness of certification	X	X							X	
	2) Insufficient confidence of industry and consumers on the existing certification system	1) Improvement of general confidence on the system through full enforcement of the system in the priority areas	X	X							X	
		2) Disclosure and publicizing of procedural rules									X	
		3) Implementation of advertising activities of usefulness of certification	X	X							X	
	3) Delay in establishment of the system including that of accreditation	– Full development of the system focusing on the areas of priority	X	X							X	
	4) Insufficient testing and inspection system for full enforcement of the certification	1) Full development of the system focusing on the areas of priority	X	X							X	
		2) Modification of the testing system to make use of the facilities available at the manufacturers									X	
	5) Need for establishment of certification and accreditation system recognized internationally	1) Reappraisal and full enforcement of the existing certification and accreditation system									X	X
		2) Promotion of mutual recognition of certification with foreign certification body										X
(2) Promotion of quality control	1) Insufficient quality awareness of industry and general consumers	– Improvement of awareness of need for QC through full enforcement of certification system	X	X							X	
	2) Insufficient practice of "KAIZEN" under the prevailing QC	1) Establishment of center organization for promotion of QC							X			
		2) Provision of motivation and nurturing system for manpower development for QC undertaking						X	X			
	3) Lack of adequate manpower for implementation of QC and lack of expertise on the QC method	1) Establishment of center organization for promotion of QC				X			X			
		2) Provision of motivation and nurturing system for manpower development for QC undertaking						X	X			
	4) Need for improvement of technological level and promotion of inter-and-intra linkages of industry through dissemination of QC among SMEs	1) Establishment of center organization for promotion of QC				X			X			
		2) Development and dissemination of QC system specifically designed for SMEs	X	X	X				X			
		3) Provision of motivation and nurturing system for manpower development for QC undertaking						X	X			
(3) Testing and inspection system	– Insufficient updating of testing facilities of testing institutes in the public sector a) Difficulty in full undertaking of certification testing b) Difficulty in meeting the demand for testing from industry which is critical for QC practices	1) Full development of the system focusing on the areas of priority		X							X	
		2) Modification of the testing system to make use of the facilities available at the manufacturers									X	
(4) Calibration system related to industrial metrology	1) Need for prompt implementation of calibration system planned 2) Expansion of calibration capability responding to the demand increase and technology advancement a) Respond to increased demand for the calibration b) Expand calibration capacity for derived quantities c) Establishment of traveling calibration system providing services for large scale measuring instruments											

Note: Shaded items show the major targets under the respective recommended programs.

1) Standardization is a major driver for rationalization and streamlining of production activities as well as simplification of trade. It is a process enabled by producers, distributors, users, consumers, and other persons in a neutral position. It has an 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 with which to drive broad based reduction of production costs and the improvement of corporate performance. These can be achieved 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 the improvement of labor productivity. From the context of 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.
2) While the government is expected to take initiative at the initial stage of promoting the standardization project, government-led standardization efforts alone do not produce a desired result, and do not lead to an increased awareness of it. 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) company standards. In essence, standardization should result from concerted efforts involving the participation of industries and companies in the national standardization project and promotion of standardization within each company.
3) At the same time, international standards can be used to spearhead standardization. Their effective use helps to transfer technology subject of international standards, and can save costs related to the development of national standards.

2.2 Development of testing and inspection system

The existing testing and inspection system operated by the public sector is inadequate in general, in that the facilities and equipment are not updated, and manpower training is not undertaken sufficiently enough to enable the system to keep pace with the progress of industry. The development of the testing and inspection system, however, should be implemented according to priority on areas most expected by the industry.

Further, the present system does not have defined functions for the relevant testing and inspection institutes, such as research and development, technology guidance, and testing and inspection. Analysis of the demand for these functions, and the corresponding assignment for these of testing institutes are very important to enhance the system.

According to the manufacturer questionnaire survey, demand for outside testing service is not very high. By field, the highest percentage of the companies responded is seen in the mechanical area (32%), followed by the chemical field (29%), and electrical and physical fields, 14% each, respectively.

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 the respective percentage shares of 47% and 43% of the total responding companies.

Along with the development of testing and inspection system according to the demand for contract testing analyzed in the above, the accompanying development of that for certification system should also be promoted in view of ensuring product safety and quality, particularly in the fields of electrical and electronics, since the coverage of existing testing and inspection institutes is weak in this area.

2.3 Calibration system related to industrial metrology

The industrial metrology system is in the process of transition to a new system. The calibration system under the new system has not been established. The National Calibration Network (JNK) however, is organized by KIM-LIPI as its core organization, and 19 research institutes under the government, universities, as well as private organizations. Each member organization performs calibration service in each field of specialization.

Actual calibration practice of the manufacturing sector, however, indicates that the calibration system does not work as intended. Large companies and foreign-affiliated companies requiring high levels of accuracy use calibration service of KIM and JNK member organizations only 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 properly calibrated. Foreign-affiliated companies use foreign calibration organizations or calibration service furnished by original equipment suppliers.

There is sizable demand for calibration. According to the manufacturer questionnaire survey, 48% 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 building material industry.

Given the anticipated industrial development in the country, calibration demand is

expected to grow, and require diversification of calibration fields and increase in calibration capacity. Also, geographical expansion is expected.

2.4 Promotion of quality control

As for the obstacles to implementation of quality control systems, more than 45% of the responding companies cite the lack of knowledge on quality control methods. The second largest factor is the lack of manpower required to introduce QC systems (40% of total).

The most serious problem for the promotion of quality control in Indonesia, is the lack of an organization which is responsible in developing quality control methodology suitable for Indonesia, and disseminating it in an organized and continuous basis. In addition, the development of quality control system applicable to small and medium scale enterprises is a necessary aim in this regard.

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

Dissemination of quality control not only helps rationalize production activity of individual companies, but also contribute greatly to the structural development of the industry as a whole by fostering suppliers of reliable raw materials and parts. Structural development of the industry in 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.

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 uses standardized technical standards and methods to improve and stabilize the quality of products, raise product yield, and increase productivity, and such standards and methods can be applied to shop floors and distribution channels. At the same time, strict enforcement of quality control visualizes the need for further standardization. This means, for quality control to start from efforts toward compliance with established standards, national or international, and then going beyond these. It must aim at meeting consumer needs and quality requirements, both in the present and future.

In view of the above, the government should also make further efforts to promote quality control particularly by the following points:

1) Establishment of center organization, which undertakes research on quality control technology suitable for the country, and disseminate these on the basis of well

organized long-term dissemination plan.

2) To make use of resources available in the country, qualified quality control instructors should be registered at an appropriate organization either from private companies, government agencies, research institutes, or academe.
3) To establish or improve general access to information related to quality control.
4) To develop and disseminate quality control systems that are viable for small enterprises to implement.

3 Strategy for Industrial Standardization and Quality Control Promotion

The following are the required strategies for promotion of industrial standardization and quality control (Chart 2):

(1) Dissemination of standardization and quality control among industries

1) To focus on creation of incentives: The certification system is expected to play a critical role here. In particular, this will result in the following:
   a) They will be able to recognize the importance and effectiveness of industrial standards in production and distribution areas.
   b) They will have the incentive 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 related to their industries.
   d) Revision of the existing standards according to industry's needs and the development of new standards will be encouraged, thereby increasing the value of standards.
   e) On the other hand, the establishment and operation of the effective and reliable certification system will help raise quality awareness among consumers, and create an environment that will urge the industries to prioritize quality.
2) The concept and methodology of quality control conducive to the improvement of operating efficiency need to be disseminated to industries, particularly among foreign-affiliated companies 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 their needs in development of standards.

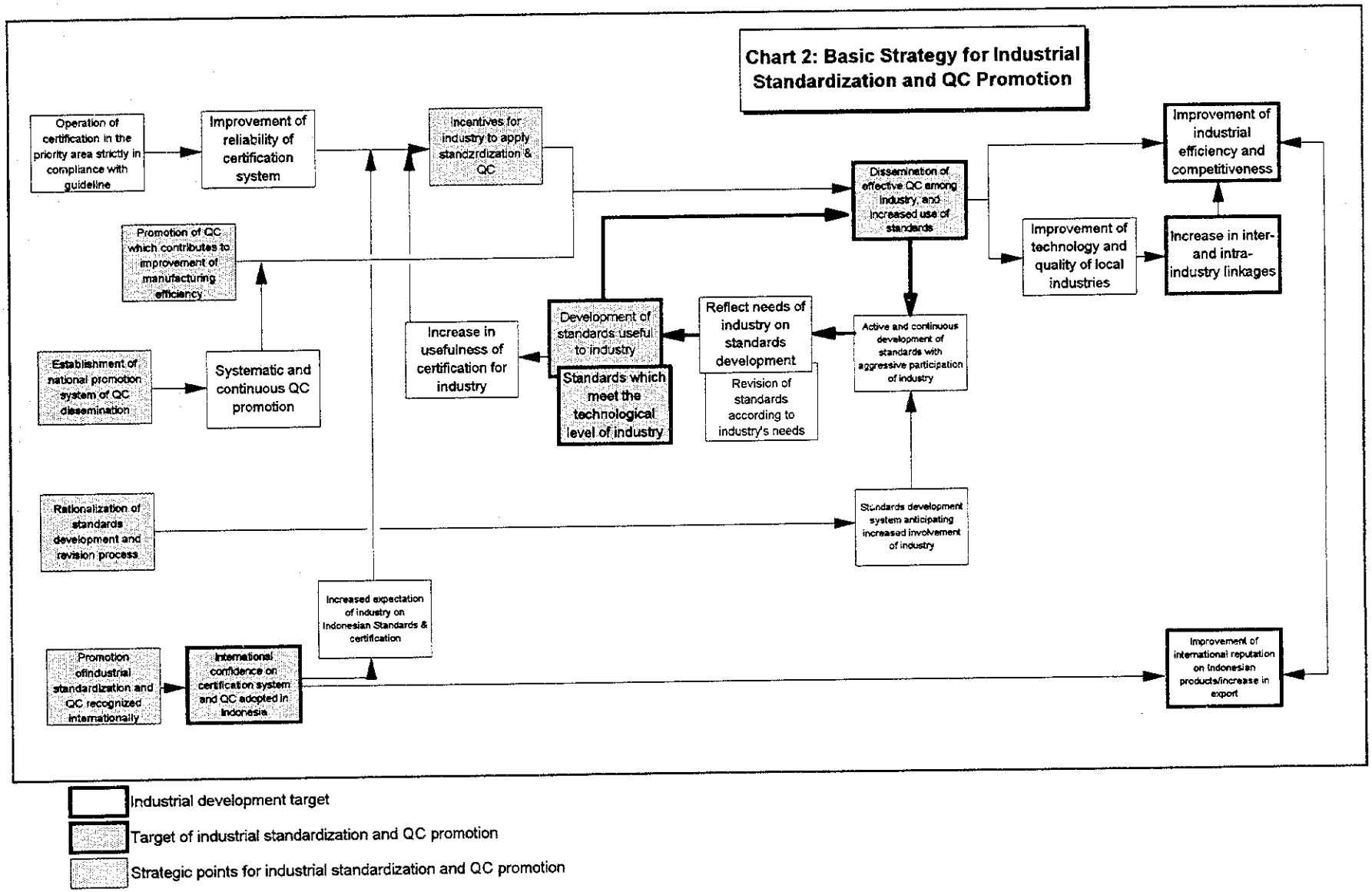


Chart 2: Basic Strategy for Industrial Standardization and QC Promotion
Operation of certification in the priority area strictly in compliance with guideline
Improvement of reliability of certification system
Incentives for industry to apply standardization & QC
Dissemination of effective QC among industry, and increased use of standards
Improvement of industrial efficiency and competitiveness
Improvement of technology and quality of local industries
Increase in inter- and intra-industry linkages
Promotion of QC which contributes to improvement of manufacturing efficiency
Establishment of national promotion system of QC dissemination
Systematic and continuous QC promotion
Increase in usefulness of certification for industry
Development of standards useful to industry
Standards which meet the technological level of industry
Reflect needs of industry on standards development
Revision of standards according to industry's needs
Active and continuous development of standards with aggressive participation of industry
Rationalization of standards development and revision process
Standards development system anticipating increased involvement of industry
Increased expectation of industry on Indonesian Standards & certification
Promotion ofindustrial standardization and QC recognized internationally
International confidence on certification system and QC adopted in Indonesia
Improvement of international reputation on Indonesian products/increase in export
Industrial development target
Target of industrial standardization and QC promotion
Strategic points for industrial standardization and QC promotion

(2) Enhancement of system to promote standardization and quality control:

1) To create an organization that facilitates the development of standards according to industry needs. Such organization should be empowered to rationalize the standards development and updating process, and to provide easy access to industries and their participation. The following results are expected:

a) The move to establish and update standards will be unleashed, while their use will be encouraged to raise public awareness on their usefulness;

b) As a result, the industries can and will reflect their needs for future development of standards on a continuous basis.

2) To establish an organization and structure that will initiate quality control drives at the national level, enabling the promotion of quality control in a systematic, organized and sustainable manner.

3) To make the standardization and quality control system of Indonesia internationally-recognized. The following results will be produced:

a) Expectation of the industries in the Indonesian standards and certification system will rise encouraging their participation in the standardization process.

b) The frequent use of standards by the industries will help align the standardization process with industry needs.

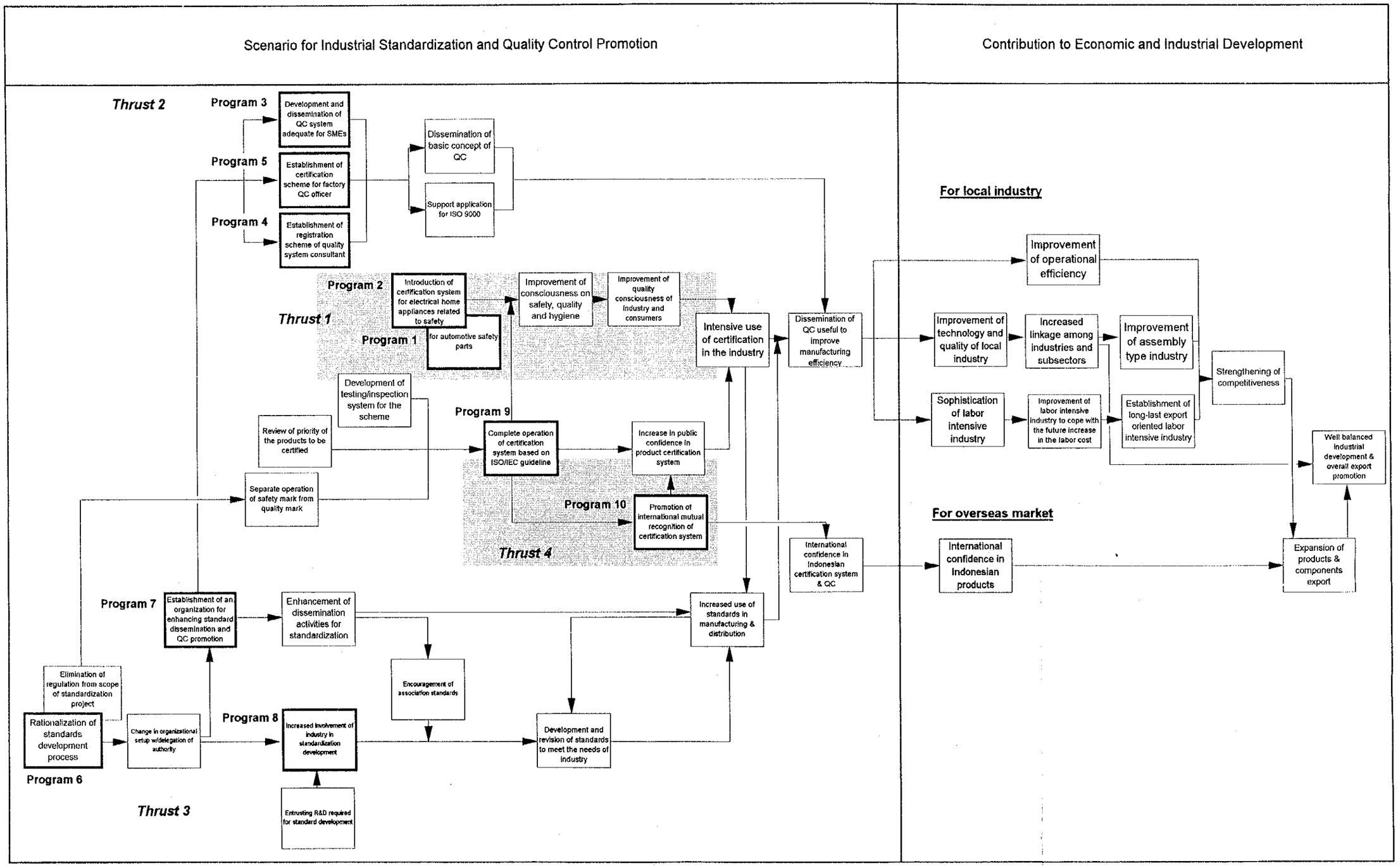
4 Program Recommendation for Industrial Standardization and Quality Control Promotion

(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 the Certification System

Product quality most recognizable by consumers is related to safety of product in its daily use. By implementing a reliable product certification system that covers safety aspects, quality awareness of consumers can be raised and 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 3.

Chart 3 : Industrial Standardization and Quality Control Promotion and their Contribution to Industrial Development



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

Automotive spare parts are generally purchased directly, 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, these are mere copies of genuine products that are also distributed in the market. Such parts, when installed on cars, create a risk of accident that endangers not only drivers but also other vehicles and pedestrians. The risk involved becomes very serious if an imitated component is related to safety of vehicle driving. Thus, it is meaningful to introduce a product certification program for parts that are widely distributed in the after market.

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

General consumers tend to select 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 life and property caused by electrical leak and overheating. To eliminate products not complying with safety standards from general distribution, the introduction of product certification program is recommended for widely-sold home appliances that require safety precautions and can easily be copied.

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 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 are essential efforts in surviving through a highly competitive environment. Thus, the standardization and quality control promotion program for these enterprises should limit its support to areas where difficulty is faced on an individual basis. 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 to disseminate quality awareness and quality control practice according to conditions of these enterprises.

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

At present, there is a marked difference in the technology adopted and quality levels 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 accounted for by the fact that the latter imports raw materials and parts which are also available from the former. Clearly, the improvement of 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 in educating managers and employees in understanding 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 of 60-70% of those in ISO 9000 series, and designed to serve as the first step to facilitate the upgrading to higher levels.

Program 4: Establishment of registration scheme of quality system consultant

When enterprises intend to establish the quality system based on the ISO 9000 series, they mostly use outside consultants, since they rarely have their own staff with adequate expertise and experience. This program aims to eliminate availing the services provided by incapable consultants by means of registering only those who have adequate experience and expertise. This will facilitate the search for qualified services of the quality system based on the ISO 9000 series.

This scheme is considered to serve as an effective motivation in nurturing capable consultants by giving them opportunity for the involved activities.

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

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

On the other hand there are many companies which are aware of the importance of quality control, but do not implement it because of the lack of quality control staff with the necessary expertise and experience.

This program provides the system that aims to assist 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.

(II) 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

Under the present system for development of standards, each standard is deliberated upon during DSN's general meeting, after having been approved by related ministries. In essence, the system is designed to establish standards utilizing a very elaborate process. This is not complementary with the current state of national standards development in Indonesia, where standards meeting 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 allowing accelerated participation of user industries and their timely development in accordance with actual needs.

Program 6: Preparation for rationalization of standards development process

To ensure that the development of standards proceeds by reflecting industry needs, 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

it is founded on the following common groundwork:

1) Standardization contributes to 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 be successfully implemented only on the basis of established standardization efforts at the corporate level and the development of industry standards founded on such efforts.

The program entails the following actions in undertaking the above arrangements.

1) Reappraisal of the basic concept of standardization.
2) Simplification and streamlining of standards development and operation of organizations and procedures.
3) Early implementation of the existing plan to increase representatives of industries in the (standards development) technical committee.

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

A system that plays a central role in the promotion of standardization and quality control will be established. The system will materialize a structure that will develop standards reflecting the industry needs in a timely manner, as assumed under Program 6. On the quality control front, the system will lead in the preparation and implementation of QC promotion at the national level.

At present, SNI is not well appreciated among industries, and its use is limited to a relatively small number of companies. The certification system can serve as effective means to urge manufacturers to comply with standards. By the same token, quality control is a power vehicle for the promotion of SNI. Further, it is recommended to establish a national commendation system for companies and individuals to help motivate company employees in taking and maintaining standardization initiatives.

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

The Ministry of Industry which controls approximately 70% of SNI standards, plans to develop 500 draft SNI standards annually, through R&D institutions and regional institutes under BPPI. The program proposes to rationalize the draft standards development system which involves substantial amount of work, including maintenance work covering the review and revision of SNI.

Program 6 is designed to set forth the legal foundation for the rationalization and streamlining of the standards development process. This program focuses on the establishment of an actual system and structure that will rationalize and streamline standards development. The basic direction presumed in the process are:

1) Adopt international and foreign standards into national standards as much as possible, and limit the areas where the Indonesian original standards are developed. This will reduce the burden for standards development.
2) Divert the drafting and reviewing work of SNI to various organizations such as by entrusting it to industrial associations, etc. This will also be useful also in reflecting the opinions of industry in standards development process.

Program 9: Increase in public confidence on product certification system

The certification system is a very effective instrument for the promotion of standardization and quality control. In Indonesia however, it is rarely adhered to except in the case of industrial electrical equipment industry that is required to obtain certification for products procured by PLN. This is because: 1) the present certification system is not well known among consumers and users and thus, is not widely used by industries; and 2) because of insufficient operating rules including mandatory certification, the system is not fully relied on. This program intends to develop the certification system into one that meet industrial needs and widely used among the related industries.

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

Program 10: Promotion of international mutual recognition of certification system

With the assessment and registration of the quality system under ISO 9000 series becoming a global phenomenon, attention is also raised demanding the mutual approval of the system under a bilateral or multilateral arrangement. This move, if successfully pursued, will further unleash market globalization.

Nevertheless, mutual certification on a bilateral basis involves various special factors in addition to a standard form of mutual approval at an international level, and thus, it would be very difficult to achieve, unless there is an internationally-recognized national system.

The program is designed to achieve the goal of bilateral mutual certification through

the following steps:

1) Reappraisal and full enforcement of the existing accreditation and certification system based on the ISO/IEC system.
2) Promotion of joint assessment and mutual surveillance with foreign certification body.

Implementation Suggestions

(1) Implementation plan and steps

Chart 4 shows the suggested implementation plan.

(2) Overall Coordination/Monitoring System

The programs are closely related with each other, so that their coordinated implementation as well as implementation of individual programs is critical in producing the successful result. To this end, a system should be established to monitor the overall progress, make adjustment, support and recommendations as required or execute program improvement.

(3) Foreign Technical Support

These programs are assumed to be implemented by the existing organizations with existing facilities and manpower, as they might be reorganized, expanded or improved. The effect and efficiency of executing these programs can be maximized by obtaining the collaboration of industry sectors and the academic community. In Indonesia, however, industry sectors have insufficient experience in standardization and quality control promotion, and do not have sufficient key personnel that can manage the proposed programs and their implementation. Alternatively, reference to overseas experience in undertaking the similar programs, and obtaining support of experienced foreign experts will be effective, particularly in the following areas:

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

   Reference to foreign experience in the selection of products to be certified, and establishment of standards (e.g. "Quality Automotive Parts Certification Scheme" by JAPA (Japan Automotive Parts Dealers Association), and Transportation Ministerial Decrees of Japan regarding safety standards for vehicles, etc.)
2) **Program 2:** Introduction of safety mark certification program for home electrical appliances
   a) Reference to foreign experience in the selection of products to be certified, and

Chart 4: Suggested Implementation Plan

Order of precedence	Year :	1st	2nd	3rd	4th	5th
5	**Program 1: Introduction of certification program for automotive replacement safety parts**					
	1) Study & selection of automotive replacement parts					
	2) Development of standards for the parts					
	3) Development of testing/inspection system for the scheme					
	4) Start of operation of the certification scheme					
3	**Program 2: Introduction of safety mark certification program for home electrical appliances**					
	1) Selection of home appliances for the certification					
	2) R&D and development of standards for the appliances					
	3) Legislative preparation for the regulation (*)					
	4) Development of testing/inspection system for the scheme					
	5) Start of operation of the certification scheme					
3	**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					
3	**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					
3	**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					
1	**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					
2	**Program 7: Establishment of an organization for enhancing standardization and quality control**					
	1) Formulation of a prospectus and an operation plan					
	2) Establishment of the organization					
3	**Program 8: Diversification of standards drafting process for increased involvement of industry**					
	1) Consensus on increased adoption of int'l & foreign standards					
	2) Promotion of QC					
	3) Encouragement of association standards and involvement of industry					
3	**Program 9: Increase in public confidence on product certification system**					
	1) Change in the scope of system to limit to voluntary certification					
	2) Review of the items based on the above					
	3) Revision of testing labo accreditation scheme					
	4) Training program for quality system certification assessors					
4	**Program 10: Promotion of international mutual recognition of certification system**					
	1) Review of the existing system based on ISO/IEC system					
	2) Complete operation of the system according to the above guideline					
	3) Joint assessment and mutual surveillance w/foreign certification body					

establishment of safety standards (e.g. "Electrical Appliance and Material Control Law" of Japan, and IECEE-CB Scheme, etc.)

b) Technological transfer regarding design and operation training of testing/inspection laboratory for the certification

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

Reference to foreign experience in development of the system (e.g. QIP (Quality Improvement Practice) in Malaysia, dissemination of TQM among SMEs in Japan, etc.)

4) **Program 7:** Establishment of a system for enhancement of dissemination of standardization and QC promotion

Reference to foreign experience regarding the activities and financial performance of similar organizations/systems (e.g. Japanese Standards Association, etc.)

5) **Program 9:** Increase in public confidence on product certification system, and **Program 10:** Promotion of international mutual recognition of certification system

Technological transfer regarding review of the existing system and its improvement to ensure complete implementation

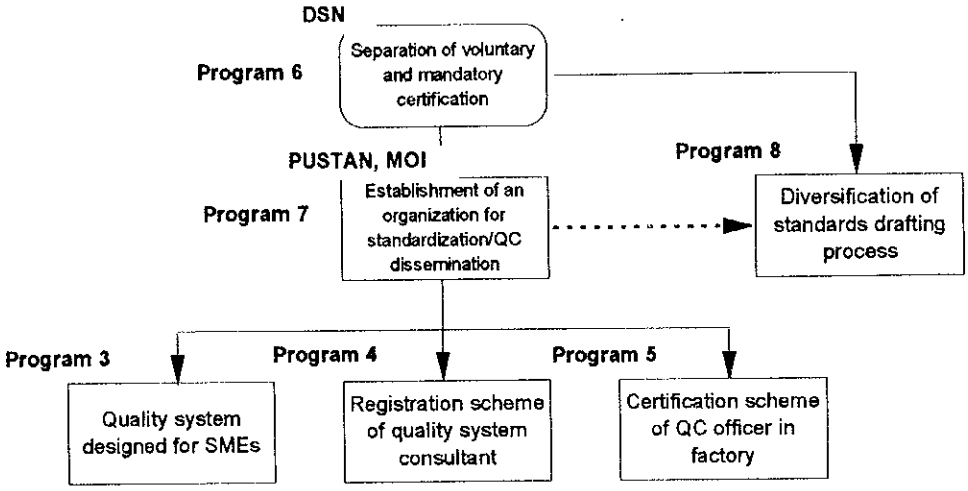
(4) Suggested plan for integrated implementation of the programs

Following recommends integrated implementation plans of the above programs in consideration of the it relationship, and the possible organizational setup for implementation. It consists of two plans. Both of these integrated implementation plan assume the precedent implementation of Program 6.

The main theme of the first integrated implementation plan is increased involvement of industry in standard development and enhancement of dissemination of standardization and quality control. The plan is to implement in an integrated manner Programs 3, 4, 5, 7, and 8 in addition to Program 6. The plan may be undertaken mostly by the existing organizations with existing facilities and manpower, but with reorganization and expansion/improvement if necessary.

Following shows the programs included and the relationships among them in the plan.

Chart 5: Suggested Plan for Integrated Implementation (1)



The second implementation plan is the program group, the main target of which is to ensure public confidence on standardization project and certification system through their complete implementation, and to realize international mutual recognition of the certification system. It focuses on Programs 2, 9 and 10 assuming Program 6 as a precedent program[2]. The plan is the one for which technological transfer from the experienced foreign countries is effective if available, though the existing organizations, facilities and manpower are the essential factors for their successful implementation.

The following shows the programs involved and the relationships among them. For the effective promotion of standardization and quality control in the industrial sector through implementation of this program group, implementation of other programs designed to promote quality control, becomes indispensable.

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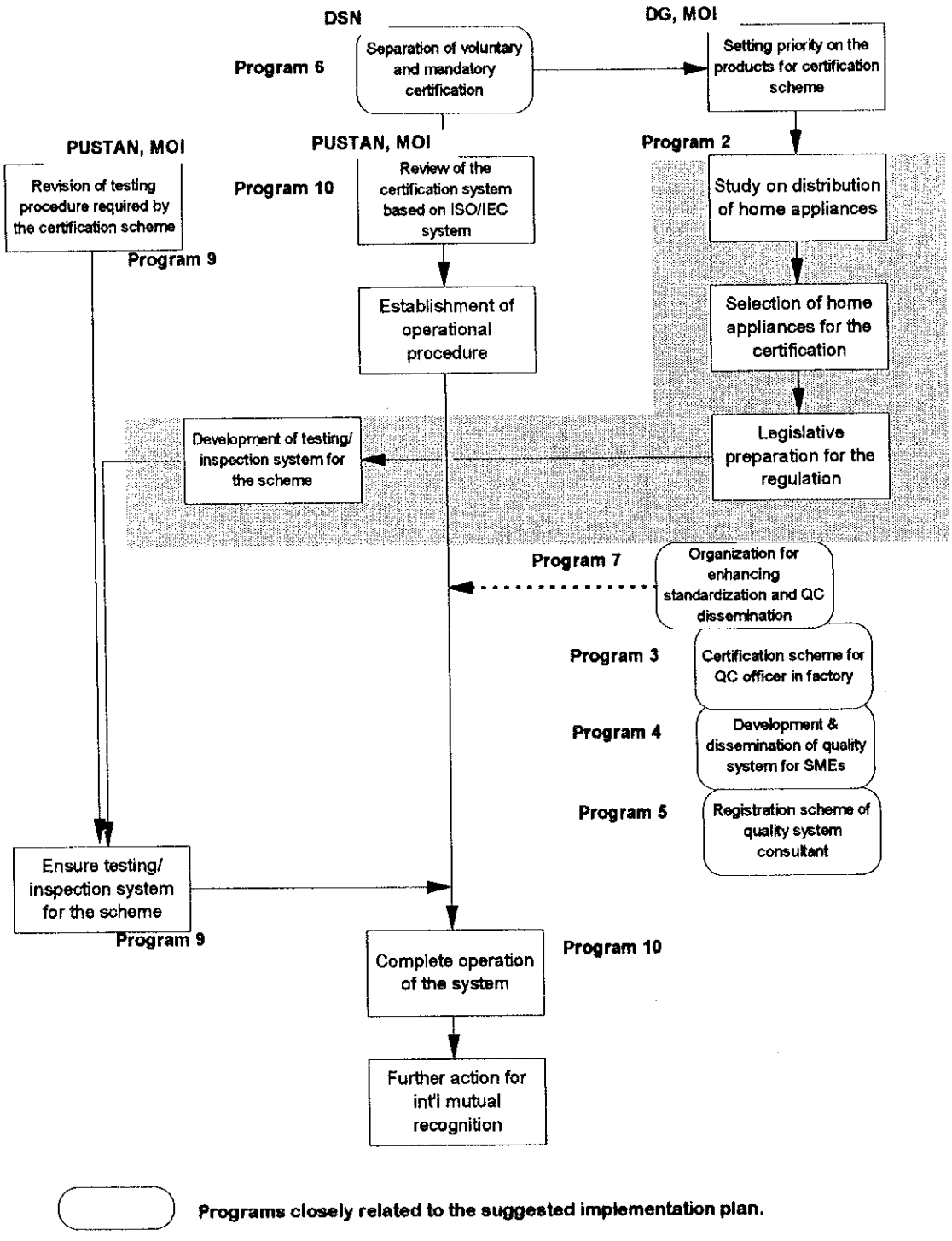
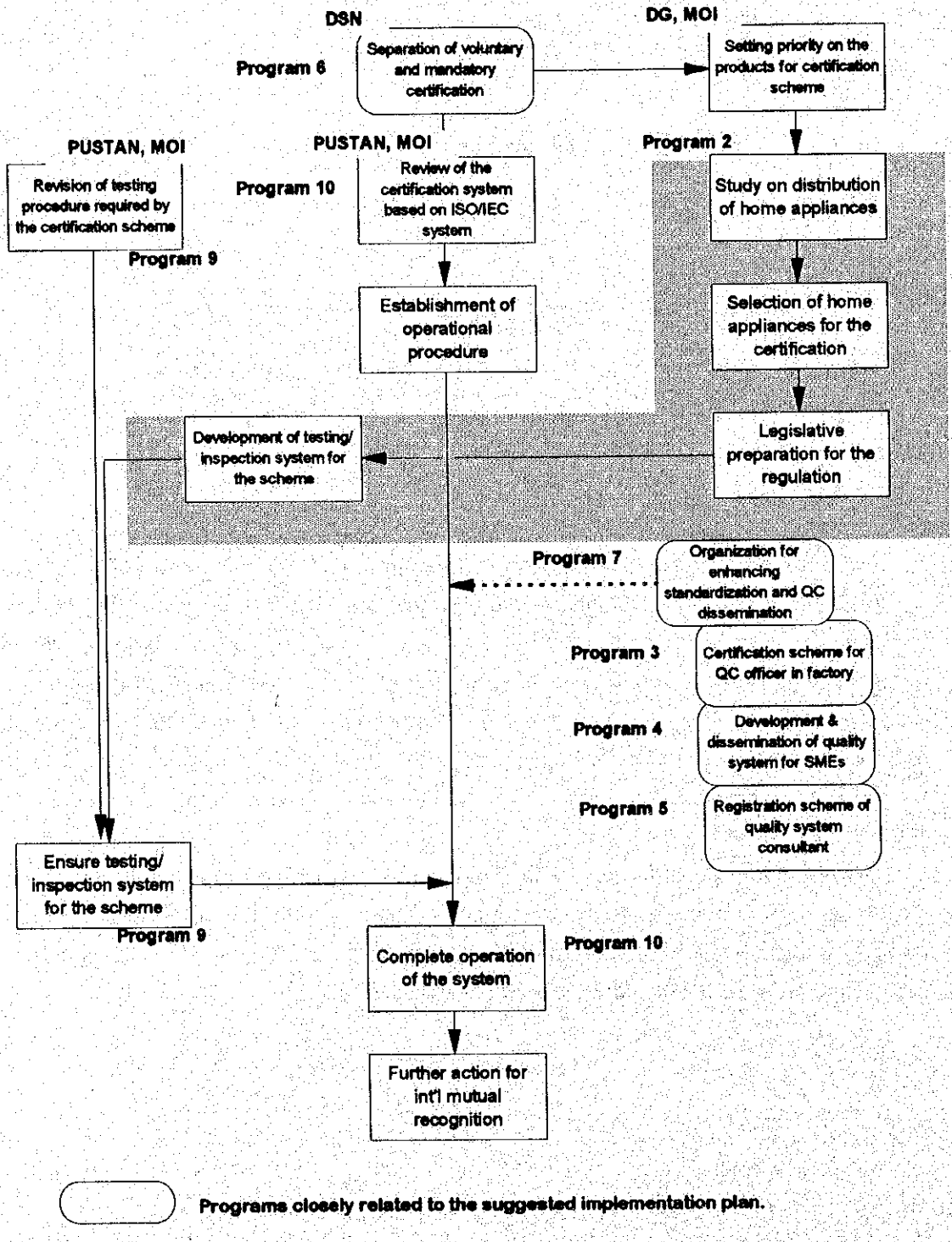
[2] Program 1 was excluded from these plan since it requires study on distribution of automotive parts, and analysis of automotive accident statistics in advance. Further, the program is expected to be implemented in a manner similar to Program 2.

Chart 6: Suggested Plan for Integrated Implementation (2)



Programs closely related to the suggested implementation plan.

Chart 6: Suggested Plan for Integrated Implementation (2)



Programs closely related to the suggested implementation plan.

1 Background, Objective and Scope of the Study

1.1 Background and Objective of the Study

The Republic of Indonesia has started its second long-term development plan (PJP II) in 1994, and will end by 2018. The first PJP (25 years, from 1969 to 1993) is considered to serve as the stage in building the foundation for economic take-off toward achieving self-reliance in the process of the country's economic development. Now, PJP II positions itself in the take-off period.

In the industrial area, industrialization and less dependence on oil are emphasized, with the manufacturing sector being positioned as the core of development.

REPELITA VI, the first five-year plan under PJP II, started in 1994 and has set forth the objective of industrial development in "the restructured and soundly established industrial sector." This is in recognition that the strong and modernized industrial sector with the ability to promote an independent and reliable economy, can be materialized only with a powerful technological capability and reliable economic system. Promotion of industrial standardization and quality control is one of the essential factors which contributes to achievement of this powerful technological capability.

Yet, the standardization system in Indonesia is in the middle of restructuring and is still weak to fully meet such industrial development needs.

In total while the enhancement of industrial standardization and quality promotion in Indonesia is called for, diverse problems that cannot be overcome with by makeshift improvements on a case-by-case basis is being faced. For this reason, the formulation of a master plan for industrial standardization and quality control promotion at this stage of development, will certainly play an significant role in its fruitful development.

Under such circumstances, at the informal request from the Government of Indonesia to the Government of Japan on the Study, JICA sent a study team to Indonesia for the selection and verification of projects in September 1993, and a discussion on the details of the request. Based on the result, JICA conducted a preliminary study in December 1993 to confirm the contents of the request and discuss study items. Then in March 1994, the preparatory study team visited the country to discuss the contents of the full-scale study on the basis of the results of the preliminary study, and agreed and signed the Scope of Work (S/W) of the Master Plan Study on Industrial Standardization and Quality Control Promotion with the Indonesian Government.

Based on the Scope of Work, JICA sent a study team consisting of UNICO

International Corporation as its leader organization, and Japanese Standards Association as the member organization. This report compiles the results of the Study conducted by the team.

According to the Scope of Work, the objective of the present study is to formulate a master plan for the enhancement of the industrial standardization system in Indonesia, thereby improving the quality of the country's industrial products, and contributing to industrial development and export promotion.

1.2 Scope of the Study

The scope of the Study is defined in the Scope of Work (S/W) which has been agreed between the Indonesian Government and the Preparatory Study Team of JICA on March 28th, 1994. The scope includes the following items:

1. To study background and relevant conditions
   1.1 Overall economic situation
   1.2 Present situation of industry
   1.3 General status of industrial standardization, quality control, accreditation, certification and testing and inspection
   1.4 Export conditions for industrial products
   1.5 Government policies, laws and regulations for the development of industry

2. To study present situation of standardization, quality control, accreditation, certification and testing and inspection, and to identify their problems
   2.1 Government policies, laws and regulations
   2.2 Execution system and administrative mechanism
   2.3 Administrative organizations and their functions
   2.4 Testing and inspection facilities, equipment and personnel
   2.5 Accreditation and certification process
   2.6 Testing and calibration process
   2.7 Education and training on standardization, quality control, accreditation, certification and testing and inspection
   2.8 Standardization and quality control in the industries

3 To formulate a master plan for the development of industrial standardization and the promotion of quality control

3.1 Institutional and technical aspects of national standardization activities[1)]

3.2.1 Overall recommendations to national standardization activities

3.2.2 Harmonization of national standards with international standards

3.2.3 Dissemination of national standards to the industries

3.2.4 Consolidation of national certification and accreditation scheme

3.2.5 Introduction of quality management system to the industries

3.2.6 Enforcement of certification and testing and inspection activities

3.2.7 Development of human resources and technology transfer

3.3 Expected effect after the master plan is formulated

3.4 Tentative schedule of implementation

The Study covers the industrial sector. The following industrial subsectors are focused particularly according to the Minutes of Meeting on the S/W for the Study:

1) Electric appliances and machinery
2) Electronic appliances
3) Automotive components
4) Agricultural machinery
5) Ceramic building materials

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1) The following numbering system is based on the S/W.

2 Industrial Development in Indonesia and Target of Industrial Standardization and Quality Control Promotion

This chapter analyzes the evolution and limitation of development of the industrial sector in Indonesia, and discusses the industrial development strategy and the target of industrial standardization and quality control promotion on the basis of such analysis.

2.1 Industrial Development in Indonesia and its Development Plan

2.1.1 Economic growth

In the 1970s, the Indonesian economy showed relatively high growth due to stable oil revenues. In the 1980s, growth slowed down owing to the decline in crude oil prices. Until the structural conversion to non-oil and gas sectors was promoted, and growth resumed in the late 1980s.

Nevertheless, the economy maintained a growth rate of more than 5% throughout the period, with an average growth rate during 25 years of the PJP I program being 6.8%. Seven percent of average annual growth rate was estimated to have been achieved during the REPELITA V period.

2.1.2 Changes in industrial structure

The most remarkable change in industrial structure is the relative decline of the agricultural sector, rapid growth of the industrial sector and a decline of the petroleum and gas sector. In other words, the economy has successfully accomplished rapid industrialization, as it becomes less dependent upon the oil sector.

The share of the industrial sector in GDP rose appreciably in the 1980s, reaching 12–13% in the early 80s. In 1991 it exceeded 21%.

2.1.3 PJP II (Second long term development program)

The PJP I period is considered as a preparation stage in the Indonesian economic development process in building the foundation for taking off towards economic self-reliance. PJP II period is then defined as commencing the take-off process.

During this period, the plan sets target economic growth rates of 6.2% in REPELITA VI and 8.7% in REPELITA X, with an average 7% throughout the period (6.8% during

the PJP I period), and a quadruple of GDP per capita[2].

Sector-wise, continued industrialization and less dependence in the oil sector are emphasized. While the agricultural sector is targeted to grow at 3% in real terms, a high growth rate of 9% is set for the manufacturing industry, and the non-petroleum and non-gas manufacturing sector at a 10% level. As a result, the share of the agricultural sector is expected to be less than 10% in the final stage of PJP II, while that of the manufacturing sector will exceed 30%[3].

2.1.4 REPELITA VI (6th Five-Year Plan)

Under PJP II, the industrial sector is positioned as a central force of economic development, and industrial development is expected to be a source of employment growth. REPELITA VI, which is the first five year development plan of PJP II, sets the major goal of industrial development in "the industrial sector restructured and soundly established." This goal leads to a target under PJP II, to establish a powerful and modern industrial sector with the ability to promote a sustainable and reliable economy. The powerful and modern industrial sector is understood to be achieved solely on the foundation of the powerful technical capability and the reliable economic system.

Also, the goal of restructured and sound industrial sector is a reflection of the awareness that it requires enhancement and improvement in many respects, as the economy enters the take-off period. The restructured industrial sector, by definition, refers to industries which are 1) powerful, 2) deep, 3) enhanced, 4) expanded, and 5) dispersed throughout the country. These attributes are characterized by the strengthening of linkage among upper, intermediate, and lower streams of the industries; large, medium, small-sized industries, and traditional industries; and the industrial and other sectors of the economy. Other factors characterizing the goal are significantly high growth rates and value added, and the increases in employment opportunity and export products.

In view of the above, the following program for industrial development is formulated:

(1) Core Programs

1) Development of cottage, small-and-medium industries

a) Human Resource Quality Improvement

b) Development of Cottage and Rural Industries

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[2] As GDP per capita in the final year of PJP I was US$650, the target income level is US$2,600. Malaysia's average income level is slightly more than US$2,000.

[3] The share of the manufacturing sector in South Korea and Taiwan is 29% and 34%, respectively in 1990. It appears that the plan intends to achieve the same level of industrialization in these countries.

c) Development of Small-and-Medium Industries
d) Development of Systems to Support Small-and-Medium Industries

2) Programs on Upgrading of Industrial Technologies
a) Development of Product and Manufacturing Technologies
b) Development of Industrial Planning and Engineering
c) Development of Environmentally Sound Industries
d) Transfer and Dissemination of Technology
e) Standards, Certification and Accreditation

3) Restructuring the Industry
a) Expanding and Strengthening Production Base
b) Development of Export-oriented Industries
c) Development of Industrial Human Resources
d) Development of Industrial Organizations
e) Expanded Dispersion of Industries

(2) Support Programs
1) Environmental Control
2) Development of Information on Industries
3) Education, Training and Counseling on Industry
4) Research and Development of Industry

2.1.5 Expectation for the industrial sector in economic development and major considerations in industrial development

Under the ongoing economic development policy of the Indonesian government, the shift to open market economy is a primary objective, and the industrial sector holds the key to its success through increased 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 an economy that is about to take off. 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 order to use 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., in the establishment of overseas production bases by industrialized nations and the NIEs. In particular, with the tightened labor supply in Malaysia, Thailand, and Asian NIEs due to a rapid pace of industrialization in these countries, an accompanying rapid rise in salary and wage, foreign

companies view Indonesia as a new production base with high growth potential possessing 1) a certain level of technology, 2) a large domestic market with a massive potential purchasing power, and 3) abundant labor supply. Thus, future industrial development needs to be directed to allow the country to use its advantages most effectively.

To ensure the successful and sustainable implementation of the promotional strategy, a bottom-up innovation in the industrial sector is called for. Major areas for innovation needed from the technological viewpoint are 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 establishing reputation of Indonesian products in the export market.

2.2 Target and Strategy of Industrial Standardization and Quality Control Promotion

2.2.1 Target of industrial standardization and quality control promotion

For the successful promotion of industrial standardization and quality control, the efforts are needed in pursuing the following:

1) Quality control that brings productive results to the production and distribution system is accepted industry-wide.
2) The industries spontaneously participate in development of standards to accelerate the development and updating of effective standards that meet the levels required by industries, and the use of standards as the basis of quality control[4)].
3) Quality control methods and certification systems used in Indonesia become internationally recognized.

The extent of demand for the promotion of industrial standardization and quality control, and impeding factors as well as requirement for its possible solutions may vary across industry subsectors and types of companies in each subsector. The following section reviews them by type of enterprise in each subsector.

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4) National standards are not only standards used for quality control, and in-house standards as well as association standards are included in this context.

(1) Foreign-affiliated companies and joint ventures

These companies, which particularly belong to the auto and automotive parts industry, the electrical and electronics industry, and the metalworking industry covered by the present study[5], are urged to increase their international competitiveness. More specifically, 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 related to quality control lies in the need for securing quality and performance of local products in order to accelerate local procurement. They aim to improve productivity of suppliers through elaborate quality control and thus boosting the availability of locally produced components and parts with competitive quality and price.

The second largest concern is the proliferation of quality awareness to their employees. Generally, foreign-affiliated companies and joint ventures have their own established brands for which they must secure product quality and performance to meet the 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, wherein the staff sent by parent companies play a critical role. Most companies still have to establish independent quality control systems operated by local employees. Many companies have been training quality control personnel through their own programs including training at their parent companies. However, with a demand growth at an accelerated rate, it will exert pressure on companies' resources because 1) the anticipated increase in production activity demands more quality control personnel, and 2) quality control training requires time and cost, as it starts from quality awareness and knowledge of statistical data processing, these constituting the fundamentals of quality control techniques. To overcome the situation, public organizational support is desirable to provide basic education and training.

They will be increasingly aware of the need to actively involve in the development of Indonesian standards, so as to ensure the same 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, from the interest of

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

promoting standardization efforts, these companies are expected to take leadership in such promotion, and in updating Indonesian standards as widely acceptable standards in actual industrial operation.

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

For these companies, particularly those in the auto and automotive parts industry, the electrical and electronics industry[6], major challenges are 1) to reinforce competitiveness by raising production yield, and 2) to promote cost reduction by increasing the scale of production for exports.

Quality control activities of these companies are based on those instructed by their customers or partners (foreign-affiliated companies and joint ventures) in the form of education and training at foreign partners' facilities, or through technical assistance. They have minimum required equipment for quality control. However, as seen in the previous section, their quality control ability utilizing local staff is fairly limited. It is evidenced by the fact that none of these companies apply quality control data collected at field to "kaizen" (or continuous improvement) efforts. Since they conduct quality control in each process, this becomes is effective in preventing shipments of defective products. However, efficiency of production remains unimproved mainly because of quality control personnel's limited in knowledge and experience, and partly because of the lack of incentive under 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 to internal standards as basis for subsequent technological development. Thus, standards are not likely contribute to the improvement of technical capability.

As seen among foreign-affiliated companies and joint ventures, it is desirable to make certification and inspection in Indonesia acceptable to the export market by meeting the requirements for certification of product quality, and a 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

[6] There is no ceramic building material manufacturer classified into this category.

building material industry, mainly ceramic tiles (floor and wall) and glazed roof tiles. These industries are expected 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 focused on efforts to prevent the shipment of defective goods, rather than on quality control, offering little incentive for the improvement of production efficiency. Also, quality and performance levels required by customers are below international levels.

Quality control equipment is not fully owned and is not effectively used.

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

For this purpose, providing incentives for the improvement 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 subject of the present study, these companies are found in the automotive parts industry serving the after market independent of auto makers, the foundry and machining (metalworking) industries, and the unglazed roof tile industry.

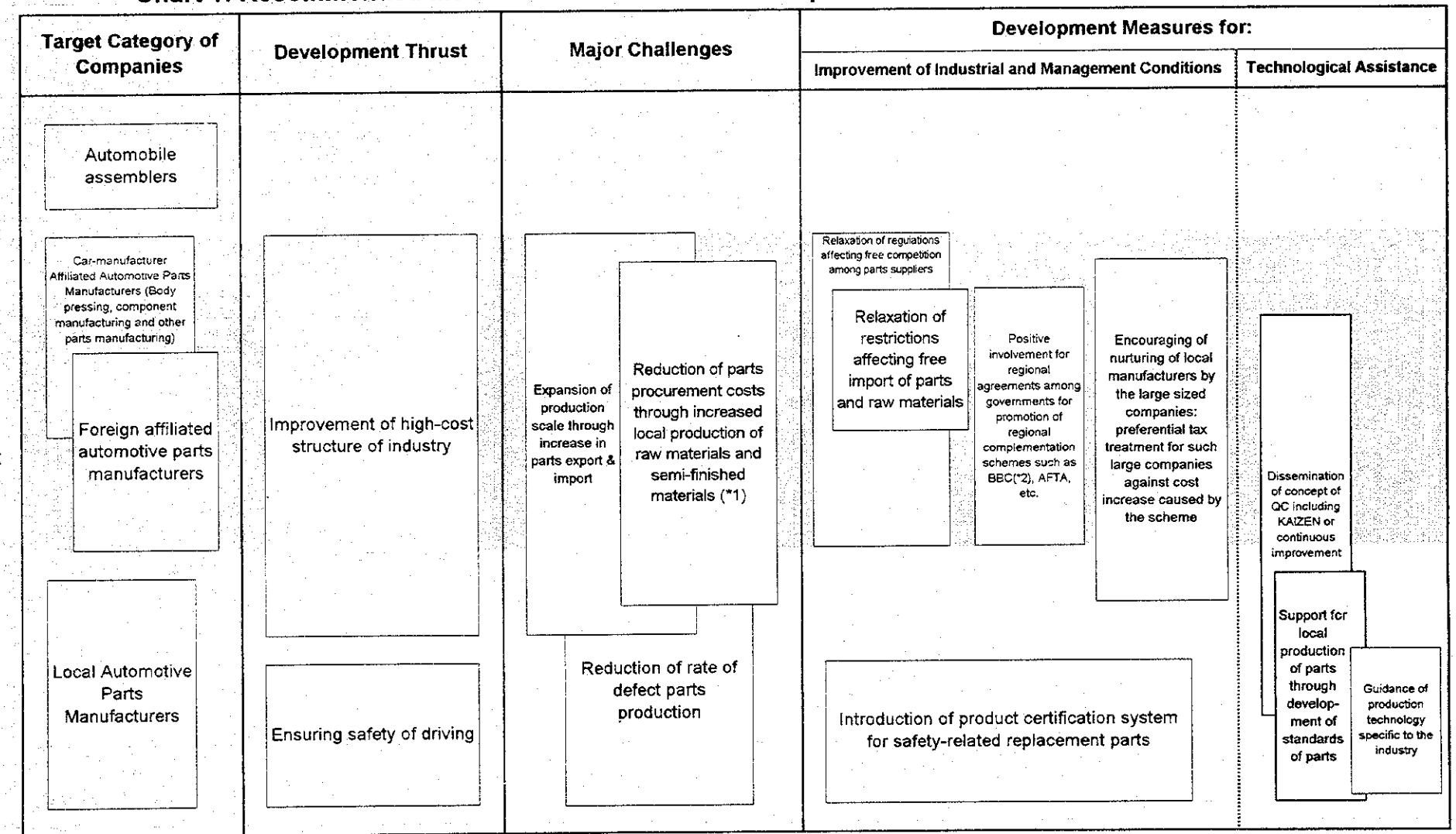
These companies conduct few quality control activity, mostly limited to visual inspection at the final stage of production. Production technology is mostly copied from manufactured products in the past, and is limited to the knowledge of managers and some staff. Accumulation of technology through the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

There is no clear need for quality control among these companies, and market incentive seems to be the best way to promote the value of quality control.

For these companies, incentives for quality control should be provided by using the certification system, while education and training need to be promoted to secure quality control personnel as the need arises.

The development targets and prospective measures for it are shown in Charts 1 to 6 by sub-sector under study.

Chart 1: Recommended Measures for Subsector Development - Automobile & Automotive Parts -



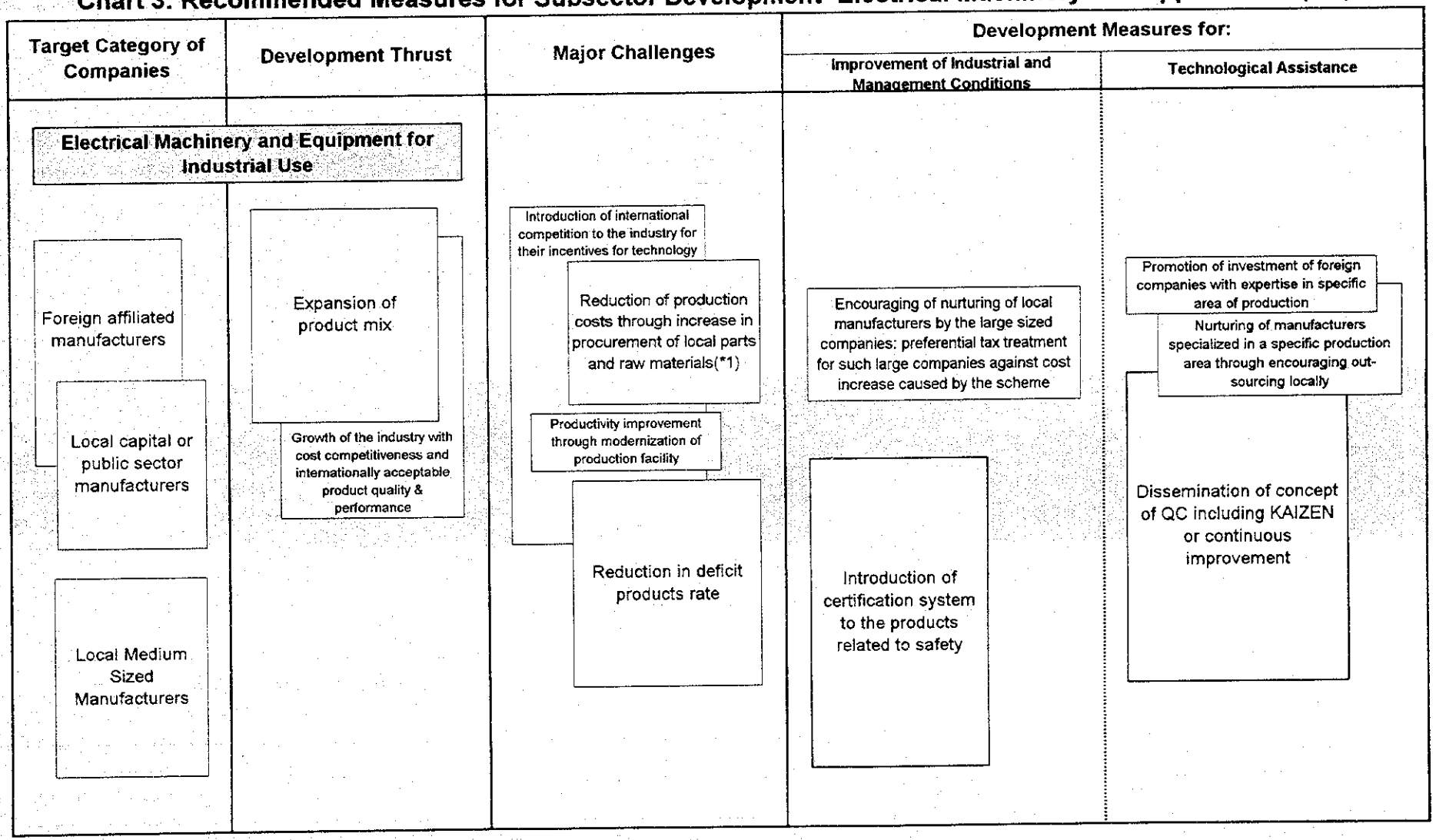
(*1) See Chart 5; (*2) Brand to Brand Complementation Scheme

Chart 2: Recommended Measures for Subsector Development - Agricultural Machinery -

Target Category of Companies	Development Thrust	Major Challenges	Development Measures for: Improvement of Industrial and Management Conditions	Development Measures for: Technological Assistance
Diesel Engine Manufacturing Subsector	Strengthening of cost competitiveness	Reduction of production costs through increase in procurement of local parts and raw materials(*1)	Encouraging of nurturing of local manufacturers by the large sized companies; preferential tax treatment for such large companies against cost increase caused by the scheme	
		Production concentration through part complementation among foreign manufacturers; Modernization and expansion of production facilities	Positive involvement for regional agreements among governments for promotion of regional complementation schemes such as BBC(*2), AFTA, etc.	
		Reduction of deficit products production rates	Relaxation of restrictions affecting free import of parts and raw materials	Technology transfer on QC concept to local staff
Farm Machines & Irrigation Pump Manufacturing Subsector				
Joint Ventures	Increase in capacity utilization rate through improvement of	Thorough implementation of QC		Technology transfer on QC concept to local staff
	Reduction of defect product rate of locally procured cast products	Improvement of production technology specific to the industry & control technology of local SMEs in foundry sector		Technological assistance by the government to local medium standing companies in foundry sector(*1) Guidance for cooperatives on production technology specific to the industry Enhancement of technology specific to the industry in the fields of design, processing & assembling
Local Capital Companies	Regulation on distribution of substandard goods	Making most of certification system		

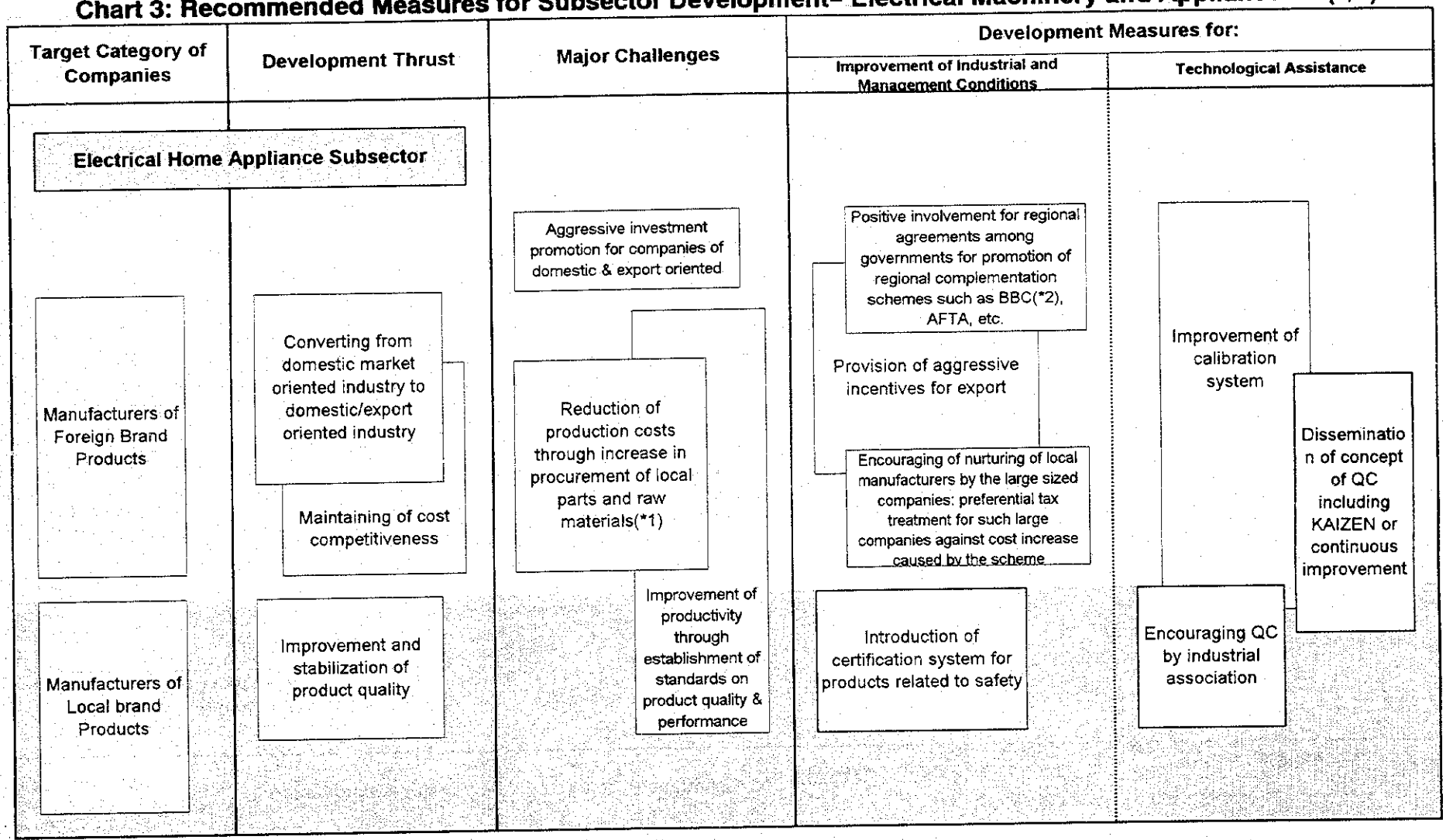
(*1) See Chart 5

Chart 3: Recommended Measures for Subsector Development- Electrical Machinery and Appliances - (1/2)



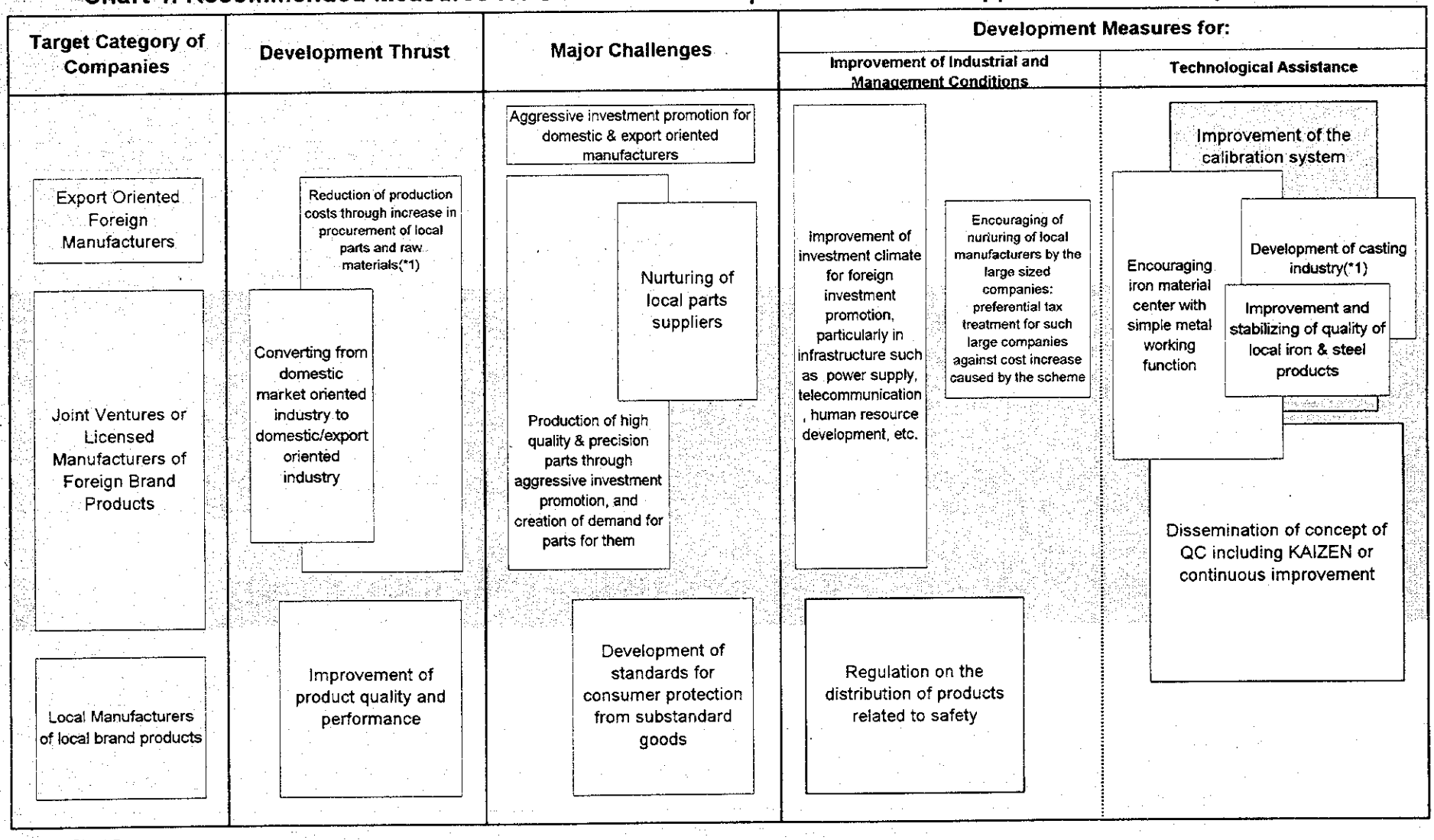
(*1) See Chart 5 (*2) Brand to Brand Complementation Scheme

Chart 3: Recommended Measures for Subsector Development– Electrical Machinery and Appliances – (2/2)



(*1) See Chart 5 (*2) Brand to Brand Complementation Scheme

Chart 4: Recommended Measures for Subsector Development - Electrical Appliances and Components -



(*1) See Chart 5

Chart 5: Recommended Measures for Subsector Development - Metalworking -

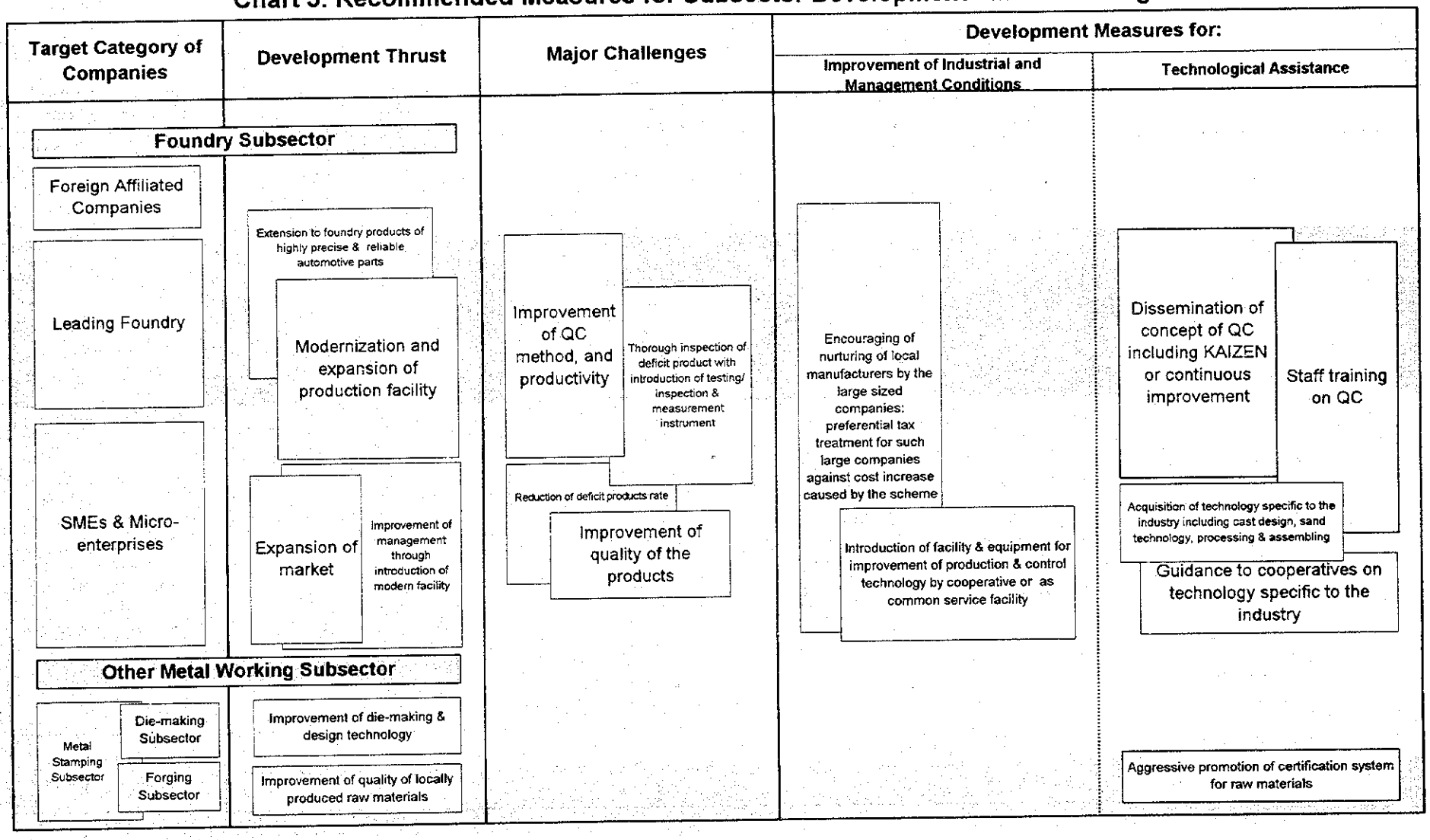
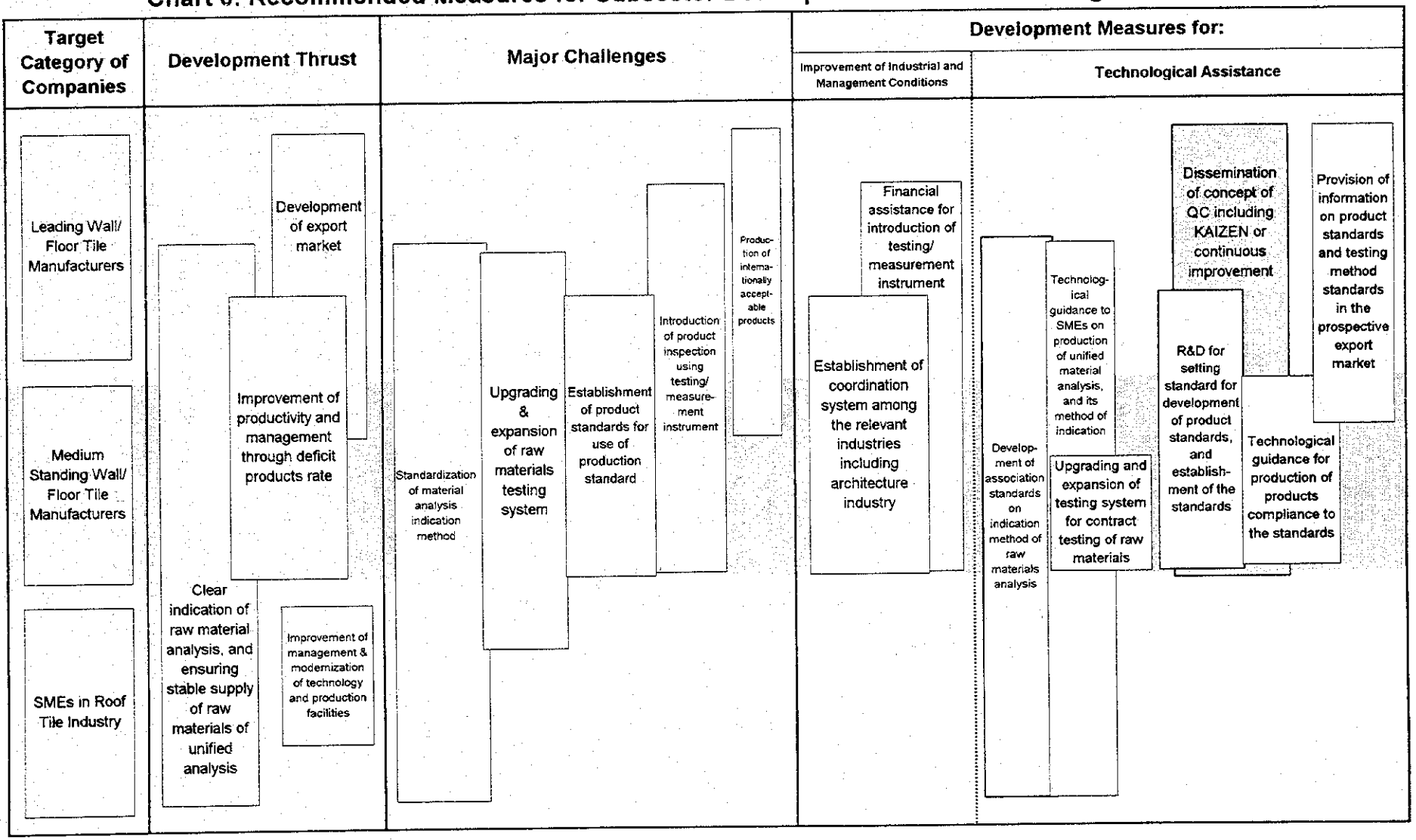


Chart 6: Recommended Measures for Subsector Development - Ceramic Building Materials-



2.2.2 Strategy for industrial standardization and quality control promotion

Given the overall consideration for the promotion of standardization and quality control in the existing environment, the following are the required strategies (Chart 7):

(1) Dissemination of standardization and quality control among industries

1) Except for foreign-affiliated companies and joint ventures, there is a lack of or very weak motivation for local companies to work toward standardization and quality control. The first step, therefore, should focus in developing this motivation. The certification system is expected to play a critical role here. A useful and reliable certification system for the industries should be developed. This way, the industries are encouraged to raise quality awareness in the process while obtaining certification. In particular, this will produce the following results:

a) They will be able to recognize the importance and effectiveness of industrial standards in production and distribution areas.
b) They will have 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 related to their industries.
d) Revision of the existing standards according to industry's needs and the development of new standards will be encouraged, 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 will urge the 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 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 be encouraged to reflect their needs in the development of standards.

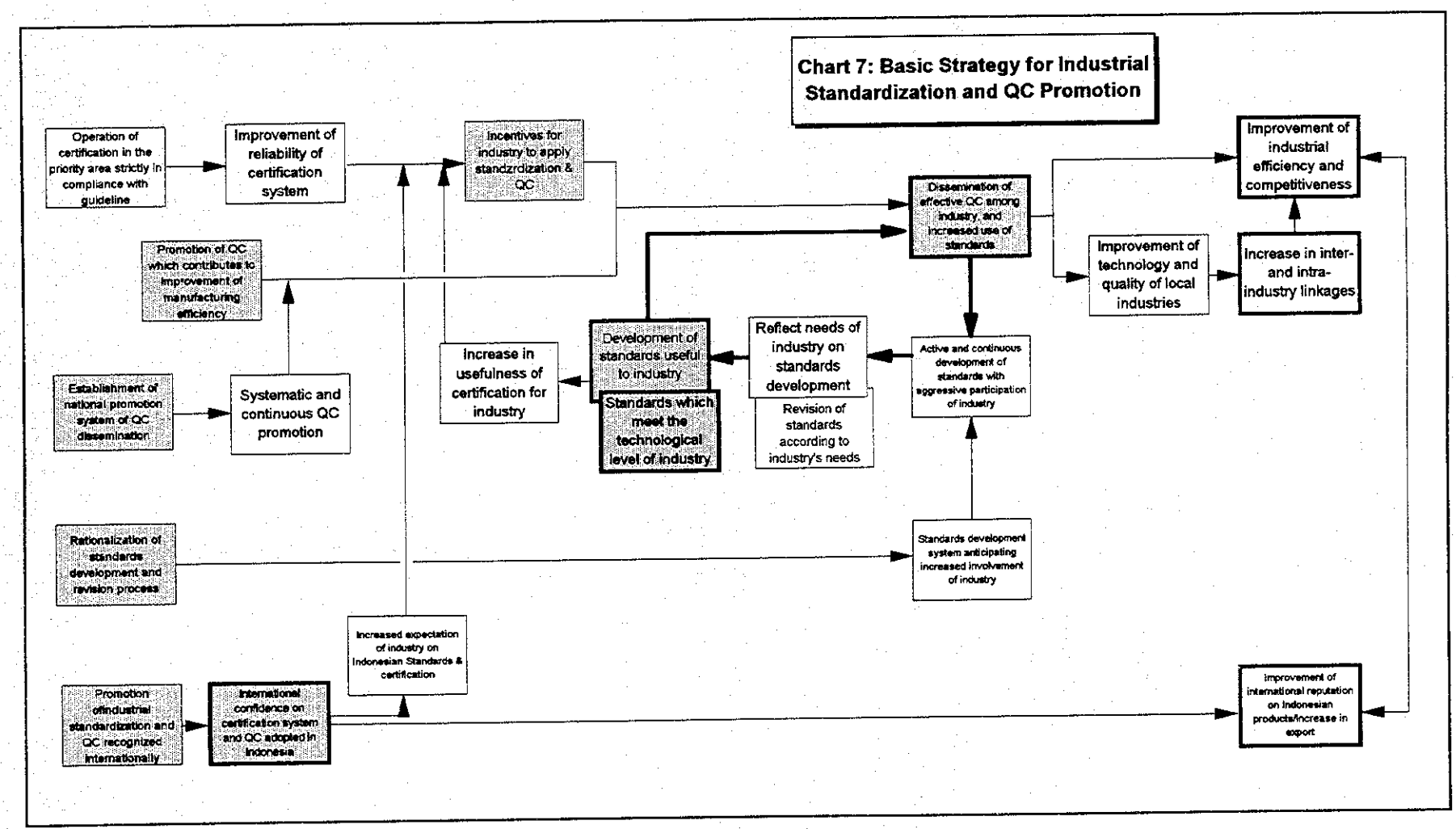


Chart 7: Basic Strategy for Industrial Standardization and QC Promotion
Operation of certification in the priority area strictly in compliance with guideline
Improvement of reliability of certification system
Incentives for industry to apply standzrdization & QC
Dissemination of effective QC among industry, and increased use of standards
Improvement of industrial efficiency and competitiveness
Promotion of QC which contributes to improvement of manufacturing efficiency
Improvement of technology and quality of local industries
Increase in inter- and intra-industry linkages
Establishment of national promotion system of QC dissemination
Systematic and continuous QC promotion
Increase in usefulness of certification for industry
Development of standards useful to industry
Standards which meet the technological level of industry
Reflect needs of industry on standards development
Revision of standards according to industry's needs
Active and continuous development of standards with aggressive participation of industry
Rationalization of standards development and revision process
Standards development system anticipating increased involvement of industry
Increased expectation of industry on Indonesian Standards & certification
Promotion ofindustrial standardization and QC recognized internationally
International confidence on certification system and QC adopted in Indonesia
Improvement of international reputation on Indonesian products/increase in export
Industrial development target
Target of industrial standardization and QC promotion
Strategic points for industrial standardization and QC promotion

(2) At the same time, the following strategies are recommended for the enhancement of system to promote 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 standards development and updating process, and provide easy access to the industries for participation. The following results are expected.
   a) The move to establish and update standards will be unleashed, as the use of standards will be encouraged to raise public awareness on its usefulness.
   b) As a result, the industries can and will reflect their needs in future development of standards on a continuous basis.

2) To establish an organization and structure that will initiate quality control drives at the national level, enabling the promotion of quality control to be carried out in a systematic, organized, and sustainable manner.

3) To make the standardization and quality control system of Indonesia internationally recognized. The following results will be produced:
   a) Expectation of the industries in the Indonesian standards and certification system will rise to encourage their participation in the standardization process.
   b) The frequent use of standards by the industries will help align the standardization process with industry needs.

3 Outline of Industrial Standardization in Indonesia and Issues for Promotion

3.1 Industrial Standardization

3.1.1 Historical background of the present SSN System

The standardization projects were independently operated by each government agencies in the past. The government and the industries, however, began to recognize the need for unified national standards. In 1984, an organization that coordinates standardization activities at the national level, DSN (Dewan Standardisasi Nasional; Standardization Council of Indonesia) was established by Presidential Decree No.20.

After the establishment, DSN has been working in launching SSN (National Standardization System) based on SNI (National Standard of Indonesia) and has set forth the following timetable:

Step 1 : Preparation period for SNI and SSN, until 28 February 1991.
Step 2 : Transition period to get fixed SNI based on SSN, from 1 March 1991 until 31 March 1994.
Step 3 : Actualization of SNI based on SSN has been running well and strict /consistent to rules on 1 April 1994.

According to the schedule, the system would be inaugurated on April 1, 1994. However, in consideration of the status of preparation by ministries and agencies serving as technical institution, DSN's Plenary Meeting on March 22, 1994 approved the extension of the transition period up to March 31, 1995. The action authorizes the use of SNI marks that satisfy requirements.

3.1.2 System of SSN

Primary components of the SSN project in Indonesia are the establishment of SNI standards and their application. Implementation of SNI is driven by various vehicles including the SNI marking (certification) system. The SSN system also contains the following systems including metrology:

1) Standard formulation system
2) Standard implementation system
3) Standardization development and control system

4) Standardization cooperation and information system
5) Metrology system
6) Accreditation system

3.1.3 SNI

The Standard consists of voluntary SNI and mandatory SNI.

(1) Mandatory SNI

Mandatory standard is a standard whose application is mandatory. Whether it is made mandatory or not is decided by technical institutions and approved by DSN, and its application is obligatory throughout Indonesia. Standards pertaining to health of consumers, product users or the public, and the environment are mandatory. Other standards which are not directly related to this interest can also be made obligatory depending on the need.

(2) Voluntary SNI

Voluntary SNI are standards recommended to be naturally used. It is decided by a technical institutions. The voluntary SNI can in the future be made mandatory by the technical institution concerned on technical or economic grounds and/or other considerations.

(3) Current state of standards formulation

As of October 1994, SNI contains a total of 3,550 standards. In addition, 200 have been reviewed and awaiting approval. 3,550 standards include 15 revised standards.

At present, existing standards controlled by ministries and agencies are being transferred to SNI, and mandatory SNI is in the discussion stage. Under SII (MOI standards), there were 47 mandatory standards (as of 1993). Under SP (MOT standards), there were 47 mandatory standards for export inspection, and 15 for import and domestic trade (as of October 1994). Finally, there are 321 mandatory standards under SLI (MOME standards).

3.1.4 Organizational setup, execution organizations, and procedures

SSN organizationally consists of a policy making and approval organization, DSN, and execution organizations called technical institutions.

(1) Standardization approval organization

The approval organization of SSN is DSN. DSN, at the same time, has a function of coordinating the scope of standardizing activities, and synchronization of standardizing programs to establish integrated national standardization programs.

Final decision on SSN matters is made during DSN's Plenary Meeting.

(2) Execution organizations

Execution organizations for the national standardization system are technical institutions participating SSN.

(3) Establishment of standards

The formulation of draft SNI is a responsibility of the technical institution (a ministry or an agency at present). The organizational set-up for draft SNI formulation varies from one ministry to another, and it is roughly classified into those which have permanent technical committees, and those that establish ad-hoc committees as required.

Ministries and agencies are expected to enforce SNI as either voluntary or mandatory standards according to the principles of the SSN system.

The period required for standards formulation is three years in total, divided into one year for the development of the draft SNI by the technical organization, and two years for DSN's deliberation and approval procedures. Each standard is reviewed every 5 years or as required.

3.1.5 Certification and accreditation system

The certification and accreditation system is primarily based on the SNI marking (product certification) system. Certification covers that of quality system, qualified assessors, and testing and inspection laboratories. The system includes accreditation system of organizations that issue these certifications.

The certification and accreditation scheme in Indonesia has a structure headed by KAN (National Accreditation Committee) serving as a supreme organization that provides and supervises accreditation service, and an advisory organization for DSN's chairman. Assessment of accreditation is undertaken by KAIT (Technical Accreditation Committee) which is established within each ministry and agency involved in management and operation of SSN, which in turn, reviews application for accreditation. Accreditation is issued to the following five categories of certification bodies.

1) Quality System Certification Body
2) Product Certification Body
3) Personnel Certification Body
4) Testing Laboratory
5) Technical Inspection Body

3.1.6 SNI marking system

(1) Outline of the system[7]

Under the SNI marking system, a company manufacturing a product complying with a SNI standard: 1) receives certification from a quality system certification body stating that the company is capable of manufacturing the complied product on a continuous and stable basis, 2) receives verification that the produce complies with SNI from an accredited testing laboratory, and 3) applies to a product certification body by submitting these certificates. Once the product is approved, the company can ship the product bearing the SNI mark.

(2) Eligible products

All the products covered by SNI are eligible for SNI marking. They are, however, divided into those subject to mandatory certification and those allowed for voluntary certification.

(3) Certification criteria

Certification criteria consist of the following two requirements:

1) Product specifications

Standards for product specifications are SNI that covers the product eligible for SNI marking.

2) Quality system

Standards for quality system is any one of the following five modules:

- Module I: Self declaration
- Module II: SNI/ISO 9003
- Module III: SNI/ISO 9002
- Module IV: SNI/ISO 9001
- Module V: Other Standards Equivalent with ISO 9000 series

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[7] At present, the Ministry of Industry is most advanced in the enforcement of system, and the SNI marking system described in the following is based on the system developed by MOI.

The self-declaration in Module I is a set of standards comprising requirements for quality systems on the basis of ISO 9000 series, that are adjusted in consideration of the technical and financial conditions of Indonesian companies.

3.1.7 Export Import commodities

Trade commodities are treated with the following:

1) Specifically for export commodities the following stipulation applies: "a standard for export commodity may not be inferior to SNI, meaning that the export commodity standard shall use SNI with possible additional, non-mandatory specification as needed."
2) For imported commodities, the standard shall at the minimum, meet the SNI and the national standards of the country concerned.

Quality inspection system for export, import and domestic trade is certification system based on SP/SNI. The Directorate is responsible for the standardization and quality control of exported, imported, as well as locally trade commodities in Indonesia. In October 1994, 193 standards have been promulgated, 47 of which are implemented as mandatory for export, and 15 for import and for domestic trade. The other standards are to be used voluntarily by the trade community at large.

3.1.8 Current state and major issues of standardization

(1) Delay in preparation for implementation

At the time of the present study, SSN undergoes a suspension period until April 1995, during which laws, institutional arrangement, organizational structure, manpower, and facilities and equipment are being set up for official implementation. Thus, the general structure of the project, as discussed below, contains many concerns that are to be completed in the future.

1) Need for prompt formulation of individual guidelines and operation manuals

Basic rules that show a general direction of unified promotion of SSN by related ministries and agencies are defined in a basic guideline "SYSTEM STANDADISASI NASIONAL (18/2.06/HK.01.04/5/92)" decided and published by DSN in 1992. Actual implementation of SSN, however, requires individual guidelines that are referred to in the basic guideline. Approximately 70 guidelines are conceived to be formulated under the current plan, and nearly one half is in the preparation stage.

To enable technical institutions to implement SNI, operating rules are needed by persons who are actually engaged in the day-to-day enforcement. At present, no other

operating rules are available.

2) Need for ensuring manpower, facility and equipment

Implementation of SSN in accordance with basic rules will require manpower for certification service, and resources to conduct compliance tests including equipment and manpower.

As regards to the establishment of SNI, MOI, that is responsible for 70% of all SNI, anticipates that a shortage of resources in meeting the workload required for the draft SNI formulation process, will further increase in 1995, including shortage in working space, office equipment, and funds.

3) Need for institutional set-up for certification and accreditation scheme

At present, MOI is the only ministry that has KAIT.

(2) Need for reviewing basic stances for promotion of standardization

1) Standardization is a major driver for rationalization and streamlining of production activities, as well as simplification of commercial trade. It is the process carried out by producers, distributors, users, consumers, and other persons in a neutral position. It inherently has an 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 with which broad-based reduction of production costs and the 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, the rise in operating rate, and the improvement of labor productivity can be driven. 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.

2) While the government is expected to take initiative during the initial stage of promoting the standardization project, government-led standardization efforts alone do not produce a desired result and lead 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 standards[8]. In essence, standardization should be implemented with concerted efforts involving the participation of industries and companies in the national standardization project and

[8] 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.

promotion of standardization within each company.

3) At the same time, international standards can spearhead standardization, as their effective use helps transfer technology entailed in such standards, while saving costs related to the development of national standards.

(3) Establishment and revision of SNI

PUSTAN, MOI has a plan to establish or revise approximately 2,250 standards by the end of REPELITA VI (1994/95 through 1998/99). Since around 250 of them were completed in 1994, they have to establish or revise 500 standards every year on the average starting from 1995. It means that they have to entrust the establishment of 20 standards for each research and testing institutes under BPPI on the average. While 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 demand of users of industrial standards, particularly the industries, can be reflected, and 2) how harmonization with international standards should be secured. These points should be kept in mind at all times to accomplish the stated purpose.

(4) Delay in establishment of institutional setup for certification and accreditation system

As for the accreditation of quality system certification bodies, DSN-KAN accredited B4T-QSC, in April 1994, as the first quality system certification body. Then, two more organizations were accredited by November 1994 with the other two still under review. By the end of REPELITA VI, 20 quality system certification bodies are required to meet the demand, according to MOI.

The situation is same for the certification of assessors. So far, all the assessors in Indonesia were certified by foreign certification bodies.

There are 14 assessors for quality system and 11 assessors for quality management system in laboratory. The Ministry of Industry anticipates the need for 200 assessors, 40 lead assessors of quality system, and 120 assessors of quality management system in laboratory by the end of REPELITA VI. Immediate action is required to cope with this issue.

As of October 1994, no organization has been accredited under other categories of certification bodies.

(5) Issues relating to dissemination of standards

1) Language

English versions of SNI are published for only some of the standards for export inspection. In the future, English publication is desirable. At least, publication of reference in English versions, like JIS, brings many benefits for local companies by allowing them to easily show standards based on which their products are manufactured.

2) Needs for enhancement of other dissemination activities

The activities for dissemination of standards are weak in general. The following are the points requiring immediate improvement:

a) Publication of more detailed information on the establishment of standards including the plan for their establishment, and the current status of draft standards in the review process;

b) SNI catalogue with more detailed information, including identification of a technical institution developing each SNI and personnel to whom an inquiry can be made the corresponding international standards, adoption of international unit systems (SI), record of SNI mark indication, index, and SNI-related laws and regulations;

c) Specifying technical institutions responsible for standards in SNI catalogues to allow users to make direct inquiry to each institution which has developed a particular standard;

d) Active promotion of Quality Month with preparation and distribution of posters and slogans, including assignment of the leading organization;

3.2 Testing and Inspection System

3.2.1 Outline of testing and inspection system

(1) Testing and Inspection Resources Related to National Certification System

The testing and inspection system related to the national certification system is being developed into a certification and accreditation scheme under SSN. A principal component of the certification and accreditation scheme is the SNI marking (product certification) system, and certification covering quality control systems and product compliance with standards. Testing and inspection organizations are responsible for checking whether products are in compliance with specific standards.

To secure testing organizations capable of performing such certification service, the testing laboratory accreditation system is established within the framework of the SSN certification and accreditation scheme. The scheme is operated by KAN (National

Accreditation Committee) as the supreme supervisory organization, under which KAIT (Technical Accreditation Committees) are established in each ministry and agencies involved in SSN conducting the examination.

At the same time, it is planned to build a Testing Laboratories National Network for the purpose of mobilizing existing testing organizations, and maintaining their technological levels. The network will consist of the above government and private accredited testing laboratories, from which a standard testing laboratory is established within each technical institution (related ministry and agency). The standard testing laboratories will be responsible for maintaining capabilities of the national network of testing laboratories, and have necessary functions related to the supervision and guidance of other testing laboratories for the improvement of their testing capabilities. In particular, they will conduct repetitive and comparative tests so as to equalize testing capabilities, and also calibrate measuring instruments of testing equipment within the network.

While the building of the certification and accreditation scheme is underway, no testing laboratory has yet been accredited under the scheme. In the near future, the testing institutions under MOI, the testing laboratories under the Ministry of Trade, and the private testing organization are expected to obtain accreditation.

Historically, the national certification system in Indonesia has been managed by individual ministries which control various standards. In the industrial field, SII certification controlled by the Ministry of Industry, and SP certification under the supervision of the Ministry of Trade, are major elements. Another certification system having significant influence in industrial products is the LMK marking system which covers electrical equipment based on SPLN, and procurement standards for the government-owned electric power company.

Both SII and SP involve mandatory certification. SII mandatory certification is conducted by 9 central research institutions and 14 regional research institutions which offer actual testing and inspection services.

SP certification consists of export inspection and certification for domestic sales[9]. Both are conducted by regional testing laboratories (BPMP) under the Ministry of Trade, testing institutions under the Ministry of Industry, and a private accredited testing

[9] The export inspection system is primarily designed for tax collection, rather than certification under standards. It covers quantity check and price evaluation and is conducted by SGS, a Switzerland-based company having a worldwide testing network, in importing countries under contract with the Ministry of Commerce.

organization, PT. Sucofindo. Certification of products complying with national standards, and mainly covering imported goods, is done in the form of random sampling in the market. On the other hand, export inspection involves sampling organizations which collect samples from shipments and send these to testing organizations. PPMB under the Ministry of Trade does not conduct testing, and instead supervises testing laboratories, the private testing organization, and sampling organizations, and is responsible for cross checking to maintain testing accuracy.

The above organizations are also responsible for testing and inspection services related to the voluntary certification under the jurisdiction of the Ministry of Industry.

(2) Testing and Inspection System Related to Contract Testing and Certification Services

A variety of organizations provide contract testing service or certify test results as a third party organization (the issuance of test reports). Generally speaking, contract testing service conducted in relation to in-house quality control is entrusted to any of the above public testing organizations, other manufacturers having testing capabilities, or parent companies in the case of foreign-affiliated companies.

Service relating to certifying test results as a third party organization is usually entrusted to public testing organizations, including SISIR in Singapore and SIRIM in Malaysia.

Contract testing service is performed by a variety of public testing organizations, namely 23 testing laboratories under the Ministry of Industry, LMK-PLN for electrical equipment, the agricultural machinery research institute, and local testing laboratories controlled by state governments.

3.2.2 Demand for testing and inspection service

According to the manufacturer questionnaire survey, demand for outside testing service is not very high. By field, the highest percentage of the 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% in percentage share of the responding companies respectively.

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.

3.3 Calibration System Related to Industrial Metrology

3.3.1 Outline of the calibration system

The industrial metrology system is in the process of transition to a new system. The calibration system under the new system has not been established.

In the new system, national standards having traceability with international standards are established, under which secondary standards are provided to form a national calibration network. To ensure 1) coordination of the national calibration network, and 2) coordination and synchronization on accreditation, certification, testing, calibration and inspection, Committee E (Committee for Metrology or Committee on Calibration) will be established under DSN's Executive Council.

While national standards still have to be established, primary standards in the basic five areas (other than time and mass) are owned by KIM-LIPI, those related to mass by DOM-MOT, and those related to time by the public telephone company.

The National Calibration Network (JNK) is organized by KIM-LIPI as a core organization, and 19 research institutes under MOI, MOT, MOME and universities, as well as private organizations[10]. Each member organization performs calibration service in each field of specialization. These organizations are accredited in the accreditation system under ISO 25/38/40, but they will be accredited by KAN/KAIT under the new system.

3.3.2 Major issues related to the calibration system

There is sizable demand for calibration. Based on the manufacturer questionnaire survey, 40% of the respondents use calibration organizations of various types. The percentage varies greatly among subsectors, ranging from 39% for the automobile/automotive parts industry to 64% for the ceramic construction material industry.

Actual calibration practice of the manufacturing sector, however, 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

[10] At present, 22 research organizations apply for the membership with Committee E, and will be determined by December 1995.

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 avail calibration service furnished by original equipment suppliers.

Given the anticipated industrial development in the country, calibration demand is expected to grow in response to diversification of calibration fields and the 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 carry out proper calibration service. However, there is lack of standards for derived quantities[11] because of 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 augment the network. Present accreditation standards are reportedly based on ISO 25/38/40, but are 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 to boost the certification network, a clear definition of accreditation standards is required.

[11] In Japan, derivative quantities for which calibration service is possible are around 80, compared to 50 in the NIBs.

4 Current State of Quality Control Promotion and Major Issues in Indonesia

4.1 Organizational Structure for Quality Control Promotion

4.1.1 Organizations and programs for quality control promotion at national level

There is no organization that engages in the promotion of quality control at the national level having satisfactory activities.

In Indonesia, a nationwide event on quality control is conducted annually by DSN. In November, a national meeting is held to promote quality control with the cooperation of related ministries and agencies.

DSN, however, does not have an organization dedicated for the promotion of quality control. Rather it simply sponsors the quality month as part of its standardization program.

A central figure in the event is PMMI, rather than DSN. PMMI is an organization consisting of many leading companies in Indonesia. With major mission to promote QC circle activity, it holds annual national conferences. It also serves as the secretariat for the quality month. However, it lacks resources to support its secretariat activities, and except for sponsoring conferences and several seminars, it is unable to conduct other quality promotion activities on a continuous basis.

As for the certification and accreditation system under ISO 9000 series as part of the standardization and certification projects, an implementation body is being developed.

However, as of October 1994, only the Ministry of Industry has KAIT.

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

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

4.1.2 Organizations responsible for dissemination and education of quality control techniques

Organizations that carry out dissemination and education of quality control techniques in Indonesia are divided into those specializing in such services, and those which offer them as part of technical education and training courses.

In the former group, there is only one organization specializing in the dissemination and training of quality control techniques, ITQC (LPMT), apart from consulting firms, and individual consultants.

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

As a group organizing individuals related to quality control, IQMA has 15 chapters throughout the country.

There are many organizations that provide quality control education as part of their 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 does not include quality control techniques.

4.2 Current State of Quality Control and Its Implementation

(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. The percentage is very high compared to those adhering to other measures of quality control, indicating that most companies equate inspection with quality control. In addition, most inspections are done visually.

(2) Issues related to implementation of quality control

As for the obstacles to the implementation of quality control systems, more than 45% of the responding companies cite the lack of knowledge on quality control methods (the percentage corresponds to the total companies which cite this as the first or second

reason). The second largest factor is the lack of manpower required to introduce QC systems (40% of total).

It is reasonable to think that these companies lead in the promotion of quality control practice contemplated in the present study, because most of small-and-medium-sized enterprises and microenterprises 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 basic technology, and are not capable of utilizing control technology for the ultimate effect of quality improvement.

4.3 Issues Related to Quality Control Promotion

The most serious problem for the promotion of quality control in Indonesia, is lack of an organization which is responsible in developing quality control methodology suitable for Indonesia, and in disseminating it in an organized and continuous basis. In addition, the development of quality control system applicable to small-and-medium-scale-enterprises is necessary.

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

Many still has the misconception that quality control is costly and leads to lower productivity. The misconception comes from the fact that many people often regard inspection as quality control. Inspection-oriented quality control requires increased costs for equipment and manpower that implement the thorough inspection. Also, the rise in level of design quality sometimes leads to higher cost. Quality control, however, can reduce defects and minimize the need for reworking and adjustment, if it is effectively incorporated into the production process, the result being higher productivity and lower cost. In addition, if the intended quality level meets consumer demand, sales will increase producing economies of scale in production and further cost reduction.

Dissemination of quality control not only helps rationalize production activity of individual companies, but also contribute greatly to the structural development of the industry by fostering suppliers of reliable raw materials and parts. Structural development of the industry is fulfilled 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, which only serves 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 nurture such specialized manufacturers which can be relied upon 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 uses standardized technical standards and methods to improve and stabilize the quality of products, raise product yield, and increase productivity, which can be accomplished by applying such standards and methods to shop floors and distribution channels. At the same time, strict enforcement of quality control visualizes the need for further standardization. This means for quality control to start from efforts of complying with established standards, national or international, and then going beyond them. It must aim to meet consumer needs and quality requirements, both in the present and future. 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 becoming 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 basis for developing new methods suitable under local conditions, which can then be standardized to flourish as the industrial foundation of the country.

4.4 Recommendation on Promotion Activities for Quality Control

In view of the above, the government should also make further efforts for the promotion of quality control particularly in the following points:

1) Establishment of an organizational center, which undertakes research on quality control technology suitable for the 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 the latter organizations with an adequate curriculum and training materials involving instructor training on the basis of their research works.

2) To make use of resources available in this country, qualified persons for quality control instructor should be registered at an appropriate organization either from private companies, government agencies, research institutes, or academe. Follow-up system for these personnel entails providing updated information on QC as useful means to make most of the resources.

3) It is difficult for a local company to obtain documents and materials required 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 the general access to such information, and for this purpose, it is desired to have libraries in major cities in addition to the central facility.

4) The quality system based on ISO 9000 series requires heavy burdens from small enterprises, who are still facing difficulty in learning basic technology. It is also true however, that the development of industries with workable linkage and structure requires refocusing of priorities by small-and-medium-sized enterprises on quality control. In view of this, the time has come to start the development and dissemination of quality control systems that are viable for small enterprises to implement.

5 Program Recommendation for Industrial Standardization and Quality Control Promotion

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

Dissemination of Industrial Standardization and Quality Control to the Industries

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

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-Recognized Accreditation and Certification System

Program 10: Promotion of international mutual recognition of certification system

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

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

Product quality most recognizable by consumers is related to safety of product in its daily use. By implementing a reliable product certification system that covers safety aspects, quality awareness of consumers can be raised and 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.

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

Automotive spare parts are generally purchased directly 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, these are mere copies of genuine products that are also distributed in the market. Such parts, when installed on cars, create a risk of accident that endangers not only drivers, but also other vehicles and pedestrians. The risk involved becomes very serious if an imitated component is related to safety of vehicle driving. Thus, it is meaningful 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.
2) Increased involvement of the relevant industrial associations in standards.
3) Upgrading of R&D capability for development of automotive parts standards related to safety.
4) Establishment of standards for automotive parts.
5) Introduction of certification system for automotive replacement parts related to safety.
6) Development of testing and inspection system required for the certification of automotive parts.

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

General consumers tend to select 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 life and property caused by electrical leak and overheating. To eliminate products not complying with safety standards from general distribution, the introduction of product certification program is recommended for widely-sold home appliances that require safety precautions and can easily be copied.

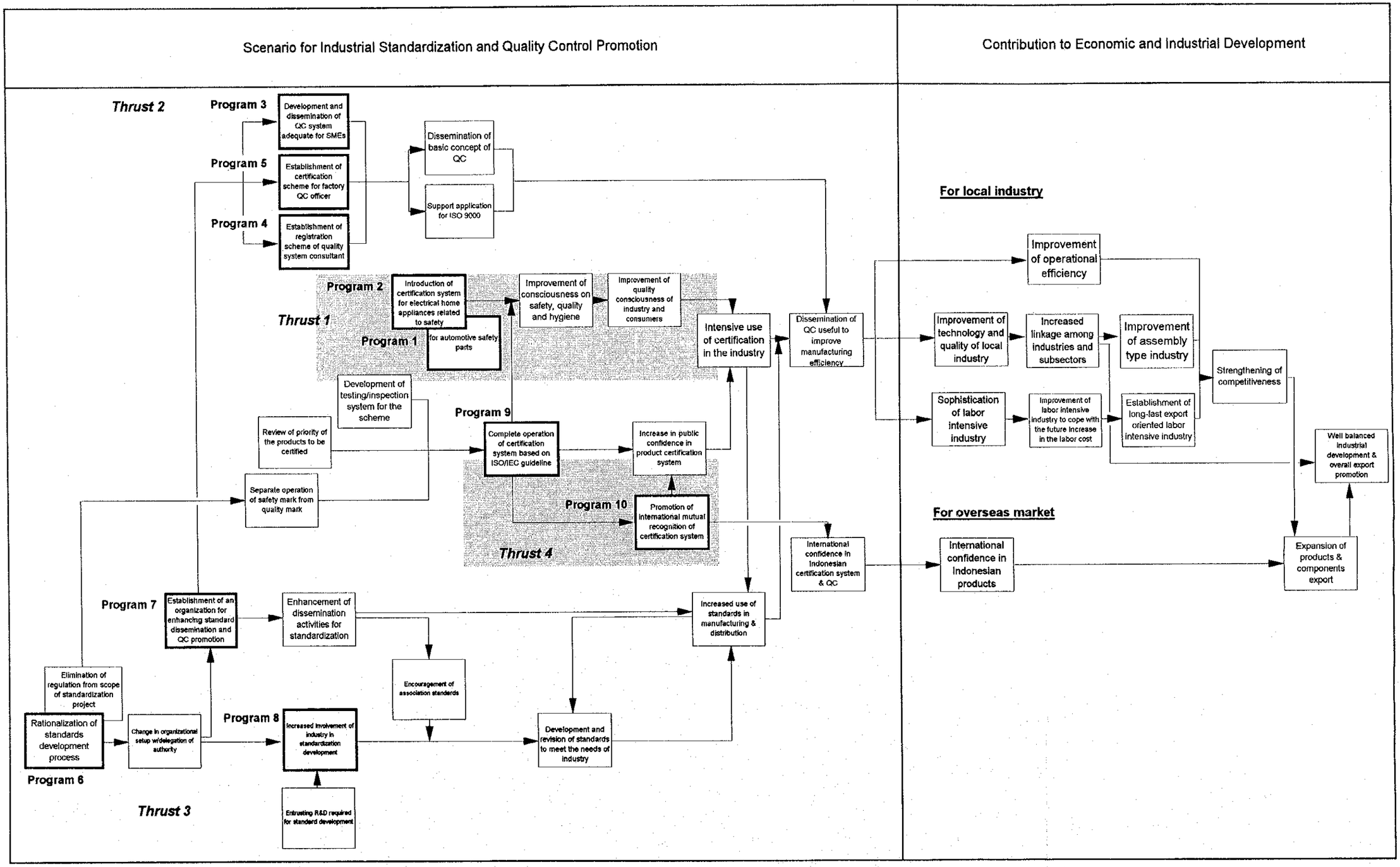
The program will entail the following actions:

1) Development of standards for home appliances related to safety.
2) Increased involvement of the relevant industrial associations in the development and dissemination of standards.
3) Upgrading of R&D capability for the development of standards for home appliances related to safety.
4) Establishment of standards for home appliances related to safety.
5) Introduction of certification system for home appliances.
6) Establishment of testing and inspection facility for certification tests for home appliances.
7) Establishment of guidelines for implementation of quality system adequately focusing on the home appliance industry.

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 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 are essential effort in surviving through a highly competitive environment. Thus, the standardization and quality control promotion program for these enterprises should limit its support to areas where difficulty is faced on an individual basis. 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

Chart 8 : Industrial Standardization and Quality Control Promotion and their Contribution to Industrial Development



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 to disseminate quality awareness and quality control practice according to conditions of these enterprises.

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

At present, there is a marked difference in the technology adopted and quality levels 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 accounted for by the fact that the latter imports raw materials and parts which are also available from the former. Clearly, the improvement of 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 in educating managers and employees in understanding 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 of 60-70% of those in ISO 9000 series, and designed to serve as the first step to facilitate the upgrading to higher levels.

This kind of intermediate system, however, is not suitable for those enterprises who actively export their products, since application of such system only tends to result adversely as they are not capable of adhering to the ISO 9000 series quality system. In Indonesia where the domestic market is large and many small enterprises relying on domestic demand, the intermediate system is considered to be very effective.

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

Following actions are needed:

1) Design of quality system suitable for small-and-medium-sized enterprises
2) Establishment of an organization for the promotion of the above quality system
   1. Management and promotion of the certification system, and advertisement of